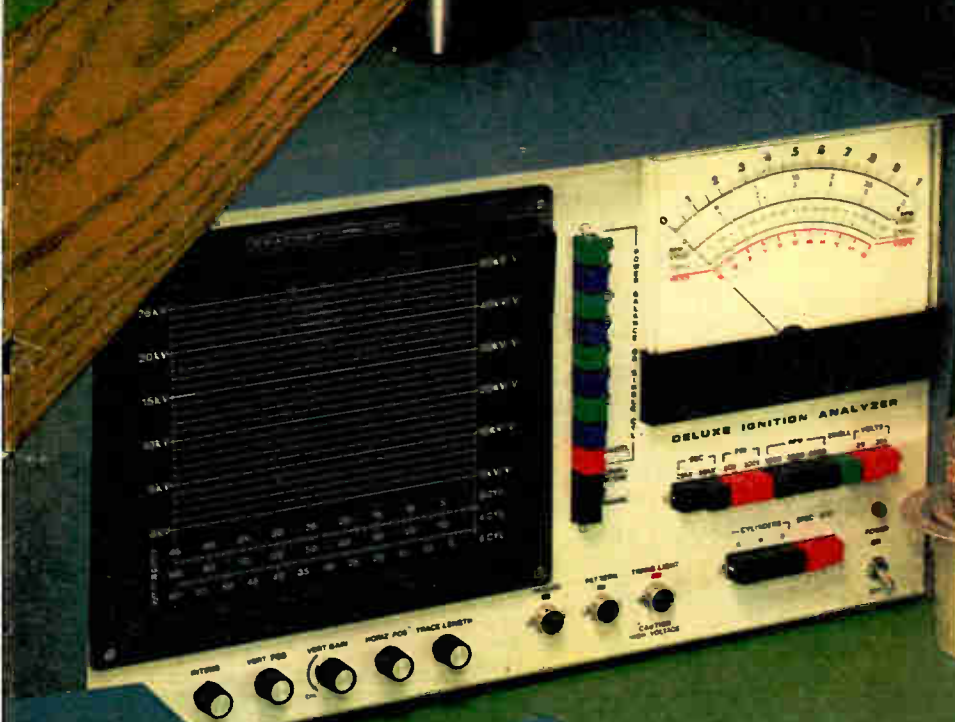


Heathkit®

SPRING-1978

NEW, EXCITING KITS!

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- ★ IGNITION ANALYZER, pg. 40
- ★ BI-DIRECTIONAL WATTMETER
pg. 70
- ★ DELUXE COINTRACKING
METAL LOCATOR, pg. 2, 47



PLUS

nearly 400 fun-to-build, money-saving kits and assembled products

- POWERFUL INTEGRATED PERSONAL COMPUTER SYSTEMS
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- QUALITY TEST INSTRUMENTS
- AMATEUR RADIO GEAR
- MARINE, AUTO AND R/C KITS

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HEATHKIT ELECTRONIC CENTER CATALOG 820R

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New The Heath "Cointrack"

Our Finest Metal Locator

Build the GD-1190 and enjoy the thrill and excitement of locating small coins and other valuables!

Only
\$159.95
Kit



- Search Coil Optimized for "Coin-Shooting"
- Adjustable Discrimination

The GD-1190 is the finest Metal Locator Heath has ever produced! Designed with the "coin-shooter" in mind, it features a search coil optimized for coin locating, and adjustable discrimination so incredibly good you'll be finding "treasure" in areas where high "junk" content makes operation with other locators all but impossible! Push-button tuning maintains maximum sensitivity — effortlessly. And for shallow water searching the 1190's waterproof head won't leave you out of the action. Weight is minimal and to cut fatigue even more, an adjustable shaft is provided for maximum comfort. The 1190 collapses for easy storage and transportation. And with its optional GDA-1190-1 nickel-cadmium battery pack installed you can recharge the 1190 at home, or in the field from the cigarette lighter of your car! Operates on six AA cells (not included). An outstanding value.

Kit GD-1190, Shpg. wt. 5 lbs. **159.95**

GDA-1190-1, Nickel-Cadmium Battery Pack
Shpg. wt. 2 lbs. ... **18.95**

GDA-1190-2, Headphones
Shpg. wt. 2 lbs. **11.95**

GDA-1190-3, Carrying Case
Shpg. wt. 2 lbs. **11.95**

GD-1190 SPECIFICATIONS: Sensitivity: 4" to 6" depth depending on coin size, amount of discrimination, and soil condition. Method of Detection: Off resonance type. External Controls: Volume, Discrimination, Tuning, 4-position mode switch. Output: Meter, Speaker, Phone Jack. Dimensions: Search Coil: 6" diameter. Overall Length: Shaft extended 45½", Shaft collapsed 22½". Receiver Case: 10" L x 4¼" W x 3¼" H. Power Requirements: Six-AA Dry cells or Alkaline, or rechargeable nickel-cadmium battery pack (GDA-1190-1). Weight: 3.4 lbs.

HEATHKIT ELECTRONIC CENTERS ARE IN MAJOR MARKET AREAS COAST-TO-COAST



Visit your Heathkit Electronic Center (Units of Schlumberger Products Corporation) and see our Complete Product Line.

Parts and service available. (Retail prices on some products may be slightly higher.)

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Los Angeles, 90007
2309 S. Flower St. 213-749-0261
Pomona, 91767
1555 Orange Grove Ave. N. 714-623-3543
Redwood City, 94063
2001 Middlefield Rd. 415-365-8155
Sacramento, 95825
1860 Fulton Ave. 916-486-1575
San Diego (La Mesa), 92041
8363 Center Dr. 714-461-0110
San Jose (Campbell), 95008
2350 S. Bascom Ave. 408-377-8920
Woodland Hills, 91364
22504 Ventura Blvd. 213-883-0531

COLORADO — Denver, 80212
5940 W. 38th Ave. 303-422-3408

CONNECTICUT — Hartford (Avon), 06001
395 W. Main St. (Rte. 44) 203-678-0323

**Heath/Dana
CS-1048
Electronic
Speed Control**



**Greatly Reduces Driver
Fatigue to make your Long
Distance Driving
a Pleasure**

\$79⁹⁵

- Automatically maintains speed for those long drives
- Mounts right on turn-signal arm for easy, convenient operation

Long distance drivers and "freeway cruisers" will really appreciate the CS-1048. Simply accelerate to the desired cruise speed, press a button, and the CS-1048 electronically takes over and maintains your speed. A "memory" remembers your cruise speed and returns your vehicle, at the push of a button, to that speed after you've used your brakes to slow down. Cuts fatigue to make driving safer and more pleasurable. Installs easily on most American and foreign cars, even those with manual transmissions! See page 45 for a complete description.

**Accutrac[®]
4000**

\$389⁹⁵



**In Money
Saving Kit Form**

- Includes wireless remote-control, base and cartridge
- No soldering — circuit boards and wires with connectors for easy 2-3 hour assembly

The Accutrac gives you total "computerized" control over how you play your records, and you can operate it from its own front panel controls, or from your easy chair with the wireless remote control included! Has superior turntable features too: precision direct-drive; die-cast, dynamically-balanced platter; tubular "S" shaped tonearm with electronically controlled cue, pause and muting, plus anti-skate. The built-in cartridge tracks at ¼ to 1½ grams, and provides a frequency response of 10 Hz to 24,000 Hz. Overall size, 18½" W x 17¾" D x 6" H. Includes base, dust cover, wireless remote transmitter and receiver, built-in high performance cartridge.

Kit AL-1700, Shpg. wt. 27 lbs.389.95



AL-1700 SPECIFICATIONS: Turntable Speeds: 33½ and 45-rpm, electronic speed change. Variable Pitch Controls: 5% Range, individual control for each speed. Build-up Time: Within 2 seconds to full speed. Wow and Flutter: less than 0.03 WRMS (DIN 45507). Rumble: Better than -70 dB (DIN 45539B), better than -50 dB (DIN 45539A). Cartridge Type: low-mass induced magnet. Output: 3.5 mV/5.5 cm/sec. Channel Separation: 28 dB. Stylus Tip: 0.0003x0.0007" elliptical diamond. Power Requirements: 120 VAC, 50/60 Hz.

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E. Detroit, 48021
18149 E. Eight Mile Rd. 313-772-0416

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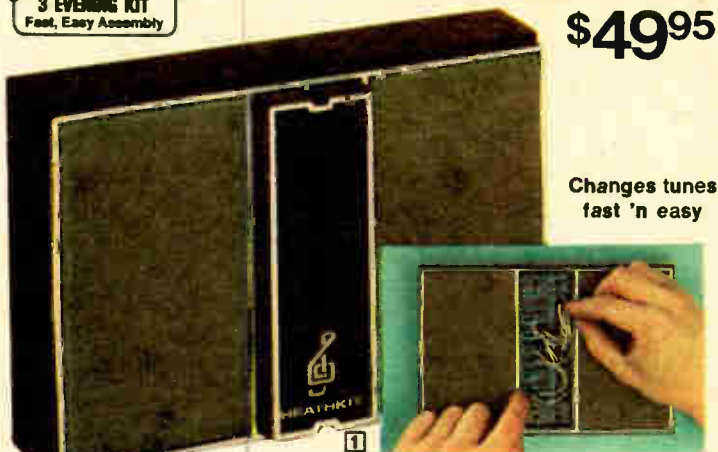
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Norfolk (Virginia Beach, 23455)
1055 Independence Blvd.
804-460-0997

WASHINGTON — Seattle, 98121
2221 Third Ave. 206-682-2172

WISCONSIN — Milwaukee, 53216
5215 W. Fond du Lac 414-873-8250

3 EVENING KIT
Fast, Easy Assembly



Changes tunes
fast 'n easy

\$49⁹⁵ 1 Unique Programmable Doorbell

A FUN to build and use kit that will brighten your home all year 'round! A one-octave C through C "keyboard" lets you program any tune up to 16 notes — celebrate the season, a birthday, an anniversary, a special party — whatever you like. Change notes by simply rearranging the leads. And installation is easy too — just wire between existing bell transformer and TD-1089. The TD-1089 is loud enough to be heard throughout most homes, but you can add extra speakers to spread the sound throughout the house. Easy assembly too, ideal for first-time builders.

Kit TD-1089, Shpg. wt. 3 lbs. **49.95**

TD-1089 SPECIFICATIONS: Power Requirement: 16 volts AC, 50/60 Hz, from standard doorbell transformer (not supplied) with 10 VA Rating. Tone Characteristics: Decaying, mellow. Speaker Size: 3" x 5" oval — 16 Ohm. Extra speakers can be added for a total of not less than 16 Ohms. Programming Matrix: 13 notes x 16 beats — same note up to 9 beats. Dimensions: 5 3/4" H x 8 3/8" W x 2 3/4" D. Net Weight: Approx. 1 1/4 lbs. Power Drain: Idle, 6 watts, Maximum 12 watts.

1 EVENING KIT
Fast, Easy Assembly



2 Freezer Alarm could save you money

It signals if the freezer door is left open; and it signals if freezer temperature reaches 20°F even though the door is closed. The dual-alarm system uses both an audible "beep" and a flashing light. The alarm shuts off automatically when freezer temperature returns to about 10°F. Sensors install easily in any freezer; alarm box mounts anywhere with 20-ft. cable supplied.

Kit GD-1183, Shpg. wt. 2 lbs. **15.95**

3 Mount-anywhere "touch-control" Light Switch with half-brightness position

Gives you on-off switch control wherever you need it, without the bother and expense of extra outlets, wall boxes and rewiring. Simply plug your lamp (up to 150 watts incandescent only) into the control unit, plug the unit into an AC outlet. The remote touch-plate mounts anywhere and connects to the unit by an easily concealed wire. Then simply touch the plate briefly for half-bright, longer for full "on", and touch again for "off". Control unit 1 1/4" x 2 3/8" x 3 1/2". For 105-135 VAC, 60 Hz.

Kit GD-1187, Shpg. wt. 1 lb. **14.95**

4 Heathkit Telephone Amplifiers can make your telephone system more useful

Low As
\$54⁹⁵

- Talk and listen to calls "hands-free"
- Great for conference and family calls
- Includes connectors for easy installation

In performance, features and value, these two quality telephone amplifiers equal the finest you can rent or buy. To answer the phone, simply press the power button; to hang up press it again. Voice-activated circuitry instantly and silently switches the amplifier from talk to listen. A slide control adjusts the volume; a listen button lets everyone in the room hear both sides of a conversation, or lets you monitor the line while talking privately. The built-in microphone lets you talk from up to 10 feet away. To return the phone to normal operation, just turn the amplifier off. The GD-1112 requires an external phone to place calls, the GD-1162's built-in dial and ringer makes it a completely self-contained telephone. Both units operate on standard 9-volt battery (not supplied), or optional GRA-43-1 AC converter, order below. For easy installation, the GD-1112 includes a 1/4" diameter phone plug and a 1 3/4" square four-pin telephone plug; the GD-1162 has a 1 3/4" square four-pin telephone plug and, for business phones, a 15-pin dataphone connector. Both come with 6', 4-conductor cable. Each unit, 2 1/2" H x 8 1/2" W x 5 3/4" D.

Kit GD-1112, Amplifier, Shpg. wt. 3 lbs. **54.95**

Kit GD-1162, Amplifier with Dialer, Shpg. wt. 4 lbs. **74.95**

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

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



Heathkit electronic digital "Super-Clock"

An electronic digital floor clock with full 3¼" high numerals
in a modern, functional etagere cabinet

\$169⁹⁵

- Automatic dimming circuit adjusts to room light for a charming and pleasant glow
- Hour and minute read-out can be seen from anywhere in the room
- Optional electronic Westminster Chimes build in easy for an authentic, rich "Big Ben" sound

Add elegance with a "space-age" touch anywhere in your home! The GC-1195 "super-clock" is housed in a stylish cabinet with four smoked glass shelves for plants, books or knick-knacks — and the cabinet is finished in handsome simulated walnut-veneer laminate with anodized aluminum corner pieces.

The 3¼" high clock digits glow brightly enough to be read even in daylight, and an automatic dimming feature adjusts them to diminishing room light for a charming, subtle display in dim or darkened rooms.

The clock displays hours and minutes, with the center colon pulsing each second. A special power failure indicator circuit pulses the display brightness to show that power has been interrupted and clock must be reset. Easy time setting is accomplished by readily accessible, easy-to-use fast and slow time advance switches located on the bottom of the clock chassis. For even more charm and "Old World" distinction, add our electronic clock chimes accessory (described below).

Kit GC-1195, Shpg. wt. 72 lbs. Mailable **169.95**

GC-1195 SPECIFICATIONS: Display: 3¼" diffused incandescent readout. Format: 3½-digit (12-hour) time readout. Power requirement: 108-132 VAC, 50/60 Hz, 30 watts. 216-264 VAC, 50/60 Hz, 30 watts. Dimensions: 14" W x 9½" D x 60½" H. Net Weight: 48½ lbs.



Westminster Chimes Accessory

\$79⁹⁵ Authentic "Big Ben" chimes sound

Builds into the GC-1195 or GC-1197 to provide rich, electronically synthesized "Big Ben" chimes: 4 notes on the ¼-hour, 8 notes on the ½-hour; 12 notes on the ¾ hour and the full 16-note passage and hour announcement on the hour. And you can even turn on a reassuring electronic "tick-tock". Has volume and pitch adjustment, sound-decay control, "tick-tock" volume control, built-in speaker.

Kit GCA-1195-1, Shpg. wt. 3 lbs. **79.95**



Digital Electronic Shelf "Super Clock"

\$99⁹⁵ Has the same great features as our Digital Floor Clock in a handsome Shelf Clock Case

Uses the same electronics and display as the GC-1195 floor clock, but is housed in a good-looking walnut-veneer cabinet suitable for shelf, table or desk-top use. Accepts optional GCA-1195-1 electronic chimes. Specifications same as GC-1195 above, except dimensions are 6½" H x 12½" W x 6¼" D.

Kit GC-1197, Shpg. wt. 18 lbs. **99.95**



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

\$99⁹⁵

Stay "on top" of conditions with this five-function weather station

The Heathkit ID-1290 Weather Station monitors indoor and outdoor temperatures, barometric pressure, wind speed and direction — all with electronic accuracy and reliability. It's ideal for home or office, airport pilot lounges, anywhere accurate and instant weather information is needed.

The barometer lets you observe changes as small as 0.02 inches of mercury to indicate changing weather conditions. 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 for precision readings.

The ID-1290's walnut-grained plastic cabinet can be hung vertically or horizontally; or used as a handsome and distinctive desk set with the stands included. The remote transmitter assembly (windcups, weather vane and outdoor temperature sensor) clamps onto any 1" to 1½" diameter TV antenna mast and is connected to the plaque

with optional 8-wire cable (below). Easy and enjoyable kit assembly makes the ID-1290 a great project for first-time builders too. Includes comprehensive weather book.

Kit ID-1290, Shpg. wt. 9 lbs. 99.95

ID-1290 SPECIFICATIONS: Wind Speed: 0-30 mph, ±2 mph; 0-90 mph, ±5 mph. Direction: 8-point readout over 360°. Temperature: 0° to +120°F, ±2°F (typ. IN-DOOR); -40° to +120°F, ±2°F (typ. OUTDOOR). Barometric Pressure: 29-31 inches of mercury within .05 inches, accurate up to altitudes of 10,000 ft. Operating Temperature: Receiver, -32° to 100°F; Transmitter, -40° to +120°F. Power requirement: 110-130 VAC, 50/60 Hz, 3.5 watts. Dimensions: Wall mount, 20½" W x 7" H x 2" D; Desk 20½" W x 7" H x 6¾" D. Net Weight: 7 lbs.

8-Wire cable for remote transmitters

IDA-1290-1, 50 ft. cable, 2 lbs. 7.95

IDA-1290-2, 100 ft. cable, 4 lbs. 13.95

IDA-1290-3, 150 ft. cable, 6 lbs. 18.95

Digital Wind Speed and Direction Indicator

Outstanding accuracy and easy-to-read digital display make this kit a "must" for pilots, boaters — anyone whose activities are affected by the wind. Pick the two readout modes you want from the three available: miles or kilometers per hour, or knots. Switches select mode and front-panel lights show which is in use. Incandescent bulbs mark the 8 principal compass points, providing 16-point resolution. Uses same transmitter assembly and cable as above.

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

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.

Digital Indoor/Outdoor Thermometer

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

Kit ID-1390A, Shpg. wt. 4 lbs. 74.95

ID-1390A 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. Display: 2½-digit planar gas discharge with + and - sign. Power Requirement: 110-130 VAC, 60 Hz, 4 to 6 watts approx. Dimensions: 2½" H x 7" W x 5" D.



Heath Keeps You On Time!



1 EVENING KIT
Fast, Easy Assembly

Start your kit building career with this budget-priced digital alarm clock. The GC-1107 makes a great starter kit, is super-reliable, and you'll really have a great time putting it together! The clock features a pleasant blue-green display that automatically adjusts to ambient light conditions and is easily wired to give you the time in either a 12- or 24-hour format. Also, in addition to hours and minutes, the GC-1107 indicates AM and PM, tells you when the alarm is set, and alerts you if the clock has been shut off during power interruptions.

The alarm on/off switch is easily accessible at the rear of the 1107's cabinet. And if you're the type who hates to face the sunrise, the

Look no further! Our budget-priced super-accurate digital clock is an ideal choice for your first kit!

\$29⁹⁵

- Display dims automatically
- "Snooze" feature lets you "catnap"
- Has a power failure indicator

"snooze" feature, also accessible on the rear panel, will allow you to take 9-minute catnaps over the period of an hour if you choose!

A Slow switch and Fast switch let you advance the time for easy, accurate setting. And to avoid accidental bumping, or the curiosity of children's little fingers, both switches plus the Time-Alarm switch have been recessed into the base of the GC-1107's mounting cabinet.

You'll find assembly of the GC-1107 to be very easy. A single circuit board forms the basis of the kit and because most of the clocks functions are accomplished by two integrated circuit chips you'll have very few parts to mount.

The GC-1107 has a built in speaker so you'll easily hear its alarm, is styled in a handsome simulated wood-grain finish that fits any decor, and at this low price, is really a bargain. 2 1/4" H x 7" W x 4 3/4" D.

Kit GC-1107, Shpg. wt. 3 lbs. **29.95**

Unique, digital programmable stopwatch



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

Seven functions ...
elapsed time, sequential, total activity, split time, start/stop, upcount and downcount

\$89⁹⁵

For features, versatility and accuracy, we don't think you can find a better stopwatch than our GB-1201! Reads hours, minutes, tenths and hundredths of seconds in a

bright red digital readout that's easy to see in almost any light. Includes pre-wired AC adapter/charger, rechargeable batteries, sun-screen, and lanyard. Has alarm output, external trigger. Special modification instruction lets you convert the GB-1201 to read hundredths of minutes — perfect for car rallies and time studies.

Kit GB-1201, Shpg. wt. 2 lbs. **89.95**
ICA-2009-1, Felt-lined Naugahyde® carrying case, wt. 1 lb. **4.95**

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

Turn your music into a dazzling light show



A kaleidoscope of color for your parties and get-togethers!

\$89⁹⁵



Music becomes bursts of colored light

The TD-1006 Color Organ adds exciting sights to your sound system. Just connect the TD-1006 to the speaker leads of any sound source (except AM radio). Without affecting the sound, active filters separate the audio signal into four frequency bands, each with 35 brilliantly colored lights — red for bass, blue for low-midrange, green for upper-midrange and amber for treble (140 lights total). The lights pulsate in time to the music creating spokes of color that seem to swirl. Input is 1 volt RMS min. to 22 volts RMS max. Line isolation provides source protection. 22 3/4" W x 22 3/4" H x 4 1/2" D, can even be wall mounted. For 120/240 VAC.

Kit TD-1006, Shpg. wt. 34 lbs. **89.95**

Our fully computerized digital color TV



Simulated TV Picture

FREE GD-1999 TV Game
Worth \$24.95 FREE with
your GR-2001. See page 12.

Heathkit GR-2001 — The most advanced color TV available anywhere — at any price!

The GR-2001 sets a new standard in color TV convenience and versatility. Program it through its front panel computer for an entire evening of TV viewing, then just sit back and relax. The GR-2001 automatically and accurately changes channels for you. You can even program it to automatically rotate your outdoor antenna system for the best reception! And thanks to the GR-2001's advanced electronics and quality black matrix picture tube, you have one of the finest performing sets too. Picture quality is consistently excellent, year after year.

The GR-2001 includes all the world-famous features of Heath color TV — custom installation option, built-in self-service features like a dot generator, centering and convergence circuits and a test meter to help you really save money on service during the life of the set. Like all Heathkit products, the comprehensive manuals lead you from unpacking to plug-in in easy-to-follow steps. Modular circuit boards and pre-built wiring harnesses minimize point-to-point wiring. Build it and you'll agree — the GR-2001 is one of the finest color TV's available anywhere. See full details on next page.

Heathkit GR-2001 25" (diagonal) Color TV Kit

Even if you order it without the options below, it's still one of the finest sets you can buy anywhere! Order your choice of cabinets from page 11. Includes chassis, picture tube, one speaker.

Kit GR-2001, 146 lbs., Motor Freight 729.95

Second Speaker for GR-2001. Fits in space on GR-2001 cabinets where indicated. With cables. GRA-2000-7, Shpg. wt. 2 lbs. 9.95

8-Channel Accessory for your GR-2001. Adds 8 more channels to the GR-2001's random-access tuning system for a total of 24 channels.

Kit GRA-2001-9, Shpg. wt. 1 lb. 10.95

GD-1185 TV Programmer. Automatically changes channels at any time you select — up to 16 changes in any 12 or 24-hour period. Front-panel keyboard and on-screen readout make it easy to enter any time or channel you want. Requires GRA-601 Clock below for operation.

Kit GD-1185, Shpg. wt. 8 lbs. 159.95

Easy-to-build On-Screen Digital Clock. Displays the time in hours, minutes and, if desired, seconds in 12/24 hour format below the channel number. Easy-to-read white digits.

Kit GRA-601, Shpg. wt. 1 lb. 35.95

Automatic Antenna Rotor Control. Rotates your antenna to preselected directions for the best reception on each channel. Accepts up to 3 channels for each of 8 directions. Operates with or without GD-1185 above. For use only with existing Cornell Dubilier AR-40 rotor system (Heath

GDP-1176 or GDP-258) or optional motor below.
Kit GD-1184, Shpg. wt. 6 lbs. 69.95
GDA-1184-1, Rotor Motor. Requires 5-wire cable (not supplied). 11 lbs. 39.95

GR-2001 with Programmer and Clock

- GR-2001 Deluxe 25" Color TV **SAVE \$54.90**
 - GD-1185 Programmer **If purchased separately, 944.85**
 - GRA-601 On-Screen TV Clock **944.85**
- GRS-2001, 155 lbs. Motor Freight 899.95
Order optional cabinet, page 11

GR-2001 with Programmer, Clock and Rotor Control

- GR-2001 Deluxe 25" Color TV **SAVE \$64.85**
 - GD-1185 Programmer **If purchased separately, 1014.80**
 - GRA-601 On-Screen TV Clock **1014.80**
 - GD-1184 Automatic Antenna Rotor Control (less motor)
- GRS-2002, 161 lbs. Motor Freight 949.95
Order optional cabinet, page 11

Convenient Wireless Remote Control

Controls on-off, volume, up/down channel scan and tint, turns programmer on or off. Operates up to 20 ft. away from set.
Kit GRA-2001-6, Shpg. wt. 4 lbs. 99.95





The GR-2001 is an enjoyable kit to build—and its built-in servicing features mean you can keep getting top performance from your set for years. The fully illustrated manuals take you step by step from unpacking to plug-in. And the thrill of building a kit of this complexity gives it a value far greater than its price!

Our custom-installation option lets you build the GR-2001 into a wall, mount it in your own custom cabinet, or order one of our beautifully constructed cabinets on page 11. Any way you do it, you'll find the GR-2001 to be one of the best television bargains ever—it returns your investment with year after year of beautiful, trouble-free performance.

1 Programmer Keyboard. These eight buttons allow you instant access to the optional Programmer's static NMOS random access memory (RAM). Just enter the time and channel number you want — up to 16 changes in either of two switch-selected positions. Then the optional Programmer's memory takes over. While you sit back and relax, the GD-1185 Programmer automatically and accurately changes to the right channel at the right time.

2 Convenient Remote Control. The optional remote control lets you adjust volume, turn the set on or off, adjust tint, scan up or down through the pre-programmed channels — even turn the optional Programmer on or off. The advanced remote control receiver builds right into the chassis on the GR-2001.

3 Random-Access Tuning. The 3 x 4 keyboard lets you instantly choose any of 16 preselected stations. Switch from VHF to UHF, up or down, in any sequence, and be tuned in instantly, without switching through in-between channels. Up and down buttons on the keyboard also let you scan all the preselected stations. And the optional GRA-2001-9 lets you add up to 8 additional channels — up to 24 in all!

4 Automatic Antenna Rotor Control: A Heathkit exclusive! With the optional GD-1184 antenna rotator control, you can program the GR-2001 to automatically rotate your outdoor antenna system as it changes from one channel to another, for optimum reception on every channel. It's perfect for areas where stations are widely separated.

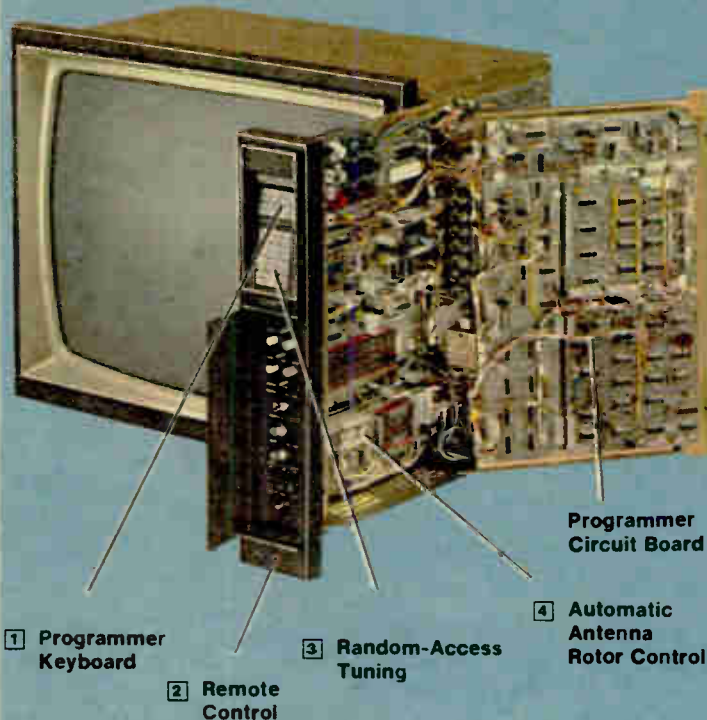
5 Separate Audio Circuitry on the IF board. The GR-2001 gives you sound that's truly superb. The wide-range speaker (included) offers excellent fidelity too. And an audio output jack lets you listen to the TV sound through your stereo system.

6 Phase-Locked-Loop Horizontal and Vertical Hold Circuits. The GR-2001 "locks in" on any channel with a picture that's rock-steady and stable. There are no ordinary vertical and horizontal hold controls because you never need them — so you get consistently excellent pictures year after year.

7 Black-Matrix Picture Tube. The GR-2001's 25" (diagonal), ultra-rectangular picture tube provides one of the brightest, sharpest pictures in the world. The tube is fully shielded to maintain excellent color purity.

GR-2001 SPECIFICATIONS: Deflection: Magnetic, 90°. Focus: Electrostatic. Convergence: Magnetic. Antenna Input Impedance: VHF: 300Ω balanced or 75Ω unbalanced. UHF: 300Ω balanced. Picture IF Carrier: 45.75 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: Frequency Response: ±1 dB, 50 Hz to 15 kHz. Output voltage: Greater than 1.0 V RMS. Audio Output: 4Ω or 8Ω, 2 watts. Power Requirement: 110 to 130 volts AC, 60 Hz, 200 watts. Overall Dimensions: 20½" H x 29½" W x 21¾" D. Net Weight: 112 lbs.

It's features like these that make the GR-2001 one of the finest-performing color TV's around

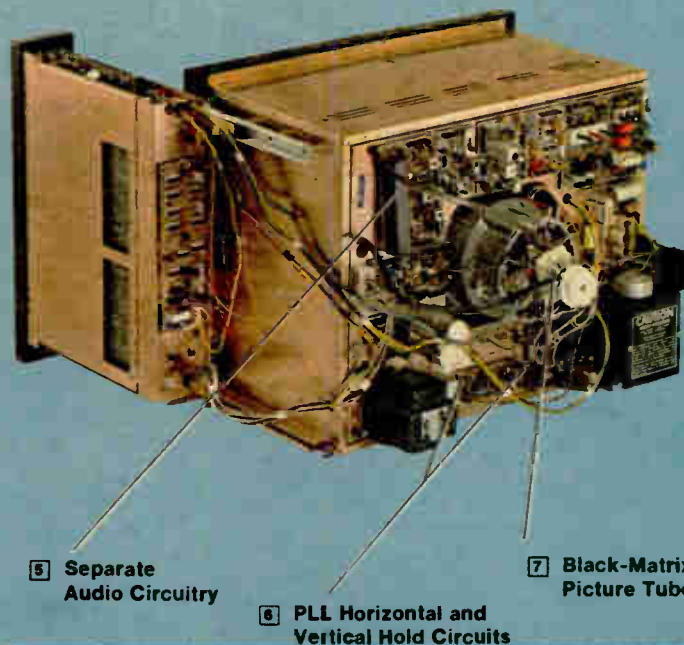


1 Programmer Keyboard

2 Remote Control

3 Random-Access Tuning

4 Automatic Antenna Rotor Control



5 Separate Audio Circuitry

6 PLL Horizontal and Vertical Hold Circuits

7 Black-Matrix Picture Tube

SPECIAL WARRANTY SERVICE PLAN FOR SOLID-STATE TV MODULES!

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, the modules will be inspected and serviced at a charge of \$5.00 per module. After the 90-day warranty has expired, the module service fee is \$5.00 per module plus parts. All picture tubes warranted for two full years.

Only Heathkit TV offers custom mounting options

Heathkit color TV's are sold without cabinets so you can do your own custom installation. Build into a wall, design your own console, etc.



FREE! GD-1999 TV Game worth \$24.95 Free with your GR-2000. See page 12.

Simulated TV Pictures



GR-2000 SPECIFICATIONS: Picture Tube: 25" (diagonal). Viewing Area: 315 sq. in. Deflection: Magnetic, 90 degrees. Focus: Electrostatic. Convergence: Magnetic. Antenna Input Impedance: VHF: 300 Ω balanced or 75 Ω unbalanced; UHF: 300 Ω balanced. Tuning Range: TV channels 2 through 83. (Preset any 16). Picture IF Carrier: 45.75 MHz. Sound IF Carrier: 41.25 MHz. Color IF Subcarrier: 42.17 MHz. Sound IF Frequency: 4.5 MHz. Video IF Bandwidth: 4.08 MHz, at 6 dB down. Hi-Fi Output: Output Impedance: 2200 Ω . Frequency Response: ± 1 dB, 50 Hz to 15 kHz. Harmonic Distortion: Less than 1% at 1 kHz. Output Voltage: greater than 1.0V rms. Audio Output: Output Impedance: 4 Ω or 8 Ω . Output Power: 2 watts. Dimensions: 20 $\frac{1}{2}$ " H x 29 $\frac{1}{2}$ " W x 21 $\frac{3}{4}$ " D. Power Requirements: 110 to 130 volts AC, 60 Hz, 200 watts. Net Weight: 112 lbs.

Heathkit GR-2000 25" Diagonal Color TV offers outstanding performance and value

\$619⁹⁵

This is the set that brought color TV into the digital age

Simply touch a button on the front panel (or the optional remote control) and the sophisticated programmable digital counter sweeps up or down through any 16 pre-selected stations. And because the tuning is electronic, you eliminate noisy, unreliable turret tuners.

Even the channel numbers are displayed electronically, right on the screen. They can be adjusted to remain on the screen for up to 1 $\frac{1}{2}$ minutes or permanently if you choose. And you can recall them by changing the channel or by tapping the Volume on the remote control. Critics and owners have praised the GR-2000 for a bright, accurate color picture that seems to make programs "come alive." The picture tube provides outstanding brightness and sharpness thanks to its negative matrix and fully-illuminated phosphor dots.

The GR-2000's circuitry is some of the most sophisticated in the industry. It was the first TV to utilize a fixed IF filter which virtually eliminates adjacent-channel interference — especially important in urban areas crowded with stations. This advanced filter provides ideally-shaped bandpass and — unlike the "traps" used in most sets — it never requires

alignment. And the GR-2000 uses other advanced circuitry to assure superior performance — improved signal circuits for greater clarity and definition, DC-controlled contrast for reduced interference, an integrated circuit color amplifier for more precise, realistic tints, and an IC automatic gain control for excellent sensitivity, selectivity and noise rejection. You get a consistently excellent picture year after year.

The completely illustrated assembly manual makes it easy to feel the pride of "building it yourself." Almost all the circuitry mounts on plug-in printed circuit boards and factory-fabricated wiring harnesses minimize point-to-point wiring. You'll find that building a GR-2000 is enjoyable — and you'll be even prouder of its exceptional performance.

Because you build the set, you can service it. All the circuitry you need is built in — a digital-design dot generator, circuits for purity and convergence adjustments, vertical and horizontal centering circuits and a test meter. Much of the circuitry is accessible by pulling out the service drawer. You can keep your set in top condition with less inconvenience and expense. Shpg. wt. 147 lbs.

Kit GR-2000, Motor Freight 619.95
Second Speaker for GR-2000. Fits in space

on GR-2000 cabinets (where indicated). Includes all cables.

GRA-2000-7, Shpg. wt. 2 lbs. 9.95



Digital Clock

Shows time in hours, minutes and seconds in white numerals.

Kit GRA-601, Shpg. wt. 1 lb. 35.95

Ultrasonic Remote Control

Armchair control of on/off, color controls, digital readout and channels. Includes receiver for in-chassis mounting, hand-held transmitter. Operates up to 20 ft. from set.



Kit GRA-2000-6, Shpg. wt. 4 lbs. 99.95

SPECIAL WARRANTY SERVICE PLAN FOR SOLID-STATE TV MODULES!

If a component proves defective during the 90-day period, the modules will be serviced with no charge for parts or labor. If the problem is due to a construction error, the modules will be inspected and serviced at a charge of \$5.00 per module. After the 90 day warranty has expired, the module service fee is \$5.00 per module plus parts. All picture tubes warranted for two full years.

GR-2000, 2001 Color TV Cabinets



Simulated TV Pictures

Contemporary cabinet. Constructed of solids and veneers; oiled walnut finish. 28 $\frac{3}{8}$ " H x 46 $\frac{1}{8}$ " W x 20 $\frac{3}{8}$ " D. (24 $\frac{1}{8}$ " D including cup).

GRA-602-25, Shpg. wt. 78 lbs. Motor Freight 194.95

Compact contemporary cabinet. Beautifully finished in luxurious oiled walnut finish. Fully assembled with cutout for one speaker. 34 $\frac{3}{8}$ " H x 33 $\frac{3}{8}$ " W x 20 $\frac{3}{8}$ " D. (24 $\frac{1}{8}$ " D including cup).

GRA-608-25, Shpg. wt. 76 lbs. Motor Freight 159.95



Mediterranean cabinet with doors. Accepts 2 speakers. Dark oak finish. 29 $\frac{3}{8}$ " H x 48 $\frac{1}{8}$ " W x 23" D. (28 $\frac{3}{8}$ " including cup).

GRA-605-25, Shpg. wt. 125 lbs. Motor Freight 289.95



Early American cabinet. Twin speaker capability. Distressed maple finished. 31 $\frac{3}{8}$ " H x 47 $\frac{1}{8}$ " W x 20 $\frac{3}{8}$ " D. (24 $\frac{1}{8}$ " D including cup).

GRA-603-25, Shpg. wt. 83 lbs. Motor Freight 214.95



Mediterranean cabinet. Accepts 2 speakers. Dark oak finish. Hardware features Antique Gold finish. 30 $\frac{3}{8}$ " H x 49 $\frac{1}{8}$ " W x 20 $\frac{3}{8}$ " D. (24 $\frac{1}{8}$ " D. incl. cup).

GRA-604-25, Shpg. wt. 95 lbs. Motor Freight 209.95



For GR-900 Color TV Only. 30 $\frac{3}{8}$ " H x 48 $\frac{3}{8}$ " W x 20 $\frac{3}{8}$ " D. (23 $\frac{1}{2}$ " D with cup). Allow 10 weeks for delivery.

GRA-404-25, 91 lbs. Motor Freight 199.95

Antennas and accessories designed for better reception

Antennas for Crisp Reception



"Super Antenna". VHF-UHF-FM. 60 elements. F/B signal rejection: VHF Lo, 21 dB; hi, 22 dB; UHF, 22 dB. 171" boom. 109" turning radius. Includes removable FM blocking elements.

GD-1461, 300 ohms, less mast and cable.
Shpg. wt. 17 lbs. Motor Freight 84.95
75-ohm 89.95*

Deluxe "Fringe" Antenna. Not shown. Excellent VHF/UHF reception in "weak signal" or fringe areas. 131" boom, 80" turning radius.

GD-1441, 300 ohms, less mast and cable.
Shpg. wt. 25 lbs. 39.95
75-ohm 44.95*

*Includes GD-298 and GD-1054 to convert to 75 ohms. Reg. \$8.90—Only \$5 with antenna.



Cornell-Dubilier Rotor System

Consists of control box and rugged outdoor rotor for dramatically improved TV and FM reception. The perfect match for your GR-2001 Television and optional GD-1184 Rotor control. Let your GD-1184 automatically control the GDP-1176 for optimum viewing enjoyment. Heavy-duty 1 rpm rotor has positive automatic stop, instant reverse. Supports antennas to 150 lbs. Lower mast clamp accepts $\frac{7}{8}$ " to 2" dia. masts. Has solid-state control box for year after year reliability, 360° rotor control, plugs into AC outlet. Installation is quick and easy. Requires 5-wire cable (not supplied).

GDP-1176, Shpg. wt. 14 lbs. 59.95

CB Trap Filter



Cuts out unwanted CB interference to give you improved picture quality. Connects directly to TV antenna terminals on your set. 300 ohm impedance. No assembly is required.

GD-1239, Shpg. wt. 1 lb. 6.95



75/300 Ohm Transformer-Splicer

Matches one 75 ohm coax cable to separate 300 ohm VHF and UHF leads. Has extremely low loss and is perfect for use with home cable TV installations. 82 channel. Has no-strip pre-attached leads for extra convenience.

GD-298, Shpg. wt. 1 lb. 4.95



Matching Transformer

Converts 300 ohms to 75 ohms for coax. Use with your GD-1461 or GD-1441 to convert them to 75 ohm coax down-lead. Very low loss. 82 channel. The ideal starting point for conversion to your own in-home cable-TV system.

GD-1054, Shpg. wt. 1 lb. 3.95

Coax Cable

100 feet of high quality low loss RG-59U coax cable. Use in conjunction with GD-298 and GD-1054. Comes complete with antenna boot and connectors (installed). Long life, weather resistant. Needs matching transformers at both ends.

GD-328, Shpg. wt. 4 lbs. 10.95

Carry Anywhere Black and White Portable TV

\$179⁹⁵

- 12 VDC or 120 VAC operation
- Exceptional 12" diag picture

At home, the GR-104C plugs into a wall outlet. In your car, camper or boat, it works right from your 12-volt battery system. Outdoors, you can use it with its optional self-contained battery pack as a go-anywhere portable. Any way you use it, you'll get a crisp, clean, clear black-and-white picture of unsurpassed quality. Three video IF amplifiers provide superior gain and a 4-circuit VHF "memory" tuner brings in each VHF station with real precision. Has regulated power supply for drift-free operation, all-channel detent tuning, lighted channel indicators, telescoping antenna for VHF and a loop antenna for UHF. Rugged high-impact case with carrying handle for easy portability. Easy kit assembly with two circuit boards and a wiring harness. The VHF and UHF tuners are factory assembled and aligned. A battery-charging circuit is included with the optional Battery Pack. When the Battery Pack is connected to the TV Set and the line cord is plugged into an AC receptacle, the battery automatically begins to recharge as soon as the set is turned off.



Simulated TV Picture

Kit GR-104C, Shpg. wt. 35 lbs. 179.95

Kit GRA-104-3, Optional Battery Pack, 10 lbs. 64.95

GR-104C SPECIFICATIONS: Picture Size: 74 sq. in. viewing area, 12" picture diagonal. Deflection: Magnetic, 110 degrees, 20 mm neck. Focus: electrostatic. Antenna Input Impedance: 300 ohm balanced. Tuning Range: VHF TV channels 2 through 13 (memory-type fine tuning). UHF TV channels 14 through 83. Picture IF Carrier: 45.75 MHz. Sound IF Carrier: 41.25 MHz. Sound IF: 4.5 MHz. Video Response: To 3.5 MHz. Audio Power Output: 500 mW into 24 ohm load. Power Requirement: 110-130 volts, AC, 48 watts; 12 volts DC at 24 watts. Overall Size: 11 $\frac{1}{2}$ " H x 15 $\frac{3}{4}$ " W x 9 $\frac{1}{8}$ " D.

Home Entertainment from Heath!



GR-500



GR-400
Simulated TV Pictures

Both
with
FREE
GD-1999!
See
below.

GR-2050 21" (Diagonal Measure) Color TV Kit

Has the same outstanding features and specifications as the GR-2000 but with 21" diagonal screen.

Kit GR-2050, with chassis, picture tube, one speaker, Shpg. wt. 122 lbs., Motor Freight **579.95**
GRA-2050-1, Contemporary Cabinet, Shpg. wt. 74 lbs., Motor Freight **144.95**
 Optional Remote Control
Kit GRA-2000-6, Shpg. wt. 4 lbs. **99.95**
 Optional On-Screen Digital Clock
Kit GRA-601, Shpg. wt. 1 lb. **35.95**

GR-2050 SPECIFICATIONS: Same as GR-2000 pg. 10, except Picture Tube: 21" diagonal. Dimensions: 18 $\frac{3}{4}$ " H x 26 $\frac{1}{2}$ " W x 19 $\frac{1}{4}$ " D.

Small Screen TV with Outstanding Features and Performance!

Both feature precision in-line gun color tubes with negative matrix screen for outstanding contrast and brightness. Have on screen channel display, automatic fine tune; and once contrast, brightness, color and tint controls have been set... a touch of the PPC button returns picture to perfection instantly! Also feature four tuner circuits, instant-on, hi-fi output jack, and speaker defeat switch.

Kit GR-500, less cabinet, 19" Diagonal Measure, Shpg. wt. 101 lbs., UPS **539.95**
GRA-500-1, walnut veneer table model cabinet (main illustration), 17 $\frac{1}{4}$ " H x 25 $\frac{1}{2}$ " W x 14" D (17" D including cup), Shpg. wt. 28 lbs., UPS **51.95**
Kit GR-400 (less cabinet), 17" Diagonal Measure, Shpg. wt. 77 lbs., UPS **484.95**

GRA-400-1, walnut-veneer cabinet (16 $\frac{1}{4}$ " H x 24 $\frac{1}{8}$ " W x 12 $\frac{3}{4}$ " D), (15 $\frac{3}{4}$ " D including cup), Shpg. wt. 26 lbs., UPS **44.95**
GRA-403-18, roll-around cart. 22" H x 27" W x 15 $\frac{1}{2}$ " D, Shpg. wt. 17 lbs., UPS **24.95**
GRA-601, Digital Clock Accessory, Shpg. wt. 1 lb. **35.95**

GR-500, -400, SPECIFICATIONS: Deflection: Magnetic, 90 degrees. Focus: Electrostatic. Convergence: Magnetic. Antenna input impedance: VHF: 300 Ω balanced or 75 Ω unbalanced. UHF: 300 Ω balanced. Tuning range: TV channels 2 through 83. Picture IF carrier: 45.75 MHz. Color IF carrier: 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 requirement: 110-130 VAC, 60 Hz, 200 W.



SAVE \$25!

GD-1999 Universal Color TV Game Kit

For hours of fast-paced action connect the GD-1999 to your TV and name your game: Tennis, ice hockey, or handball for two or play one against the machine. The ball is always served off the face of the racquet and after 4 volleys ball speed automatically increases for added realism and excitement. The GD-1999 goes together in about an hour and the game board is fully assembled and tested. The unit is designed for permanent connection to your set and will not interfere with its normal operation. The two game controllers have 10 foot connecting wires so you can operate and reset the games from your favorite easy chair. FCC Type Approved.

Kit GD-1999, Shpg. wt. 3 lbs. (Was 49.95 in Cat. 818) **Now 24.95**

FREE with purchase of any Heathkit color TV! Specify GD-1999 and color TV model no. on order blank.



SPECIAL VALUE
HEATH
ASSEMBLED

Channel F — Video games you'll never tire of

Always a challenge, the exciting Fairchild Channel F is the one video game that doesn't grow obsolete. New challenges await by simply changing one Videocart™ cartridge (order below) for another. FCC Type Approved. Fully Assembled.

Model GD-1240, Unit only. Shpg. wt. 11 lbs. **149.95**

Videocart™ Channel F Game Cartridges

GDA-1240-1, Tic-Tac-Toe, Shooting-Gallery, Doodle, Quadra-Doodle, (1 player)
GDA-1240-2, Desert Fox Tank Battle (2 players), Shooting Gallery (1 player)
GDA-1240-3, Blackjack and Double-Blackjack (1 or 2 players)
GDA-1240-4, Spitfire, an exciting airplane dogfight (1 or 2 players)
GDA-1240-5, Spacewar, battling space-

ships (2 players)
GDA-1240-6, Math Quiz (Add & Subtract)
GDA-1240-7, Math Quiz (Mult. & Div.)
GDA-1240-8, Magic numbers logic games (1 player)
GDA-1240-9, Dragstrip (1 or 2 players)
GDA-1240-10, Maze Games (1/2 players)
GDA-1240-11, Backgammon (2 Players)
GDA-1240-12, Baseball (2 players)
 Each Cartridge, Specify Model No., Shpg. wt. 1 lb. **19.95**

Unique Products For the Home at Special Heath prices!



FREE! Timer and two Tapes with GDS-1230 A \$73.90 Value!



Sony Betamax™ 2-Hour Videocassette Recorder

Never miss a favorite TV program again! Record the shows you like in color or b&w for playback later, record when you're away with the optional timer, even record one show while watching another!

The videocassette recorder you've heard so much about. Now you can add a totally new dimension to your television viewing. Record and view any time you like.

Just set the Betamax and your show is recorded (sound and picture) on the special 1/2" video tape cassette. Play it back with perfect sound and picture resolution whenever you're ready.

The standard cassette will record up to two hours of programming. The cassette may be erased and used over and over again.

The optional Betamax Timer allows you to record at a pre-set time so you can capture your favorite when you're not at home. Easy to operate and easy to hookup to your TV.

The Betamax gives you complete access to all the shows on TV. And its clean modern styling will enhance your decor, be the perfect addition to your home entertainment center, and at this Heath special offer price — it's a terrific buy! Fully assembled and ready to use.

Heath Special Offer! Sony Betamax, Automatic Timer and TWO 2-Hour Videocassettes for the price of the Betamax alone!

GDS-1230, Shpg. wt. 62 lbs. Motor Freight **995.00**

If purchased separately,

GD-1230, Betamax Alone. 55 lbs. Motor Freight **995.00**

GDA-1230-1 Automatic Timer. Shpg. wt. 5 lbs. **40.00**

GDA-1230-2, 2-Hour Videocassette Tapes. 1 lb. each **16.95**



Fidelity Electronics Deluxe Chess Challenger™

Here's the advanced version of the famous Chess Challenger computerized board that challenges you with its own moves and strategies. New features include three increasing levels of difficulty selected from the keyboard, programming the computer for the first move and pre-arranging the pieces for mid and endgame situations. The chess board has files and ranks designated in standard international chess notation too. Has keyboard entry of moves including castling and en passant, a computer memory for position verification, and a digital display with four digit readout to indicate "to" and "from" positions. There are indicator lights for "check" when the computer puts you in check and "I lose" when the computer resigns. For 120 VAC, 60 Hz. With full instructions.

GD-1248, Fully assembled. Shpg. wt. 6 lbs. **199.95**

Standard Chess Challenger. Has features similar to above, single level of play, no computer first-move. With chess pieces and full instructions. Ideal for beginners.

GD-1235, Fully assembled. Shpg. wt. 6 lbs. **149.95**



Digital Thermometer

\$49.95

Assembled
Reads Fahrenheit or Celsius

A bright four digit LED display provides temperature readout over a range from 32 to 212°F (or switches to read 0-100°C) in 1/10th degree increments. Flashing decimal point provides low battery warning. Assembled. Less battery.

GD-1226, Shpg. wt. 2 lbs. **49.95**



Klima-Gro® Indoor Greenhouse

\$299.95 A miniature garden plot with electronically-controlled climate for your indoor plants
(less base)

Klima-Gro gives your plants the perfect environment for optimum growth. Light and heat are controlled automatically. A built-in moisture sensor and meter tells you when to water your plants—no more guessing. 24-hour timer regulates the internal light. The electronic control panel is fully assembled — only mechanical assembly is required. 51" W x 26" D x 28" H.

Kit GD-2225, Shpg. wt. 98 lbs. (see shipping note below) **299.95**

GDA-2225-1, Optional Base. 55 lbs. (see note below) **79.95**

Note: If you purchase the Klima-Gro and optional base at the same time, shipping and handling for both items is only \$20.00. If you order them separately, shipping and handling is \$20 for each item. So you can SAVE \$20 by ordering the Klima-Gro and base together. Shipping is via motor freight from Charlotte, Michigan. Include your phone number on order for notification of arrival. Arrangements for home delivery may be made at no extra charge in most cases. No COD orders accepted. Continental U.S. only.



Automatic Phone Answering System

\$199.95 The Record-a-Call® VOX 70 has all the features you need in an automatic telephone answering device. Voice actuation permits a caller to speak as long as desired.

Assembled Other features include silent monitor, announce only, dictation capability, fast forward, rapid rewind, rapid erase, and more. 120 VAC powered. 9" x 11 7/8" x 3 7/8". Fully assembled.

GDP-1227, Shpg. wt. 12 lbs. **199.95**

Our easiest-to-build Organ kit EVER!

The Computerized Heathkit/Thomas Troubador

\$1799⁹⁵

You SAVE up to 1/3 when you build it yourself!

- Easier assembly with preassembled sub-chassis and precut, color-coded wiring harnesses
- Easy to play even for a beginner
- Microprocessor-based for real versatility



The TO-1860 incorporates nine preassembled and tested circuit boards.

You'll be playing in no time. And enjoying every minute of it too. The TO-1860 is Heath's easy to build version of the fabulous microprocessor-based Thomas Troubadour. Quick-learn features like Color-Glo keys, color-coordinated music, one finger chords and chord memory make it easy even for the beginner.

It's fun and easy to build! Preassembled and tested modular circuit boards, wiring harnesses with built-in connectors, and no complex tuning procedures let you complete assembly in 30 hours or less. Nine preassembled and tested circuit boards comprise most of the electronics in the TO-1860. Color-coded, precut wiring harnesses plug directly into the circuit boards.

You'll have the best organ value on the market. The TO-1860 utilizes the latest "computerized" microprocessor technology to produce some of the best music you've ever heard. The cabinet has a glass music rack and comes fully-assembled of furniture-grade hardwoods. A matching padded bench with storage is included.

Kit TO-1860, Shpg. wt. 256 lbs. Motor Freight 1799.95

TO-1860 SPECIFICATIONS: VOICES & EFFECTS: (Solo) — Flute 16' Flute 8', Flute 4', Trombone 16' (0), Trumpet 16', Bassoon 16', Diapason 8' (0), Clarinet 8', Oboe 8', Violin 8' (0), Mandolin (Preset), Banjo (Preset), Solo Sustain, Main Bright. (Accomp.) — Tuba Horn 8' (0), English Horn 8', Cello 8' (0), Flute 8', Flute 4'. (Pedal) Bass Flute 8'—16', Pedal Sustain. SPEAKEASY FEATURES: (Rhythm) — Waltz, Fox Trot, Swing, Rhythm & Blues, Rock, Polka, Samba, Bossa Nova, Rhumba. (Accomp. Presets) — Piano, Guitar, Banjo, Harpsichord, Presets Cancel. Additional Features: Fancy Fingers, Strum, Arpeggio, Fancy Foot, Walking Bass. SOUND SYSTEM: (2) Solid State Amplifier (Stereo System). (2) 12" Heavy Duty Speakers. DIMENSIONS: 37" High, 23" Deep, 43½" Long. NET WEIGHT: 185 lbs.



12-Solo Instrument
Voices

Rhythm and Drum
Accompaniment



5-Accompaniment
Instruments

Minor and Expression
Pedals

Deluxe Electronic Metronome

A necessary accessory for student and teacher alike. A front panel control turns the unit on and adjusts tempo from 40 to 210 beats per minute. Adjustable volume. A handy chart on cabinet bottom relates tempos in various time signatures to beats per minute. Cherry-finish birch cabinet. Easy 1 evening assembly. Requires two 9-V batteries (not supplied).

Kit TD-17, Shpg. wt. 2 lbs. 19.95



The Heathkit/Thomas Keyboard Combo

\$569⁹⁵

Create the sound of an entire musical group with one-finger

At the touch of a finger the TO-1102 accurately reproduces the sounds of 12 solo instruments (see specifications). As you play the solos, the TO-1102 automatically accompanies you with piano, guitar, banjo, harpsichord or flute rhythms and alternating bass notes. Variable slide controls for drum tempo and volume let you preset rhythms of Waltz, Fox Trot, Swing, Rock and Latin. Has 12 major and 12 minor chords. Fun to build and even more fun to play. Contemporary design cabinet is fully-assembled. Bench included.

Kit TO-1102, Shpg. wt. 189 lbs. Motor Freight 569.95

TO-1102 SPECIFICATIONS: Solo Instruments: Flute, Clarinet, Trumpe:, Violin, Ac-cordion, Guitar, Piano, Banjo, Mandolin, Harpsichord, Vibes, Hawaiian Guitar. Accompaniment Instruments (Rhythm): Piano, Guitar, Banjo, Harpsichord and Flute: Tempos — Waltz, Fox Trot, Swing, Rock, Latin. Drum Controls: Tempo — Variable Slide; Volume — Variable Slide. Chords: 24 one-finger Chords, Memory Chord. Controls: Vibrato Cancel; Reverberation, variable slide; Keyboard Balance, variable slide. On-off switch with pilot indicator. Expression control. Headphone jack. Cabinet: Contemporary Design with Rosewood Finish: Sound System: solid-state amplifier with 12" heavy-duty Speaker. Dimensions: 34¼" H x 36" W x 21¼" D. Net Weight: 150 lbs.



AA-1506
Power Amplifier

AN-2016 Digital
Tuner/Preamplifier

Modulus™ The incredibly flexible system designed to change with your changing needs

There's never been a system to match the versatility of the Modulus. Whatever your listening preference may be, from stereo FM to spacious quadraphonic, the AN-2016 can fit the bill. In both flexibility and function, Modulus is the perfectly articulated system. Start with the AN-2016, a pair of speakers and the AA-1506 Amplifier for the basis of a superb system. Enjoy the low noise and wide dynamic range of Dolbyized FM stereo broadcasts by plugging-in the optional AD-1504 Dolby® FM Module. Later, when your listening requirements dictate those "live-performance" sound levels, hookup a larger amplifier like our AA-1640 "Superamp". If 4-channel happens to be your listening preference, all you need is another pair of speakers and a second amplifier for discrete quadraphonic sound. And even that can be improved upon by plugging-in the optional AM-1503 full-logic SQ Decoder Module and the CD-4 disc demodulator Module. No rewiring is ever necessary; everything simply plugs-in.

The AN-2016 is just as appealing to the ear, too. Total harmonic distortion is an insignificant 0.05% over the entire frequency range of 20 Hz to 20,000 Hz. Wide FM stereo separation of 40 dB at 1000 Hz is ensured by a phase-locked-loop stereo multiplex circuit. Preamplifier overload and resultant distortion are nearly nonexistent since the AN-2016 reaches full output at 170 mV and does not overload until high-level input reaches 5 volts. Full output for the phono amplifier may be achieved with as little as 2 mV with overload occurring only when input reaches 60 mV. FM sensitivity is a low 1.7 μ V. The AM section of the AN-2016 reflects unusual design efforts as well. Dual-gate MOSFET's in the front end, a 9-pole LC filter and a static-shielded loop antenna (a Heath exclusive) contribute to true high fidelity AM sound.

In step with the AN-2016's superior specs are, of course, its many convenience features. There are peak responding meters to monitor the output of each channel, a center channel tuning meter for FM and a signal strength meter that serves to indicate strongest signal on both AM and FM. Scope outputs let you align your antenna for lowest multipath distortion and unlike most components, internal fully-adjustable FM muting can be switched on and off at the front

panel. The AN-2016 Modulus is perfect for your audio aspirations whatever they may be. Order yours today.

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

CD-4 Demodulator Module. Lets you play CD-4 discrete 4-channel records through the AN-2016. Includes calibration record. For use with CD-4 phono cartridge.

Kit AD-1507, Shpg. wt. 2 lbs. **89.95**

Dolby FM Module. Provides the reduced noise and increased dynamic range of Dolbyized FM. Assembles, installs in one evening.

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

SQ Decoder Module. For 4-channel SQ material. Includes full-logic with variable blend enhancement for outstanding separation from tapes, records and FM.

Kit AM-1503, Shpg. wt. 2 lbs. **59.95**

Matching low-distortion power amplifier

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

Design that complements the Modulus system but performance deserving of any fine component system. Pure, clean sound that's surprisingly free of audible anomalies. At full output, for example, intermodulation distortion is only 0.1% and drops to an imperceptible 0.05% at 0.1 watt. Frequency response, as you'd expect, is exceptionally wide and flat: -0.5 dB at 8 Hz and 45,000 Hz. A damping factor of greater than 60 makes this amplifier's superior bass response readily apparent. The AA-1506 features pushbutton main and remote speaker switches, power-on light and Heath's exclusive polarized speaker plugs that make speaker phasing problems a thing of the past. And the AA-1506 is easy to build, too. A built-in test meter lets you check your work as you progress. As the basic power amplifier for your hi-fi system (Modulus or other), the AA-1506 is difficult to equal.

Kit AA-1506, Shpg. wt. 25 lbs. **199.95**

AN-2016 SPECIFICATIONS: PREAMPLIFIER—Frequency Response: -0.5 dB at 10 Hz and 30 kHz. Total Harmonic Distortion: less than 0.05% at 1.5 V into 20K ohms. IM Distortion: less than 0.05%. Hum & Noise (unweighted): phono, -75 dB ref. to 10 mV; high-level, -80 dB ref. to 0.25V. Bass Control: ± 15 dB at 20 Hz nominal. Treble Control: ± 12 dB at 20 kHz nominal. Hi Filter: -3 dB at 7 kHz ± 1 kHz, 12 dB/octave. Lo Filter: -3 dB at 30 Hz ± 2 Hz, 12 dB/octave. Input Sensitivity (for 1.5 V output): phono, 2/6 mV (switch selected). Phono Equalization: ± 0.5 dB of RIAA standard from 20-20,000 Hz. Output Voltage: 1.5 RMS. **FM TUNER**—(Monophonic)—Sensitivity: 1.7 μ V (IHF); 3.5 μ V for 50 dB S/N. Signal-to-Noise Ratio: 68 dB at 1000 μ V. Selectivity: greater than 100 dB. Capture Ratio: 1.3-dB. Spurious Rejection: greater than 90 dB. IF Rejection: greater than 100 dB. Image Rejection: greater than 90 dB. Total

Harmonic Distortion: 0.3%. IM Distortion: less than 0.1%. AM Suppression: 68 dB. Antenna Inputs: 300 Ω balanced; 75 Ω unbalanced.—FM (Stereo)—Stereo Sensitivity: 35 μ V for 50 dB S/N Total Harmonic Distortion: 1 kHz, 0.35%. Stereo Separation: 40 dB at 1 kHz; 20 dB at 15 kHz. SCA Rejection: 65 dB. **AM TUNER**—Sensitivity: 6 μ V for 20 dB S+N/N. Selectivity: more than 60 dB at 20 kHz. Signal-to-Noise Ratio: more than 48 dB. Harmonic Distortion: less than 1.0% at 400 Hz. Antenna: external static-shielded loop. **GENERAL**—Power Requirement: 120/240 VAC, 60/50 Hz. AC Convenience Outlets: 2 switched, 2 unswitched (500 watts max.). Dimensions: approx. 6 1/2" H x 19" W x 14 1/2" D. †SQ is a trademark of CBS, inc.; "Dolby" is a trademark of Dolby Labs and "CD-4" is a trademark of the Japan Victor Company.

The AR-1515; engineering excellence



Our premier stereo receiver embodies the Heathkit philosophy of design

Only extraordinary concepts and engineering efforts could produce an outstanding receiver like the AR-1515 — digital frequency readout, power for nearly any speaker system and performance to please the ear of the most exacting listener.

Professional-quality sound is the ultimate goal for both high-fidelity manufacturer and audiophile alike. One seeks to create it in his equipment, the other to obtain and enjoy it. We believe the Heathkit AR-1515 has achieved that goal and the specifications tend to bear us out. Consider the 0.08% harmonic distortion figure; virtually undetectable. Frequency response is +0, -1 dB from 8 Hz to 45,000 Hz and +0, -3 dB from 4 Hz to 80,000 Hz. Of course all this merely means that the amplifier section of the AR-1515 reproduces a clean signal without producing things you shouldn't hear (like hum and hiss). And what you don't hear in the AR-1515 is just as important as what you do hear. Quiet musical passages and lulls are exactly that; quiet. Hum and noise are more than 65 dB below full output on phono and 80 dB below full output on high level sources.

The tuner section of the AR-1515 also reflects the superb engineering that typifies Heath audio products. FM sensitivity is better than 1.8 μ V. Stations that were once unlistenable (or difficult to bring in) suddenly become part of your listening repertoire. Selectivity and image rejection are 100 dB and 90 dB respectively so the station you tune in is the only station you hear. This can be an important consideration in a crowded metropolitan area or if you live close to a radio transmitter. The digital frequency display is illuminated only when you are listening to an FM or AM broadcast. And with the help of the center-tuning and signal strength meters, you tune with greater speed and accuracy than conventional analog scale tuners. And of course the optional AD-1504 Dolby™ FM module (described on page 18) can be installed anytime you're ready to further upgrade your FM reception.

In the AR-1515, the tuner section cannot be discussed without praising the AM performance. It is, by any definition, high-fidelity and not just a side-consideration suited to only news and weather. As a mat-

ter of fact, it is often difficult to distinguish an AM broadcast from an FM broadcast so good is the AM sound. Describing the AM section are terms usually reserved for FM tuners. For example, dual-gate MOSFET's in the front end a computer-designed 9-pole filter provide outstanding selectivity and never need alignment during the life of the receiver. An external shielded-loop antenna is provided for optimum AM reception. The AR-1515's AM performance opens up an entire spectrum of new listening.

In a solid-state receiver like the AR-1515, the power supply that feeds the semiconductor devices is of key importance. The transformer-operated power supply in the AR-1515 contains two bridge rectifier circuits and one full-wave rectifier circuit as well. Critical semiconductor voltages are closely regulated and filtered by electronic networks for stable, noise-free operation. Two AC outlets are provided on the receiver's rear panel to furnish switched and unswitched power to other equipment such as a turntable or tape player. A relay circuit provides turn-on delay to prevent "thumps" from damaging your speakers.

The front panel of the AR-1515 presents a clean, uncluttered appearance with the most frequently-used controls in an exposed array. The remaining controls are concealed behind a hinged, drop-down panel. On either side of the digital frequency readout, indicator lights tell at a glance what input and mode of operation you've selected. Specially-designed bass and treble controls act primarily at the frequency extremes to let you compensate for room acoustics and program deficiencies while maintaining smooth midrange response. Preamp-out/amp-in jacks let you hook up an audio equalizer such as the Heathkit AD-1305 for even better sound.

The AR-1515 is remarkably easy to build. Open chassis construction, modular circuit boards and color-coded wiring harness couple with a profusely illustrated, step-by-step assembly manual for quick, easy assembly. A separate test meter even lets you check your work as you complete each major phase of construction.

Kit AR-1515, Shpg. wt. 47 lbs. 599.95
Kit AD-1504, Optional Dolby FM Module, 1 lb. 49.95

in every aspect

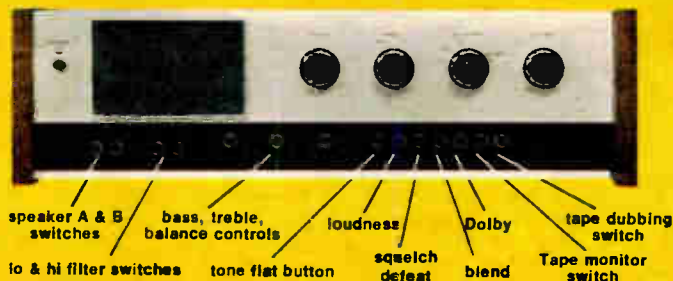


Beyond a doubt one of the finest stereo receivers you can buy — and one of the most unique as well

only
\$599⁹⁵

The kind of receiver you'd expect from one of the industry's first pioneers. A receiver that reflects the years of experience and expertise that's made Heathkit an audio watchword. Convince yourself by studying the specifications — congratulate yourself when you build and hear it.

The unique AR-1515 front panel



The AR-1515's superb specifications

AMPLIFIER — Frequency Response: +0, -1 dB, 8 Hz to 45 kHz; +0, -3 dB, 4 Hz to 80 kHz. Intermodulation Distortion: less than 0.08% from 0.25 to 70 watts (full output). Damping Factor: Greater than 60. Input Sensitivity: Phono 1 & 2, 2 mV. Aux., Tape & Dub., 200 mV. Input Overload: Phono, greater than 100 mV, Aux., Tape & Dub., greater than 10 V. Hum and Noise: Phono (2 mV reference), -65 dB. Aux., Tape & Dub., (200 mV reference) -80 dB. **FM (Monophonic)**: Frequency Response: ± 1 dB, 20-15,000 Hz. Antenna: 75 or 300 ohm. Sensitivity: 1.8 μ V*. Selectivity: 100 dB*. Image Rejection: 90 dB*. Capture Ratio: 1.5 dB*. **AM Suppression**: 65 dB*. Harmonic Distortion: 0.3%. Intermodulation Distortion: 0.1%. Signal to Noise Ratio: 70 dB*. Spurious Rejection: 90 dB*. Mute Threshold: 0-5 μ V variable: FM (Stereophonic).

Channel Separation: 40 dB or greater at mid-frequencies; 35 dB at 100 Hz; 20 dB at 10 kHz. 20 dB (nominal) at 15 kHz. Harmonic Distortion: 0.35% with 100% modulation. 19 and 38 kHz Suppression: 60 dB. SCA Suppression: 60 dB. **AM**: Sensitivity: 5 μ V with 50-ohm direct input. Selectivity: 20 dB at 10 kHz. **AM Antenna**: external static-shielded loop. Image Rejection: 70 dB at 600 kHz. 50 dB at 1400 kHz. **GENERAL**: Accessory AC Outlets: One switched and one unswitched. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 21½" W x 6¾" H x 15" D. Net Weight: 35.8 lbs.

*Rated IHF (Institute of High Fidelity Standards).

Dolby is a trademark of Dolby Laboratories.

Heathkit Hi-Fi is the "sound" choice

If you're in the market for stereo hi-fi equipment, you know the number of available choices is staggering. It can be difficult for even the most knowledgeable audiophile to make the right decisions. We understand this at Heath and go out of our way to provide solid, useful information about our products to make your choices easier.

Our equipment specifications, for instance, are always expressed in terms that most accurately describe the device's true performance. A good example is the hum and noise specification given for a preamplifier or the preamp section of a tuner or integrated amplifier. Unless otherwise stated, Heathkit specifies hum and noise referenced to the unit's rated sensitivity. Many manufacturers specify hum and noise referenced to 10 mV (often without telling you). Using a 10 mV input reference gives a more "advertisable" hum and noise figure but is misleading. Consider the Heathkit AP-1615 Preamp/Control Center. Hum and noise for the AP-1615 is 65 dB using a 2.2 mV input reference. Using a 10 mV reference, the hum and noise figure would be 78 dB! This same credibility is typical of every other specification we quote.

Also typical of Heathkit audio equipment is reliability and care in design. A large part of the cost in most other hi-fi gear goes to cover the cost of aesthetic "improvements" — change for the sake of change. You can be certain that what you've invested in a Heathkit has a basis in real value and not in something that won't improve your listening enjoyment. And isn't that what hi-fi is all about; listening enjoyment? From extra care in component selection (i.e. only 1 in 5 integrated circuits are noise-free enough to be acceptable for the AP-1615) down to the assembly manuals that leave nothing to chance, Heathkit audio equipment reflects engineering excellence. The benefits are real — you can see and hear them — so make Heathkit your "sound" choice.

Save on system discounts

You can save an additional 5% by ordering a complete hi-fi system from Heath. Just 1) choose a receiver and a pair of speakers or 2) an amplifier, pair of speakers and a program source such as a turntable, tuner or tape deck, add up the total cost and deduct 5%. See our handy system ordering aid on page 25.



AR-1429 Stereo Receiver—Simply good sound!



\$329.95

Superb performance in an intermediate receiver; 1.8 μ V sensitivity; 40 dB stereo separation; 65 dB hum & noise.

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

Excellent specifications in a piece of high-fidelity equipment usually mean good sound and (unfortunately) a high price. The AR-1429 certainly has excellent specifications and good sound. What it does not have is a high price and dubious "features" you'll never use; in other words, simply good sound. That's not to say the AR-1429 isn't a sophisticated unit. It is. A true complementary-symmetry power amplifier, for example, accounts for the incredibly low distortion. Two 8-pole ceramic filters are used in the FM section for improved selectivity. Two 4-pole ceramic filters are used in the AM section to the same advantage. These ceramic filters never need alignment even after years of use.

There's more, too. A FET muting circuit silences the output of the built-in preamplifier during turn-on and turn-off. This prevents "thumps" from damaging your speakers. Field-effect transistors are used in the preassembled FM tuner and in the AM RF circuit to improve sensitivity and signal-handling capability. And something unheard of in a receiver of this price; an optional Dolby[®] FM Module you add anytime you're ready for the pure strains of Dolbyized FM music with its increased dynamic range and reduced noise. Just build the AD-1504 and plug it into the AR-1429. It's that simple.

The AR-1429's amplifier circuits are connected to the preamplifier circuits on the back panel by plug-in jumpers. These jumpers may be removed to use the circuits independently or to connect an audio equalizer such as the Heathkit AD-1305. Two sets of speaker jacks are provided on the back panel. Separate switches on the front panel let you select either or both sets of speakers. For added versatility, the back panel also has two high-level inputs, a magnetic phono input and a tape monitor jack that allows you to make professional style recordings or to connect an accessory like the AD-1304 Active Audio Processor.

On the front panel, a tune meter and a signal strength meter allow for optimum FM tuning. A headphone jack is handy for private listen-

ing. The AR-1429 is an excellent choice as the nucleus of your system and its traditional styling blends subtly with any decor.

Kit AR-1429, Shpg. wt. 32 lbs. 329.95

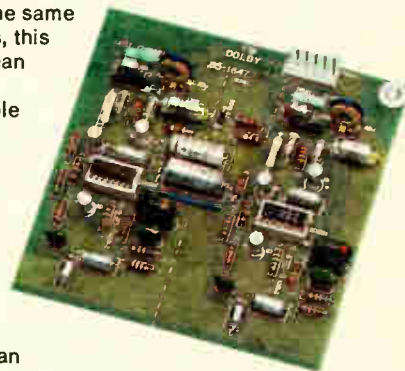
**Kit AD-1504, Optional Dolby FM Module. (See below)
Shpg. wt. 1 lb. 49.95**

AD-1504 Dolby[™] FM Module

The advantages of FM radio are many; low background noise, greater immunity to interference, stereo broadcasts and a wide variety of music from rock to classical. Unfortunately, stereo multiplex broadcasting compromises the transmitted signal by increasing background noise more than 20 dB over a monophonic broadcast of the same material. For many listeners, this extra 20 dB of noise can mean the difference between acceptable and unacceptable reception (especially in weak signal areas).

The AD-1504 Dolby FM Module can reduce this undesirable background noise on Dolbyized transmissions now being broadcast by many FM stations. And in strong signal areas, the AD-1504 can help your Heathkit receiver or tuner achieve incredibly low noise levels. Builds in one evening and plugs into the Heathkit AN-2016, AR-1515, AR-1429 and the AJ-1515.

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



AR-1429 SPECIFICATIONS: AMPLIFIER—Frequency Response: -1 dB, 5 Hz to 45 kHz. Damping Factor: 60; Input Sensitivity: Phono, 2 mV; Aux. Tape and Tape Mon., 200 mV. Hum and Noise: Phono, -65 dB (-79 dB for 10 mV input); Aux., Tape and Tape Mon., -75 dB. Input Overload: Phono, 90 millivolts; Aux., Greater than 10V; Tape, Greater than 10V; Tape Mon., Greater than 10V. Phono RIAA^{*} Equalization: ± 1 dB (30 Hz to 20 kHz). Input Impedance: Phono, 47 k Ω ± 5 percent and 100 pF; Aux., 50 k Ω ± 20 percent and 100 pF; Tape, 50 k Ω ± 20 percent and 100 pF; Tape Mon., 50 k Ω ± 20 percent and 100 pF. **FM SECTION**—Sensitivity: 1.8 μ V* (10.3 dBf) usable, 4.0 μ V

(17 dBf @ 50 dB signal to noise). Selectivity: 65 dB. Capture Ratio*: 1.8 dB; AM Suppression*: 48 dB; Image Rejection: 90 dB*. Stereo Separation: 40 dB, typ. at 1000 Hz. Frequency Response: ± 1 dB from 20 to 15,000 Hz. **AM SECTION**—Sensitivity: 10 μ V. Selectivity: 20 dB. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 4 $\frac{3}{4}$ " H x 20" W x 13 $\frac{1}{2}$ " D.

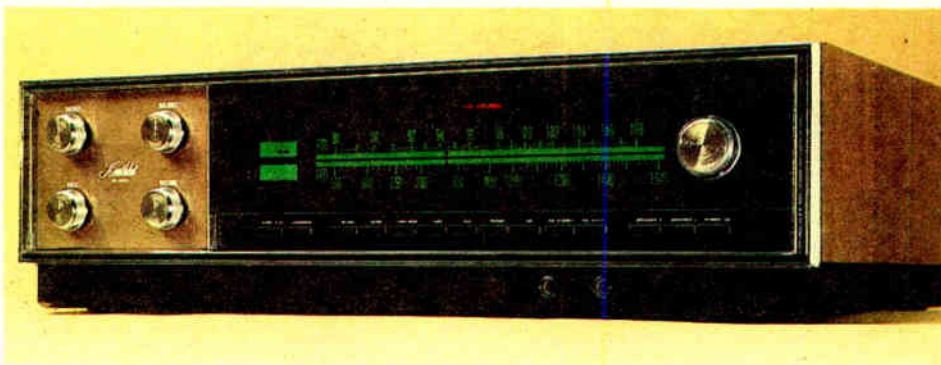
* Rated IHF (Institute of High Fidelity) Standards.

Dolby is a trademark of Dolby Labs.

**The AR-1500A Receiver:
Unequaled hi-fi value!**

\$429⁹⁵

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



AR-1500A SPECIFICATIONS: AMPLIFIER—Frequency Response (1 watt level): -1 dB, 9 Hz to 80 kHz; -3 dB, from less than 5 Hz to 120 kHz. Intermodulation Distortion: Less than 0.1% at full power; less than 0.1% at 1 watt. Damping Factor: Greater than 60. Input Sensitivity: Phono, 1.8 millivolts; Tape, Aux., Monitors: 140 millivolts. Hum & Noise: Phono (10 millivolt reference), -63 dB. Tape and Aux (0.25 volt reference), 75 dB. *FM (Stereo) —Channel Separation: 40 dB or greater at midfrequencies; 35 dB at 50 Hz; 25 dB at 10 kHz; 20 dB at 15 kHz. Harmonic Distortion: 0.5% at 1000 Hz with 100% modulation. 19 kHz and 38 kHz Suppression: 55 dB or greater. SCA Suppression: 55 dB. AM—Sensitivity: 50 μ V with external input; 300 μ V per meter with radiated input. Image Rejection: 70 dB at 600 kHz; 50 dB at 1400 kHz. IF Rejection: 70 dB at 1000 kHz. **GENERAL**—Accessory AC Outlets: Two. One switched and one unswitched (240 watts). Power Requirement: 120 or 240 volts, 60/50 Hz AC. 40 watts idling (zero output) and 356 watts at full output. Dimensions: Overall—18½" W x 5½" H x 13¾" D.

*Rated IHF (Institute of High Fidelity) Standards.

Dollar-for-dollar, you'll find it very hard to equal the features and performance of the AR-1500A. It has long been a standard of comparison by experts the world over. Small wonder — its speci-

fications and circuitry rival that of today's finest receivers yet the price remains surprisingly low. Study the specifications: Intermodulation distortion is a mere 0.1% at one watt or at full power. IHF sensitivity is a low 1.8 μ V. Frequency response extends from 9 Hz to 80,000 Hz, +0, -1 dB. Sophisticated, proven designs account for this great performance. A phase-locked multiplex demodulator for instance, provides over 40 dB of stereo separation in the middle frequencies. Field-effect transistors in the factory-assembled front end provide high sensitivity and excellent resistance to overload. Push-button function selectors simplify operation and signal strength and tuning meters aid tuning. On the back panel, preamp-out and power amp-in jacks let you add audio accessories and a scope output lets you monitor multipath distortion. And the AR-1500A is one of the few receivers you can custom-mount in the wall or in the optional walnut veneer case.

Kit AR-1500A, Shpg. wt. 51 lbs. **429.95**
ARA-1500-1, Walnut veneer case, Shpg. wt. 5 lbs. **27.95**



As much receiver as you may ever need

Moderate power output (adequate for most applications) at a price right for any budget

A low price doesn't have to mean low performance and the AR-1219 is audible proof. In every respect but total power output, it compares with receivers costing far more. Intermodulation distortion is less than 0.5% at full power and less than 0.2% at 1 watt. A low 2 μ V sensitivity ensures excellent reception of FM broadcasts. And the AR-1219's moderate power output is sufficient to drive just about any speaker system to levels adequate for normal home listening.

Advanced circuit designs such as a phase-locked-loop FM stereo circuit reduce distortion and increase stereo separation. The AR-1219's power supply is zener diode regulated

for stable operation of the receiver's solid-state circuitry. All this translates into quality hi-fi sound at an easily-affordable price.

Unlike many receivers in this price range, the AR-1219 has provision for every important auxiliary function. Two AC outlets (one switched, one unswitched) on the rear panel supply power to accessory equipment such as a turntable or a tape recorder. There's a tape monitor switch on the front panel and a tape monitor jack on the rear panel for complete recording capabilities. A stereo headphone jack on the front panel lets you listen in privacy. Pushbutton function selectors make operation quick and easy. A swivel-mounted AM antenna and inputs for a 75- or 300-ohm FM antenna make excellent reception possible even in fringe areas. The AR-1219 is

AR-1219 AM/FM Stereo Receiver

\$199⁹⁵

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

easy to build even for a first-time kit builder and requires only a minimal amount of space. It could very well be all the receiver you'll ever need.

Kit AR-1219, Shpg. wt. 18 lbs. **199.95**

AR-1219 SPECIFICATIONS: AMPLIFIER—Frequency Response: \pm 1 dB, 7 Hz to 100 kHz. IM Distortion: less than 0.5%, full power; less than 0.2% at 1 watt. Damping Factor: Greater than 30. Input Sensitivity: Phono: 2 millivolts; Tape: 190 millivolts; Tape Monitor: 190 millivolts. (NOTE: Input sensitivity is the rms input voltage needed to obtain 15 watts of output power per channel into 8 Ω loads.) Input Overload: Phono: Greater than 75 millivolts; Tape: Greater than 2.5 volts; Tape Monitor: Greater than 2.5 volts. Hum and Noise: Phono, -60 dB; Tape, -65 dB. **FM SECTION**—Sensitivity: 2 μ V*. Selectivity: 60 dB*. Image Rejection: 50 dB*. Stereo Separation: 40 dB typ., 35 dB minimum. Signal to Noise*: 65 dB (65 dB). **AM SECTION**—Sensitivity: 100 μ V per meter*. Selectivity: 40 dB. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 3¾" H x 17" W x 13" D. *Rated IHF (Institute of High Fidelity) Standards.

Top Performing 1515 "Separates"



AA-1515 high-performance Stereo Amplifier

\$319⁹⁵

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

The same insistence on perfect sound that leads the audiophile to the AR-1515 Receiver is also available to the fancier of component systems. The AA-1515 is a separately-contained version of the amplifier section found in the AR-1515. It has the power to drive most any speaker system to concert levels without distorting. In fact, this is very close to a "totally anonymous" amplifier. Look at that super-low distortion figure! And background noise is down a full 65 dB on phono and 80 dB down on other inputs. Overload on phono input is greater than 100 millivolts and above 10 volts on all other inputs.

Dual peak-responding output meters monitor the output of each channel and are calibrated in both watts and decibels. These meters respond to peaks as brief as a record click and are very accurate. Unlike most output meters, they can even serve as overload indicators. High and low filters let you compensate for worn, scratchy records. Use the AA-1515 with the AJ-1515 or any other tuner or tuner/preamp with equally pleasing results.

Kit AA-1515, Shpg. wt. 40 lbs. 319.95

AA-1515 SPECIFICATIONS: Frequency Response: -1 dB, 8 Hz to 45 kHz; -3 dB, 4 Hz to 80 kHz. IM Distortion: less than 0.08% from 0.25 to 70 watts. Damping Factor: greater than 60. Input Sensitivity: Phono, 2 mV. Aux., Tuner, Tape Mon., Tape Dub., 150 mV. Input Overload: Phono, greater than 100 mV. All other inputs: greater than 10 volts. Hum and Noise: Phono, 65 dB. Tape, Tuner and Aux., 80 dB. Power Requirements: 120 or 240 volts; 60/50 Hz. Dimensions: 17 1/2" W x 6 1/2" H x 14 1/4" D. Net Weight: 27 lbs.

AJ-1515 deluxe AM/FM Stereo Tuner

\$399⁹⁵

Taken from the tuner section of the fabulous AR-1515 Receiver, the circuitry in the AJ-1515 reflects the same engineering excellence. Superb FM sensitivity of only 1.8 μ V pulls-in those outlying stations that a lesser tuner would probably miss. And you can be sure that what the AJ-1515 receives will be passed on to your amplifier free of noise and static. Harmonic distortion is a mere 0.3% and intermodulation distortion is just 0.1%. Image rejection is a full 90 dB so you get only the stations you tune. Even this outstanding FM reception can be bettered with the addition of the optional AD-1504 Dolby™ FM Module (described in detail on page 18). And like the AR-1515, the AJ-1515's AM performance is so clean and noise-free that you'll have to look twice at the function selector to make sure you're not listening to FM. Lastly, the big bright red digits of the frequency readout are clearly visible from across the room so you can tell at a glance what station you're listening to.

Kit AJ-1515, Shpg. wt. 27 lbs. 399.95

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

AJ-1515 SPECIFICATIONS: Frequency Response: ± 1 dB, 20-15,000 Hz. Antenna: 300 ohm balanced, 75 ohm unbalanced. Sensitivity: 1.8 μ V. Selectivity: Alternate Channel, 100 dB*. Image Rejection: 90 dB*. IF Rejection: 90 dB*. Capture Ratio: 1.5 dB*. AM Suppression: 65 dB*. Harmonic Distortion: 0.3%. Intermodulation Distortion: 0.1%. Spurious Rejection: 90 dB*. Signal-to-Noise Ratio: 70 dB*. Stereo Channel Separation: 40 dB at 1000 Hz, 35 dB at 100 Hz, 25 dB at 10 kHz, 20 dB at 15 kHz. Stereo Harmonic Distortion: 0.35%. 19 kHz and 38 kHz Suppression: 60 dB. SCA Suppression: 60 dB. Mute Threshold: 0.5 μ V (variable). AM Sensitivity: 5 μ V. Selectivity: 20 dB. Image Rejection: 70 dB at 600 kHz, 50 dB at 1400 kHz. IF Rejection: 40 dB at 600 kHz, 60 dB at 1400 kHz. Harmonic Distortion: 3%. Power Requirement: 120 or 240 volts, 60/50 Hz. 30 watts. Dimensions: 17 1/2" W x 6 1/2" H x 14 1/4" D. Weight: 27 lbs. *Rated IHF (Institute of High Fidelity) Standards. Dolby is a trademark of Dolby Labs.



AA-2015 deluxe 4-Channel Amplifier

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

\$199⁹⁵

The AA-2015 is a 4-channel amplifier for the audiophile who enjoys quadrasonic listening. Styled in the same vein as the beautiful AA-1515, the AA-2015 has similar features but includes *four* peak responding output meters and complete volume and balance controls for each channel. There are jacks for both 2- and 4-channel headphones and switches to control front and rear channel speakers. The AA-2015 is compatible with all discrete 4-channel program sources and accepts the optional AD-1507 CD-4 Discrete Disc Decoder Module and the AM-1503 SQ Decoder Module as well.

Kit AA-2015, Shpg. wt. 40 lbs. 199.95

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

Kit AM-1503, Optional SQ Module. Shpg. wt. 1 lb. 59.95

AA-2015 SPECIFICATIONS: Frequency Response: (at 1 watt): 0 dB to -1 dB, 7 Hz to 40 kHz. Intermodulation Distortion: Less than 0.2% from 250 mW to 35 watts. Damping Factor: greater than 50. Input Sensitivity: Phono, 2 mV. High level, 200 mV. Input Overload: phono, 95 mV. High level, 5 volts. Hum and Noise (input shorted): Phono, -65 dB. High level, -75 dB. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 18" W x 6 1/2" H x 14 1/4" D. Net Weight: 31 lbs.

SQ is a Trademark of CBS, Inc.

CD-4 is a Trademark of Japan Victor Company.



Low cost 1219 stereo components

AA-1219 Stereo Amplifier

\$124⁹⁵

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

Derived from the outstanding amplifier section in the AR-1219 Receiver (described on page 18) but self-contained for the added flexibility of a "component" system. The same excellent specifications too. Intermodulation distortion is less than 0.5% at full power decreasing to less than 0.2% at 1 watt. Phono hum and noise is -60 dB. Stereo channel separation is 55 dB. These are specifications truly deserving of the term high-fidelity. The AA-1219 is a perfect match both in terms of styling and performance for the AJ-1219 at right but it can be used satisfactorily with other components. Two AC outlets (one switched, one unswitched) on the rear panel supply power to accessory equipment like a turntable or tape recorder. Input level controls let you match the outlet of your phono cartridge to the amplifier. A tape monitor switch and associated jack let you make outstanding recordings with cassette and reel-to-reel decks.

Kit AA-1219, Shpg. wt. 15 lbs. **124.95**

AA-1219 SPECIFICATIONS: Frequency Response: ± 1 dB, 7 Hz to 100 kHz. IM Distortion: less than 0.5% at full power; less than 0.2% at 1 watt. Hum and Noise: -65 dB. Power: 120/240 VAC, 60/50 Hz. Dimensions: 3 $\frac{7}{8}$ " H x 12 $\frac{3}{4}$ " W x 12" D.

AJ-1219 AM/FM Stereo Tuner

\$124⁹⁵

Low 2 μ V sensitivity ensures superb reception; advanced circuitry for low cross-modulation and good separation

Like the AA-1219 Amplifier, the AJ-1219 AM/FM Stereo Tuner has its basis in the AR-1219 Receiver. Advanced solid-state circuitry makes it a tuner good enough for any system. For example, ceramic filters in the FM circuit provide better than average selectivity. In the pre-assembled FM tuner, a field effect transistor further improves sensitivity and provides low cross modulation and resistance to overload on strong stations. The FM IF circuit utilizes two integrated circuits for excellent gain and limiting characteristics and ceramic filters are used so that no alignment is ever necessary. The AJ-1219's phase-locked-loop multiplex circuit provides excellent separation and low distortion.

A built-in rod-type antenna ensures good AM reception and terminals on the rear panel allow connection of an external FM antenna. The AJ-1219 is an outstanding basic tuner for your component system.

Kit AJ-1219, Shpg. wt. 12 lbs. **124.95**

AJ-1219 SPECIFICATIONS: FM Sensitivity: 2 μ V. Selectivity: 60 dB. Capture Ratio: 2 dB. AM Suppression: 50 dB. Stereo Channel Separation: 40 dB typ., 35 dB min. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 3 $\frac{7}{8}$ " H x 13" W x 11" D.

Synthesized Digital FM Stereo Tuner

Fantastic 0.005% tuning accuracy with digital frequency synthesis and digital readout. Three-way tuning; use the front panel keyboard to enter frequency, auto sweep from the top of the band downward stopping at each listenable station (or only stereo stations) or program it to stop at any of three preselected stations.

Kit AJ-1510A, Shpg. wt. 25 lbs. **519.95**
Pecan Veneer Case, AJA-1510-1, Shpg. wt. 8 lbs. **28.95**

AJ-1510A SPECIFICATIONS: Antenna: 75 or 300 ohm. Sensitivity: Less than 1.8 μ V. Selectivity (alternate channel): Greater than 95 dB. Capture ratio: Less than 1.5 dB. Harmonic distortion: Less than 0.3%. IF rejection: Greater than 95 dB. Spurious rejection: Greater than 90 dB. STEREO PHONIC - Channel separation: 1,000 Hz, 40 dB; 80 Hz, 25 dB; 10 kHz, 25 dB; 15 kHz, 20 dB. Harmonic distortion: 0.35%. AUDIO OUTPUT - Audio output level: (fixed): 1.2 V rms nominal (with 100% mod.). GENERAL - Power Requirement: 120/240 VAC, 60/50 Hz, 50 W.



AA-18 Mono Amplifier

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

A low-cost way to monaural sources.

Use the AA-18 with a record player having a ceramic cartridge, a tape player, a monophonic AM or FM tuner or any signal input of at least 250 millivolts. If you have an efficient 8-ohm speaker, you'll be surprised at the volume the AA-18 will deliver. And it will be "clean sound" too. The AA-18's output transistors are arranged in a complementary-symmetry circuit that provides improved frequency response.

Kit AA-18, Shpg. wt. 4 lbs. **26.95**



House your stereo gear in this beautiful cabinet

\$289⁹⁵

Fully assembled
Mediterranean style solid oak trim - pecan finish

Ducted port enclosures, precut 12" openings. 26 $\frac{7}{8}$ " H x 66" W x 9 $\frac{1}{4}$ " D. Changer Base: 5 $\frac{1}{2}$ " H x 18" W x 14" D. Shpg. wt. 193 lbs.

AE-101, Motor Freight **289.95**

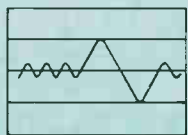


Why you need a "Superamp"

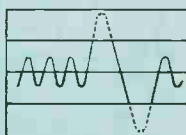
Many hi-fi systems need a "super-amp" like the AA-1640 for good scientific and musical reasons. As sounds become louder, the ear becomes less sensitive. For one sound to seem twice as loud as another (10 dB louder), requires 10 times as much power. A 3 dB change is just noticeable, yet it requires twice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

In an average-sized room, acoustic suspension speakers may require 20 watts per channel to produce a reasonable listening level — about 90 dB. But when a momentary musical peak of 10 dB comes along, your amplifier must try to produce 200 watts per channel.

Tone controls, loudness circuits, and equalizers make the same demands. And if your amp



unclipped



clipped

can't deliver that much power, it clips off the peaks of the signals. Clipping causes distortion and reduces the dynamic range — the contrast between loud and soft passages. Music sounds constricted, harsh and unreal. Clipping also produces harmonics which can actually damage your tweeters.

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

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

Stereo Preamplifier with top-of-the line features

Perfect for use with AA-1640 or any high-quality stereo power amplifier

The Heathkit AP-1615 offers the kind of specifications and features normally found on preamps costing much more. Harmonic and IM distortion are insignificant, less than 0.05%. And extremely wide dynamic range, 100 dB for all inputs, means that even the loudest and most complex musical passages come through with minimum distortion. If you need tone controls, the optional AD-1305 (right) offers far more versatility and precise tone adjustment than ordinary bass and treble controls. A relay instantly mutes the output when power is turned on or off to prevent "thumps." A sub-sonic filter eliminates the noise from turntable rumble or record warp. Has high-frequency filter, two phono inputs, aux. and tuner inputs, tape monitor, mono switch, headphone jack and front panel dubbing inputs and outputs. Handsome styling too, with brushed aluminum front panel, black metal top and solid walnut end panels. The AP-1615 is an easy kit to build. Parts mount on a single printed circuit board, and point-to-point wiring is kept to a minimum. Even if you're a first-time kit builder, you can build a better preamp than you probably thought you could afford.

Kit AP-1615, Shpg. wt. 12 lbs. Was 159.95 Now 139.95



SAVE \$20!

AP-1615 SPECIFICATIONS: Input Sensitivity: Phono, 2 mV, Hi-Level (Tuner, Tape, Aux., Tape Mon and Tape Dub): 180 mV. Input Overload: Phono, over 100 mV, Hi-Level, over 10 V. Hum and Noise: Phono, -65 dB (2 mV input); Hi-Level -85 dB (180 mV input). Frequency Response: Phono, ± 0.5 dB, 30 Hz to 15 kHz, Hi-Level, ± 2 dB, 20 to 20 kHz. Rated Output: 1.5 V at rated sensitivity. Tape Output: 180 mV. Harmonic and IM Distortion: Less than 0.05% from 20 Hz to 20 kHz at 1.5 V output. Channel Separation: 50 dB at 1 kHz. Filters: Low, -3 dB at 15 Hz, -12 dB octave/slope. High, -3 dB at 7 kHz, -12 dB octave/slope. Power Requirement: 120/240 VAC, 60/50 Hz, 25 watts. Dimensions: 4 1/2" H x 17 1/2" W x 8 1/2" D.

For the true Audiophile-The Heath AA-1640



The electrical performance of the Heath AA-1640 makes comment superfluous. In every respect it ranks with finest high-power amplifiers on the market.

Julian Hirsch, *Stereo Review*
May '75



SAVE \$30!

The Heathkit AA-1640 "Superamp" — designed for use with the finest stereo components

\$449⁹⁵

less meters

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

For the purist Heath offers the AA-1640. This is an amplifier for the audiophile who desires the distinctive quality of component separates, wants maximum control, yet constantly strives for musical reproduction that is free from the imperfections and coloration so commonly found with low-priced systems. The AA-1640 features distinctive modern styling, excellent specifications and a unique incorporation of power and features that offers you the ultimate in musical reproduction and the maximum in system protection.

The AA-1640 utilizes a unique speaker protection system which does not connect your speaker at turn on until transients have decayed, and immediately disconnects speakers at turn off. It also features circuitry which disconnects speakers when dangerous DC voltages and very low frequencies are present and prevents them from reaching and damaging your expensive speaker systems.

The amplifier also features massive side mounted heat sinks. These heavily finned units provide maximum cooling and at the same time avoid the need for noisy cooling fans found on many other "super amps". Should overheating occur, thermal circuit breakers disconnect your speakers to prevent amplifier damage, and illuminate an LED to alert you of the situation.

The electronics found in the AA-1640 have but one purpose . . . the clean, flawless reproduction of musical information. Frequency response is flat within -1 dB from 7 to 50,000 Hz, total harmonic

distortion is infinitesimal, and with hum and noise inaudible at 100 dB below full output, you'll hear your music on a clean background of velvety silence.

The AA-1640's inputs feature a two transistor unity gain amplifier for impedance matching and to provide maximum preamp to amplifier signal transfer. The preamplifier circuit has a differential amplifier to keep DC output level at zero, and an eight device (per channel) push-pull configured class AB output stage. And for extra protection, both channels employ speaker fusing and "intelligent" solid-state current limiting, to protect the output transistors should an external short circuit occur. The result of this painstaking design work is a power amplifier capable of reproducing both quiet passages and the thundering fortissimo of the grand finale all with equal ease and definition.

For added convenience and control add the optional peak-responding panel meters to your AA-1640. This pair of highly accurate indicating devices are so fast they can respond to peaks as short as a record click (making them excellent for overload indication).

Both meters feature individual circuit boards, back-lighted scales, and calibration from -30 to +3 dB and 0.2 to 200 watts (into an 8 ohm load). The meters can be installed when your amplifier is assembled, or later. However, if you buy the meters at the time you purchase your amplifier, you'll save \$29.95. Shpg. wt. 72 lbs. UPS only.

Kit AA-1640, Less meters Was \$479.95, Now Only 449.95

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

MONEY-SAVER SPECIAL!

Buy the amp and meters together and **SAVE 29.95.**

Kit AAS-1640, Shpg. wt. 83 lbs., UPS 489.95

OTHER AA-1640 SPECIFICATIONS: Frequency Response: -1 dB, 7 Hz to 50 kHz; -3 dB, 5 Hz to 100 kHz. Intermodulation Distortion: less than 0.1% from 0.25 to 200 watts. Damping Factor: greater than 50. Hum and Noise: Less than 400 μ V or 100 dB below full output. Channel Separation: 50 dB, min. Input Impedance: 50k ohms. Input Sensitivity: 1.5 V. Net Weight: 58 lbs. Dimensions: 19" W x 7 1/4" H x 18" D. Power Requirement: 120 VAC, 60 Hz only.

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

Offers more complete control than conventional bass and treble controls

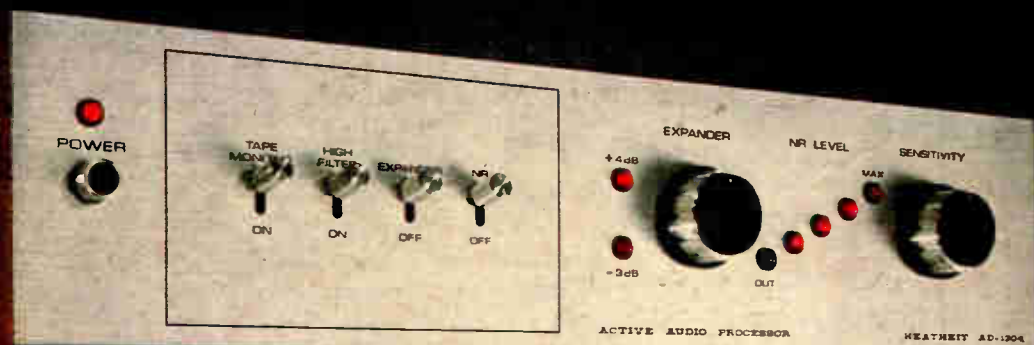
The AD-1305 is an audio equalizer offering complete tone control versatility with five slide controls for each stereo channel. It is designed for use with the AP-1615 at left, or any receiver or amplifier having a preamp output and power amp input, or tape monitor. Provides precise corrections in each portion of the frequency spectrum, without overlapping. A center detent allows exact "0" dB setting bypassing each band; a tone flat switch bypasses the equalizer entirely.

Compensates for room acoustics, differences in cartridges and speakers, even deficiencies in program sources. Can also be used with tape recorders to filter old or scratchy records or broadcasts before recording. Active bandpass filters with large, fully-shielded coils, ensure extremely low distortion. The AD-1305's own tape monitor lets it be used in a receiver's tape monitor circuit without losing monitor capability. The AD-1305 is a fun-to-build kit too, even for first-time builders. Parts mount on three circuit boards, and there's minimal point-to-point wiring, so assembly is fast and easy. Case with solid walnut end panels.

Kit AD-1305, Shpg. wt. 11 lbs. 129.95



AD-1305 SPECIFICATIONS: Input Impedance: 100k ohms. Output Impedance: 100 ohms. Rated Output: 1.5 V rms. Overload: 5 V rms. Signal-to-Noise Ratio: 90 dB below 1.5 V. Total Harmonic Distortion: 0.05% from 20 Hz to 20 kHz at 1.5V output. IM Distortion: 0.05% at 1.5 volts. Frequency Control Range: (separate controls for each channel), 30-125 Hz, 125-500 Hz, 500-2000 Hz, 2000 Hz to 8 kHz, 8 kHz-32 kHz. Overall Gain (flat): Zero dB (unity gain). Slope of Filters: 12 dB per octave. AC outlets: one switched, one unswitched. Power Requirement: 120/240 VAC, 60/50 Hz, 10 watts. Dimensions: 4 3/8" H x 17 1/2" W x 8" D.



Active Audio Processor for less noise from all program sources

\$219⁹⁵

Improves the sound of any hi-fi system — reduces background noise and extends dynamic range of most source material

Much of the background noise heard in recorded music has its origin in the recording and manufacture of the record (or tape) or during the broadcast process. Even the finest high fidelity systems are not immune to this noise and it is virtually impossible to eliminate completely. The Heathkit AD-1304 can, however, eliminate much of the noise. Specifically, it is designed to both eliminate high frequency noise and add 7 dB of dynamic range expansion to any program source.

A separate expander section and noise reducer account for 7 dB of dynamic range expansion and up to 10 dB of noise reduction. Of the expander circuit, the January 1978 issue of High Fidelity Magazine says: "... the expander circuit in the Heath rates high marks in comparison with other single-band expanders. It gives a subtly enhanced dynamic range that sounds quite natural while remaining unobtrusive in operation." For inherently noisy material such as 78-rpm recordings, AM radio or 8-track tapes, a high-filter switch on the front panel activates a 7 kHz, linear phase, 12 dB per octave filter.

AD-1307 Audio Control Center

\$129⁹⁵

For truly accurate power monitoring and extra system versatility

Many stereo hi-fi systems, especially those with medium to high power capabilities, need what the AD-1307 provides; accurate power output monitoring for exact speaker balancing and one-button control of major AC-powered auxiliary components. Peak-responding meters calibrated in both decibels and watts react instantly to outputs as brief as a record click. Because of their quick response and extreme accuracy, these meters are uniquely useful as overload indicators. Their expanded scales let you read from just a few tenths of a watt — up to 200 watts. The output meters provided with most types of receivers and amplifiers fall short of these abilities and are therefore limited in usefulness. A switch on the front panel allows you to monitor the outputs of either of two amplifiers.

Barrier-type terminal strips on the rear panel allow you to hook up one stereo amplifier to two sets of speakers, two stereo amplifiers (or one 4-channel amp) to four speakers, a monophonic amplifier to one or more speakers, and even a pair of electrostatic headphones. Conventional stereo headphones plug into two jacks on the front panel. Four switched and four unswitched AC outlets (with a total of

24

7 EVENING KIT
Fast, Easy Assembly

LED's on the front panel indicate the amount of noise reduction and dynamic range expansion taking place and front panel controls allow for visually adjusting the thresholds of both the expander and the noise reducer. This method of adjusting the thresholds is quicker and easier than other units which rely on "by-the-ear" adjustments. The AD-1304 connects between the tape output and tape monitor jacks on most types of receivers, preamplifiers and integrated amplifiers. Tape monitor facilities are provided on the back panel of the AD-1304 so that the tape monitor function is not lost. Make the AD-1304 a working part of your system today.

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

AD-1304 SPECIFICATIONS: Rated Input: 200 mV. Input Impedance: 100K ohms. Gain: Expander off, 0 dB (unity) ± 0.5 dB. Expander on, -3 dB to +4 dB. Frequency Response: +0, -0.2 dB from 20 Hz to 20 kHz. High Filter: 7 kHz, 12 dB octave rolloff. Noise Reduction: 10 dB typical between 4 kHz and 15 kHz. Hum and Noise: -70 dB, 20 Hz to 20 kHz. Channel Separation: 50 dB at 1 kHz. Output Impedance: 500 ohms. Input Overload: 5 volts. Total Harmonic Distortion: 0.1% from 20 Hz to 20 kHz. Power Requirements: 120/240 VAC, 50/60 Hz, 15 watts. Dimensions: 17½" W x 4½" H x 8½" D. Net Weight: 10 lbs.



1500 watts) provide flexible power control of the individual components in your system.

Kit AD-1307, Shpg. wt. 11 lbs. 129.95

AD-1307 SPECIFICATIONS: Meter Scale Calibration: -30 dB to +3 dB, 0.2 to 200 watts. (0 dB = 200 watts into 8 ohms.) Meter Circuit Type: Peak Responding. Meter Circuit Response Time: Less than 50 μ sec. Meter Circuit Fall Time: Greater than 0.5 sec. Power Requirement: 120 VAC, 50/60 Hz, 10 watts, 240 VAC, 50/60 Hz, 10 watts. Dimensions: 4½" H x 17½" W x 8½" D. Weight: 8 lbs. (3.6 kg.)

Buy a complete Heathkit Audio System and SAVE!

Buying a complete Heathkit hi-fi system ensures well-balanced, complementary performance and saves money, too—A full 5%! Use this handy Audio System Planning Guide to help you choose the system that's right for you. It's easy: First decide whether you prefer a receiver system, an integrated amplifier system or a "separates" system. Then simply choose one item from each column to make up that system. For example, under "Separates" Systems, you might choose the AA-1640 Amplifier, the AP-1615 Preamp, the AJ-1515 Tuner, the AL-1700 Turntable and a pair of AS-1348 Speakers. This comprises a "Separates" system.



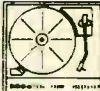
Figure the savings

You've chosen your ideal system, now add up the cost of the individual units.* From this total, deduct 5% and that's your system savings.

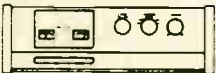


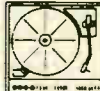


AUDIO SYSTEM PLANNING GUIDE

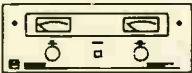
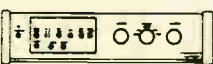
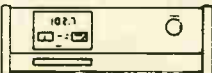


RECEIVER SYSTEMS

Receivers	Speaker Systems		Optional Turntables/Changers	
				
AR-1515	AS-1348-2 AS-1373-2	AS-1344-2 AS-1363-2	AL-1700 ACP-1217	ACP-1237 ACP-1243
AR-1500A	AS-1373-2 AS-1344-2	AS-1363-2	ACP-1217 ACP-1237	ACP-1243 ACP-1166
AR-1429	AS-1344-2 AS-1363-2	AS-1352-2	ACP-1237 ACP-1243	ACP-1166 ACP-1161
AR-1219	AS-1363-2 AS-1352-2	AS-1342-2 AS-1332-2	ACP-1243 ACP-1166	ACP-1161

INTEGRATED AMPLIFIER SYSTEMS

Integrated Amps	Speaker Systems		Tuners	OR	Turntables/Changers
					
AA-1515	AS-1348-2 AS-1373-2	AS-1344-2 AS-1363-2	AJ-1515 AJ-1510A		AL-1700 ACP-1217 ACP-1237
AA-1219	AS-1363-2 AS-1352-2	AS-1342-2 AS-1332-2	AJ-1219		ACP-1243 ACP-1166

"SEPARATES" SYSTEMS

Amplifiers	Preamplifier	Tuners	OR	Turntables/Changers	Speaker Systems
					
AA-1640 AA-1506	AP-1615	AJ-1515 AJ-1219 AJ-1510A		AL-1700 ACP-1217 ACP-1237	AS-1348-2 AS-1373-2
	AN-2016 Tuner/Preamp			ACP-1243 ACP-1166 ACP-1161	AS-1344-2 AS-1363-2

*Other Heathkit audio products related to the basic system (such as the AD-1304 or AD-1305) and ordered at the same time, also qualify for the 5% discount.

Save on Fully assembled turntables and changers



World-famous Accutrac® 4000
available in money-saving
kit form from Heath

The turntable that lets you "program" individual cuts on your records in the order YOU want to hear them. Complete with base, built-in cartridge and wireless remote control! See page 3 for details.

only **\$389⁹⁵**



B-I-C 960 belt-drive changer
\$169⁹⁵

With Base and Cartridge

The same ultra-reliable design as the B-I-C 981 minus the electronic speed control, adjustable pitch and strobe. 33 $\frac{1}{3}$ and 45 rpm. Includes base and your choice of Empire 2000E/111 or Shure M91ED cartridge (specify). 15 $\frac{7}{8}$ " W x 12 $\frac{1}{8}$ " D x 4 $\frac{1}{8}$ " above board, 1 $\frac{5}{8}$ " below. If purchased separately, up to \$246.85.

ACP-1166, Shpg. wt. 11 lbs. Assembled 169.95



Dual 721 direct-drive automatic turntable
\$389⁹⁵

With Base and Cartridge

One of the finest turntables available. Fully automatic single-play, electronic direct-drive motor, twin gimbal tonearm mounting, adjustable tonearm height, calibrated anti-skate, more. 33 $\frac{1}{3}$ and 45-rpm operation. CD-4 capability. With Shure V-15 Type III cartridge, base and dust cover.

ACP-1217, Shpg. wt. 25 lbs. Assembled 389.95

ACCESSORIES FOR B-I-C TURNTABLES

- ADP-1263, Simulated wood-grain plastic base, Shpg. wt. 3 lbs. . 16.95
- ADP-1164, Hinged dustcover, Shpg. wt. 4 lbs. 9.95
- ADP-1165, 45-rpm spindle, Shpg. wt. 1 lb. 3.95
- AD-1037, Automatic 45-rpm adaptor, Shpg. wt. 1 lb. 1.95

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

Stereo Cartridges



Shure V-15 Type III. Famous for its excellent tracking and smooth, uncolored sound. For tonearms capable of tracking at $\frac{3}{4}$ to 1 $\frac{1}{4}$ grams. See specifications at right.

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



Audio-Technica AT-14Sa. Specially shaped and polished Shibata stylus for unparalleled quadrasonic CD-4 and stereo response. Lasts twice as long as ellipticals! Specs at right.

ADP-1139, Shpg. wt. 1 lb. 85.00
With turntable purchase 45.00



B-I-C 940 belt-drive changer
\$129⁹⁵

With Base and Cartridge

A true B-I-C automatic changer — with belt drive, low speed 24-pole synchronous motor, up to six-record continuous play. Has viscous-damped cueing, 12" platter, 33 $\frac{1}{3}$ and 45 rpm speeds, and CD-4 capability. Includes base and your choice of Empire 2000E/111 or Shure M91ED cartridge (specify). If purchased separately, up to \$206.85.

ACP-1161, Shpg. wt. 11 lbs. Assembled 129.95



B-I-C 981 with electronic speed control
\$209⁹⁵

With Base and Cartridge

B-I-C's newest and best changer! Unique "programming panel" permits automatic play of a single disc once or up to six times, or plays a six-record stack. Has 24-pole motor, strobe light with adjustable speed control, platter with cast strobe markings. 33 $\frac{1}{3}$ and 45 rpm speeds. With base, specify Empire 2000/III or Shure M91ED. Add \$45 for Shure V-15 Type III or Audio-Technica AT-14Sa.

ACP-1243, Shpg. wt. 13 lbs. Assembled 209.95



Dual 1245 deluxe automatic
\$219⁹⁵

With Base, Dust Cover and Cartridge

Quality automatic changer has famous Dual features: full-size 12" platter, 6% pitch control and lighted strobe, continuous repeat switch, adjustable height cue control. Factory-assembled, includes base, dust cover and Empire 2000E/III or Shure M91ED cartridge (specify).

ACP-1237, Shpg. wt. 18 lbs. Assembled 219.95

Model	Response (Hz)	Output	Separation	Stylus	Tracking	Price Alone	With Turntable
ADP-1062, Wt. 1 lb. Shure M91ED	20-20,000	5.0 mV	25 dB	Ellipt. 0.2 x 0.7	$\frac{3}{4}$ to $1\frac{1}{2}$ gr.	59.95	FREE
ADP-1147, Wt. 1 lb. Empire 2000E/111	20-20,000	4.5 mV	28 dB	Ellipt. 0.2 x 0.7	$\frac{1}{2}$ to $1\frac{1}{2}$ gr.	69.95	FREE
AD-1059, Wt. 1 lb. Shure V-15 Type III	10-25,000	3.5 mV	28 dB	Ellipt. 0.2 x 0.7	$\frac{1}{4}$ to $1\frac{1}{4}$ gr.	85.00	45.00
ADP-1139, Wt. 1 lb. Audio-Tech. AT-14Sa	5-45,000	2.7 mV	25 dB	Shibata	$\frac{3}{4}$ to $1\frac{1}{4}$ gr.	85.00	45.00

Heath-recommended assembled stereo cassette decks



\$439⁹⁵ assembled

Aiwa 6550 deluxe cassette deck with Dolby®

If you're looking for professional features in a cassette deck, then the Aiwa 6550 is for you. Features like continuous readout of time remaining on tape puts an end to overrun and consequent tape waste and eliminates the worry of running out of tape in the middle of the recording process. There are separately selectable 3-position switches so that you get the proper bias and equalization from all types of tapes. A bias adjustment knob allows you to adjust the high frequency response on LH tapes for the best performance level. Shocks and vibration in the tape unit are kept to a minimum by the oil damped gears. The cassette cover lowers silently and smoothly at the push of a button. A high efficiency drive system keeps wow and flutter to a low 0.05% (WRMS). Two-step peak indicator lamps supplement the VU meters to display over-level input during the recording process. Other features include memory rewind mechanism, quick review/cue, Ferrite Guard Head, 3.4 mW headphone jack output and removable cassette cover.

The Aiwa 6550 is a front runner in cassette recording and deserves to be a part of every good stereo high fidelity system. Make it a part of yours. Fully assembled.

ATP-1244, Shpg. wt. 25 lbs. **439.95**

AD-6550 SPECIFICATIONS: Frequency response: LH tape: 20-15,000 Hz; 30-13,000 Hz ± 3 dB. CrO₂ tape: 20-17,000 Hz; 30-15,000 Hz ± 3 dB. FeCr tape: 20-17,000 Hz; 30-15,000 Hz ± 3 dB. S/N ratio: 65 dB (Dolby-on, FeCr tape). Wow and flutter: 0.05% (WRMS). Fast forward and rewind time: 90 sec. (C-60 tape). Head: Ferrite Guard Head (FGH). Motor: 38-pulse FG servo motor. Input sensitivity/impedance: Mic: 0.3 mV/200 ohms-10K ohms. Line-in: 50 mV/50K ohms. DIN: 0.1 mV/K ohms/3K ohms. Output level/impedance: Line-out: 0.775V/50K ohms. DIN: 0.775V/50K ohms. Headphone: 3.4 mW/8 ohms. Power consumption: 10W. Power source: AC: 110-120V/220-240V (selectable with voltage selector) 50/60 Hz. Dimensions: 16 $\frac{1}{4}$ " W x 5 $\frac{1}{4}$ " H x 13" D. Weight: 16.5 lbs.

©Dolby is a trademark of Dolby Laboratories Inc.



\$239⁹⁵ assembled

Aiwa AD-1250 cassette deck with Dolby®

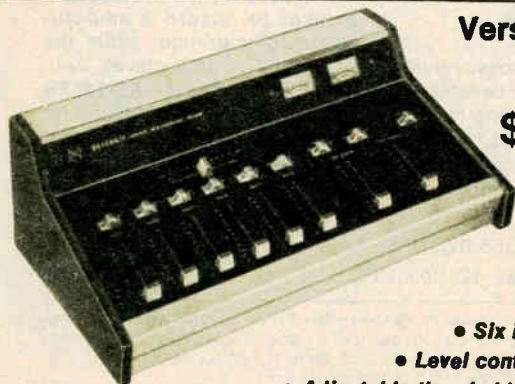
Ultra-modern design and the features you need for top-quality recordings. The futuristic, inclined panel makes operation of controls and tape insertion a breeze. Features include an oil-damped cassette ejection system for smooth, noiseless ejection, large VU meters and LED peak indicator for precision recording levels on all types of material and, of course, Dolby noise reduction for greatly reduced-tape hiss and background noise. Piano-type keys give a light but positive action. A mechanical pause key is separate from other keys for quick identification and operation. Separate 3-position bias and equalizer switches allow for optimum recording with conventional, CrCO or FeCr tapes.

The performance of the AD-1250 is excellent too; frequency response is a full 30-16,000 Hz with standard tape, wow and flutter are less than 0.09% (WRMS) and signal to noise ratio is 60 dB (dolby-on with FeCr tape). The tape head is constructed of long-lasting ultra-hard permalloy famous for its frequency response characteristics and resistance to distortion. Add the AD-1250 to your hi-fi system today. It's an outstanding value and a superb performer at a sensational low price! Fully assembled.

ATP-1233, Shpg. wt. 17 lbs. **239.95**

AD-1250 SPECIFICATIONS: Frequency response: 30~14,000 Hz (LH tape). 30~16,000 Hz (CrO₂ tape). 30~16,000 Hz (FeCr tape). Head: Ultra-hard permalloy head. Fast forward and rewind time: 85 sec. (C-60 tape). Motor: DC servo motor. Input sensitivity/impedance: LINE: 50 mV/50K ohms. DIN: 0.1 mV/K ohm/3 K ohms. MIC: 0.3 mV/200~10 K ohms. Output level/impedance: LINE: 0.775 V/50 K ohms (OVU). DIN: 0.775 V/50 K ohms (OVU). HEADPHONE: 1 mW/8 ohms. Tape speed: 4.8 cm/sec. (1-7/8 ips). Wow and flutter: 0.09% (WRMS). S/N ratio: 60 dB (Dolby-on FeCr tape). Semiconductor: 2 ICs, 19 transistors, 12 diodes, 3 LEDs. Power consumption: 10W. Power source: 110~120 V/220~240 V (Selectable with voltage selector) 50/60 Hz. Track system: 4-track, 2-channel Recording system: AC bias. Erasing system: AC erasure. Dimensions: 15 $\frac{1}{4}$ " W x 5 $\frac{1}{4}$ " H x 10 $\frac{1}{2}$ " D. Weight: 10.2 lbs.

©Dolby is a trademark of Dolby Laboratories Inc.



Versatile Stereo Mike Mixer Console

\$144⁹⁵



- Six inputs, two outputs
- Level controls for each input
- Adjustable threshold for LED indicators

Wide frequency response and low distortion give you clean, life-like mixing capability. Each of the TM-1626's two outputs has its own master level control and meter 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 most any type of microphone. The fourth microphone input has a "pan" control to adjust its apparent location from left to right or anywhere in between. All six inputs can be individually switched to left, off, or right channel. Access to "Mix-Bus" permits paralleling added mixers for extra inputs and outputs. A pair of backlit meters with two switch-selected ranges plus a pair of LED's with adjustable threshold show instantaneous peaks faster than any meter. Case with walnut-veneer end panels.

Kit TM-1626, Shpg. wt. 12 lbs. **144.95**

There's a Heathkit

Buy a pair of speakers and SAVE!

Heath makes it easier than ever for you to get a great deal on speakers for your stereo. Order them by the pair and save! And, no matter what speaker you choose, you'll get the great sound and easy assembly that make Heathkit speakers your BEST choice!



\$169⁹⁵ each

\$319⁹⁵ pair

1" wide-dispersion dome tweeter for superb definition

Easy-access controls and fuses

4½" midrange in special subenclosure

Gutsy 10" woofer for solid, well-defined bass



A top-quality 2-way speaker system



\$109⁹⁵ each **\$199⁹⁵** pair

For surprisingly high volume from low- and medium-power amplifiers

Here's a two-way speaker system with the ability to produce lots of good, clean sound regardless of the size of your amplifier. Just 6 watts is enough, in fact, but it will take up to 100 watts maximum! The AS-1352 has improved frequency response and a wider frequency range than our other two-way shelf systems. The 1¾" tweeter



has phenolic ring suspension for superior dispersion. Has a flat/—3 dB high frequency switch, separately fused woofer and tweeter. Handsome factory assembled walnut-veneered cabinet with acoustical foam grille. 24" H x 13½" W x 11" D. 8 ohms impedance.

Kit AS-1352, Shpg. wt. 55 lbs. UPS each 109.95

Kit AS-1352-2, Shpg. wt. 116 lbs. UPS pair 199.95

AS-1352 SPECIFICATIONS: Frequency Range (—10 dB): 30 Hz to 20 kHz. Frequency Response: ±3 dB, 45 Hz to 18 kHz. Impedance: 8 ohms nominal. Recommended Amplifier Power: 6 watts min. to 100 watts (fused for larger amplifiers). Crossover Frequency: 2800 Hz (12 dB/octave). Dimensions: 24" H x 13½" W x 11" D. Weight: 38 lbs.

Our best-selling 3-way speaker

Precise selection of this speaker system's "Q" ensures a smooth, wide range frequency response and a "natural" sound

Our most popular three-way speaker system and the one that best illustrates the rewards of careful design. For example, a special sub-enclosure isolates the 4½" midrange speaker from distortion caused by woofer vibrations (most bookshelf systems use a less effective plastic back behind the midrange cone). Second, the subenclosure is filled with a polyester damping material which prevents reflections — a primary cause of midrange coloration. The 1" dome tweeter is one of the finest made — excellent power handling and superb definition. Even at 12,000 Hz its horizontal dispersion is 120°! The 10" woofer provides solid, well-defined bass. And the woofer-to-midrange crossover frequency is 500 Hz to minimize IM distortion and ensure smoothness.

To create a sharply focused sound "image", all three of the AS-1373's drivers are flush-mounted; 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 can be positioned directly above the midrange. Whether you position the system horizontally or vertically — simply interchange the tweeter and switch plate.

Kit AS-1373, 68 lbs. UPS 169.95

Kit AS-1373-2, 141 lbs. UPS pair 319.95

AS-1373 SPECIFICATIONS: Frequency Range (—10 dB): 30 Hz to 22 kHz. Frequency Response: ±3 dB, 40 Hz to 20 kHz. Impedance: 8 ohms. Recommended amplifier power: 11 watts min. to 200 watts. (fused for larger amplifiers). Crossover frequencies: 500 Hz (12 dB/octave) and 3000 Hz (12 dB/octave). Fuses: Woofer, 1¼ amp Slow-Blow; midrange, ¾-amp Slow-Blow; tweeter, ½-amp regular. Controls: 3 kHz shelf/flat; 10 kHz rolloff/flat. Dimensions: 26" H x 14½" W x 11½" D, without 1¼" grille. Weight: 47 lbs.

Low-priced 3-way bookshelf speaker



\$129⁹⁵ each **\$239⁹⁵** pair

All the advantages of full three-way performance at a two-way price

The AS-1363 is a full-range 3-way speaker system that uses a 10" woofer, a 4½" midrange speaker and a 1" dome tweeter. The woofer-to-midrange crossover frequency is 750 Hz (6 dB/octave) to ensure a smooth-sounding midrange; while the

midrange to tweeter crossover is 4000 Hz (6 and 12 dB/octave). Two-position midrange and tweeter switches let you adjust the AS-1363's sound to suit any listening room. Each driver is individually fused for protection. Impedance is 8 ohms. The factory-assembled cabinet features a handsome pecan-veneered Mediterranean finish and hardwood trim, with a decorative gold/black patterned grille cloth. 24¾" H x 14¼" W x 11½" D.

Kit AS-1363, Shpg. wt. 55 lbs. UPS each 129.95

Kit AS-1363-2, Shpg. wt. 128 lbs. UPS pair 239.95

AS-1363 SPECIFICATIONS: Frequency Range (—10 dB): 30 Hz to 20 kHz. Frequency Response: ±3 dB, 45 Hz to 18 kHz. Impedance: 8 ohms, 6 ohms minimum. Recommended Amplifier Power: 5 watts min. to 130 watts (fused for larger amplifiers). Dimensions: 23¾" H x 14¼" W x 11½" D. Weight: 40 lbs.

speaker system for everyone



Our incredible 3-way floor system

\$309⁹⁵
each

\$579⁹⁵
pair

Low distortion and incredible bass response at even loud listening levels — a complement to even the finest component systems!

The AS-1348 will do justice to any stereo system's amplifier. It combines a massive 15" rear-facing, slot-loaded woofer, two 4½" mid-range speakers and three 1" tweeters in a precision-designed cabinet. The two midrange drivers radiate directly forward for excellent presence and realism. The three tweeters face forward, angle right and angle left for high-frequency response with outstanding dispersion. Has individual driver fuses and six-position attenuation controls. Fully assembled, sealed acoustic-suspension enclosure with walnut and oak veneer finish, acoustically transparent grille cloth. 38" H x 24" W x 15" D. 8 ohms impedance. Motor Freight.

Kit AS-1348, Shpg. wt. 110 lbs. each 309.95
Kit AS-1348-2, Shpg. wt. 220 lbs. 579.95

AS-1348 SPECIFICATIONS: Frequency Range (-10 dB): 22 Hz to 22 kHz. Frequency Response: ±3 dB, 28 Hz to 20 kHz. Impedance: 8 ohms nominal. Recommended amplifier power: 8 watts min. to 250 watts (fused for larger amplifiers). Crossover frequencies: 500 Hz (12 dB/octave) woofer-to-midrange and 3000 Hz (6 and 12 dB/octave) midrange-to-tweeter. Dimensions: 38" H x 24" W x 15" D. Weight: 100 lbs.



Two front-facing midrange drivers and multi-directional three tweeter array

Mid-priced 2-way speaker system



\$74⁹⁵
each

\$139⁹⁵
pair

Efficient 2-way system that's excellent for low- to medium-power amplifiers

The AS-1342 doesn't need much amplifier power so if you have a small system, this is the speaker for you. Uses an 8" woofer and a 2x6" horn-type tweeter that can be mounted for best high-frequency dispersion whether you place the system horizontally or vertically — a Heath exclusive! Has a continuous tweeter level control.

Kit AS-1342, Shpg. wt. 32 lbs. UPS each 74.95
Kit AS-1342-2, Shpg. wt. 78 lbs. UPS 139.95

AS-1342 SPECIFICATIONS: Frequency Range (-10 dB): 40 Hz to 16 kHz. Frequency Response: ±3 dB, 60 Hz to 14 kHz. Impedance: 8 ohms nominal. Recommended Amplifier Power: 4 watts min. to 50 watts (fused for larger amplifiers). Crossover Frequency: 2500 Hz (12 dB/octave). Dimensions: 22¼" H x 12" W x 10½" D. Weight: 20 lbs.

Low-priced 2-way speaker system



\$59⁹⁵
each

\$109⁹⁵
pair

Accurate sound reproduction at a low, low price

An excellent choice for low to medium priced music systems or use them as extension speakers. Has an 8" woofer with a hefty 1 lb. ceramic magnet and a 1¾" phenolic ring tweeter. Can

be driven by as little as 9 watts, but handles up to 50 watts. Has individual driver fuses and tweeter level control.

Kit AS-1332, Shpg. wt. 29 lbs. UPS each 59.95
Kit AS-1332-2, Shpg. wt. 63 lbs. UPS 109.95

AS-1332 SPECIFICATIONS: Frequency Range (-10 dB): 40 Hz to 20 kHz. Frequency Response: ±3 dB, 50 Hz to 18 kHz. Impedance: 8 ohms nominal. Dimensions: 19" H x 10½" W x 8" D (without grille). Weight: 15 lbs.

Our 2-way column speaker is virtually omnidirectional



\$139⁹⁵
each

\$259⁹⁵
pair

The perfect "party" speaker gives outstanding dispersion of a bright, clean sound

Here's a speaker that will sound just as outstanding no matter where you sit in the room. Two 1" dome tweeters and two 6½" full-range drivers are mounted in separate woofer-tweeter arrays on adjacent sides of the cabinet to maintain well-balanced sound. The woofers are located well above the floor, so bass response is solid and well-defined. There is no mid-bass boom or resonance, so mid-frequencies come through loud and clear. The tweeters deliver a full

10 to 20 dB more off-axis response than conventional tweeters for bright, clean highs — and their amazing 270° dispersion pattern maintains a well-balanced stereo image regardless of speaker placement. Has a nominal 4 ohms impedance, so most amplifiers will deliver up to TWICE their rated 8 ohm power. Separately fused woofers and tweeters, flat/-3 dB level control. Light walnut-vinyl finish on all four sides, simulated black slate top and acoustically transparent foam grille.

Kit AS-1344, 57 lbs. UPS each 139.95
Kit AS-1344-2, 122 lbs. UPS pair 259.95

AS-1344 SPECIFICATIONS: Frequency Range (-10 dB): 35 Hz to 22 kHz. Frequency Response: ±3 dB, 55 Hz to 20 kHz. Impedance: 4 ohms minimum. Recommended Amplifier Power: 6 watts min. to 100 watts (fused for larger amplifiers). Crossovers: 4000 Hz mechanical (on woofer) and 12 dB/octave electrical on tweeter. Fuses: 1½-amp Slow-Blow for woofers, 1 amp regular for tweeter. Control: 2 position tweeter level, flat and -3 dB. Dimensions: 40" H x 11" W x 11" D. Weight: 45 lbs.

Here's Professional Sound at low Heath Prices

LOWEST PRICES EVER!
SAVE on both the individual pieces and the complete system!



Professional-quality PA Equipment

1 P.A. Control Amplifier. Delivers 100 watts continuous power to two column speakers, has six fully mixable low-impedance inputs; each with bass, treble reverb-on-off and attenuation controls; complete filtering system for good sound. Add as many booster amps and speakers as you need for any audience coverage — even add more control amps for additional inputs. Rugged particle board case, 21½" W x 11¼" H x 7" D. For 120/240 VAC, 60/50 Hz.

Kit TA-1620, Shpg. wt. 54 lbs. **Now Only 429.95**

2 Low-Distortion Booster Amplifier. Use with the TA-1620 for even more power. Delivers 100 watts continuous to two column speakers. Matched in style and stackable with the TA-1620.

Kit TA-1625, Shpg. wt. 22 lbs. **Now Only 179.95**

3 PA Speaker Column. Has six 8" full-range speakers response tailored for clean voice reproduction; an output jack for TA-1625 booster amp, or to connect two columns in parallel. With 50' cable, storage compartment. 14" W x 62" H x 10¼" D. Shpg. wt. 112 lbs.

Kit TS-1630, Motor Freight **Now Only 179.95**

SAVE on this complete PA system!

SAVE \$289⁹⁰

If purchased separately, \$789.85

TA-1620 Control Amplifier and Two TS-1630 Column Speakers.
 Kits TAS-1620, Shpg. wt. 319 lbs. Motor Freight **499.95**

25-watt Guitar Amplifier

An excellent choice for the musician on the move! Powerful enough for good sound levels yet compact and light for easy portability. The rugged one-piece case with carrying handle houses a full control amplifier and a speaker system featuring two heavy-duty 12" woofers — takes plenty of power for day-in, day-out performance without breakup.

Has two dual-input channels — one for accompaniment, microphone, etc.; the other for special effects. Features double-spring variable reverb and tremolo with variable rate and depth, a line reverse switch to minimize hum. Two footswitches permit hands-free control of reverb and tremolo. Compact and functional ¾" black vinyl-covered wood cabinet measures 28" W x 19¾" H x 9" D. For 120/240 VAC, 60/50 Hz.

Kit TA-16, Shpg. wt. 61 lbs. **199.95**



This Personal Engraved Name Plate shows extra pride in your Heathkit Project

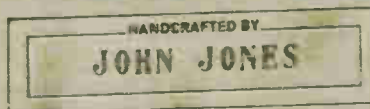
FILL IN THIS SPECIAL NAME PLATE ORDER FORM COMPLETELY AND BRING IT IN TO YOUR LOCAL HEATHKIT ELECTRONIC CENTER. PLEASE PRINT YOUR NAME PLAINLY IN CAPITAL LETTERS, USING A MAXIMUM 14 CHARACTERS (INCLUDING SPACES) IN THE BOXES PROVIDED BELOW.

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Please enter my order for ___ GDP-1225 name plates. The price is \$1.50 for one, \$1.30 each for two or more (including postage and handling to your Heathkit Electronic Center).

Name _____
 Address _____
 City _____
 State _____ Zip Code _____

CUT OUT ENTIRE FORM ON DOTTED LINE AND ATTACH TO YOUR KIT ORDER



\$150
 for one

Your personal name plate in jewel-like, silver-satin finish — etched, hand-engraved and adhesive backed. Easily worth \$2.95 — a real value with your order!

(\$1.30 each for 2 or more)
 (\$1.75 if purchased separately)

Separate purchase can only be made through your local Heathkit Electronic Center

What better way to show your pride in your finished kit? The handsome hand-engraved name plates feature a virtually indestructible silver-satin, brushed jeweler's finish on durable Metal Graphics™ Aluminum and self adhesive backing. You'll want one for every Heathkit product you own. Remember, your name plate order must accompany a regular kit order to get the lowest price.

Kits for Better Fishing



1 \$99.95

1 Heathkit Dual-Range Depth Sounder

Shows depth, type of bottom, 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. Has switch-selected 0-60 and 0-240 ft. ranges. Fixed noise rejection, polarity protection,



2 \$74.95

tection, super-bright neon indicator. Gimbal mount, quick-disconnect power and transducer leads. Shpg. wt. 8 lbs.

Kit MI-1031-1, with thru-hull transducer, 15' coax. 99.95

Kit MI-1031-2, with transom transducer, 25' coax. 99.95

2 Heathkit Single-Range Depth Sounder

As above, single 0-240 ft. range, no alarm. Shpg. wt. 8 lbs.

Kit MI-1030-1, with thru-hull transducer and 15' coax. 74.95

Kit MI-1030-2, sounder with transom transducer and 25' coax. 74.95

3 Heathkit Dual-Range Fish Spotter® Sounder

The Heathkit MI-2901 Fish Spotter® Sounder has adjustable audible alarm you set to sound off at any depth to 240 ft. Fish swimming between surface and preset depth will trigger alarm. Includes two switch-selected ranges (0-60' and 0-240') for sharper definition; noise rejection circuit; bright neon-flasher for precise depth reading. Rugged aluminum cabinet. Portable suction-cup transducer bracket. Powered by two 6-volt lantern batteries (not included).

Kit MI-2901, Shpg. wt. 8 lbs. 99.95

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

MI-2901 SPECIFICATIONS: 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, $\pm 5\%$. Noise Rejection: Fixed at approximately 500 microseconds integration time. Power Requirement: 12 VDC. Dimensions: (Less Handle) 7" H x 6" W x 11" D.

4 Heathkit Economy Fish Spotter® Sounder: Similar to MI-2901 above, but with single range to 120-ft. Reads 240' max. Has bright neon indicator. No audible alarm.

Kit MI-2900, Shpg. wt. 8 lbs. 74.95

5 Heathkit Scanning Transducer Bracket: Designed for use with Heathkit MI-2901 and MI-2900 Fish Spotter® sounders. "C" clamp mounting. For 1 3/8" cylindrical transducer.

Kit MIA-2900-1, Shpg. wt. 4 lbs. 19.95



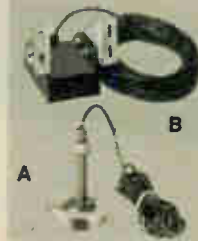
\$99.95

3 Dual-Range Fish Spotter®



5

4 Economy Fish Spotter®



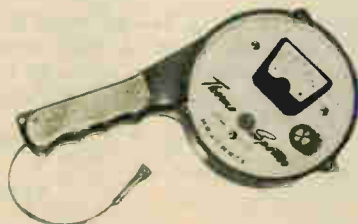
These depth sounders are available with either through-the-hull or transom-mount transducers. The transom mount unit (B) is recommended for high-speed craft with planing hulls. The through-the-hull transducer (A) is ideal for a permanent mount on larger boats.

MI-1030 and MI-1031 SPECIFICATIONS: Frequency: approx. 200 kHz. Accuracy: Within 2% of actual depth. Transducer: Barium titanate ceramic element encased in waterproof housing. Power requirement: 0-60' range, 225 mA @ 11-15 VDC (MI-1031 only), 0-240' range, 125 mA 11-15 VDC with one return pulse. Dimensions: 6 1/2" H x 5 3/4" W x 7 1/4" D.

The Thermo Spotter® thermometer

Completely self-contained with submersible sensing element on a 100-ft. cable. Kit includes operations manual with fish temperature preference charts. Uses 1.5-volt penlight battery (not included).

Kit MI-104, Shpg. wt. 3 lbs. . 34.95



It's Heath for better boating!



\$159⁹⁵

Heathkit Digital Depth Sounder

Lets you know depth of water below you from 2.5 to 199 ft.

Accurate depth readings at a glance. Dual-range digital display automatically reads depth in 0.1 foot increments from 2.5 to 19.9 feet and in 1 foot increments from 20 to 199 feet. A red light signals clearance of 10 feet or less. Single knob controls power on/off and brightness control. Rugged Cyclocac[®] case; gimbal mounting bracket; 15 feet cable for through-hull installation, 25 feet for transom mount.

Kit MI-101-1, With through-hull transducer, Shpg. wt. 7 lbs. . . . **159.95**

Kit MI-101-2, With transom transducer, Shpg. wt. 6 lbs. . . . **159.95**

MI-101 SPECIFICATIONS: Accuracy: $\pm 2\%$, ± 1 digit. Current drain: 300-500 mA. Power requirement: 10-17 VDC @ 500 mA. Dimensions: 2 1/4" H x 6 5/8" W x 8 1/2" D (less gimbal hardware).



Heathkit Digital Radio/Direction Finder

Digital readout pinpoints AM or beacon stations

Keeps you informed on the 190-410 kHz LW band and standard AM. It identifies stations with a digital frequency readout, and gives you a heading from its big easy-read azimuth ring marked in 2° increments! Has excellent sensitivity, lighted meter for accurate null indications, telescoping sense antenna for

an impressive bearing accuracy of $\pm 3^\circ$. Has front panel RF sensitivity control. Operates from 12 VDC system, or 6 "D" cells (not included). Battery-saver circuit cuts display off after 20 seconds, can be recalled instantly.

Kit MR-1010, Shpg. wt. 14 lbs. **219.95**

MR-1010 SPECIFICATIONS: Sensitivity: Typically 30 $\mu\text{V}/\text{m}$ (LW) for 10 dB S+N/N. Selectivity: (6 dB points): 3 kHz (LW); 5 kHz (AM). 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: 7 1/4" H x 11 1/2" W x 12" D.



Midland 45-Channel VHF Marine Radiotelephone

Has full legal 25-watt transmitter output

Model 13-535. Here's a full feature radiotelephone that's right for any boat! Covers marine channels 6-28 and 65-88 for transceiver operation, receives marine channel 15 and both NOAA weather channels. Has 25 W/1 W power switch, squelch control, phase-locked-loop tuning, lots more! Includes

coiled-cord mike, bracket, DC cord.

MWW-4501, Assembled, 10 lbs. **399.95**

A-S 8', 6 dB antenna, chrome ratchet base.

MWS-4511, Shpg. wt. 6 lbs. UPS **79.95**

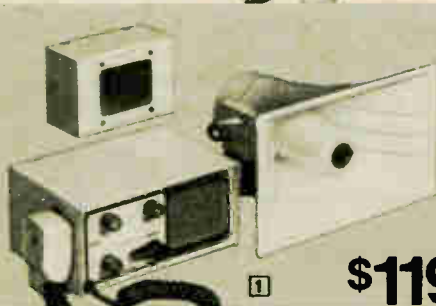
COMBO SPECIAL — SAVE \$39.95!

MWW-4501 and MWS-4511 together.

If purchased separately, \$479.90.

MWS-4501, Shpg. wt. 16 lbs. **439.95**

13-535 SPECIFICATIONS: Control: PLL synthesized with detent tuning. Connections: Microphone, external speaker, antenna, DC power. Power Source: 13.6 VDC (nominal) negative ground. Size: 3 1/4" H x 8" W x 10 1/2" D.



\$119⁹⁵



\$54⁹⁵



1 Automatic Foghorn/Hailer. Features a husky 55-watt amplifier; foghorn rate and duration controls; separate "listen" & "hail" gain controls. Includes low-profile weather-resistant deck horn, 20 ft. speaker cable, gimbal mount. Operates on 12 VDC power system, positive or negative ground. 4 3/4" H x 9 3/4" W x 9 1/4" D.

Kit MD-19A, Shpg. wt. 15 lbs. **119.95**

Kit MDA-19-1, Optional remote speaker for intercom use.

Shpg. wt. 2 lbs. **12.95**

32

2 Economy Power Inverter. Operates electric razors, lamps, other small appliances from 6 or 12-volt input. Supplies 117 VAC square wave with up to 175 watts continuous power rating. Not for high starting current or sine wave AC equipment. 25-amp fuse.

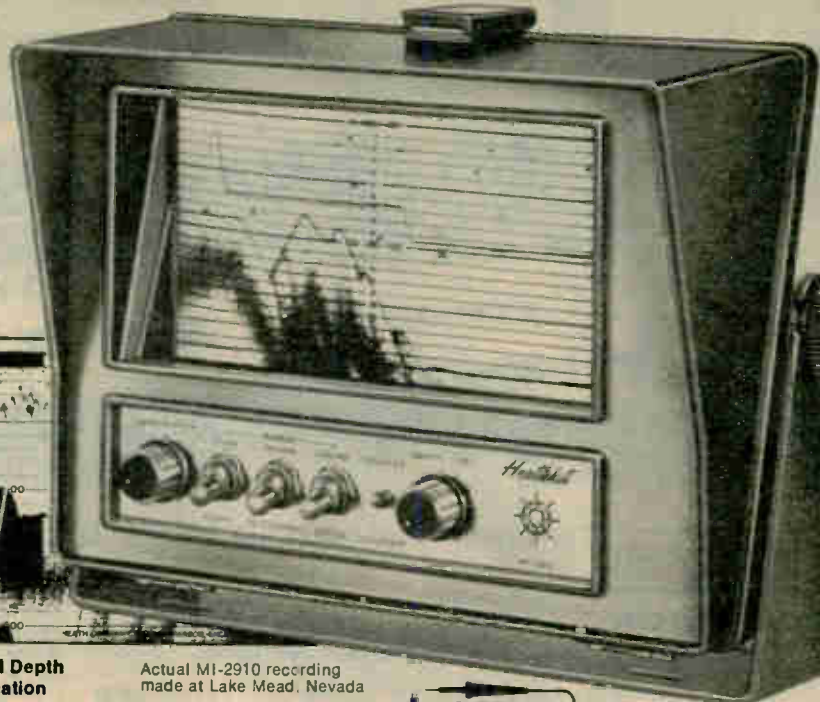
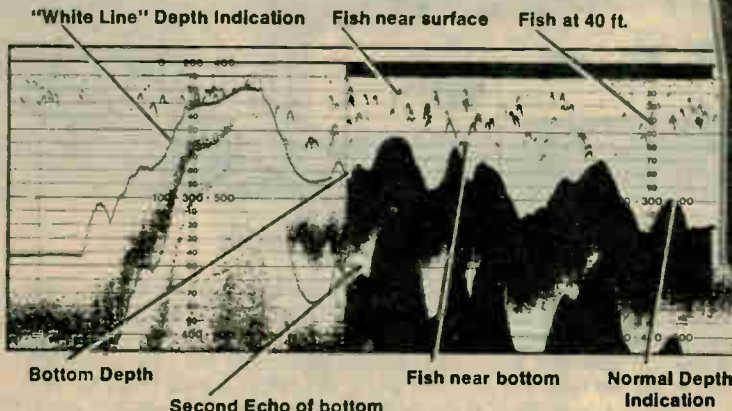
Kit MP-10, Shpg. wt. 8 lbs. **54.95**

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

Find fish faster and easier!



The Heathkit Straight Line/White Line Depth Recorder



Actual MI-2910 recording
made at Lake Mead, Nevada

6 EVENING KIT
Fast, Easy Assembly

The Heathkit MI-2910 is one of the most useful boating and fishing accessories you can own. It helps you find the fish, and it provides a permanent record of the best spots and depths so you can find your favorite spots again and again easily. Its bottom recording accuracy also makes it a valuable navigation aid for following coast line depths and mapping lakes. Best of all, it's priced a lot lower than comparable recording depth sounders.

An on-off sensitivity control adjusts the MI-2910 to indicate the bottom and fish or other objects above it. The MI-2910 will clearly indicate schools of bait and small fish as well as individual large fish. Holes and dropoffs are clearly shown for lake mapping purposes too. The extra-wide-beam transducer covers a larger area of water than most conventional units, so you get a better and wider "picture" of what's below you. Its three ranges (5' to 200', 200-400', and 400-600') make it useful for virtually any lake or coastal area.



Available with through-the-hull or transom-mounted transducer.

Uses a straight line recording system for easier and more accurate chart reading and interpretation. A white line control lets you adjust the bottom indication to a fine line so objects or fish close to the bottom can be distinguished easily. A switch controlled marker puts a vertical line on the chart for easy reference marking. A roll of paper lasts approx. 13 hours for continuous charting. And the two-piece case opens easily for

convenient paper replacement.

The MI-2910 has two lamps to light the chart for easy operation at night. The weather-resistant case with gasket seals helps prevent water from getting in the recorder. A universal gimbal mount lets you install the MI-2910 just about anywhere, and remove it for theft protection and storage when not in use. With one roll chart paper.

Kit MI-2910-1, recorder with through-the-hull transducer and 30' cable, Shpg. wt. 17 lbs. **299.95**

Factory assembled and calibrated version of above
WI-2910-1, Shpg. wt. 16 lbs. **424.95**

Kit MI-2910-2, recorder with transom mount transducer and 30' cable, Shpg. wt. 17 lbs. **299.95**

Factory assembled and calibrated version of above
WI-2910-2, Shpg. wt. 16 lbs. **424.95**

MIA-2910-1, Two Rolls Chart paper. Shpg. wt. 2 lbs. **9.95**

MI-2910 SPECIFICATIONS: Power Requirement: 11-16 VDC at 1.6 amperes maximum. Depth Range: 5' to approx. 600'. Display: straight (vertical) line plotting on high contrast paper. Accuracy: better than 97% of indicated depth with belt motor speed at 320 rpm. Controls: Sensitivity control with power on-off switch. White line control with on-off switch. 0-200', 200-400' and 400' to 600' range switches. Marker pushbutton. Transducer: frequency, 50 kHz, ± 4 kHz. Beam Width: 35° at 3 dB. Cable length: 30 ft. Mounting: through-hull or transom. Chart Paper: Size, 3 1/4" x 50' with pre-marked depth scales. Take-up speed, approx. 3/4" per minute. Running time per roll: approx. 13 hours. Dimensions: less gimbal bracket, 11" W x 8" H x 7" D. Net Weight: less transducer 6 1/2 lbs.

SAVE \$30

MR-1134 Marine-Band VHF Automatic Scanning Monitor

- Priority channel selection
- Large, lighted channel indicators
- Automatic or manual channel selection

Lets you automatically monitor up to 8 marine frequencies on the 156-163 MHz VHF marine band. Listen to weather frequencies, marine emergency channels, harbor instructions, fishing reports, ship-to-shore and ship-to-ship communications, more. Includes channel lockout, priority scanning and more. Manual scanning too, simply push the button for the channel you wish to monitor. A 4-pole crystal

filter provides good selectivity (for crowded signal areas, use the optional 8-pole filter on page 35). A built-in telescoping antenna brings in plenty of signals, there's also provision for an external antenna. Handsome blue and white marine styling, rugged splash proof case. AC or 12 VDC operation. Easy kit assembly and no-instrument alignment. Order crystal certificates from page 35.

Kit MR-1134, Shpg. wt. 9 lbs. (Was 89.95 in Cat. 818) **Now 59.95**

MR-1134 SPECIFICATIONS: Scanning Range: any 8 MHz segment of the 146-174 MHz frequency range. Sensitivity: 0.5 μ V or less for 12 dB SINAD. Adjacent Channel Rejection: -40 dB typ. (-55 dB typ. with optional 8-pole filter). Scan Rate: approx. 16 channels per second. Scan Delay: approx. 1/2 second. Priority Channel Check: approx. 4 seconds. Dimensions: 3 1/2" H x 8 1/2" D x 11 1/4" W. Net Weight: 5 lbs.



Convenient and versatile AM/FM Digital Electronic Alarm Clock-Radio

SAVE \$15

\$124⁹⁵

- "Catnap" with the 7-minute snooze button
- Stay "on time", even if AC power fails thanks to the built-in "fail safe" circuit

Here's everything you need in a quality clock-radio — 24 hour set'n forget alarm, fine sound and style that fits anywhere — kitchen, bedroom, den, office. The GR-1075 all-electronic digital clock reads out the time in conventional 12-hour format with bright orange 7-segment Beckman digits. Displays AM or PM, too. A lighted decimal pulsates to indicate seconds and also shows that the alarm is properly set. Readout features automatic brightness control. The 24-hour alarm cycle can be set to wake you with a gentle pulsating, electronic "beep" (which can be changed in volume by the radio volume control) . . . or by the soft music from the FM or AM radio station of your

choice. The 7-minute snooze cycle feature is repeatable for up to an hour. Two 9-volt batteries (not supplied) take over during power interruptions and keep the clock counting, without the display — when power is restored the clock is "on time" and the alarm will go off at the set time. On the front panel are finger-flip switches for on/off; AM/FM selection; radio or electronic alarm; "wake-up" alarm set; "Snooze" cycle; plus volume and AM/FM tuning controls. Black plastic cabinet with brushed aluminum trim strip, and simulated walnut-grain vinyl end panels.

Kit GR-1075, Shpg. wt. 10 lbs. . (Was \$139.95 in Cat. 817), Now 124.95

GR-1075 SPECIFICATIONS: FM Sensitivity: 5 μ V @ 30 dB quieting. AM Sensitivity: 300 μ V/M @ 20 dB quieting. Speaker: 3" x 5" oval. Power requirement: 120/240 VAC, 50/60 Hz; 17 watts max.; clock, 7 watts. Dimensions: 4 $\frac{1}{4}$ " H x 13 $\frac{3}{8}$ " W x 8 $\frac{1}{8}$ " D.

AM Pocket Portable Radio

A pocket portable and a practical first kit that will give you first rate performance. Take it camping, to the beach, use it around the house. The GR-1008 will give you musical enjoyment wherever you are. It's easy to build. And with a chassis layout so roomy — even the beginner will have lots of room to maneuver! The GR-1008 features a stunning black and white case with the look of today and with its built-in 3 $\frac{1}{2}$ " speaker you'll get fine sound even at high volume. 4" H x 7 $\frac{7}{8}$ " W x 2" D. Operates on 9-volt battery (not supplied).

Kit GR-1008, Shpg. wt. 2 lbs. 16.95

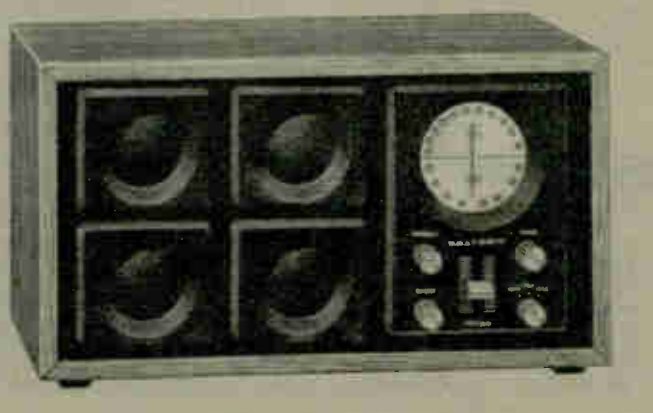


1 EVENING KIT
Fast, Easy Assembly

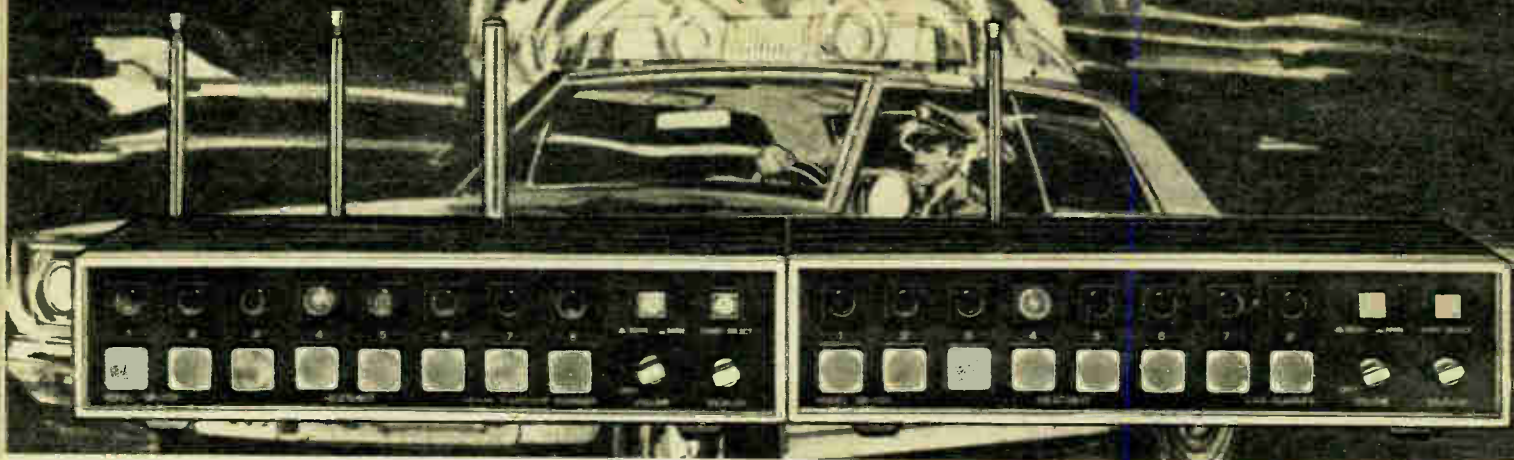
Deluxe Heathkit AM/FM Table Radio

An outstanding value, this compact and handsome table radio puts great sound anywhere you want it! Features quality solid-state circuitry, a sensitive AM/FM tuner and a full-range acoustic-suspension speaker. Its low-distortion amplifier (Power Output: 5 watts, minimum RMS, into 8 ohms with less than 1.0% total harmonic distortion from 60 Hz to 15 kHz) gives you a roomful of full-bodied sound. Separate bass and treble controls let you tailor the sound the way you like best. Handsome teak-grained vinyl-covered cabinet with molded front grille. Easy kit assembly, too, even for first-time builders.

Kit GR-1085, Shpg. wt. 12 lbs. 99.95



GR-1085 SPECIFICATIONS: FM: Sensitivity: 5 μ V. Selectivity: 60 dB. GENERAL: Power Requirement: 120/240 VAC, 50/60 Hz, 25 watts. Speaker: 4 $\frac{1}{2}$ " x 8 Ohm. Dimensions: 7" H x 13" W x 7 $\frac{1}{4}$ " D.



Action-packed Heathkit Automatic Scanning Monitors

GR-1132 3-Band VHF/UHF Monitor

Monitor fire calls, police, ambulances, Amateur 2-meter FM, marine emergency vehicles, gov't weather stations, more. It automatically scans each channel, stopping on any signal, then resumes scan after broadcast. Priority feature — checks priority channel every 4 seconds. 4-pole crystal filter (for even better selectivity in crowded signal areas, order the optional 8-pole filter, right); channel lockout buttons; extra-large lighted channel indicators. Telescoping antennas for each band, provision for external antenna. Built-in speaker, volume and squelch controls. AC and 12 VDC power supplies. Order crystal certificates at right.

Kit GR-1132, Shpg. wt. 9 lbs. **139.95**

GR-1132 SPECIFICATIONS: Scanning Range: LC-VHF, any 10 MHz segment of 30-50 MHz frequency range. Hi-VHF, any 8 MHz segment of 146-174 MHz frequency range. UHF, any 8 MHz segment of 450-500 MHz frequency range. Sensitivity: Lo and Hi VHF: 0.5 μ V or less for 12 dB SINAD. UHF: 0.7 μ V or less for 12 dB SINAD. Adjacent Channel Rejection: (30 kHz channel spacing) — 40 dB typ. (—55 dB typ. with optional 8-pole filter). Scan Rate: approx. 16 channels per second. Scan Delay: approx. 1/2 second. Priority Channel Check: approx. 4 seconds. Antenna Impedance: 50 ohms. Audio Output: AC operation, 1 watt; DC operation, 2 watts; less than 10% distortion. Power Requirement: 120 VAC, 60 Hz, 12 watts or 13.8 VDC, 300 mA squelched; 500 mA at full output. Dimensions: 3 3/8" H x 8 1/2" D x 11 1/8" W. Net Weight: 5 lbs.



4-Band Shortwave — just right for the beginner

Tunes foreign broadcasts from all over the globe — amateur and CB radio bands — local and marine weather reports — ships at sea — plus standard AM. Features wide slide-rule tuning dial with logging scale; signal-strength tuning meter; built-in AM rod antenna plus connection for SWL antenna. Also has variable BFO for code reception, built-in speaker, front panel jack for external speaker or headphone, switched automatic noise limiting. Most parts mount on a single circuit board for easy step-by-step assembly.

Kit SW-717, Shpg. wt. 10 lbs. **79.95**

GR-1131 Hi-Band VHF Scanning Monitor

If the emergency services in your area use the high-VHF band, this is the low-cost way to listen in! Monitor fire calls, police, ambulances, Amateur 2-meter FM, marine emergency vehicles, government weather stations and more. Other features same as GR-1132.

Kit GR-1131, Shpg. wt. 9 lbs. **89.95**

GR-1131 SPECIFICATIONS: Scanning Range: any 8 MHz segment of the 146-174 frequency range. Sensitivity: 0.5 μ V or less for 12 dB SINAD. Other specifications same as GR-1132 at left. Dimensions: 3 3/8" H x 8 1/2" D x 11 1/8" W. Net Weight: 5 lbs.

See page 33 for the MR-1134 Marine Band Scanner



Outdoor Scanner Antenna

For VHF and UHF. Really helps improve reception. Covers all bands, VHF and UHF. For masts to 1 1/2" diameter. SO-239 receptacle. GRA-1132-1, Shpg. wt. 2 lbs. **24.95**

Accessories for all scanners on this page

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

Crystal Certificate. You send to crystal mfr. with specific frequency. Crystal is returned postpaid. Order one for each frequency.

GRA-1100-1 **each 4.95**

Optional 8-pole crystal filter. Improves selectivity for use in crowded signal areas.

GRA-1100-2, Shpg. wt. 1 lb. **9.95**

Note: Some states prohibit use of scanners in vehicles. Check with local authorities.

Improve your SWL listening with these two low-cost additions

Long-wire SWL antenna. Really helps you pull in stations! 75' long wire with 30' lead-in, all insulators and hardware for easy setup. A must for serious listeners.

GRA-72, Shpg. wt. 2 lbs. **4.50**

Superox Headphones. These quality low-cost headphones are ideal for use with the Heathkit SW-717 SWL receiver and many others. Feature dual coils for excellent sensitivity, wide headband for comfortable listening. 600 ohms impedance.

GD-396, assembled. Shpg. wt. 1 lb. **5.95**

SW-717 SPECIFICATIONS: Frequency coverage: 550 kHz - 1500 kHz, 1.5 — 4 MHz, 4 — 10 MHz, 10 — 30 MHz. Meter: Indicates relative signal strength. Headphone Jack: Accepts low impedance headphone or external speaker. Loudspeaker: Built-in. Power Requirement: 120/240 VAC, 60/50 Hz, 8 W. Dimensions: 5 1/2" H x 14 1/2" W x 8" D.

Heathkit Pack-17™ R/C—Uncompromised

Every Heathkit R/C product is the result of quality design and engineering by people who care about R/C. We were the first to use ceramic filters to help eliminate drift; the first to put 8-channels in a single, versatile and reliable unit; the first to give you the convenience of instant plug-in frequency change. Compare Heathkit R/C with top-of-the-line assembled models — you'll see why Heathkit R/C is your smartest buy!

HEATHKIT PACK-17™ R/C gives you the performance and reliability every RC'er wants — PLUS build it yourself kit value! The transmitters, receivers and servos have the quality and reliability you NEED for serious R/C competition; the positive-action control sticks are smooth and responsive; and the easy-to-handle transmitters are compact and comfortable. Heathkit R/C is easy and fun to build too — with a thorough and complete instruction manual that even shows you how to solder. Buy and build Heathkit R/C gear — it's the winning way to fly!

NOTE: Amateur Radio License required for operation on 53 MHz band. Class C License required for operation on 27 and 72 MHz bands.

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

Kit GDA-505-D, Shpg. wt. 6 lbs. 144.95

2 5-Channel Single-Stick Transmitter & 1 module. 1-hand control of 3 channels, throttle control with trim & 1 aux. channel.

Kit GDA-505-S, Shpg. wt. 5 lbs. 154.95

3 8-Channel Dual-Stick Transmitter & 1 module. Same as GDA-505-D, plus landing gear switch & 2 additional channels.

Kit GDA-1205-D, Shpg. wt. 6 lbs. 154.95

4 8-Channel Single-Stick Transmitter & 1 module. Same as GDA-505-S, plus landing gear switch & 2 additional channels.

Kit GDA-1205-S, Shpg. wt. 6 lbs. 174.95

Receiver & 1 module (less batteries).

Kit GDA-1205-2, Shpg. wt. 1 lb. 64.95

Receiver battery pack.

Kit GDA-1205-3, Shpg. wt. 1 lb. 13.95

6 3-channel Pack-17™

Has the convenience and versatility of plug-in frequency change and it's the ONLY 3-channel system we know of that INCLUDES rechargeable batteries and an external charger so you fly with full power and uncompromised performance. Has 2-axis stick assembly, easy to handle transmitter with convenient strap for one-hand operation. An optional conversion pack lets you go 4 channels by adding another channel to the stick. All three stick channels have trim control, the 4th channel is controlled by a thumb tab. Compatible with all Heathkit servos; ideal for use as trainer transmitter with GDA-1205 and GDA-505 systems. Specify frequency when ordering (see specs below).

Kit GDA-1405-1, 3-ch. transmitter with 1 Module. 5 lbs. 89.95

Kit GDA-1405-3, 4-ch. conversion. 1 lb. 14.95

Kit GDA-1205-2, receiver with 1 Frequency Module. 1 lb. 64.95

Kit GDA-1205-3, receiver battery pack. 1 lb. 13.95

GDA-1205 AND GDA-505 SERIES SPECIFICATIONS: TRANS. — RF Frequency: crystal controlled, all bands. Frequency stability: within ±.005% on 27 MHz; within ±.002% on 53 MHz, 72 MHz. Temp. Range: 0 to 160°F. RF Output Circuit: pi network. RF Input Power: at least 500 mW. Modulation: on-off carrier keying. Approx. Current Drain: 100 mA on all bands. Controls: GDA-1205, 8 channels (4 with trim), on/off, trainer button; GDA-505, 5 channels (4 with trim), on/off switch, trainer button. Power Supply: Internal 9.6V 500 mA Ni-Cad. battery. Rechargeable simultaneously with receiver battery at 35 to 40 mA from 120 volt power line.

Dimensions: 7" H x 7" W x 2" D. Net Weight: 2½ lbs., with battery.

GDA-1205-2 SPECIFICATIONS: RECEIVER — Local Oscillator Operating Frequency: crystal-controlled, all bands. Temperature Range: 0 to +160°F. Sensitivity: 5 µV or better. Selectivity: 6 dB down at ±4 kHz; 30 dB down at ±9 kHz. Current Drain: 10 mA. Intermediate Frequency: 453 kHz. Power Supply: 4.8 V battery pack (GDA-1205-3). Controls: On/off switch. Dimensions: ¾" H x 1¼" W x 1¼" D. Net Weight: 2 ozs.

GDA-1405-1 SPECIFICATIONS: TRANSMITTER — RF Carrier Frequency: One frequency, crystal-controlled



Special-design plug-in frequency modules let you fly while the others are grounded! Instantly switch to any of 17 frequencies — and each module is perfectly matched so you get maximum RF output without alignment problems!

Additional Frequency Modules

When ordering specify frequency desired (see list below).

Transmit Module, Shpg. wt. 1 lb. 19.95

Receive Module, Shpg. wt. 1 lb. 13.95

FREQUENCIES AVAILABLE (MHz): 26.995, 27.045, 27.095, 27.145, 27.195, 53.1, 53.2, 53.3, 53.4, 53.5, 72.08, 72.24, 72.16, 72.32, 72.40, 72.96, 75.640 MHz. (When ordering, specify transmit or receive.)

SPECIAL 5-MODULE OFFER — SAVE \$15!

5 Transmit and 5 Receive Modules Only \$154⁵⁰
of your choice — specify frequencies Shpg. wt. 6 lbs.

5 A FUN-FLY plane designed for intermediate and advanced flyers. The high strength plastics used in construction make the Delthon lighter than comparably-sized balsa planes, but much more rugged. Has 46½" wingspan, 33½" body. Kit includes tank, wheels, all hardware. Does not need additional covering materials or paint. Ideal for use with all Heathkit R/C systems. With detailed manual.

Kit RP-1028, Shpg. wt. 6 lbs. 89.95

Receiver Flight Pack Special!

Save \$33⁷⁵

If purchased Separately, 198.70

Ideal for outfitting your second aircraft, or updating your present plane. Includes GDA-1205-2 Receiver Kit and 1 Module, GDA-1205-3 Receiver Battery Pack, and your choice of four GDA-1205-4 Miniature Servos or GDA-1205-5 Subminiature Servos. System includes batteries. Specify module frequency and type of servo.

Kit GDS-1205-F, Shpg. wt. 21 lbs. 164.95

Complete 3-channel Systems

Ideal for beginners, or as second systems for experienced flyers.

System with miniature servos
Includes 3-channel transmitter and one frequency module, receiver and one frequency module, receiver battery pack, and two miniature servos.

If purchased separately, 228.65
GDS-1405-1, 25 lbs. 189.95

System with subminiature servos
Includes 3-channel transmitter and one frequency module, receiver and one frequency module, receiver battery pack, and two subminiature servos.

If purchased separately, 228.65
GDS-1405-2, 25 lbs. 189.95

When ordering, specify module frequencies. Systems include batteries.

on 27 MHz, 53 MHz or 72 MHz bands. Operating Temperature: 0°-160°F. Controls: 3 channels (two with trim); ON-OFF switch. Optional fourth channel. Power Supply: Internal 9.6V, 500 mA hours, nickel-cadmium battery. Rechargeable simultaneously with receiver battery at 35-40 mA from external charger. Frequencies Available: 27 MHz (11 meters) — 26.995, 26.045, 27.095, 27.145 & 27.195, 53 MHz (6 meters) — 53.100, 53.200, 53.300, 53.400, 53.500, 72 MHz (4 meters) for R/C planes only — 72.080, 72.240, 72.400, 75.640. (All Models — 72.160, 72.320, 72.960. Dimensions: 9½" H x 3¼" W x 2¼" D.

Save up to \$107.60 on complete 5 and 8-channel systems

5-Channel dual stick: Includes transmitter and one frequency module, receiver and one frequency module, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, up to 343.65.

GDS-505-D, Shpg. wt. 27 lbs. 264.95

5-Channel single stick: Includes transmitter and one frequency module, receiver and one frequency module, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, up to 353.65.

GDS-505-S, Shpg. wt. 27 lbs. 264.95

8-Channel dual stick: Includes transmitter and two frequency modules, receiver and two frequency modules, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, up to 387.55.

GDS-1205-D, Shpg. wt. 27 lbs. 299.95

8-Channel single stick: Includes transmitter and two frequency modules, receiver and two frequency modules, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, up to 407.55.

GDS-1205-S, Shpg. wt. 27 lbs. 299.95

When ordering, specify module frequencies and type(s) of servos. All systems include batteries.

SAVE EVEN MORE! Buy one of these Heathkit R/C systems with the exciting NEW Cessna Skyhawk 172 from Delta Products!

Easy-to-build trainer plane has 48" wingspan, includes Fox .25 RC engine, fuel tank, fuel line, machined aluminum mount, all wheels, even prop and hardware.



Cessna 172 Flight Pack

\$74⁹⁵

Buy it with a Heathkit System and you're flying first class!

The Cessna 172 Skyhawk is an ideal trainer plane for the beginning R/C'er or as an excellent fun-fly ship for those with experience. Build it in 5 to 10 hours and it includes all needed accessories, all you need is fuel.

RP-1172, Cessna 172 Skyhawk Flight Pack only, Shpg. wt. 8 lbs. 74.95

SAVE \$103.70! Five-Channel Dual-Stick System. Same as system GDS-505-D plus Cessna Skyhawk Flight Pack. **RPS-505-D, Shpg. wt. 20 lbs. 314.90**

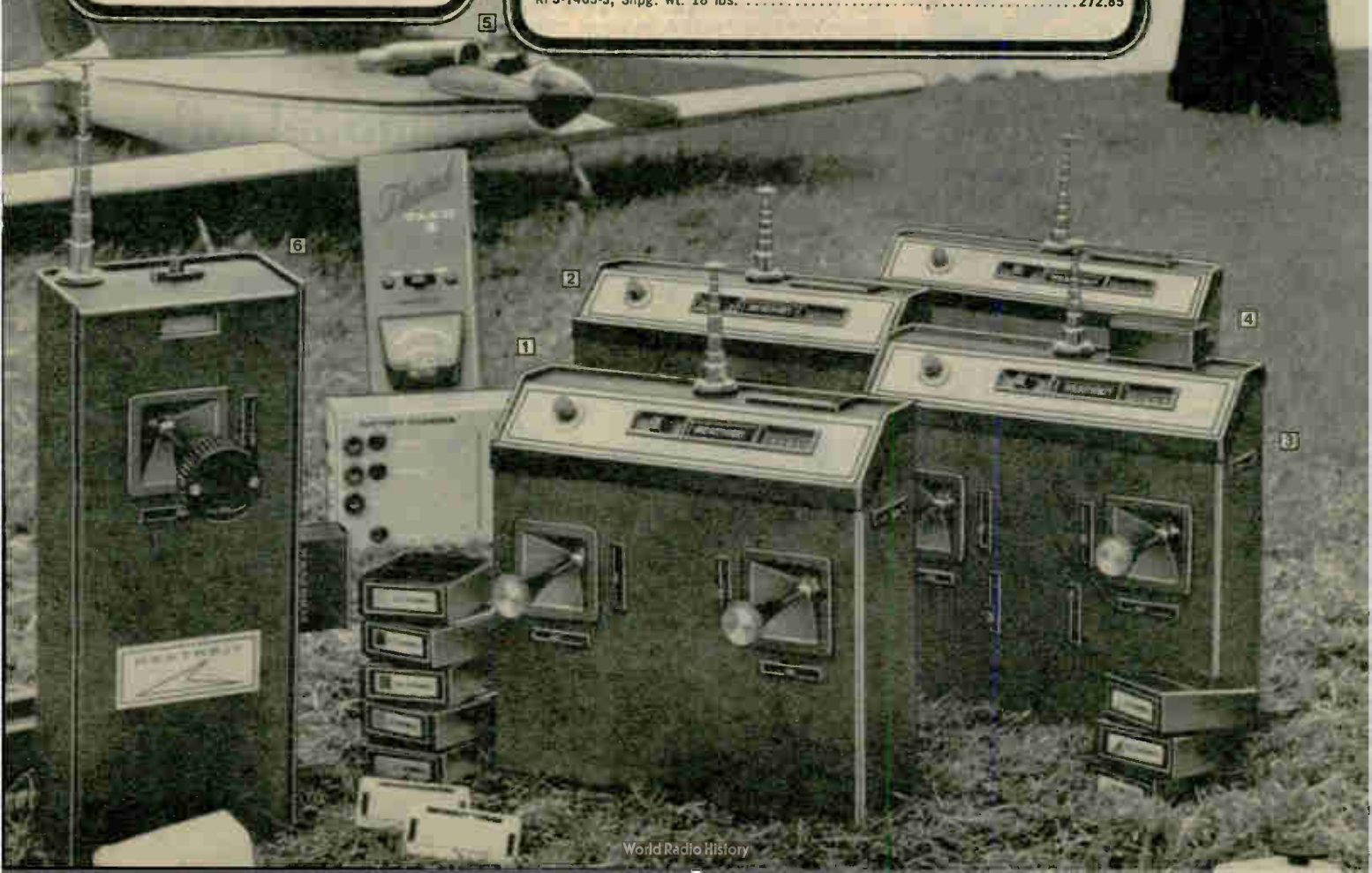
SAVE \$113.70! Five-Channel Single-Stick System. Same as system GDS-505-S plus Cessna Skyhawk Flight Pack. **RPS-505-S, Shpg. wt. 19 lbs. 314.90**

SAVE \$112.60! 8-Channel Dual-Stick System. Same as system GDS-1205-D plus Cessna Skyhawk Flight Pack. **RPS-1205-D, Shpg. wt. 22 lbs. 349.90**

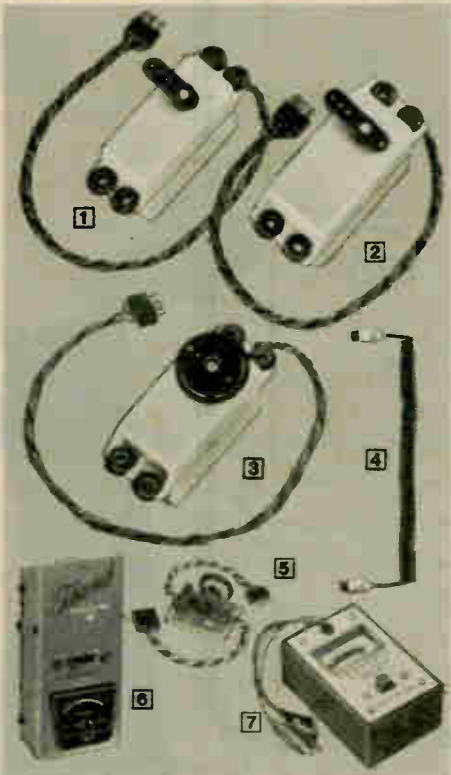
SAVE \$132.60! 8-Channel Single-Stick System. Same as system GDS-1205-S plus Cessna Skyhawk Flight Pack. **RPS-1205-S, Shpg. wt. 22 lbs. 349.90**

SAVE \$53.80! 3-Channel System. Same as system GDS-1405-1 plus Cessna Skyhawk Flight Pack. **RPS-1405-2, Shpg. wt. 17 lbs. 249.90**

SAVE \$60.90! Deluxe 3-Channel System. Same as system GDS-1405-1 plus Cessna Skyhawk Flight Pack and additional servo for complete 3-channel control. **RPS-1405-3, Shpg. wt. 18 lbs. 272.85**



Servos and Accessories for Heathkit R/C



1 Sub-Miniature Servo. For use with all Heathkit R/C systems.

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

GDA-1205-5 SPECIFICATIONS: Power Requirements: Battery — 4.8 VDC. Idle current, 15 mA maximum. Stall current, 450 mA nominal; no load current, 80 mA. Mechanical Output: 1 rotary arm, 1 rotary wheel. Position Accuracy: 1.0%. Dimensions: 1 1/4" H x 3/4" W x 2 1/2" L (length includes mounting ears, height includes the outputs.) Net Weight: 1.25 ozs. Other specifications same as GDA-1205-4 above.

2 Miniature Servo. For Heathkit R/C systems.

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

GDA-1205-4 SPECIFICATIONS: Input Signal: Pulse 1-2 msec. wide, 4 V P-P. Thrusts: 4 lbs. min. at rotor. Travel Time: 0.5 sec. Rotary Output Travel: 90° rotation. Temperature Range: 0°-160°F. Power Requirements: Battery — 4.8 VDC. Idle current — 15 mA maximum. Stall current — 450 mA; no load current, 80 mA. Gear Train Backlash: Less than 0.002". Mechanical Output: 1 rotary arm, 1 rotary wheel. Position Accuracy: 1.0%. Dimensions: 1 1/4" H x 1 1/4" W x 2 1/2" L (length includes mounting ears; height includes outputs). Net Weight: 1.75 ozs.

3 High Torque Servo. For use with all Heathkit R/C transmitters and receivers. Features high power (torque) and fast transition (rotational speed). You can wire it to operate 90° or 180°. Heavy-duty gearing.

Kit GDA-1205-8, Shpg. wt. 1 lb. 29.95

GDA-1205-8 SPECIFICATIONS: Input Signal: Pulse 1-2 msec wide, 4 V p-p. Torque: 6 lbs. at outer hole. Travel Time: 0.4 sec. Rotary output travel: 90° or 180° rotation. Temperature range: 0-160° F. Power Requirements: Battery, 4.8 V. Idle current, 20 mA maximum.

Stall current, 1000 mA. No load current, 150 mA. Mechanical output: 1 rotary arm, 1 rotary wheel. Position Accuracy: 1%. Dimensions: 1 1/4" H x 1 1/4" W x 2 1/2" L (length includes mounting ears, height includes outputs.) Net Weight: 1.75 oz.

4 Trainer link accessory. Six-foot coiled cord connects two GDA-1205 or 505 Transmitters for in-flight instruction — one unit is "master" with override, the other is "slave."

GDA-1205-6, Shpg. wt. 1 lb. 11.95

5 Servo Centering Standard. Calibrates all Heath Servos with variable pots to 1.4 milli-second pulse width standard. Eliminates recentering when changing control units. Included in all Pack-17 transmitters!

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

6 Thumb® Tach peaks performance. Measures model engine rpm without physical connection to engine. Two ranges — 0-5000 and 0-25,000. Perfect for needle valve adjustment, selection of glow plugs, gears and props.

Kit GD-69, Shpg. wt. 1 lb. 29.95

7 R/C Battery Monitor. Expanded-scale voltmeter checks capacity (under load) of batteries. Has meter, connector for all Heathkit battery packs, alligator clips for Nicads. Pocket case.

Kit GD-1188, Shpg. wt. 1 lb. 17.95

Radio Control Handbook. (Not shown). Detailed information on the use and maintenance of Heathkit R/C gear. Get the most from Heath R/C gear, others too. **GDA-1205-7 1.00**

Add realism and excitement to your model railroad

Heathkit Transistorized Power Supply/Throttle

\$84⁹⁵ Get top performance from every engine in your line

The Heathkit RP-1065 makes an HO or N-gauge layout dramatically more realistic! Just operate the slide throttle control to make your engines gradually build up speed just like a real train, at slow speeds, maintain realistic acceleration and braking. Braking is independent of the throttle and controlled by a five-position knob.

The RP-1065's load compensation circuitry prevents stalling out when climbing grades, even lets you precisely simulate a real train, slowing as it climbs, then accelerating as it goes down. Helps overcome side rod and gear train binding, tight spots in wheel bearings, even tight sections of track. Easily powers two HO or N-gauge engines — has built-in short protection with an indicator light and a time delay to prevent false triggering.

The RP-1065 goes together in just a couple of evenings, even if it's your first kit. There's just one circuit board to wire, and a plug-in IC simplifies assembly. Operates on 120 VAC. 4 3/4" x 9 1/2" x 8 1/2".

Kit RP-1065, Shpg. wt. 9 lbs. 84.95



Special offer!

Order RP-1065 and RPA-1065-1 together, for only

\$106⁹⁵

Order RPS-1065.

Walk-Around Controller for RP-1065

Provides remote operation of Throttle, Brake position switch and Engine direction switch, from approx. 20-ft. away from RP-1065.

Kit RPA-1065-1, Shpg. wt. 3 lbs. 24.95

10-ft. Extension Cable. For operation to approx. 30-ft.

RPA-1065-2, Shpg. wt. 2 lbs. 8.95



Heath Strobe Light for Aircraft, Emergency Vehicles, Boats

Meets Federal Air Regulation No. 23.1401 requirements for Anti-Collision Lighting

\$79⁹⁵

The Heathkit OL-1155 Aircraft Strobe Light signals a truly unusual kit-form value. The OL-1155 is designed primarily as an aircraft strobe light for use as an anti-collision or supplemental beacon — and can be used as a direct replacement for standard 3¾" rotating beacons. 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 drawing a nominal current of 1.5 Amperes, and includes a built-in line filter. An internal adjustable trimmer lets you vary the flashing frequency of the strobe. The OL-1155's construction manual is straight forward and simple to follow. And with just a single circuit-board to assemble you'll have your project completed in no time. Manual includes template with mounting dimensions.

Dozens of uses. Besides its obvious uses as an aircraft strobe light, the OL-1155 can be used in any number of other emergency applications. Mount it on your boat cabin-top or masthead for marine foul-weather anti-collision protection. Put it atop antennas, tall buildings, etc., for use as a highly visible marker light. Or, order your OL-1155 with the optional amber or red lens, below, for use in emergency vehicle applications.

- Kit OL-1155, (with clear lens). Shpg. wt. 3 lbs. **79.95**
- *OLA-1155-2, Red lens. Shpg. wt. 1 lb. **8.95**
- *OLA-1155-3, Amber lens. Shpg. wt. 1 lb. **8.95**

NOTE: For the FAA PMA certification necessary for aircraft installation, return your completed OL-1155 to your local Heathkit Electronic Center or the Heath factory.



OL-1155 SPECIFICATIONS — FAA Design Approval: Under STC SA2719WE for all Cessna 182 aircraft prior to S/N 53599 & STC SA2720WE for all Cessna 210 aircraft prior to S/N 57481. Power requirements: 12 VDC negative ground only, 1.5A. Dimensions: 6" H x 3½" diameter (mounting plate — 5½" diameter).

High-accuracy, low-priced Aircraft Clock/Timer

SAVE \$20



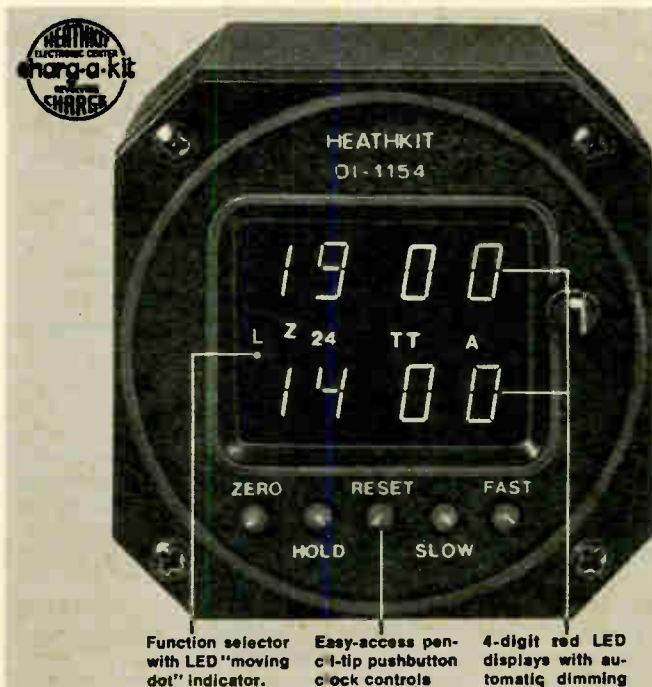
- Indicates GMT, local time — times to 24 minutes and 24 hours, preset alarm too
- FAA/PMA Approved, Meets DO-160 requirements

New Low Price \$139⁹⁵

An important instrument for any pilot — gives you the accuracy and reliability you NEED for any flight timing function, at about HALF THE COST of competitive models. All timing functions are quartz-crystal controlled for exceptional accuracy. The upper 4-digit display shows 24-hour GMT or ZULU time; the lower display shows local time, 24-minute timer (displays minutes and seconds), total trip timer (24 hours max.); and an alarm time that you have stored in the memory of the trip timer. This alarm time function is for fuel management or check point notification. A function switch selects the time shown on the lower display. Both clocks run continuously, the trip timer runs only when the aircraft's master power switch is on. Displays dim automatically for night flying. The OI-1154 fits a standard 3½" instrument panel for easy mounting in most any aircraft.

Kit OI-1154, 3 lbs. Was 159.95, Now 139.95

Note: FAA approved for Cessna 172N, STC No. STC SA168GL (requires FAA Form 337). Field approval on FAA Form 337 required for other aircraft. Completed kit must be returned to a Heathkit Electronic Center or factory for DMIR inspection (at no additional charge), before installation by an A & P mechanic (or supervised pilot installation). Heath will also set adjustment for maximum accuracy. Meets DO-160 environmental requirements.



OI-1154 SPECIFICATIONS: Display Functions: (Top), 24 hour Zulu or GMT; (Bottom), 24 hour local, 24 minute timer (in minutes and seconds); 24 hour total trip time; 24 hour trip time alarm. Input Voltage: 14 VDC or 28 VDC. Input Current: 0.5 A max.

(bright display). Crystal Oscillator Accuracy: Typical, less than ±1 minute per month. Initial, 0.004% at 25°C. Drift, ±0.003%, -20°C to +65°C. Aging, 0.002% per year. Dimensions: 3.3" x 3.3" x 6" deep.

New Ignition Analyzer

\$419⁹⁵

- Pushbutton Selection of Individual Cylinders
- Parade, Superimpose, and Individual Patterns
- Solid-State Construction

Designed for the auto hobbyist yet perfect for the professional garage operation, the Heath CO-2600 provides the most asked for features in an ignition analyzer of this quality. Rock steady parade patterns are made possible by the latest design in inductive pickup circuitry and switch selection of number of cylinders — four, six or eight. Dwell measurements are indicated on the big eight-inch meter. Has two voltage ranges — 0-2 V for corroded connections and points measurements and 0-20 V for battery condition and general distribution checks. Cylinder selection buttons can be pushed in multiple numbers so that banks of cylinders can be shorted for carburetor balance and for display of one or more cylinders. Both parade and super-imposed displays or primary or secondary waveforms at two different amplitudes are available on the 12" diagonal CRT. Rugged high-temperature oil and gas resistant neoprene cables provide easy, positive connections to engine. Includes adaptor for GM HEI ignition systems. For use with 4, 6, or 8-cylinder (4-cycle) or 2-rotor Wankel engines and standard, transistorized or C-D ignition systems. Use with optional timing lights below for a complete, economical home tuneup center. Available May, 1978.

Kit CO-2600, Shpg. wt. 83 lbs. 419.95

COA-2600-2, Alternator Test Adaptor, Shpg. wt. 1 lb. 6.95

COA-2600-3, Scope Cart, Shpg. wt. 25 lbs. 39.95

CO-2600 SPECIFICATIONS: For Use With: Standard, transistorized, or C-D ignition systems. 4, 6 or 8-cylinder (4-cycle), or 2-rotor Wankel engines. Signal Pickup: Direct for primary, inductive for parade trigger, and capacitive for secondary. Tachometer and Voltmeter Accuracy: $\pm 3\%$ of full scale on any range. Scope Vertical Expand: Minimum 2 to 1. Operating Temperature Range: 32°F to 104°F. Tachometer: 1000 rpm, 3000 rpm, or 6000 rpm. Voltmeter: 2 or 20 VDC. Power Requirements: 110/130 or 220/260 VAC 50/60 Hz. Weight: 53 lbs. Dimensions: 12 $\frac{1}{2}$ " H x 25 $\frac{1}{4}$ " W x 14 $\frac{1}{8}$ " D.

New COA-2600-4 Timing Light

Deluxe timing light and distributor advance meter designed specifically for use with the CO-2600. Measures advance to 60°.

Kit COA-2600-4, Shpg. wt. 3 lbs. 49.95

Timing Light for your "2600" — Limited Quantities

Many times brighter than the flash from timing lights operated from only the spark plug voltage. For 2600 only.

Kit COA-2500-1, Shpg. wt. 3 lbs. 19.95

WOA-2500-1, Assembled version of above. Shpg. wt. 3 lbs. 29.95

Heathkit CO-1015 Ignition Analyzer

\$169⁹⁵

- Built-in rpm indicator
- Clamp-on inductive pickup for easy hookup

Can be used with any standard, transistorized or capacitive discharge ignition system on four, six or eight-cylinder engines with distributors. You select one of four different patterns — primary or secondary. In either parade or superimposed display. For detailed analysis, the horizontal sweep can be expanded 10 to 1, vertical sweep 2 to 1. The optional 12-volt inverter mounts permanently to the unit's rear panel, for portable or "on the road" tests. Includes adapter for use with General Motors High Energy Ignition systems.

Kit CO-1015, Shpg. wt. 22 lbs. 169.95

Kit COA-1015-1, 12-Volt Inverter. Lets you operate CO-1015 from your car's 12-volt lighter socket. Shpg. wt. 3 lbs. 37.95

CO-1015 SPECIFICATIONS: Power Requirement: 120/240 VAC, 60/50 Hz, 16 W. RPM Range: 400-5000. Cylinders: 3, 4, 6 or 8. Vertical Expand: Approx. 2 to 1. Horizontal Expand: Approx. 10 to 1. Sweep Length: $\pm 5\%$ over entire RPM range. Intensity: Fixed. Presets: Focus, Astigmatism, Trigger Adjust, Tach Cal. Connection Cables: 12' pick-up clamp; ground and secondary clip leads extend 2' beyond pick-up clamp. Tachometer: 0-1000 RPM, 0-5000 RPM $\pm 5\%$ of full scale. Dimensions: 7" H x 10 $\frac{1}{2}$ " W x 17 $\frac{1}{2}$ " D.

Low-Cost Engine Analyzer

\$79⁹⁵

Color-coded meter for easy readings

This professional-grade instrument

tests conventional, magneto, transistorized, and most capacitive discharge ignition systems — both positive and negative ground, any voltage, on any 3, 4, 6 or 8-cylinder engine. Also tests storage battery, generator or alternator, voltage regulator, starter, distributor, ignition circuit (points, condenser and coil), accessories and all the electrical wiring. Operates on 3 standard "C" batteries (not supplied). Has convenient carrying handle. Comes complete with all leads and accessories.

Kit CM-1050, Shpg. wt. 8 lbs. 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° (on 0-60° scale), 0-60°, $\pm 3\%$ 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. Cables Supplied: Two 8' two-conductor test cables. One 2' alligator to alligator lead. One 2' alligator to push-on connector lead. One calibration cable. Accessories Supplied: 90-ampere shunt, 0.25 Ω resistor assembly. One insulation-piercing alligator clip. Two #10 solder lugs. (± 14). Dimensions: 7 $\frac{1}{2}$ " H x 10 $\frac{1}{2}$ " W x 8 $\frac{3}{4}$ " D.

Do your own spring tuneups and save!



Super-bright
xenon
flash tube

\$69⁹⁵

*Built-in meter
measures distributor
advance or engine RPM*

CI-1096 Deluxe Timing Light with Built-in Advance Meter and Tachometer

Here's a really convenient, easy way to keep tabs on your car's engine timing and distributor advance functions. The CI-1096 incorporates a timing light, advance meter and tachometer in one compact, lightweight unit. Merely press the trigger to get a super-bright timing flash and a meter indication of distributor advance in degrees. Take your finger off the trigger and the meter indicates engine RPM. The 250° meter movement measures mechanical or vacuum advance up to 60° from 1500 to 4500 RPM and indicates engine speed to a maximum of 4500 RPM. Inductive pickup clips around the #1 sparkplug wire for quick connection. Powered directly from your car's battery or from a separate 12VDC power supply. Functions with all types of ignition systems.

Kit CI-1096, Shpg. wt. 4 lbs. **69.95**

CI-1096 SPECIFICATIONS: Useful Light Range: Up to 2 ft. in daylight. Triggering: Current pickup coil. Power Requirement: 12VDC battery or separate 12VDC power supply. Dimensions: 7 1/4" H x 2 5/8" W x 11 1/2" D.

Deluxe Timing Light — brighter than daylight

Features a handy inductive pickup that clips directly around the #1 sparkplug wire without removing wire, using adapters, etc. (Recommended for GM-HEI and other systems, where high voltage may be present.) Has a super-bright xenon flash bulb that can be seen easily even outdoors. Can be hooked up while the engine is running, and won't interfere with other auto test equipment either. Comfortable pistol-grip handle, insulated blue-plastic housing. Polarity protected. Powered by your car's battery or a separate 12-volt supply. With all cables, pickup and clips. 6 1/2" H x 2" W x 10" L.

Kit CI-1040, Shpg. wt. 3 lbs. **34.95**

Economy Solid-State Timing Light.

As above, no inductive pickup.

Kit CI-1020, Shpg. wt. 3 lbs. **22.95**



\$29⁹⁵



Three-in-one Tuneup Meter helps you keep your car in top shape

Combines a distributor cam dwell meter, tachometer and a DC volt-meter. Measures dwell angle on most 4-cycle, 3, 4, 6 and 8-cylinder engines. Shows engine RPM on two scales — 0-1500 RPM and 0-4500 RPM. Checks voltage from 0-20 volts. Can be used with both 6 and 12-volt electrical systems with positive or negative ground, and with all new factory-installed solid-state and high-energy ignition systems. It has just two leads to connect to the engine and draws its power directly from car battery. Complete with leads, instructions, high-impact case.

Kit CM-1073, Shpg. wt. 4 lbs. **29.95**

CM-1073 SPECIFICATIONS: Dwellmeter: Three dwell scales: 8 cyl., 10-45 degrees; 4 cyl., 20-90 degrees; 6 cyl. & 3 cyl. x 2, 25-60 degrees. Tachometer: Two RPM ranges; Low range — 0-1500 RPM; High Range — 0-4500 RPM. Voltmeter: Direct reading scale, 0-20 VDC. Power Requirement: 10 mA approximate average current. Meter: 4 1/2", 1 mA (100 degree movement). Accuracy: ±3% of full scale. Dimensions: 4 1/4" H x 8 1/2" W x 7 1/4" D.



Exhaust Gas Analyzer checks fuel efficiency

\$69⁹⁵

Monitors your car's exhaust for minimum air pollution and maximum efficiency by measuring thermal conductivity of the exhaust gases. Shows the air-fuel ratio, combustion efficiency and the percentage of carbon monoxide in the exhaust. The CI-1080 is essential when you're tuning up a car which must meet specific requirements for exhaust emissions. Comes with all cables and tubing for easy connection.

Kit CI-1080, Shpg. wt. 6 lbs. **69.95**

CI-1080 SPECIFICATIONS: Meter Scales (3): 11.5-15.0 Air-Fuel Ratio. 70%-90% Combustion Efficiency. 0-8% Carbon Monoxide. Exhaust Type: From 4-cycle gasoline engines. Not for use with catalytic converters. Accuracy: Within 1 Air-Fuel Ratio depending on fuel used. Meter: 4 1/2", 100-0-100 μA. Connectors: Battery cord, 7 feet. Sensor cord, 21 feet. Exhaust flexible tube, 30 inches. Power Requirement: 6-volt or 12-volt car battery, less than 150 mA. Weight: 4 lbs., 12 oz.



1



2

BUY BOTH and SAVE \$19.95

1 Heathkit CD Ignition System improves your car's performance

- Helps you get longer life from plugs and points
- Assures fast, sure starts in all kinds of weather
- Improves gas mileage to help you save money and energy

Get up to 50,000 miles between tuneups on cars, trucks, inboards, I/O & outboard marine engines with 12V battery/distributor/coil negative ground systems. Delivers a larger, more precisely-controlled spark to the plugs to better burn the air-fuel mixture. Reduces problems caused by point bounce

and wear. Further extends plug life and the tune-up interval. External override button switches to conventional system. Build it in a couple of hours, install in less than that. 3 1/8" H x 3 3/4" W x 6" D.

Kit CP-1060, Shpg. wt. 3 lbs. 34.95

2 Breakerless Ignition Adaptor for CD Ignition Systems

Develops a timing signal that isn't subject to mechanical problems of point wear and bounce. Replaces the points of all pre-1975 GM V-8 engines, and all AMC V-8s with external dwell adjustment (not for others). Easy-to-build unit mounts inside engine compartment; sensor mounts inside distributor, without removing points. Designed for operation only with Capacitive Discharge Ignition Systems such as the CP-1060 or similar units. Shpg. wt. 2 lbs.

Kit CP-1051 29.95

Kit CP-1051 29.95
CPS-1060, Ignition and Adaptor Together, Shpg. wt. 5 lbs. ... 44.95



15-Amp Automatic Battery Charger/Booster

Charges 12-volt car battery at 15-amp rate, boosts at 50-amp rate for quick start when battery is dead. Use on negative or positive ground. Meter monitors battery to indicate charge rate, current, and full charge. Circuit breaker protection.

Kit GP-1044, Shpg. wt. 22 lbs. 61.95

GP-1044 SPECIFICATIONS: Charge Rate at 120 VAC (primary): Boost, 50 amperes (max. 1 minute). Normal, 15 amps. Shuts off automatically after battery is fully charged. Output Voltage: Shuts off when voltage at terminal reaches 14.5 V. Power Requirement: 110-130 VAC, 60 Hz. Size: 6 1/2" H x 11 1/2" W x 7 3/4" D.



10-Amp Automatic Battery Charger

Keeps your car battery at full charge for easier starts. Better performance! Won't operate unless correctly connected, can't overcharge the battery. Protection circuit shuts unit off when battery fully charged. Easy to use — just connect the cables to 12-volt battery terminals and plug into AC outlet.

Kit GP-21, Shpg. wt. 13 lbs. 42.95

GP-21 SPECIFICATIONS: Charge Rate: 10 amperes maximum at 120 VAC line. Output Voltage: Between 13.2 VDC and 13.6 VDC. Power Requirement: 105-130 VAC, 60 Hz. Dimensions: 5 1/2" H x 9" W x 6 3/8" D.



Small Engine Tune-up Meter

Ideal for garden tractor, lawn mower, motorcycle, snowmobile, outboard motors, etc. Tests volts, ohms, dwell & continuity on 1 to 4 cylinder, 2 & 4 cycle engines. Built-in tach, snap-on pickup. Less batteries. (Not for Briggs & Stratton engines.)

Kit CM-1045, Shpg. wt. 4 lbs. 47.95

CM-1045 SPECIFICATIONS: Voltmeter: 0-20 V DC. Ohmmeter: 0 to 100 kΩ (10 kΩ center scale). Tachometer: Two ranges: 0-3000 rpm, 0-15000 rpm. Dwell Meter: Four scales: 1 cylinder, 90°-360°; 2 cylinder, 40°-180°; 3 cylinder, 30°-120°; 4 cylinder, 20°-90°. Power Source: Three 1.5 V "C" batteries. Dimensions: 9 1/2" H x 9 3/8" W x 5 1/4" D.

Hanson Basic Tester Set

Helps you keep your car in top shape! Includes Model 714 Remote Starter Switch, Model 715 Deluxe Compression Tester, Model 709 Vacuum/Fuel Pump Tester. CGP-1036, Assembled.

Shpg. wt. 2 lbs. ... 13.95

42



GM Voltage Regulator Tester

SAVE \$60

Easy to use, fast and accurate! Shows condition of all 4 circuits in GM Delco Integral Charging System regulators. Simply insert regulator in self-heating holder, then follow procedure listed inside case top. Has single knob meter control, two indicator lights.

CTW-1170, Assembled, Shpg. wt. 16 lbs. (Was 109.95 in Cat. 818) Now 49.95

CTW-1170 SPECIFICATIONS: Test Voltage: 16.5 VDC. Sense Voltage: Adjustable 0-17 VDC. Voltmeter: 0-20 VDC ±3%. Short Circuit Current: 0.1A. Power Requirement: 120 VAC, 60 Hz, 150W. Case: Aluminum. Dimensions: 7" H x 11" W x 7" D.



Heathkit FM Car Stereo Tuner



SAVE
\$44⁹⁵

Combo Offer!
FM Car Stereo
Tuner and Power
Amp Together!

Kit CRS-1000A, Shpg.
wt. 10 lbs. **69.95**

If purchased Separately, 114.90.

Put true hi-fi sound in your car

Offers the kind of performance you'd expect from a home system — less than 1% THD; frequency response ± 1 dB, 30 to 15,000 Hz; 3 μ V sensitivity; 60 dB selectivity; 40 dB nominal separation. Has phase-locked loop demodulator, muting circuit to eliminate noise between stations; AFC; stereo indicator light. Requires power amp. (below).

Kit CR-1000A, Shpg. wt. 7 lbs. 79.95

Kit CRA-1000-1, Power amp., fits back of tuner, for 12V battery.

Shpg. wt. 3 lbs. 34.95

CRA-1000-5, 6" x 9" 4-ohm rear deck mount hi-fi speakers (including grilles and 24' speaker lead). Shpg. wt. 7 lbs. (pair) 23.95

CRA-1000-2, 4 1/2", 4-ohm door-mount hi-fi speakers (including grilles, adapter plates for most speaker size openings and 24' speaker lead). Shpg. wt. 7 lbs. (pair) 17.95

Windshield Wiper Delay

Ideal safety accessory for driving in light mist and fog. Eliminates constant wiper arm movement when an occasional sweep is sufficient. Lets you vary the time between sweeps. Molded plastic case mounts on or under dash.

Kit CH-1068, Shpg. wt. 2 lbs. . . 17.95



CH-1068 SPECIFICATIONS — Delay Interval: 5 to 30 seconds minimum. Sweeps interval: 5 to 10 seconds minimum. Input voltage: 13.8 volts DC, $\pm 20\%$. Positive or negative ground. Wiper System Compatibility: (Electric Only) GM: All single and two speed systems. Ford: Most small and intermediate models. Not compatible with full size models or '72-76 Torino, or Montego, '74-'76 Cougar. Chrysler: Single and two speed systems on small and intermediate models which do not use a motor reversing parking system. Ask dealer about your car's system. AMC: Single and two speed systems. Other models: Electric wipers which do not use a motor reversing parking system. NOTE: Heath does not supply automotive wiring diagrams for this unit.

Emergency Strobe Light

Makes you visible so emergency help gets there quick! Just insert the adaptor plug provided into your car's cigarette lighter. A 12 ft. cord lets you place the flashing light in any spot on the car. Has non-marring magnetic base plate, highly visible flashing strobe with amber dome lens. High-impact plastic case is moisture and corrosion resistant, has storage for cable.



Kit GD-1026, Shpg. wt. 3 lbs. 34.95

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 $+60^{\circ}$.



\$39⁹⁵

Our Lowest
Price Ever!

Comfortable hand-contoured grip
with trigger to operate voice or yelp.

Rectangular horn speaker for outstanding
efficiency and voice or yelp sound projection

20-Watt Portable Megaphone/Yelp Alarm

The GD-1818 is a quality power megaphone for voice projection, with a built-in alarm that produces an attention-getting "yelp" sound. It's ideal for outdoorsmen, boat owners, fire and police departments, track and field coaches, etc. The noise-cancelling microphone amplifies your voice only with minimum background noise. Turning on the "yelp" switch produces a single downward wail each time you pull the trigger. A volume control sets the voice level. The GD-1818 can be wired for a continuous-tone, instead of the yelp sound, making it useful as a portable horn for boats, dune buggies, etc. Operates on eight "C" cells (not supplied). Rugged high-impact plastic case is spray resistant for use on water.

Kit GD-1818, Shpg. wt. 6 lbs. (Was \$59.95 in Cat. 818) Now 39.95

GD-1818 SPECIFICATIONS: Power Output: 20 watts peak voice power. Yelp Alarm: single downward wail with automatic shutoff. Optional continuous tone selected during construction. Pilot Lamp: indicates Yelp or continuous tone. Power Source: 12 volts (eight "C" cells). Weight: 4 lbs. 12 oz. with batteries. Dimensions: Horn end, 8 3/4" W x 6 1/4" H, 14 1/2" long overall.

Cab-to-Camper Intercom

Includes Master,
Remote and Cable

\$35⁹⁵

3-position switch on Master selects "Standby", "Monitor" or "Talk" modes. Remote can initiate calls and has "Radio" position to bring music into camper from cab radio. Requires 12 volt, 250 mA power source. Shpg. wt. 5 lbs.



Kit GD-160, Master, Remote & Cable 35.95

GDA-160-1, Accessory Plug. For quick disconnect when camper and cab are separated. Shpg. wt. 1 lb. 4.95

Quality Heath Digital Accessories for your Car



Easy-to-build Digital Readout Tachometer

\$59⁹⁵

- *More responsive and accurate than meter-type tachs*
- *Helps you find the best operating efficiency for your car or boat engine*

Reads your engine's RPM, even in direct sunlight, on the ½"-tall numeric display. The readout shows 1st 2 digits, multiply by 100 for actual rpm. A dimmer control adjusts the brightness for safe night-time driving. The CI-1079 operates with conventional ignition systems, capacitive discharge systems (like the Heathkit Model CP-1060), and factory electronic ignitions. For 4, 6, 8 cylinder 4-cycle engines; 2, 3, 4 cylinder 2-cycle engines; 2, 3, 4 rotor Wankels. Easy installation — simply connect the CI-1079 directly to the primary side of the ignition coil. For engines with magnetos or without access to the primary, order the optional inductive pickup below. An excellent accessory for your car and with just two circuit boards to assemble, an ideal first kit for you!

Kit CI-1079, Shpg. wt. 3 lbs. **59.95**
Kit CIA-1079-1, inductive pickup, Shpg. wt. 1 lb. **6.50**

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. Size: 1 7/8" H x 4 3/4" W x 4 3/4" D.

Digital Car Clock with 20-hour Trip Timer

\$69⁹⁵

- *Quartz crystal timebase insures high accuracy*
- *Readout dims automatically for safer night driving*
- *Easy to use built-in elapsed timer for precise trip-timing*

A totally electronic, totally reliable timepiece, typically accurate within one minute per month. Bright, easy-to-read ½"-high numerals display the time in hours and minutes. A built-in elapsed timer displays elapsed time in minutes and seconds, for the first 20 minutes. After that, the elapsed time is displayed in hours and minutes up to 19 hours — 59 minutes. "Clock/ET" button lets you display either clock time or elapsed time, while the other function continues in the memory. Built-in AM or PM indicator. Includes all hardware required to mount the unit on or under the dash of your car, boat, camper, or motorcycle. Die-cast case. Easy to assemble and with its quality look and feel, a functional centerpiece for your dash!

Kit GC-1093, Shpg. wt. 3 lbs. **69.95**

GC-1093 SPECIFICATIONS: Power Requirement: 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 3/4" W x 4 3/4" D. Net Weight: 1 lb. 4 oz.

Digital Electronic MPG Monitor/Speedometer

\$109⁹⁵

- *Helps save money every time you drive*
- *Dimmer control for night driving*

The CI-1078 reads 0-99.9 miles-per-gallon and 0-99 miles-per-hour on bright amber-orange ½"-high digits. As a miles-per-gallon monitor it helps you save gas and money every time you drive. Has a dimmer control to adjust the display for comfortable night driving, handsome die cast case with burl-grain vinyl insert. Includes all hardware for mounting in or under the dash, or on car's floor hump. **Please Note.** Ingenuity and good mechanical skill are necessary for transducer installation. You may wish to employ a qualified mechanic to install the transducers for you (fuel flow transducer installation involves cutting and removing a portion of the fuel line). Since every make and model of car is different, we cannot provide exact information for every car. The CI-1078 is not compatible with fuel injected engines or diesels. Heath cannot be responsible for damages, labor charges or replacement parts associated with transducer installation. When ordering, please specify make, model and year of your car. Be sure your car is included in the speed transducer listing below. We cannot provide information on other models.

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

CI-1078-1. For speedometer cable mounting on: '55-'68 Chrysler Corp. Cars; '55-'71 Chrysler Corp. trucks; '55-'68 GM cars (except Opel); '55-'71 GM trucks (except LUV); '55-'68 Ford cars; '55-'72 Ford Trucks (except Courier); '55-'71 American Motors Cars; '72-'73 Gremlin, Sportabout and Hornet; '55-'66 Studebaker; '55-'78 Jeep; '55-'78 English Ford. For Cruise Control mounting on '69-'78 Chrysler Corp. cars; '69-'78 GM cars (except Opel); '55-'78 Ford cars.

Kit CI-1078-1, Shpg. wt. 5 lbs. **109.95**

CI-1078-2. For transmission mounting on: '69-'78 GM cars (except Opel); '72-'78 GM trucks (except LUV); '69-'78 Chrysler Cars except Colt and Cricket; '72-'78 Chrysler trucks.

Kit CI-1078-2, Shpg. wt. 5 lbs. **109.95**

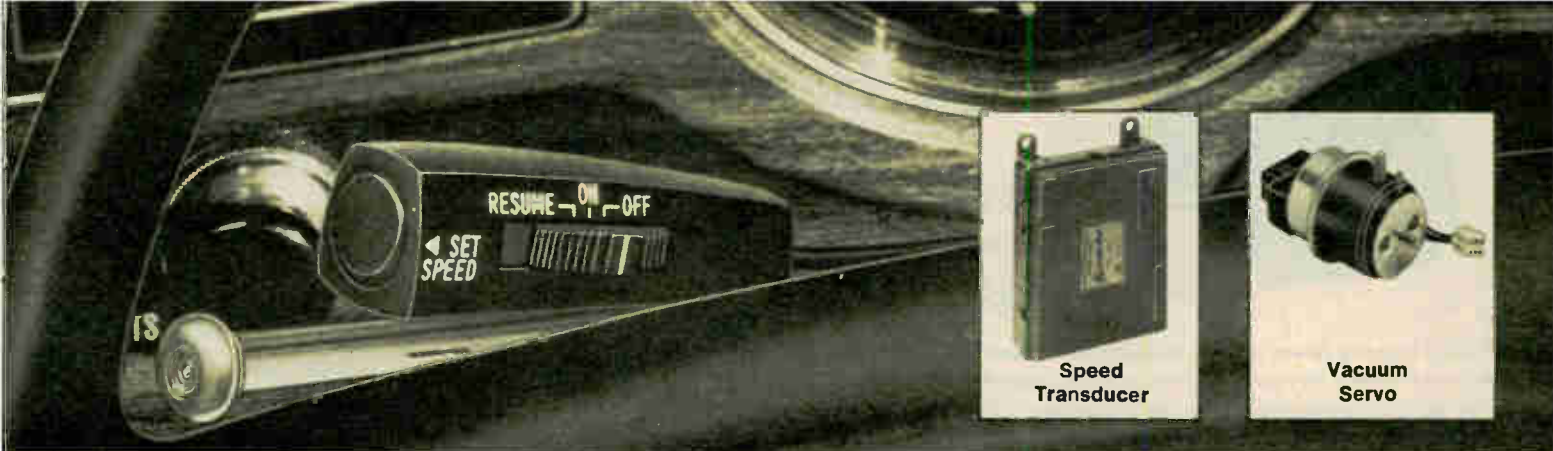
CI-1078-3. For transmission mounting on: All Opel cars; '72-'78 Audi; '55-'78 BMW; '55-'78 Mercedes; '55-'72 Saab; '55-'78 Volvo. For speedometer mounting on '55-'78 Porsche and VW.

Kit CI-1078-3, Shpg. wt. 5 lbs. **109.95**

CI-1078-4. For speedometer mounting on: '69-'78 Ford cars; '73-'78 Ford trucks (except Courier).

Kit CI-1078-4, Shpg. wt. 5 lbs. **109.95**

CI-1078 SPECIFICATIONS: Display: 3 digits, gas discharge. 0-99.9 miles per gallon. 0-99 miles per hour. Controls: Front — mpg/mph pushbutton switch, display dimmer. Rear — update control. mph calibration, mpg calibration. Speed transducer: DC generator. Flow transducer: Photo resistor sensor measures fuel flow. 1.5 to 12 gallons per hour with accuracy ±3% of maximum flow rate. Electronics: Accuracy, ±2% of maximum reading. Temperature Range: 0-60° C operating, -40° to +70° C storage. Power requirements: 10 to 17 VDC at 500 mA; 13.5 to 17 volts required to meet specifications. Display unit dimensions: 1 7/8" H x 4 3/4" W x 4 3/4" D. Display unit weight: 2 lbs.



Heathkit/Dana CS-1048 Electronic Speed Control

\$79⁹⁵

- Reduces driver fatigue
- Fits most domestic cars, vans and light trucks
- For both manual and automatic transmissions

Long distance drivers will really appreciate the CS-1048. It makes the most of famous Dana Corp. technology and a crystal clear Heath instruction manual for easy installation. Just accelerate to your desired speed, press the set button and the CS-1048 will electronically maintain the speed uphill or downhill. Holding the set button decreases speed (RETARD) and sets new cruise speed; holding the resume button lets you accelerate for passing and then resumes previous cruise speed when released. A touch on the brake pedal disengages the unit or the manual override may be used. A "memory" remembers the cruise speed and returns the vehicle to that speed, at the push of a button, after the brake has been applied to slow down. Unlike most speed controls, the CS-1048 may be used on vehicles having manual as well as automatic transmissions. The only prerequisite for installation is that the vehicle have an open driveshaft as most American and many foreign cars do. (Not for front wheel drive or transaxle vehicles). You can remove it from one vehicle and rein-

stall it on another even if the two makes are different. It comes completely assembled so that only installation on the vehicle is necessary. Installation is comprised basically of four operations; mounting the control unit on the turn signal arm, installing the electronic control module under the dash, connecting the vacuum servo to the throttle and mounting the speed transducer unit adjacent to the driveshaft. The CS-1048 operates on 12 VDC, and weighs less than 5 pounds total and the control unit is designed to mount inconspicuously on the turn signal arm within easy reach of the driver.

CS-1048, 7 lbs. 79.95

NOTE: While the CS-1048 comes fully assembled and tested, installation on the vehicle is necessary. Installation requires a certain amount of mechanical knowledge and proficiency. Modifications must be made to the throttle linkage and work must be performed under the vehicle to install the speed transducer unit. If you are uncertain of your abilities, you may wish to employ the services of a qualified auto mechanic.



Heathkit GD-18 Deluxe Mobile Siren/PA

It's a 55 watt siren with automatic or manual "wail," a 20 watt PA to amplify your voice, or a radio call alert when you're away from your vehicle. Has push-to-talk mike. NOTE: Please check the required standards for mobile sirens in your area.

- Kit GD-18, Shpg. wt. 6 lbs. 69.95**
- Assembled WD-5130, siren/PA amp, Shpg. wt. 6 lbs. 109.95**
- Assembled GDA-18-1, exterior horn, Shpg. wt. 10 lbs. 69.95**
- Kit GDA-18-2, concealed horn (requires 4½" x 4½" x 13" behind grille), Shpg. wt. 10 lbs. 69.95**
- Assembled WDA-5130-2, concealed horn, Shpg. wt. 10 lbs. 89.95**
- SAVE \$12.95 on systems! If purchased separately, 139.90**
- GD-18A (Kit GD-18 and Exterior Horn) Shpg. wt. 21 lbs. 126.95**
- GD-18B (Kit GD-18 and Concealed Horn) Shpg. wt. 21 lbs. 126.95**



Heathkit Mobile Security System

Ideal for cars with CB rigs, tape players, etc. Under-dash alarm set switch has a 5-15 second adjustable delay so you can enter or leave your car without sounding the alarm. An optional horn relay adapts the GD-1157 to cars whose horns do not use a relay or use a plug-in relay. Optional siren accessory provides attention-getting "yelp" sound instead of sounding the car horn. With all switches and hardware. Alarm unit, 2½" H x 4¾" W x 5" D. For 12 VDC negative ground only.

- 1 Kit GD-1157, Shpg. wt. 3 lbs. 24.95**
- 2 Kit GDA-1157-1, Optional Siren Accessory, 2 lbs. 21.95**
- SAVE \$6.95! GD-1157 and Siren Together.**
- If purchased separately, \$46.90.**
- GDS-1157, Shpg. wt. 6 lbs. 39.95**

New Heathkit Garage Door Opener now with improved electronics

Low As
\$174⁹⁵

- Stop Fighting Heavy Garage Doors in Bad Weather
- Door instantly reverses and returns to full open if obstructed

The GD-3309 garage door is an investment that really pays off in time and labor saved, convenience and extra security. Simply touch the button on the wireless transmitter in your car—your garage door opens automatically and the garage light turns on. Drive into the garage, touch the button again, and the garage door closes behind you. Has a powerful 1/3 hp motor that opens even the heaviest residential garage doors (up to 7 1/2' maximum height) with ease; responsive, self-lubricating screw drive. The adjustable slip clutch provides opening safety, stopping the door automatically if obstructed. When the door is closing, the important safety reverse feature takes over. If the door encounters ANY obstruction it stops and reverses instantly, and returns to full open position. Assembly is really easy, there's absolutely no soldering! Connecting leads are pre-cut and push-on connectors are already installed. A separate doorbell-type switch and 20' cable let you operate the unit from inside your house, or anywhere you may choose.

GD-3309C, Transmitter, Receiver, Mechanism.

Shpg. wt. 45 lbs. Motor Freight 174.95

GD-3309D, Two Transmitters, Receiver, Mechanism.

Shpg. wt. 46 lbs. Motor Freight 189.95

Kit GDA-3309-1, Mechanism only. Shpg. wt. 44 lbs. Motor Frt. . . 139.95

Kit GDA-3209-2, Adaptor for jamb and pivot doors. 3 lbs. . . . 11.95

GDP-3309, 1 Transmitter only. Shpg. wt. 1 lb. 24.95

GDP-3319, 1 Transmitter, 1 Receiver. (3-wire system) 1 lb. . . . 49.95

GDP-3329, 2 Transmitters, 1 Receiver. (3-wire system) 2 lbs. . . 64.95

GDA-3309-3, Power Transformer. Allows use of new transmitter and receiver with any 2-wire system door openers and model 309 below. Shpg. wt. 1 lb. 5.95

GD-3309 SPECIFICATIONS: Overall Size: 120" L x 12" H x 9" W. Motor: 117 VAC 1/3 HP. Open and Close Time: Approx. 12 seconds. Mounting Clearance: 3" above highest point of door travel. Safety Lamp: Delay circuit keeps lamp on 1 to 3 minutes. UHF TRANSMITTER: Powered by standard 9-volt battery. RF Frequency: 310 MHz. Useful Temperature Range: -50°F. to +140°F. UHF Receiver: Powered by 24 VAC from opener mechanism. Usable on any 3-wire mechanism or 2-wire with addition of GDA-3309-3. RF Frequency: 310 MHz.



New factory assembled transmitter and receiver with latest digital circuitry

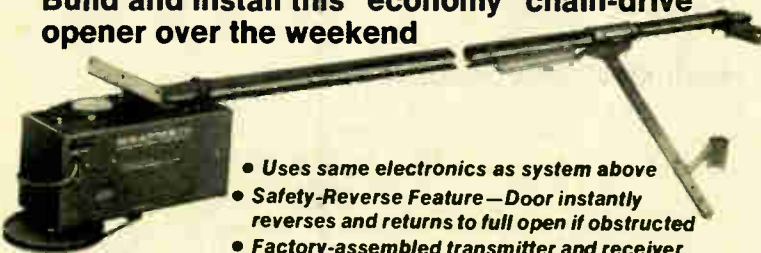
The fully assembled transmitter and receiver in the GD-3309 system incorporate the latest in solid-state electronics for improved security and reliability. The transmitters and receivers are digital and use exclusive custom IC's. They transmit an 8-bit "word" with 256 user-programmable combinations to provide maximum security and freedom from false triggering. Reprogramming is easy too — just flip the eight switches in the transmitter and receiver to a new combination. The transmitter and receiver units are fully assembled and ready to use. They are FCC approved and usable with standard NEC 3-wire systems.



Up-Down Limiters

Permanently installed limiters let you adjust amount of door travel so door coasts smoothly to proper position, open or close.

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



- Uses same electronics as system above
- Safety-Reverse Feature—Door instantly reverses and returns to full open if obstructed
- Factory-assembled transmitter and receiver and GDA-3309-3 Power Transformer

A powerful quarter-horsepower chain-drive opener at a great kit price! 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. Includes "doorbell" button & wire for manual door operation.

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GD-309-G, Transmitter, Receiver, Mechanism, 49 lbs. 134.95

GD-309-H, 2 Transmitters, Receiver, Mechanism. 49 lbs. 149.95

Kit GDA-309-1, Mechanism only, Shpg. wt. 42 lbs. 104.95

Kit GDA-309-2, Adaptor for jamb & pivot door, Shpg. wt. 2 lbs. . . 5.95

Kit GDA-309-3, Adaptor for vertical-opening 1-pc "California" style doors, Shpg. wt. 4 lbs. 16.95

To order additional transmitters & receivers, see listing under GDP-3319A and GDA-3309-3 Transformer above.

NOTE: This economy opener is mailable—for lower shipping costs!

GDA-309-1 SPECIFICATIONS: Overall Size: 123" L x 10" H x 8 1/2" W. Motor: 120 VAC 1/4 HP. Open and Closing Time: Approx. 9 sec. for 7' door. Control: Wall-mounted, doorbell-type pushbutton switch, or optional devices (transmitter-receiver, key switch, etc.). Safety: Door travel reverses instantly and returns to full open position when obstructed. Overhead Mounting Clearance: 2 1/2" above highest point of door travel. Safety Lamp: 60 watts. Automatically turns on when the door is fully open and stays on until door starts to close.

Exciting new, professional-quality metal locator — see page 2 for details.



GD-1190

\$159⁹⁵



Heathkit GD-348 Deluxe Metal Locator

This Heathkit metal locator really gets you in on the fun and excitement of treasure hunting — find coins, antiques, buried metal objects of any type, fast 'n easy.

- Contoured pistol-grip and up-front controls for real operating convenience
- Lightweight, easy and FUN to use
- Easy PC board assembly

\$99⁹⁵

This Heathkit metal locator uses 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-tum sensitivity controls conveniently located near the pistol grip handle. The shaft telescopes and the search coil folds flat for easy storage in suitcase or optional carrying case.

- Kit GD-348, Locator only, Shpg. wt. 5 lbs. **99.95**
 GDA-48-1, 9-volt battery, Shpg. wt. 1 lb. **3.25**
 GD-396, 600-ohm Superex headphones, Shpg. wt. 2 lbs. **5.95**
 GDA-348-1, carrying case, Shpg. wt. 2 lbs. **14.95**

1 Heathkit 2-Station Intercom System

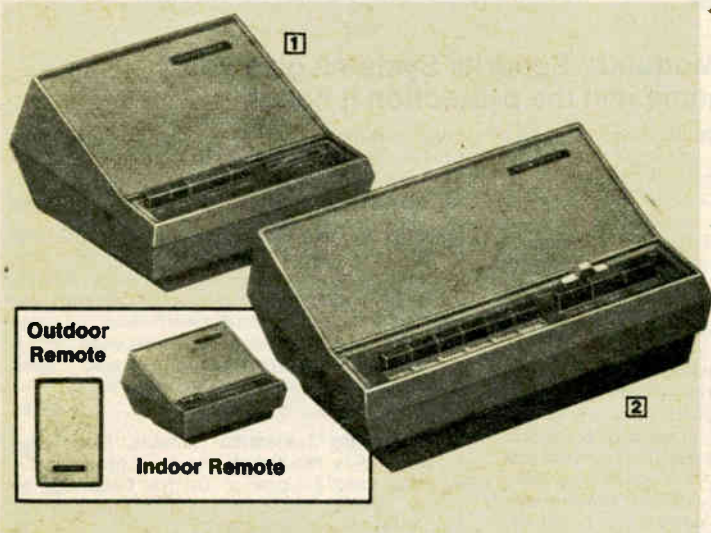
Master station accommodates up to two remotes. Remotes can initiate "private" calls to Master. Master can call either or both remote stations. Low-profile cabinets with plastic feet for surface use, holes for wall mounting. 3 $\frac{3}{4}$ " H x 6" W x 5 $\frac{3}{4}$ " D.

- Kit GD-140, one Master, one Remote, Shpg. wt. 4 lbs. **42.95**
 Kit GD-120, one extra Remote, Shpg. wt. 2 lbs. **17.95**
 GDA-110-2, 100' 4-conductor cable, Shpg. wt. 3 lbs. **9.95**

2 Indoor/Outdoor Intercom System

Master functions include "All Call," "Talk," "Dictate" ... plus monitoring of up to four Remotes. Indoor Remotes can be rendered private to prevent monitoring. GD-110 and GD-120 are light green and measure respectively 4 $\frac{1}{2}$ " H x 8 $\frac{1}{2}$ " W x 6 $\frac{3}{4}$ " D and 3 $\frac{3}{4}$ " H x 6" W x 5 $\frac{3}{4}$ " D. GD-130 has weatherproof crinkle finish. 5 $\frac{1}{2}$ " H x 3 $\frac{3}{4}$ " W x 2 $\frac{1}{2}$ " D.

- Kit GD-110, Master Station, Shpg. wt. 5 lbs. **49.95**
 Kit GD-120, Indoor Remote, Shpg. wt. 2 lbs. **17.95**
 Kit GD-130, Outdoor Remote, Shpg. wt. 2 lbs. **12.95**
 GDA-110-2, 100' 4-conductor cable, Shpg. wt. 3 lbs. **9.95**
 GDA-110-4, 100' 2-conductor outdoor cable, Shpg. wt. 1 lb. ... **5.95**



Outdoor Remote



Indoor Remote

First Alert™ Battery-Powered Early Warning Smoke Detector

\$24⁹⁵ Ionization-type detector gives earlier warning

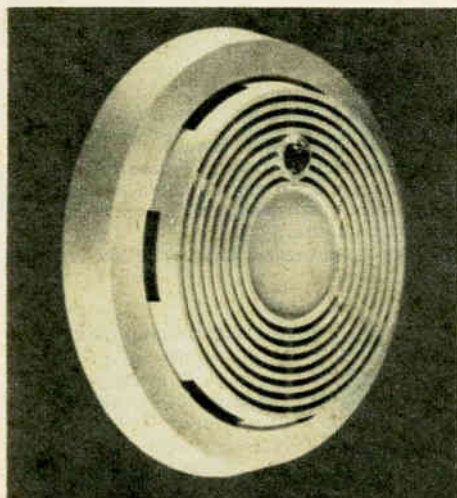
Detects fire in its first stage, when there's still time to protect your family from flames and suffocating smoke. Warns you before smoke or flames, by sounding its self-contained built-in alarm horn. This 85 decibel horn is powerful enough to awaken people sleeping soundly behind closed doors. Has dual-chamber detection for maximum reliability. Operates on its own internal battery (included!) that will last at least a year. If the battery needs replacement, a low-battery trouble signal activates and will sound an intermittent beep for as long as a month. Has automatic reset, built-in test switch to check operation before installation. 100% solid-

state circuit. Temperature range: 0° to 112°F. Humidity Range: 20%-95% RH. The First Alert provides excellent area coverage. In most cases, two units will provide effective coverage for an average size home. First Alert may qualify you for an insurance discount — check with your agent. U.L. listed. GD-1414, Shpg. wt. 2 lbs. Assembled .. **24.95**

Electronic Darkroom Timer



Has 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. 2% accuracy. 3 $\frac{1}{4}$ " H x 6 $\frac{1}{2}$ " W x 6 $\frac{1}{2}$ " D. Kit PT-15, Shpg. wt. 4 lbs. **39.95**



"Total Security" For Home or Business



Informer® Ultrasonic Alarm

\$54⁹⁵

- Completely self-contained
- Triggers indoor or outdoor alarms

"The Informer" can activate indoor buzzer alarms, outdoor bells, table or floor lamps. Any movement that interferes with transmitted signal in the room (up to 25 feet away) is perceived by the receiver, and the lamp outlet is triggered. Approximately 30 seconds later, the alarm outlet is triggered, activating indoor or outdoor alarms. Time delay between light and alarm allows you to enter room and deactivate the "Informer" without triggering the audible alarm. Set the lamp and alarm for automatic reset after 25 seconds or have audible alarm continue until the unit is manually reset. 23½" W x 10½" H x 7½" D. For 120/240 VAC.

Kit GD-39, Shpg. wt. 5 lbs. 54.95

GDA-39-1, indoor buzzer alarm,

Shpg. wt. 1 lb. 11.95

GDA-39-2, outdoor bell, Shpg. wt. 6 lbs 29.95

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

Automatic Telephone Dialer brings help fast

\$179⁹⁵ Perfect for vacation homes, warehouses, any remote location

The alarm to have for unattended areas or when you're away for an evening. Automatically dials a number you preselect — relatives, neighbors, etc., when alarm is triggered. Can be used with intrusion alarms, pressure switches, panic buttons, the GD-1158 security system, etc. Has automatic redial if line is busy, 3-digit location code, separate microphone. Battery-powered to operate if AC

48



SAVE!

Purchase the Central Processor and any two or more additional units (GD-1156 qualifies, too) and deduct 5% from the total price!

Our "Modular" Security Systems give your home just the protection it needs

[1] Ultrasonic Detector Module. Protects an area up to 300 sq. ft. When any object enters the field, sends signal to Central Processor. Each unit plugs directly into AC outlet. Use as many as needed as long as areas covered do not overlap. 10½" H x 3¼" W x 3¼" D. Note: ultrasonics operate in the same frequency range as the Heath TV remote controls, so interference between the two is possible.

Kit GDA-1158-2, Shpg. wt. 3 lbs. 84.95

[2] Central Processor Module. The "heart" of the Heathkit wireless security system, the central processor responds to signals from any of the other modules (2 thru 6 described below) to sound the alarm. Has tamper-proof circuit that sounds alarm if AC power fails, penetrating built-in siren and outputs for external speaker and phone dialer. Time delay circuit and automatic reset provide added protection and convenience. With batteries. 4½" H x 10½" W x 6" D.

Kit GDA-1158-1, Shpg. wt. 8 lbs. 179.95

[3] Auxiliary Transmitter Module. Lets you add door/window switches, mat pressure switches and other sensors to the system. Switches

must be either all Normally Open or all Normally Closed. Transmits signals to Central Processor. 3¼" H x 7¼" W x 3¼" D.

Kit GDA-1158-6, Shpg. wt. 2 lbs. 47.95

[4] Early Warning Smoke/Fire Detector. Use with GD-1158 Central Processor or by itself with its built-in speaker. Solid-state sensor detects gases generated before flames or intense heat begins. A built-in thermal switch also activates the alarm when the temperature exceeds 135° F (57°C). Has sensitivity control, "armed" light, automatic reset. 7¼" W x 3¼" H x 3¼" D.

Kit GDA-1158-5, Shpg. wt. 3 lbs. 84.95

[5] Emergency Transmitter Module. Place anywhere you need them for total protection — lets you send a signal to Central Processor by simply pushing the button. Plugs into any AC outlet. 1¾" H x 5" W x 3¾" D.

Kit GDA-1158-4, Shpg. wt. 2 lbs. 36.95

[6] On/Off Transmitter Module. Turns off Central Processor with a push of the button. Plugs into any AC outlet. To turn Processor on again, simply release the button. 1¾" H x 5" W x 3¾" D.

Kit GDA-1158-3, Shpg. wt. 2 lbs. 36.95

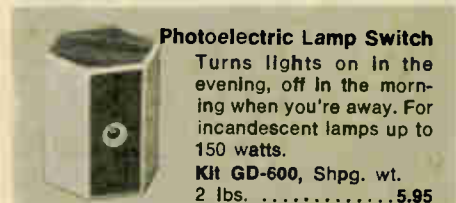
Outdoor Speaker (Not shown). Weatherproof speaker connects to Central Processor, sounds alarm outdoors so it can be heard through the neighborhood. All-weather design. Includes mounting hardware.

GDA-1158-7, Assembled. Shpg. wt. 3 lbs. .. 24.95



power fails. 4¼" H x 11" W x 6" D. With batteries. Check with phone company for installation requirements, if any.

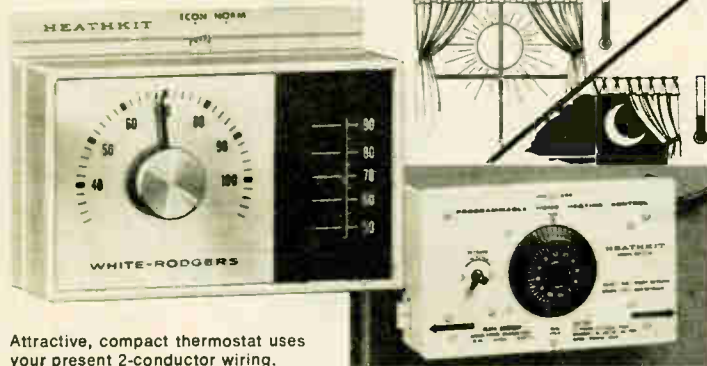
Kit GD-1156, Shpg. wt. 7 lbs. 179.95



Photoelectric Lamp Switch

Turns lights on in the evening, off in the morning when you're away. For incandescent lamps up to 150 watts.

Kit GD-600, Shpg. wt. 2 lbs. 5.95



Attractive, compact thermostat uses your present 2-conductor wiring.

Control your home heat for BIG fuel savings!

Control unit installs easily on any single-stage gas, oil or electric furnace.

Remember last winter's fuel bills? This Programmable Home Heating Control can help!

\$42⁹⁵

- Two programmable setbacks in a 24-hour period
- Econ-Norm override switch for normal operation
- Provides substantial fuel savings of 5-17%

The GD-1776 helps you conserve energy and save on fuel bills by automatically reducing room temperature during one or two pre-programmed periods. Temperature setback is adjustable up to 10°F. Temperature is returned to its normal level automatically. An ECON-NORMAL switch overrides the timer and returns your furnace to normal operation for weekends, parties etc.

The GD-1776 installs quickly and easily on any type of single-stage furnace. The replacement thermostat utilizes your existing 2-conductor wire. No extra thermostat wiring is needed. Certain combination heating/cooling systems may require the aid of a professional heating/air conditioning service if the installation presents unusual circumstances. Comes with 120 VAC power cord or can be "hard-wired" (check local electrical codes). Not intended for use with 2-stage systems.

Kit GD-1776, Shpg. wt. 5 lbs. 42.95

GD-1776 SPECIFICATIONS: Temperature Setback Range: 1 to 10°F Number of Setback Periods: 2. Setback Duration: ½ hour, minimum. 2¾ hours, maximum. Timer Dial: 24 hours. Controls: Timing, Setback. Power Requirement: 120 volts, 60 Hz, 10 watts. Furnace Control Current Rating: 1A @ 24 VAC maximum. Dimensions: Thermostat: 3¼" H x 4½" W x 1¾" D. Control Unit: 4¾" H x 8" W x 2½" D.



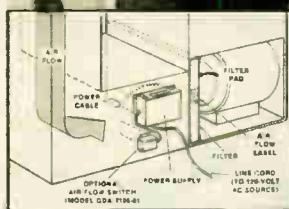
\$74⁹⁵

Ultra-convenient, efficient Ultrasonic Cleaner

For those almost impossible cleaning chores. The Heathkit GD-1150 makes fast work of deep-cleaning watch parts, most jewelry, dentures,

any delicate items that could be harmed by scrubbing or abrasives. Simply fill the stainless steel tank with any safe detergent or solvent for the item to be cleaned. Place the object or objects in the tank, set the timer and that's it! You'll be amazed how quickly and easily your possessions come clean. Tank measures 6" L x 4" W x 2¾" D. Overall, 11" L x 5¾" W x 3¾" H. For 120 VAC.

Kit GD-1150, Shpg. wt. 4 lbs. 74.95



This Heathkit Electronic Air Cleaner will help you maintain a healthier, happier home

Home Furnace electronic Air Cleaner

\$189⁹⁵ *Installs on standard furnaces or air conditioners directly in place of present filter — usually without cutting or altering ductwork*

A truly important home improvement from Heath — it lets you breathe cleaner air throughout your house, for better health, and it removes most dust, dirt and pollen so you clean less. Helps remove smoke and reduce odors too. Helps cut down on dust and dirt so you save money on cleaning bills.

The GD-1196 installs easily right in place of the air filter on your furnace or air conditioner, usually without cutting or altering ductwork. The GD-1196 removes particles — dust, dirt, pollen, even smoke — as small as 1/100th of a micron from the air in your home. It's far more efficient and effective than an ordinary fiberglass filter. It's designed for use with most gas, oil or electric furnaces, and it can be used in both heating and cooling systems.

The GD-1196 consists of a power supply and filter panel that replaces your present filter. Power is obtained directly from your furnace blower motor, or from a standard AC outlet (with accessory switch below). NOTE: Kits below differ in size of filter panel. Check your furnace's filter size/capacity before ordering. For two-zone homes, two filters may be used with a single power supply. CFM, cubic ft. per min.

Kit GD-1196-1, 20" x 25" x 2", 1000 CFM. Shpg. wt. 29 lbs. 189.95

Kit GD-1196-2, 20" x 20" x 2", 800 CFM. Shpg. wt. 27 lbs. 189.95

Kit GD-1196-3, 16" x 25" x 2", 800 CFM. Shpg. wt. 27 lbs. 189.95

Kit GD-1196-4, 16" x 20" x 2", 640 CFM. Shpg. wt. 26 lbs. 189.95

Extra Filter Panels. For replacement, or two-zone homes.

GDA-1196-1, 20" x 25" x 2". Shpg. wt. 10 lbs. 109.95

GDA-1196-2, 20" x 20" x 2". Shpg. wt. 10 lbs. 109.95

GDA-1196-3, 16" x 25" x 2". Shpg. wt. 10 lbs. 109.95

GDA-1196-4, 16" x 20" x 2". Shpg. wt. 10 lbs. 109.95

Accessory Air Flow Switch. Lets you operate the GD-1196 from standard 120 VAC wall outlet. (Required when GD-1196 is used with 240 VAC furnaces and air conditioning systems.)

Kit GDA-1196-5, Shpg. wt. 2 lbs. 26.95

GD-1196 SPECIFICATIONS: Air Cleaning Efficiency: 70% nominal. Generated Ozone Concentration: 0.02 PPM maximum. Static Pressure Drop: 0.15 in. w.g. (clean filter). Power Supply Dimensions: 12" W x 8" H x 4" D. Power Requirement: 110-130 VAC, 60 Hz, 25 watts max. Note: In some cases, a licensed electrician may have to make the electrical connections. Check with local building inspectors. Filter panels are 2" thick, so some adjustment in your present holding brackets may be required.

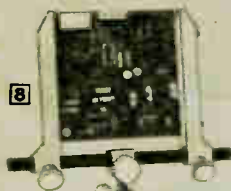
Heath-approved tools to make your kitbuilding faster and easier



1



7



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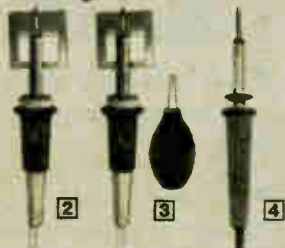


11



12

13



2



3



4



6



9



10

Illuminated Magnifier



Fluorescent lighting and 5" diameter 3 diopter lens take the strain out of close work at your bench. Requires 22-watt T-9 Circline Fluorescent tube (not included).
Model GDP-200,
Shpg. wt. 7 lbs. \$39.95

1 **NEW!** Kitbuilders' Tool Set. Includes wire stripper/diagonal side cutter; small long-nose pliers; three screwdrivers ($\frac{3}{8}$ ", $\frac{1}{4}$ ", $\frac{3}{16}$ "); Weller WP-25 soldering iron; five nut drivers ($\frac{3}{16}$ ", $\frac{1}{8}$ ", $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ "); nut starter; soldering aid; and solder.
Model GHP-1270, Shpg. wt. 3 lbs. \$27.95

2 Heath-approved Weller 25-Watt Pencil Soldering Iron. $\frac{1}{4}$ " chisel tip develops 860° heat.
Model GDP-207, Shpg. wt. 1 lb. \$7.95

3 Heath Solder/de-Solder Set. Weller 25-watt pencil iron develops 860°. Includes de-solder bulb.
GDP-1009, Shpg. wt. 1 lb. \$9.95

4 Soldering Iron For Close Work. Wall 25-watt pencil soldering iron for work on high-density boards. 3-wire cord. For 120 VAC.
GDP-1231, Shpg. wt. 1 lb. \$6.95

5 3-Heat Soldering Iron Kit. Stand with metal cage keeps iron secure. 3 ranges. Six foot power cord. 120 VAC.
Kit GH-17A, Shpg. wt. 5 lbs. \$27.95

6 Heathkit Nut Driver Set. $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{3}{16}$ ", $\frac{1}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{16}$ " and $\frac{1}{2}$ " sizes.
Model GDP-204, Shpg. wt. 2 lbs. \$11.95

7 Motor Speed Control. Ideal for use with any universal motor with rating of 15 amps or less. (Not for use with Dremel tools).
Kit GD-973A, Shpg. wt. 2 lbs. \$19.95

8 Circuit Board Holder. Holds most any shape or size circuit board. Spring loaded for quick change. Tilts 220 degrees.
GDP-1254, Shpg. wt. 2 lbs. \$16.95

9 Vacuum Base — Attaches securely to any smooth, non-porous surface. Powerful rubber suction pad holds without marring tabletop. Overall height $3\frac{3}{4}$ ". Base dimensions 5" x 4 $\frac{1}{4}$ ".
GDP-1252, Shpg. wt. 2 lbs. \$16.95

10 Extension Lamp Kit. Extension arm comes assembled. You attach socket, shade and cord. 34" reach, 360° sweep; vented shade, and movable base clamp. Less bulb.
Kit GDP-202, Shpg. wt. 4 lbs. \$16.95

11 Vertical Jaw Vise Head — For most hobby applications. Nylon jaws open to 2 $\frac{1}{4}$ ".
GDP-1253, Shpg. wt. 2 lbs. \$9.95

12 Standard Height Base — Designed for permanent installation. Three mounting lugs let you attach it securely to the work surface. As with above base, choose desired vise head from three styles listed above.
GDP-1251, Shpg. wt. 2 lbs. \$11.95

Heat Controlled Solder Station

\$39.95

New Weller WTCPN soldering station is transformer powered and features "closed loop" control of tip temperature. Has heat shield, indicator lamp, and sponge. With 700°F tip.

GDP-1108, Shpg. wt. 5 lbs. \$39.95

Set of Replacement Tips for above (all 700°F) Set Includes: $\frac{1}{16}$ " Screwdriver, $\frac{1}{8}$ " Screwdriver, $\frac{3}{16}$ " Screwdriver, $\frac{1}{2}$ " Long Conical, $\frac{3}{4}$ " Long Screwdriver.

GDP-1109, Shpg. wt. 1 lb. \$9.95

13 Vertical Vise Head — Holds bulkier items — model parts, chassis, etc. Jaws open to 6 $\frac{1}{2}$ ". Neoprene pads are reversible and replaceable.

GDP-1255, Shpg. wt. 2 lbs. \$9.95

Beginner kits that are fun and practical

Tabletop Lamp Dimmer

Set the mood for any activity with just the right amount of light — smoothly adjusts the brightness of table or floor lamps up to 300 watts. Eliminates annoying burned out elements in 3-way bulbs, even helps bulbs last longer. Build several and create the decorator's touch, in lighting, in every room of your home.

For 120 VAC. Makes a great heat-control, too, for pencil-type soldering irons used in circuit board work, installing ICs, etc. Measures 3 $\frac{1}{4}$ " H x 3 $\frac{1}{4}$ " W x 3 $\frac{1}{4}$ " D.

Kit GD-1018, Shpg. wt. 2 lbs. \$8.95



Eye Spy™ photobeam relay

The kit consists of a light source, a mirror assembly, and a photo-cell controlled relay which is activated whenever the reflected light beam is broken. Any warning devices or lamps plugged into photocell are then activated.

Works up to 25 ft. from reflecting mirror. Electronics, 5 $\frac{3}{8}$ " H x 4 $\frac{3}{8}$ " W x 5 $\frac{1}{4}$ " D. Mirror assembly, 5" H x 4" W x 2 $\frac{3}{4}$ " D. Use the Eye Spy™ to protect belongings in your garage, tool shed, or anywhere around the house.

Kit GD-1021, Shpg. wt. 3 lbs. \$16.95

Challenging!
Creative!
FUN!



wff 'n proof
think tank games

The emphasis is not on *what* to think, but *how* to think!

WFF 'N PROOF games are games of logic and skill. They're a fun and exciting way to develop fundamental skills in the areas of logic, language, science and mathematics. Like chess, the problems generated in these games become increasingly difficult as the skill of the players develops.

WFF 'N PROOF — a 21-game kit that teaches logic and develops habits of careful reasoning. Beginning games can be played by six year olds. A great way to make learning fun! **\$12.00**

ON-SETS — a 30-game kit that introduces mathematical set theory by encouraging the players to creatively devise ways of using fundamental mathematical concepts. These games can be easily enjoyed by young learners, math students and by heretofore bewildered parents. **\$9.00**

ON-WORDS — like other games in the WFF 'N PROOF series, ON-WORDS is actually several games ranging over a wide spectrum of difficulty, from levels of play appropriate for elementary school youngsters to the connoisseur of word puzzles and games. **\$6.00**

QUERIES & THEORIES — again, a series of games designed to assist the players in developing good questioning skills. An exciting way to teach that asking the right question is the most significant step in solving any problem. **\$12.00**

PROPAGANDA — an exciting game that teaches players not only *what* to think but *how* to think and how to get their ideas across to others. An intriguing game for teenagers and adults. **\$10.00**

EQUATIONS — a 5-game kit that puts excitement back into mathematics. The strategy and level of complexity are determined solely by the players. Ten-year olds will play the game at one level, adults at another. A fun way to build competence and positive attitudes towards mathematics. **\$9.00**

**Insect-Aside™
Electronic Flying
Insect Exterminator**

Kills gnats, flies, mosquitoes, moths and other flying insect pests without the aid of chemicals. All electronic and harmless to humans, birds and pets.

\$49⁹⁵



Now you can enjoy a bug-free spring and summer on your patio, lawn or in your garden. Insect-Aside is a safe, efficient way to be rid of those annoying insect pests. Uses 110 VAC house current (12 V camper model available) so no special wiring or expensive batteries are needed. Safe to humans and pets but murder on flying insects. A special black light irresistibly draws bugs to their doom. Clears up to 1/2 acre. Attractive design, can be hung anywhere. And Insect-Aside is ecologically sound; no chemicals or poisons to pollute the environment. Insect-Aside comes fully assembled so all you have to do is plug it in and start enjoying the great outdoors.

Model PIE-086 **49.95**
Model PIE-087 (12 V camper model) **54.95**

**Educational FUN
for all
AGES!**

**Steam
Engine
Kit**

**SAVE
\$10!**

\$19⁹⁵



Miniature Steam Engine Kit

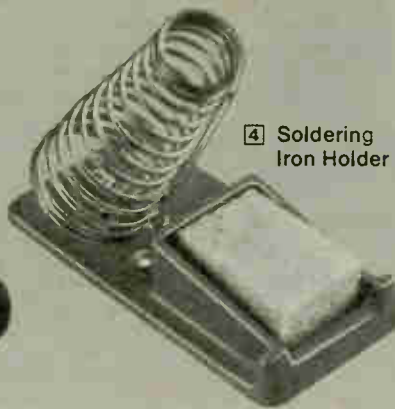
Here's hours of fun for you and the kids; a real working replica of a fuel-fired steam engine. It's fun to watch and even more fun to operate. Just think of the fun you can have teaching the youngsters about steam propulsion. Great for science fairs, exhibits, etc. Safe too; solid fuel pellets are clean burning and easy to handle and store. All parts are constructed of top quality materials designed for years of use. The boiler is solid-brass beautifully nickel-plated. Measures 11 1/2" x 14". For even more fun, add the fully assembled scale operation machine shop consisting of a shaper, saw, forging hammer, drill press and milling machine. All machines are mounted on a solid wood base and connect to the power take off pulley of the steam engine.

JEN-076, Steam Engine **Was 29.95 Now 19.95**
JEN-100, Machine Shop (Assembled) **Was 39.95 Now 29.95**
JEN-200, Extra Fuel **1.99**

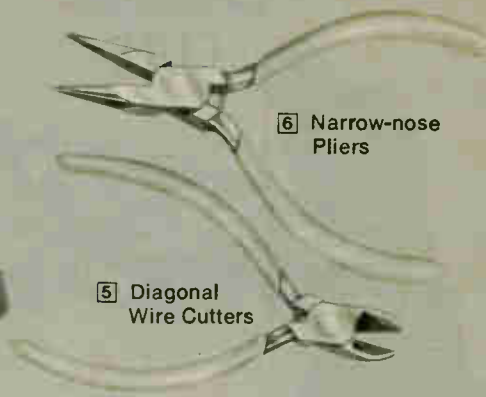
Fine Tools Make Kitbuilding Even Easier



1 Adjustable Wire Strippers



4 Soldering Iron Holder



6 Narrow-nose Pliers

5 Diagonal Wire Cutters

2 Shielded Cables



3 Desoldering Bulb

1 Adjustable Wire Strippers—Honed cutting edges cut and strip stranded or solid insulated wire. Positive adjustment can be preset for any wire size from #10 to #20 gauge. Quality spring steel. Plastic handles have spring action. Overall length 5¾".

Model 55BB 2.49

2 Shielded Cables—Now available at all Heathkit Electronic Centers; shielded transmission cable for all amateur radio, citizens band and television needs. From Columbia Cable.

COL-198 RG 8/U Superflex 29¢ per ft.

COL-188 RG 58 A/U Superflex 09¢ per ft.

COL-755 RG 59 Superflex 07¢ per ft.

COL-508 5 Wire Round Rotor 11¢ per ft.

3 Desoldering Bulb—For quick and easy removal of solder. Place tip near melted solder, squeeze and release bulb. Zip—excess solder is removed.

Model ACP-303 2.50

Replacement Soldering Iron Tips (not shown)

For your Heathkit/Weller Pencil-type iron. Screwdriver tip design.

Model ST-1 ¼" Wide 1.50

Model ST-2 ⅜" Wide 1.50

Model ST-3 ⅛" Wide 1.50

Model ST-4 ⅜" Wide 1.50

4 Soldering Iron Holder—By Weller. Designed for the Heathkit/Weller pencil-type irons on page 45. Heavy base prevents tipping. Includes built-in sponge tray and sponge.

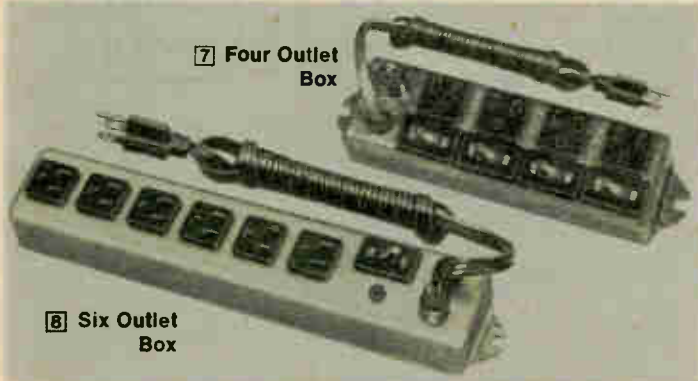
Model PH-60 6.95

5 Diagonal Wire Cutters—Semi-flush cut cuts at extreme tip. For very fine work (#20 gauge or smaller soft copper wire). Blue plastic handles. Overall length 4".

Model A97MS 6.95

6 Narrow-nose Pliers—For precision pick-up, looping, twisting and bending of finest wire. serrated tips give firm grip with minimum pressure. Blue plastic handles. Overall length 4¾".

Model A11DMS 6.95



7 Four Outlet Box

8 Six Outlet Box

Multi-Outlet Boxes let you put electrical outlets anywhere you need them

Put an end to those unsafe multi-plug adapters and tangles of extension cords with this versatile accessory. It's a must for the workshop, test or hobby bench, ham shack, just about anywhere. Gives you additional electrical outlets for real versatility in setting up equipment. Outlets are fuse-protected, grounded and individually-switched. Available in four and six outlet versions. Convenient mounting tangs make possible semi-permanent wall or floor mounting.

Use subject to local electrical zoning codes.

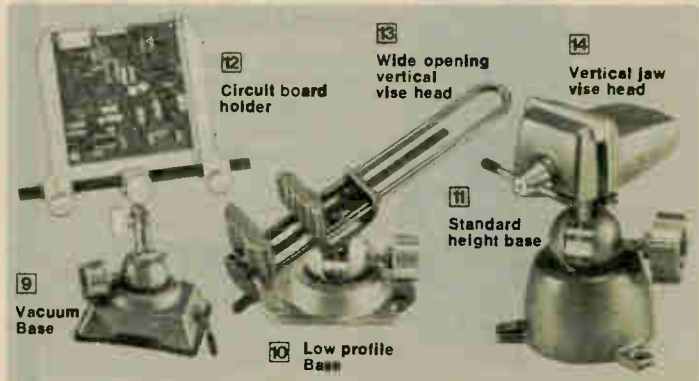
7 Four Outlet Box.

Model JB-60G 12.95

8 Six Outlet Box.

Model JB-40G 12.95

52



9 Vacuum Base

12 Circuit board holder

13 Wide opening vertical vise head

14 Vertical jaw vise head

11 Standard height base

10 Low profile Base

PanaVise® and Positioners, the handiest kitbuilding tools ever

PanaVise® could easily be the most versatile tool you'll ever use. Holds just about anything at the angle that's best for the job. Leaves your hands free for soldering, positioning, assembly, etc.

9 Vacuum Base—Attaches securely to any smooth, non-porous surface with half-turn of mounting lever. Won't mar tabletop. 3¼" H, Base 5" x 4¼". Model 380 16.95

10 Low Profile Base—Positions work close to bench surface. Base permits flush mounting with edge of bench. 2½" H, diameter 5". Model 305 11.95

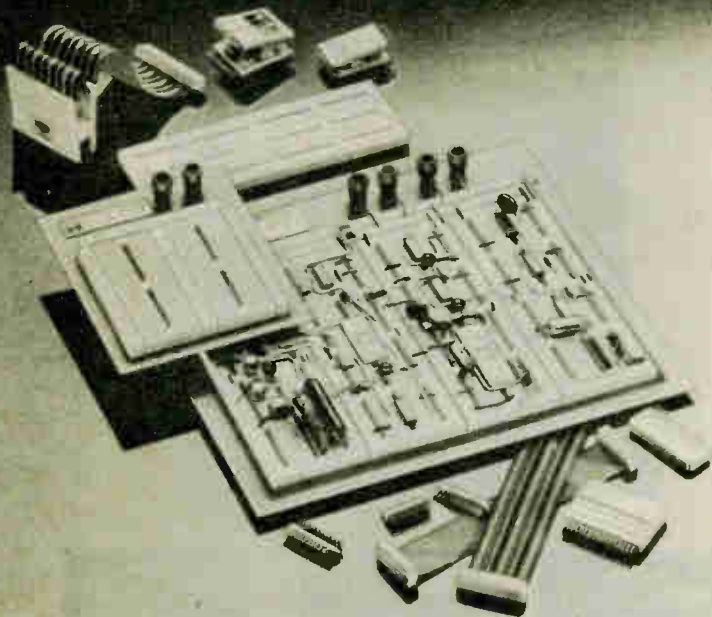
11 Standard Height Base—Designed for permanent installation. Has lugs for attachment to work surface. Model 300 11.95

12 Circuit Board Holder—Holds most any size circuit board. Spring loaded for quick change. Support tilts 220 degrees. Model 315 16.95

13 Wide Opening Vertical Vise Head—Holds bulkier items. Jaws open to 6½". Neoprene pads are reversible and replaceable. Model 366 10.00

14 Vertical Jaw Vise Head—Nylon jaws open to 2¼ inches for firm grip. Won't mar object to be worked on. Model 303-1 10.00

Computer Accessories



Your Heathkit Electronic Center has a wide selection of devices to help you get the most from your computer

Whether you're expanding, experimenting, testing logic circuits, adding I/O devices to your system, or just about anything — your Heathkit electronic center has the computer accessories you need to do the job easier and faster. All these accessories are precision engineered and guaranteed to meet or exceed published specifications.

IC Test Clips. Provide full access to integrated circuit DIP leads with positive, non-shorting electrical connection and positive mechanical clamping to dual-in-line packages. Available in row-to-row dimensions of 0.3" for 14-pin DIP's; 0.3" for 16-pin DIP's; 0.5/0.6" for 24-pin DIP's and 0.5/0.6" for 40-pin DIP's.

Ribbon Cable. A variety of ribbon cable is available in four different configurations and assorted lengths: Open end to socket connector; open end to circuit card edge connector; open end to PCB connector; and socket connectors both ends.

Terminal and Distribution Strips. Breadboarding sockets with universal matrices of solderless plug-in tie points for quick solderless circuit build-up and check out. Accept components with leads up to 0.032" diameter. No special patch cords are required, and integral non-shorting instant-mount backing is included. Available in sizes from 12 four-point tie terminals to 128 five-point tie terminals.

All-Circuit Evaluators. Universal matrices of solderless plug-in tie points for fast, easy circuit buildup and evaluation. All include mounting boards, terminal strips and terminal binding posts. Available with capacity for up to 36 fourteen-pin DIP's.

Headers. Male and female headers for board-to-board interconnection. Female headers mate with matrices of 0.025" square or round posts on 0.1" centers. Male headers mate with single and dual-row female connectors.



Make C-60 cassette copies in 2 minutes!

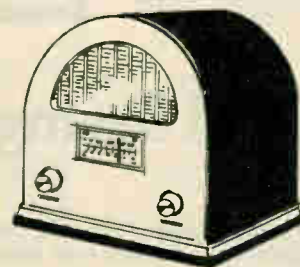
Now you can make instant REZOUND™ copies of your cassettes at any Heathkit Electronic Center

FREE! Simply purchase the low-cost Copy Cassettes™ at the store and you can make perfect monaural copies of any cassette tapes in just minutes. Copy both sides of the cassette at the same time and make up to three copies at once! Copy computer programs, seminars, lectures, language tapes, religious tapes, speeches, sales meetings, etc. It's easy, fast and practical.

The Government Law (Title 17 United States Code) has been amended by a recent Act of Congress, Public Law 92-140, protecting certain sound recordings against unauthorized duplication. It is an infringement of this law to copy any properly registered cassette designated with the copyright notice. (e.g. P 1972, Doe Records, Inc.) You are responsible for: (1) copyright infringements if any; (2) the loss of the cassette master during the cycle.

Hear your favorite Radio Shows from the past — real nostalgia and entertainment!

Only
\$2.98
per Show



REZOUND old time radio cassettes make great entertainment! They're not recreations of the great old radio shows, they're tapes of the actual shows. Some even come complete with the commercials actually used during the broadcasts. There are fifty tapes available at your Heathkit Electronic Center. Everything from *The Shadow* to *Burns and Allen* to the actual broadcast of the *Hindenburg Airship Disaster*. Also *Inner Sanctum* and *Lights Out, Lone Ranger, Mercury Mystery Theater* and more! Buy several. At only \$2.98 each, they're a great way to bring back the golden days of radio.

Microflame™ Miniature Torch

\$29⁹⁵

*Perfect for the metal-working hobbyist
or the craftsman*

The Microflame miniature gas torch opens up a whole new world of enjoyment and creativity in a fun-filled new pastime; metalsmithing. Become an artist in your own right by making beautiful and decorative metal creations. The only limit is your imagination. Everything from intricate metal sculptures to the assembly of that beautiful brass locomotive is easily within your reach. You can turn otherwise worthless scraps of metal (like tin cans and coat hangers) into striking works of art. And temperatures of 5000°F give you enough capability for small soldering or brazing jobs around your home and apartment too. The kit contains: "Microflame Torch, 6 Micronox™ cylinders, 3 Butane cylinders, a spark lighter, 12 six inch (152 mm) long silver solder brazing rods and flux, a fireproof work surface and complete instructions. The heavyweight box is ideal for storage of supplies and accessories. Order yours now and get started in this fascinating hobby that has its practical side too.

- Model MIC-4000** **29.95**
- MIC-4190**, "Metalsmithing-Something New" book **1.95**
- MIC-1100**, Jungle Elephant — metalsmith kit **2.29**
- MIC-4130**, Tree — metalsmith kit **3.95**
- MIC-4210**, Mushrooms — metalsmith kit **2.95**
- MIC-1110**, Flying Ducks — metalsmith kit **2.29**
- MIC-4110**, Flower Arrangement — metalsmith kit **5.49**

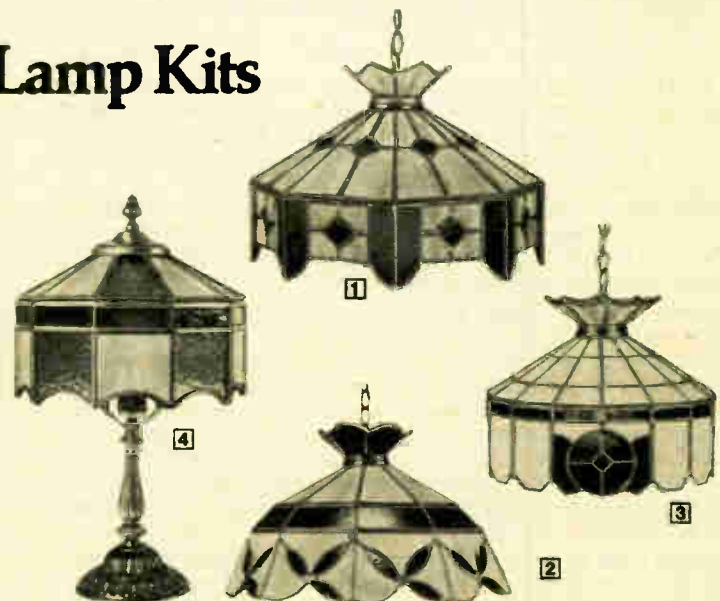


Special Savings on Tiffany Lamp Kits

*Add the delicate hues of old world charm
with colorful Tiffany Lamps from Heath*

Full leaded, stained-glass Tiffany Lamps add that perfect touch to just about any decor. With these superbly crafted kits, you can add a touch of that turn of the century charm to any room in the house. Each kit, whether it is one of the exquisite hanging lamps or the table lamp, contains all pieces necessary to put the kit together easily — all glass parts are pre cut and all lead strips are pre-channeled. The only special tool you'll need to put these lamps together is a soldering iron.

- 1** Model 1672 **Was 56.00 Now 34.95**
- 2** Model 2052 **Was 60.00 Now 39.95**
- 3** Model 1862 **Was 57.00 Now 34.95**
- 4** Model 1011 **Was 38.00 Now 24.95**



THE PRESIDENT'S CORNER



Dear Friends,

A question that occurs to some potential new kitbuilders is, quite simply, "Why build a Heathkit product?"

The first reason is performance. Heath Company, over the years, has developed a reputation for reliability and performance that is unmatched in the industry. Our designs are conservative, our circuits proven, and we're one of the few companies in the industry that guarantees the unit you purchase will meet our specifications. With a Heathkit product, you know the kind of performance you're going to get, and you know that we'll back our performance claims all the way!

The educational aspects of kitbuilding provide compelling reasons too. Every Heathkit product is supplied with a comprehensive step-by-step instruction manual that not only shows you how to put your kit together, but also how and why it works the way it does. A complete circuit description section is included in each manual, so you can learn as much as you like about your kit.

Building Heathkit products lets you see the quality that goes into them from the inside out. All our parts are of the finest quality, and when you put them together, you have a quality handcrafted product. Still another benefit of buying from Heath is the fact that we keep all functional parts in stock for a period of seven years after we have discontinued a product. If you need to replace a part in your Heathkit product, you can get it from Heath. This, along with the detailed service instructions provided in every Heathkit manual, means you

can save a lot of money by maintaining and servicing your own equipment. And you know it's done right, because you do it yourself.

Best of all though, is the FUN, satisfaction and pure enjoyment that comes from building a quality product with your own hands. It's a way for you to spend time that's productive, exciting and creative — a wonderful way to relax and take your mind off your everyday business. And there's nothing quite like the thrill of completing your kit, plugging it in, and having it perform for you. It's a feeling of pride, satisfaction and accomplishment you simply cannot duplicate with store-bought products built on an impersonal production line.

Sincerely,

D. W. Nurse
President

Copies of the Heathkit warranty or warranties for any other consumer product in this catalog costing more than \$15 can be obtained free of charge by writing the Heathkit Electronic Center nearest you, or the Director of Retail Operations, Schlumberger Products Corp., P.O. Box 167, St. Joseph, MI 49085.

ORDER FORM / AGREEMENT

Ship to:
Name _____

Address _____

City _____ State _____ Zip _____

**USE THIS FORM WHEN
ORDERING BY MAIL**

(Store addresses on page 2-3)

Heath Revolving Charge # _____

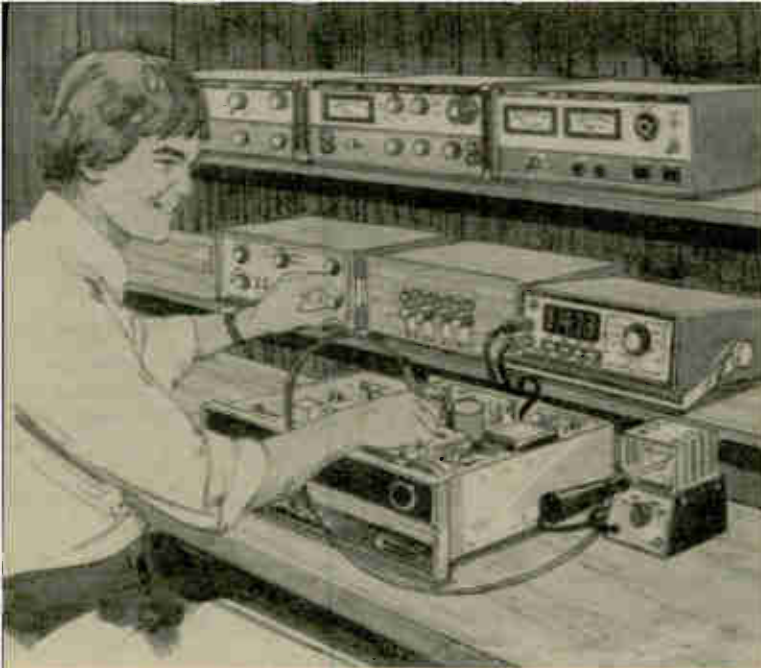
Qty.	Model #	Description	Cost Ea.	Total

*Your order will be shipped via the most efficient way available. Call your nearest Heathkit Center for shipping charges (if any).

Credit plans available,
see us for details

Check M.O. Charge

Total _____
Less Allow. _____
Tax _____
*Shipping _____
Amount Due _____



Heath Test Equipment... The Best Performance for your Dollar—now with a big 5% Discount!

Here's the way to outfit your bench with famous Heath precision instruments and save a lot of money too! Simply buy one instrument from any three of the categories shown below (three instruments minimum) and deduct 5% from the total price! If you're outfitting a complete bench and need more than three instruments you can buy as many as you like — as long as three of your instruments are from three different categories — and you can still deduct 5% from the total price! This discount even applies to any accessories — probes, connectors, cables, etc. — you want to buy. Sorry, this additional discount does not apply to the 5280 series instruments on page 76.

Ask any service professional and he'll tell you ... good test gear costs money. And the cost to equip today's up-to-date service operation? It can be astronomical! That's why we think it makes more and more sense to turn to Heath. Whether your business is Television, Audio, or Two-Way repair the story's the same. Heath makes the high performance instrumentation you need at prices you can really afford! Our prices are low and we've kept them that way — and with our special 5% discount offer, they're an even better buy! Yet at the same time we've maintained the high standards of quality you've come to depend on. Each kit you assemble represents thoughtful, proven design applications that are precision engineered to give you a test instrument that's both practical and precisely tailored to the critical needs of your electronics environment. That's why when it comes to reliability ... and price ... you won't find better!

Component Testers	Generators	Meters	Oscilloscopes	Power Supplies
IT-3117	IG-42	IM-102	IO-4510	IP-2710
IT-3118	IG-127	IM-2202	IO-4541	IP-2711
IT-3120	IG-1272	IM-5218	IO-4550	IP-2715
IT-3121	IG-1273	IM-5225	IO-4555	IP-2717
IT-5230	IG-1275	IM-5228		IP-2718
	IG-4101	IM-5238		IP-5220
	IG-5218	IM-5248		
	IG-5228	IM-5258		
	IG-5237			
	IG-5240			
	IG-5257			

FREE! Heath/Schlumberger Instrument Catalog



Pick up a copy at your
Heathkit Electronic Center

Complete descriptions, specifications and prices for many high performance assembled instruments: frequency counters, oscilloscopes, power supplies, function generators, TV and audio service equipment, multimeters, chart recorders, more.

See how easy it is to get more instrument value per dollar!

Look for the
STORE MANAGER'S SPECIAL
every week at your
Heathkit Electronic Center.
Special savings on different
products 52 times a year.

(products and/or prices
may not be the same at all stores)

IG-1275 Deluxe Lin/Log Swept Function Generator

\$339⁹⁵
Kit

- Sine, square and triangle outputs
- CW, burst, linear and log sweeps
- Variable symmetry, variable offset, VCG input



The IG-1275 is a reliable lab-grade function generator that provides sine, square and triangle waveforms PLUS swept-function waveforms for convenient frequency response tests. Also has pen lift and chart control signals for use with Heath chart recorders and others. Six operational modes; Continuous output (CW); gated CW; a burst mode that completes a variable integral number of output cycles; linear and log sweeps for a 1000:1 sweep range. Stop and start frequencies are set independently; sweep modes can also be triggered externally providing one sweep for each trigger, and stops for an integral number of cycles. Other features include: A 50 dB switch attenuator variable between ranges; adjustable symmetry from 5% to 95%; analog, sweep and sweep gate outputs for convenient system control.

Kit IG-1275, Shpg. wt. 16 lbs. **339.95**

Factory assembled and tested version of above:

SG-1275, Shpg. wt. 16 lbs. **550.00**

IG/SG-1275 SPECIFICATIONS: Output: 50-ohm source — short circuit protected. ± 10 volts open circuit. ± 5 volts into 50-ohm load. Output Flatness: ± 0.1 dB to 300 kHz. ± 0.5 dB to 3 MHz. Output Waveforms: Sine — Triangle — Square. Symmetry continuously variable 5% through 95% to 300 kHz. Frequency: 0.003 Hz through 3 MHz in 6 range steps on primary decade. Sine Distortion: Less than $\frac{1}{10^4}$. Less than 0.5% , $\times 10^2$, 10^3 , 10^4 . Less than 0.75% , $\times 10^2$. Harmonics 30 dB down $\times 10^4$. Triangle Linearity: No deviation greater than 1% to 300 kHz*. Square-Wave Rise and Fall: Less than 60 nS. Dial Accuracy: $\pm 3\%$ of full scale. Attenuator: 0 to -50 dB in 10 dB steps. Variable control 0 to -20 dB. DC Offset: Signal plus offset, limited to ± 10 volts open circuit or ± 5 volts into 50-ohm load. Time Symmetry: Within 1% of full period through 300 kHz*. Sweep Generator: 6 ranges, 10 μ s through 100 sec. Each range may be extended by 100 with the variable control. Sweep Output: Supplies 0 to 4.5-volt linear ramp at sweep generator rate from a 1000-ohm source. Sweep Gate Output Connector: Supplies high TTL level for duration of sweep or burst. Analog Out-

IG-1273 Function Generator

- Offers top performance at a budget price

Has the same fine features and specifications of the IG-1275 above, but does not offer swept-function capability.

Kit IG-1273, Shpg. wt. 12 lbs. . . **239.95**

Factory assembled and tested version of above:

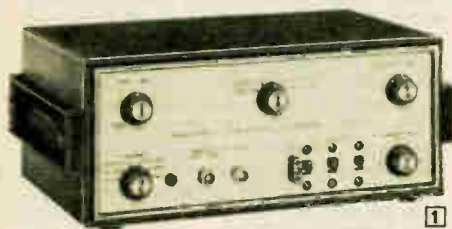
Kit SG-1273, Shpg. wt. 14 lbs. **395.00**

put Connector: Supplies 0 to 6 volts DC for 3 decade span. Less than 100-ohm source. Sync Output Connector: Supplies 1.5-volt (minimum) peak-to-peak signal from a 50-ohm source. Voltage Control Input Connector (VCO): 0 to ± 5 volts signal for a 3-decade span. 8 k Ω input impedance. External Trigger Input Connector: \pm (250 mV to 4 volts) with 10 k Ω . Triggers on positive slope. Operating Temperature: 0 $^\circ$ to 40 $^\circ$ C ambient. Power Requirements: 100 to 135 volts, 50–60 Hz, 20 watts maximum. Switch selectable for normal or low line. (200 to 270 volts, 50–60 Hz, switch selectable.) Fuse Requirements: $\frac{3}{4}$ -ampere, slow-blow, 120/240 VAC operation. Dimensions: 15" wide, 11 $\frac{1}{2}$ " deep 5 $\frac{1}{2}$ " high. 38.1 cm wide, 30.2 cm deep, 13.7 cm high.)

*Applicable only on top decade of each frequency range.

*NOTE: All specifications except those for swept functions also apply to IG/SG-1273 above

The IG-1275 and IG-1273 require a triggered sweep oscilloscope for calibration.



1

1 Stereo Generator — Provides audio or composite stereo signal for multiplex adapter adjustments... RF carrier modulated by these signals for tuner & receiver adjustments... phase test function for subcarrier transformer adjustment... a variable level crystal-controlled 19 kHz pilot signal for checking receiver lock-in ranges... plus built-in sweep and marker signals for RF & IF alignment. With test leads.

Kit IG-5237, Shpg. wt. 11 lbs. **104.95**

IG-5237 SPECIFICATIONS: RF Signal frequency: 100 MHz adjustable by approx. ± 2 MHz. Pilot modulating frequency: 10 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. Power requirement: 120/240 VAC, 50/60 Hz, 35 W. Dimensions: 5 $\frac{1}{2}$ " H x 13 $\frac{1}{2}$ " W x 9" D.

2 Function Generator — Generates highly accurate sine, square or triangle waveforms. A calibrated step attenuator adjusts from 0 to 50 dB (10V p-p to 30 mV p-p) in 10 dB steps. An attenuator control provides up to 20 dB additional attenuation for each step for a total of 70 dB. A triggered oscil-



2



3

SAVE \$20!

loscope is needed for calibration.

Kit IG-1271, Shpg. wt. 7 lbs. **119.95**

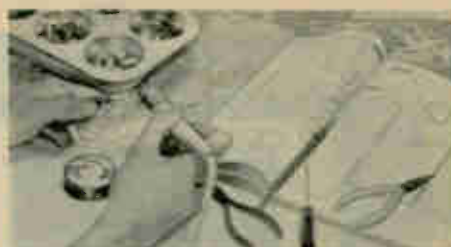
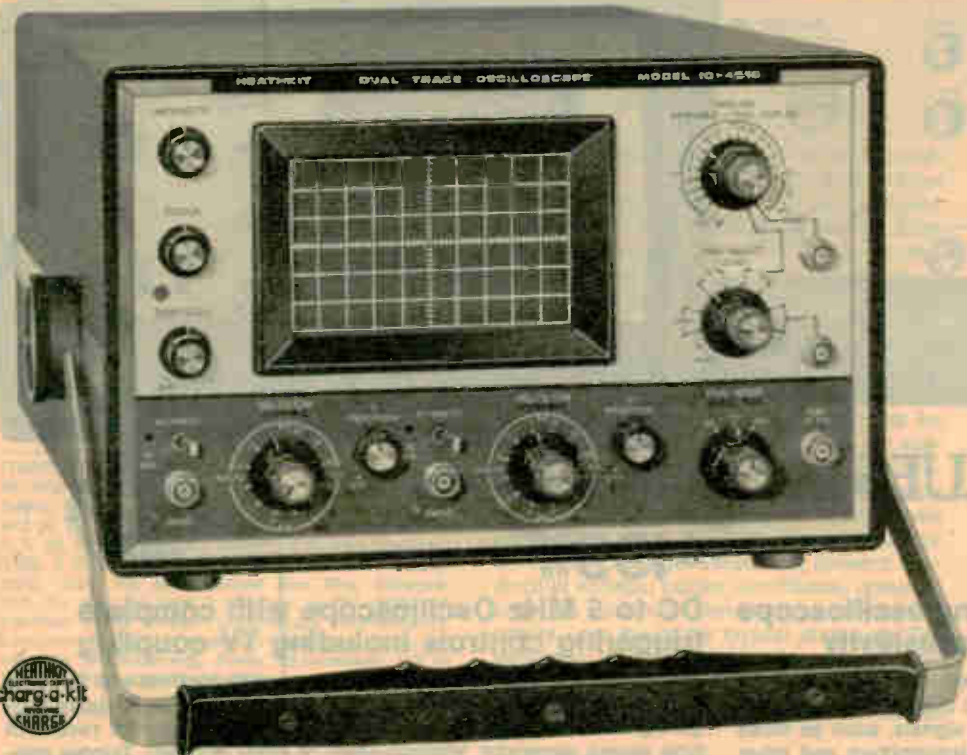
Assembled SG-1271, wired version of the IG-1271 in same attractive blue & white styling (not shown), Shpg. wt. 7 lbs. **195.00**

IG-1271 SPECIFICATIONS: Frequency 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. Sine waveform: Harmonic distortion: 3% max., 5 Hz to 100 kHz. Power requirement: 105-130 volts or 210-260 volts, rms, 60/50 Hz, 15 watts max. Dimensions: 3" H x 7 $\frac{1}{4}$ " W x 8 $\frac{1}{2}$ " D (with handle removed). Net weight: 4.2 lbs.

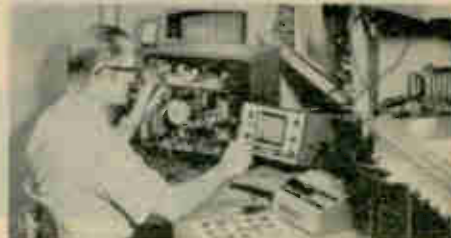
3 Precision RF Generator — The IG-42 provides 100 kHz to 30 MHz signals with $\pm 3\%$ adjustable frequency calibration. RF output voltage adjusts from 5 to 100,000 μ V in five attenuated steps, with 10:1 variable attenuation. Output can be modulated from 0-50% with 5% accuracy. 120/240 VAC, 60/50 Hz. 8 $\frac{1}{2}$ " H x 13" W x 7" D.

Kit IG-42, Shpg. wt. 15 lbs. **Was 119.95, Now 99.95**

**Dual-Trace, DC-15 MHz — the one you NEED
for professional service, circuit-design and engineering —
available fully assembled, or in money-saving kit form**



Easy kit assembly and service — major circuitry is contained on 5 PC boards



TV Servicing — excellent for stage by stage troubleshooting



Lab Work — circuit design, testing components, checking assembly

Our finest oscilloscope does it ALL!

Heathkit IO-4510 Dual-Trace Oscilloscope

\$619⁹⁵
Kit

- DC-15 MHz bandwidth with post-deflection accelerated CRT for high brightness
- Excellent 1 mV/cm input sensitivity
- 45 MHz typical triggering bandwidth

- Time base sweep to 0.1 μ s/cm; x5 sweep magnifier
- Y₁ and Y₂ trigger selection • X-Y capability

Professional scope performance at a low price — plus DC-15 MHz bandwidth, 1 mV/cm vertical sensitivity, time base to 0.1 μ s/cm and complete dual trace capability. Vertical input sensitivity of 1 mV/cm is provided over the entire bandwidth. With the 4510 and a X10 probe you can read waveforms to 10 mV, not the 50 or 100 mV found on other scopes.

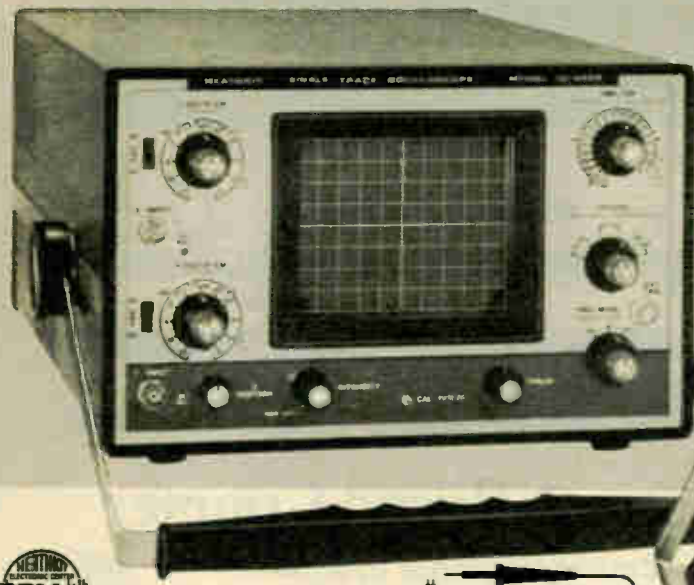
The IO-4510 will typically trigger on signals up to 45 MHz and is guaranteed to 30 MHz. And there's no stability control needed with the digitally-controlled triggering circuits. In the automatic mode, a reference baseline is generated even when the trigger signal is absent. Choice of normal or automatic sweep uses any one of 20 time bases from 0.2 sec/cm to 0.1 μ sec/cm. Any sweep speed can be magnified five times. An externally generated horizontal signal can also be selected. Internal delay lines display of at least 20 nanoseconds of the pre-triggered waveform, insuring complete waveform display — mandatory for logic analysis.

The fully regulated power supplies provide stable voltages. An adjustable AC line switch is used to match the regulated power supplies to any common line voltage from 100 VAC to 280 VAC.

IO-4510 calibration requires precise source of square waves such as IOA-4510-1 or IG-4505 on page 58.

Kit IO-4510, Shpg. wt. 36 lbs. **619.95**
SO-4510, factory assembled & calibrated version of IO-4510, Shpg. wt. 28 lbs. **850.00**

IO/SO-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% (20°C to 30°C), 5% (10°C to 40°C) referenced to 0.2 V/cm @ 25°C. Vertical Response: DC Coupling: DC to 15 MHz (-3 dB). AC Coupling: 2 Hz to 15 MHz (-3 dB). Rise Time: 24 nanoseconds. Overshoot: Less than 3%. Delay Line: Allows display of at least 20 ns of pretriggered waveform. Vertical Input: Impedance: 1 megohm shunted by approx. 40 pF. Maximum Input: 400 volts peak combined AC & DC Connector: BNC. Vertical Modes: Single: Y₁ or Y₂ selected by vertical position controls. Dual: Chopped (200 kHz) or alternate automatically selected by Time Base switch. **HORIZONTAL:** Time Base: Ramp: 0.2 sec/cm to 0.1 μ sec/cm. Positions: 20 steps in 1-2-5 sequence. Variable: Continuous between ranges to approx. 0.6 sec/cm. Accuracy: Within 3% (20°C to 30°C), 5% (10°C to 40°C) referenced to 1 ms/cm @ 25°C. Magnifier: X5 (adds additional 2% to sweep accuracy). External: Sensitivity: 0.2 V/cm (approx.) Impedance: 200 kilohms (approx.). Polarity: Negative input causes right hand deflection. Frequency Response: DC to 1 MHz (-3 dB). Connector: BNC. **TRIGGER:** Internal: Automatic: Zero crossing \pm 0.5 volts. Normal: Adjustable over 8 divisions. Slope Selection: + or - External: Automatic: Zero crossing \pm 0.2 volts. Normal: Adjustable over \pm 5 volts. Slope Selection: + or - Impedance: 1 megohm shunted by approx. 30 pF. Connector: BNC. 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° @ 100 kHz. **GENERAL:** CRT: Type: 6 x 10 cm spiral PDA. Acceleration Potential: 4 kV regulated. Phosphor: P31. Graticule: 6 x 10 cm illuminated, variable by front panel control. Power: Voltage Range: 100 to 140 VAC/200 to 280 VAC, switch selected, 75 watts. Internal Supplies: Fully regulated. Operating Temperature Range: 10°C to 40°C. Dimensions: 6.4" H x 12.9" W x 19.3" D (handle extended). Weight: 24 lbs.



8 EVENING KIT
Fast, Easy Assembly

Professional quality 10 MHz single trace scope offers outstanding features at a low price

\$319⁹⁵

- Brighter trace for easier-to-see displays
- TV trigger position
- Fully regulated power supplies

Heath puts together engineering and solid state technology to come up with an unparalleled price/performance value, the IO-4555. This scope offers the features and performance that both the professional and hobbyist can appreciate and its 10 MHz bandwidth makes the IO-4555 ideal for applications in audio, digital and television servicing. Features include X-Y capability with matched X-Y attenuation, extra-bright trace, 11 step vertical and 19 position horizontal attenuators. Vertical sensitivity may be varied in calibrated, 1-2-5 sequence from 10 mV to 20 V/cm or continuously varied, between steps, to approximately 60 volts per centimeter. Horizontal time bases may be selected in calibrated 1-2-5 sequence from 0.2 sec/cm to 0.2 μ s/cm and the X5 magnifier makes it a simple matter to observe enlarged portions of displayed waveforms. AC, DC, and TV trigger modes make application of the IO-4555 to any test configuration a simple matter. Kit construction is straightforward, with circuit boards and wiring harnesses to simplify assembly, and Heath's performance engineered solid state circuitry insures years of trouble free performance. Put the IO-4555 on your bench today. Calibration requires a precise source of square waves such as IOA-4510-1 (with additional 6 volt power source) or IG-4505 on page 58.

Kit IO-4555, Shpg. wt. 29 lbs. **319.95**

IO-4555 SPECIFICATIONS: VERTICAL: Sensitivity: 10 mV/cm to 20 V/cm. Attenuator: 11 steps in 1-2-5 sequence. Variable attenuator: Continuous between steps to approximately 60 V/cm. Accuracy: Within 3% (10°C to 40°C). Vertical Response: DC Coupling: DC to 10 MHz (-3 dB) at 6 cm. AC Coupling: 2 Hz to 10 MHz (-3 dB) at 6 cm. Rise Time: 35 ns. Overshoot: less than 5%. Vertical Input: Impedance: 1M Ω shunted by 38 pF. Maximum Input: 490 volts peak combined AC and DC. Connector: BNC. HORIZONTAL: Ramp: 0.2 sec/cm to 0.2 μ s/cm. Positions: 19 steps in 1-2-5 sequence. Variable time base: Continuous between ranges to approximately 0.6 sec/cm. Accuracy: Within 3% (20°C to 30°C), 5% (10°C to 40°C). Magnifier: X5 (adds additional 2% to sweep accuracy). Trigger: Automatic; Adjustable over 10 divisions. Normal: Adjustable over 10 divisions. Mode: AC, DC, TV. Y Channel: same as vertical. X Channel: same as vertical, except response is limited to 1 MHz. Phase Shift: less than 8° at 1 MHz. Power Requirement: 105 to 130 VAC/210 to 260 VAC switch selected, 70 watts at 120 VAC (240 VAC). 6.9" H x 12.8" W x 19.3" L (without handle). Calibration requires a precise source of square waves such as IOA-4510-1 or IG-4505 on page 66.

Lab-quality deluxe dual-trace oscilloscope features brighter trace and faster writing speed

\$419⁹⁵

- Mu-metal shield reduces error caused by electromagnetic interference
- Fully-regulated high voltage supply

The IO-4550 is an excellent choice for TV service, electronics experimentation and design. Its extra-bright trace allows easy reading even in high ambient light; its two vertical input channels have a maximum sensitivity of 10 mV/cm for accurate measurements. Input channels are displayed, chopped or alternate, as selected by the time base switch. A trigger select switch and level control allow the time base to be precisely triggered at any point along the positive or negative slope of the signal. The digitally controlled time base provides automatic triggering, so no stability control is necessary and fewer adjustments are required. The fully regulated high voltage power supply assures operation to specifications on standard line voltages from 100 to 270 volts. Mu-metal shielding helps prevent interference. Improved circuitry and just 4 printed circuit boards make the IO-4550 an easy kit to assemble. Calibration requires a precise source of square waves such as IOA-4510-1 (with additional 6 volt power source) or IG-4505 on page 58.

Kit IO-4550, Shpg. wt. 27 lbs. **419.95**

Factory assembled and calibrated version of above.

SO-4550, Shpg. wt. 25 lbs. **595.00**

IO/SO-4550 SPECIFICATIONS: VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. Attenuator: 11 steps in 1-2-5 sequence; Variable: Continuous between steps to approximately 60 V/cm. Accuracy: Within 3%. Vertical Response: DC Coupling: DC to 10 MHz. AC Coupling: 2 Hz to 10 MHz. Rise Time: 35 ns. Overshoot: Less than 5%. VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. Attenuator: Vertical Input: Impedance: 1 M Ω shunted by 38 pF. Maximum Input: 400 V. HORIZONTAL: Time Base: Ramp: 0.2 s/cm to 200 ns/cm. Positions: 19 steps in 1-2-5 sequence. Variable: Continuous between ranges to approximately 0.6 s/cm. Accuracy: Within 3%. Magnifier: X5 (adds additional 2% to sweep accuracy). External: Sensitivity: 0.1 V/cm (approx.). Impedance: 100 k Ω (approx.). Frequency Response: DC to 1 MHz. Connector: BNC. TRIGGER: Internal: Automatic; Adjustable over 10 divisions. Normal: Adjustable over 10 divisions. Slope Selection: + or -. External: Automatic; Adjustable over 0.8 V. Normal: Adjustable over 0.8 V. Slope Selection: + or -. Impedance: 1 M Ω shunted by 40 pF. Connector: BNC. X-Y: Y Channel: Same as Vertical; X Channel: Same as vertical except response is limited to 1 MHz. Phase Shift: Less than 8° @ 100 kHz. Power: Voltage Range: 100-135 VAC/200-270 VAC switch selected 70 watts at 120 VAC (240 VAC). 6.9" H x 12.9" W x 19.3" L (without handle).

Counter Buying Tips

Frequency counters are bought based on specifications and features. Here are some tips on what the important specs are, and how to interpret them.

Frequency Range. This spec would seem to speak for itself, i.e., how high does the instrument count? Be sure that the advertised frequency range is no higher than that which is guaranteed by the logic manufacturer. All Heath counters are specified in this manner.

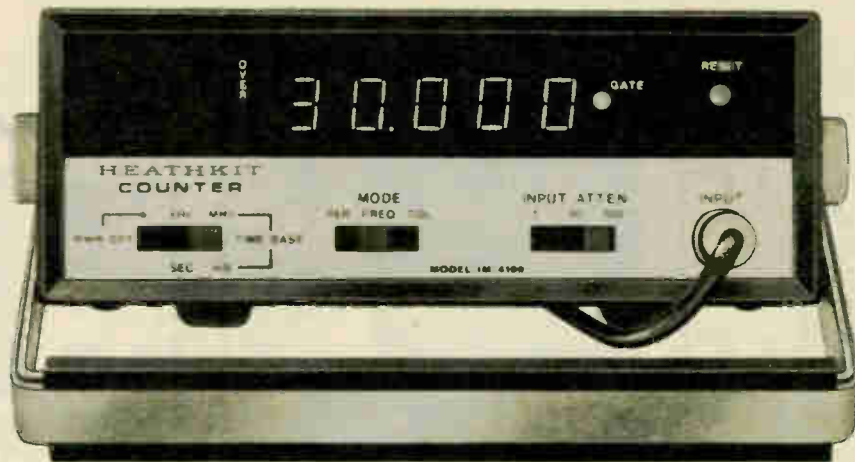
Sensitivity. Heath experience has determined that an input sensitivity of 15-25 mV is the best for most applications. Very low sensitivities (100 mV or higher) are often useless and high sensitivities (1 mV) can give false readings on noisy signals.

Input Impedance. Since the input impedance is both resistive and capacitive, you need to know both values. At high frequencies (above 110 MHz), the capacitive loading becomes the most important factor. At 500 MHz, 1 megohm shunted by 25 pF is actually a 12 ohm load. This is a VSWR of greater than 4, with a 50-ohm cable. At these frequencies, well-designed counters use as a close to a resistive 50 ohm input as practical to maintain a good VSWR. Heath counters GUARANTEE a VSWR of 1.5 to 1 up to 250 MHz, and less than 2.0 at 1 GHz.

Accuracy. This spec is given as time base accuracy ± 1 digit. Time base accuracy must include both aging rate and temperature stability to be meaningful. Some manufacturers hide errors of 25 ppm or more by omitting one or both of these factors. All Heath counters are specified with both aging rate and temperature stability to insure a true accuracy specification.

Resolution is determined by the number of digits and gate time. It is easy to be misled by simply considering the number of digits. Well-designed counters, like Heath's, always provide the proper number of digits and the proper gate times for resolution consistent with accuracy as defined above.

These considerations plus numerous other features, service and parts availability make Heath counters one of your best instruments buys!



Our Lowest-Priced Counter

Heathkit IM-4100 — Counts frequency to 30 MHz, period to 99.999 seconds, events to 99,999

\$139⁹⁵ Gives you the performance you **NEED** for precision measurements with outstanding resolution and sensitivity



The Heathkit IM-4100 is an almost unbelievable counter value. It's a full five-digit frequency counter which also functions in period and totalize modes. It provides built-in input attenuation and 12-volt operation all in one compact package. The latest digital design and a stable 10 MHz crystal oscillator assure accuracy and precision on all measurements. Its excellent resolution makes it ideal for a variety of signal alignment applications.

As a frequency counter, the IM-4100 is guaranteed to 30 MHz with 1 Hz resolution. Sensitivity is 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 μ sec! 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 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 over-range indicator and a gate lamp.

A rear panel switch easily selects internal or external time base. The rear panel connector can be used as an input for an external time base signal, frequency ratio measurements, or as an output to check the internal 10 MHz time base, or to provide a convenient frequency standard of 1 MHz for bench use. The IM-4100 operates on 120/240 VAC, or 12-volt DC. DC power is applied through a rear panel connector (mating connector supplied).

The IM-4100 is an easy kit to build, with an open chassis layout, with circuit board construction to simplify assembly. Or you can order it factory assembled and tested.

Kit IM-4100, Shpg. wt. 6 lbs. **139.95**
Factory assembled and tested version of above.

SM-4100, Shpg. wt. 6 lbs. **220.00**

IM-4100 SPECIFICATIONS

FUNCTIONS — Frequency: 5 Hz to 30 MHz minimum. Period: 1 μ sec resolution to 99.999 sec. Totalize: 1-99,999 events. Sensitivity: 15 mV rms (50 mV, 5 Hz to 50 Hz). Period Pulse Width: 25 nsec minimum. Low Frequency Signal Risettime: 1 msec for signals less than 10 Hz. Input Impedance: 1 megohm shunted by less than 35 pF. Protection: 240 volts rms at 60 Hz. Attenuator: X1, X10, X100 fixed compensation. **TIME BASE** — Frequency: 10 MHz. Setability: ± 1 ppm. Temperature stability: ± 10 ppm, maximum 0° to 40° C ambient. Aging rate, 10 ppm per year. **OSCILLATOR**

CONNECTION — External Input Frequency: DC to 20 MHz. External Input Sensitivity: TTL or 2.5 V rms from 50-ohm source. Internal Output: TTL signal at 1 MHz. **GENERAL** — Gate Interval: kHz-1 sec, MHz-1 msec. Manual Gate: DC control in events mode using external OSC input connector. Display Time: 200 msec plus gate interval. Power Requirement: 105-130 or 210-260 VAC (switch-selected). 60/50 Hz, (at 25 watts); or 9-14 VDC at 1.25 amperes. Dimensions: 2 $\frac{3}{4}$ " H x 7 $\frac{1}{4}$ " W x 10 $\frac{1}{2}$ " D (less handle).



IM-4110 — 110 MHz Input



IM-4120 — 110 and 250 MHz inputs

It's Heath for your Best Counter Values

High-Performance Frequency Counters

- Frequency, Events, Period and Period Averaging
- Bright Red LED 8-Digit Readout
- Optional 12-Volt and Battery Operation
- Overrange and Gate Lamp Indicators
- Available in easy-to-build kit form or fully assembled and tested

These frequency counters offer excellent flexibility, accuracy and resolution, PLUS features you simply won't find on others in this price range.

A switchable attenuator on the 110 MHz input divides the input signal x1, x10 or x100 to facilitate accurate measurements of large amplitude signals. The time base switch selects the gate time and the resolution of the display. The 4120 time base is controlled by a high quality TCXO (temperature-compensated crystal oscillator) with a temperature stability of ± 1 ppm and an aging rate of < 5 ppm/yr for excellent stability. (The 4110's crystal oscillator has stability of ± 10 ppm

12-volt Converter for 4110 and 4120 Frequency Counters

Mounts inside counter cabinet, permits 12-volt mobile operation of 4110 and 4120. Can also be fitted with 12 rechargeable NiCad batteries (not included, order below) for portable "in-the-field" operations.

Kit IMA-4130-1, Shpg. wt. 3 lbs. 34.95

Assembled version of above.

SMA-4130-1, Shpg. wt. 3 lbs. 60.00

Set of 12 NiCad batteries.

SMA-4130-2, Shpg. wt. 4 lbs. 99.95

and an aging rate of < 10 ppm/yr.)

Separate 50-ohm inputs are used for frequency ranges above 110 MHz to maintain low VSWR, while inputs below 110 MHz are 1 meg shunted by less than 25 pF. There's a rear panel oscillator input/output jack for an external time base, frequency ratio measurements, or it can be used as a signal source for breadboarding, calibrating or marker applications.

These counters include additional functions — events, period and period averaging. In events OP, the counting circuit increments for each input pulse with the resulting counts displayed. Events CL stops the events count and displays the accumulated total.

In the period mode, the readout displays a single period of the signal.

In the period averaging mode, the counter displays the time of a single period based on a 1000-period average. This results in a more accurate and higher resolution measurement.

A 12-position handle rotates a full 360° for

easy storage and mounting. Easy kit assembly and NO-INSTRUMENT calibration. Counters operate on 120/240 VAC (switch-selected), 12 VDC with IMA-4130-1 accessory at left, or portable battery operation with IMA-4130-1 and SMA-4130-2 batteries.

IM-4110 5 Hz to 110 MHz Counter

Applications include CB, low-band AM and FM, AM and FM broadcast bands, musical instruments, video tape systems, crystals, etc. Has single 110 MHz input.

Kit IM-4110, Shpg. wt. 12 lbs. 199.95

Assembled and tested version of above.

SM-4110, Shpg. wt. 10 lbs. 350.00

IM-4120 5 Hz to 250 MHz Counter

For above applications, plus marine and aircraft radios, 2-meter and 220 FM, general lab and research work, more. Has 5 Hz to 110 MHz and 5 MHz to 250 MHz inputs.

Kit IM-4120, Shpg. wt. 12 lbs. 349.95

Assembled and tested version of above.

SM-4120, Shpg. wt. 11 lbs. 550.00

	IM-4120	IM-4110
Frequency Range	5 Hz to 250 MHz	5 Hz to 110 MHz
Inputs	5 Hz to 110 MHz, 5 MHz to 250 MHz	5 Hz to 110 MHz
Input Sensitivity	25 mV RMS	25 mV RMS
Input Impedance	50 ohms, VSWR less than 1.5:1 110 MHz, same as 4110	1 meg shunted by < 25 pF
Protection	5 Vrms	250 V (DC + peak AC) to 100 kHz
Time Base Freq.	4 MHz TCXO	10 MHz
Aging Rate	< 5 ppm/yr	< 10 ppm/yr
Temp. Stability (0 to 40°C ambient)	± 1 ppm	± 10 ppm

OTHER IM-4110 and 4120 SPECIFICATIONS — FUNCTIONS: Events: 1 to 99,999,999. Period Resolution, 0.1 μ S. Period Average, 1000 periods. Period Pulse Width, 100 nsec min. Low Frequency Signal Risettime, 1 msec to signals less than 10 Hz. Attenuation, (110 MHz input) x1, x10, x100 fixed compensation. TIME BASE: Setability, ± 0.1 ppm. OSCILLATOR CONNECTION: Ex-

ternal Input Frequency, 1 MHz. External Input Sensitivity, TTL or 2.5 Vrms for 50-ohm source. External Input Protection, -5 V peak to +10 V peak. Internal Output, >1.5 V p-p into 50 ohms at 1 MHz. TCXO Warmup, 10 minutes. GATE INTERVAL: Frequency, 1 mS to 10 S (4 mS to 40 S on 1 GHz input). Period, determined by period of input frequency. Period Average,

1000 periods of input frequency. Display Time, 200 mS to 20 S including a count hold position. Power Requirements: 105-130 VAC or 210-260 VAC (switch-selected), 50-60 Hz at 35 watts; or 9-14 VDC at 2.5 A max. with IMA-4130-1 accessory. Dimensions: 10 1/4" W x 13 1/4" D x 4 1/2" H (less handle). Net Weight: 8 lbs.

Power your bench with Heathkit Supplies

Tri-Output Experimenter's Power Supply

\$89⁹⁵

Three floating outputs can be connected in any combination for a wide variety of output voltage and current capability

The IP-2718 offers both the functions and operational flexibility that make it an indispensable addition to the bench of the designer and experimenter. Features include a fixed 5VDC supply and two continuously variable 0-20 VDC supplies, each one completely isolated from the other.

The fixed 5 VDC source is ideal for digital experimentation and design and with a rating of 1.5 A there's enough current to handle any of today's many and varied logic devices. For greater versatility, the outputs of both 20 VDC supplies may be "strapped" in any combination to provide positive and negative voltages. These voltages may be applied with either a fixed reference or they may be allowed to "float" without reference level. There's also clutch-coupled tracking control to allow the two 20 VDC supplies to "track" each other at any specified voltage difference. This feature is ideal for analog circuits requiring both positive and negative voltages.

All three outputs are short-circuit proof and each is capable of automatic current limiting. As an extra feature, both 20 VDC supplies can be connected in parallel for higher through-the-load current operation. The front panel has a large, easy to read meter and its switchable functions allow the user to monitor both voltage and

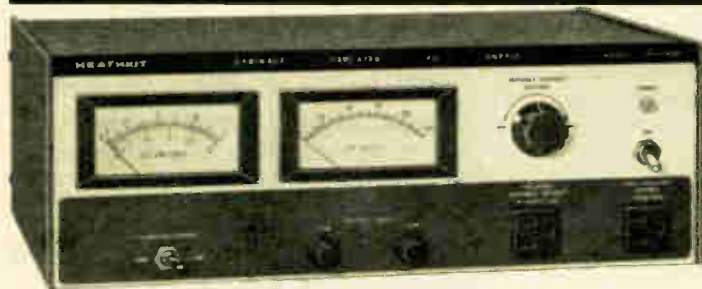


3 EVENING KIT
Fast, Easy Assembly

current outputs from each of the three supplies. An outstanding value and excellent addition to any bench.

Kit IP-2718, Shpg. wt. 12 lbs. **89.95**
Assembled SP-2718, Shpg. wt. 12 lbs. **195.00**

IP-2718 SPECIFICATIONS: Outputs: 5 volts DC $\pm 5\%$ at 1.5 A. Two 0-20 VDC at 0.5A, continuously adjustable. Regulation: Load: less than 0.1% variation from no load to full load on 20-volt supplies; less than 2% variation from no load to full load on 5-volt supply. Line: less than 0.2% variation for line voltage change of 10 volts on 20 volt supplies; less than 0.15% variation for line voltage change of 10 volts on 5-volt supply. Power Requirement: 100-135 VAC or 200-270 VAC, 60/50 Hz, 100 watts full load. Dimensions: 4 1/2" H x 10 3/4" W x 9" D.



Heathkit IP-5220 Variable Isolated AC Supply

\$129⁹⁵

- Variable 0-140 VAC output
- 1 A & 3 A ammeter ranges for easy low-current readings
- Simultaneous metering of voltage and current output

This variable AC source 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. A full 360 volt-amperes of AC power is available at the front panel variable output socket. More than enough to operate equipment with large power requirements. 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. Switch-selected 1A and 3A ranges are fused individually on the front panel. Fused variable output socket protects the IP-5220 and the circuit under test.

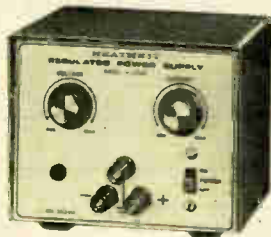
Kit IP-5220, Shpg. wt. 28 lbs. **129.95**

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.

1-15 VDC Regulated Supply

Perfect for servicing, testing or designing transistor radios, portable tape recorders and other low-voltage solid-state devices. Continuously adjustable 1-15 VDC at 500 mA output, 500 mV line and load regulation and fully adjustable current limiting. AC or DC programming capability lets you control output voltage from another source.

Kit IP-2728, Shpg. wt. 5 lbs. **27.95**



IP-2728 SPECIFICATIONS: Ripple and Noise: Less than 5 mV. Current Output: 500 mA maximum continuous load. Current Limiting: Adjustable from 10 mA to over 500 mA. Transient Response: 25 microseconds. Output Impedance: 0.5 ohm or less to 100 kHz. Power Requirement: 120/240 VAC, 60/50 Hz, 15 W at full load. Dimensions: 4 3/4" H x 5 1/2" W x 5 3/4" D. Programming: AC or DC. 5000 ohm input resistance.

64

0-400 VDC General-Purpose Power Supply

Provides 0-400 VDC at 0-100 mA continuous (125 intermittent) with excellent line and load regulation. Has front panel voltage and current meters and built-in circuit protection. Binding posts are insulated from chassis.

Kit IP-2717, Wt. 19 lbs. . . **119.95**
Assembled SP-2717 . . . **230.00**



IP-2717 SPECIFICATIONS: Additional Outputs: 0 to -100 VDC at 1 mA variable bias voltage, 6.3 VAC at 4 amps., 12.6 VAC at 2 amps. (25 VA max. AC load), filament voltage. Regulation: Output variation less than 1% from no load to full load. Ripple: Less than 10 millivolts rms. Output Impedance: Less than 10 ohms, DC to 1 MHz. Meters: Voltmeter 0-400 V or 0-150 V; Milliammeter 0-150 mA. Power Requirement: 120/240 VAC, 60/50 Hz, 150 W max. Dimensions: 5 3/4" H x 13 3/4" W x 11" D.

Dependable DC Supplies from Heath

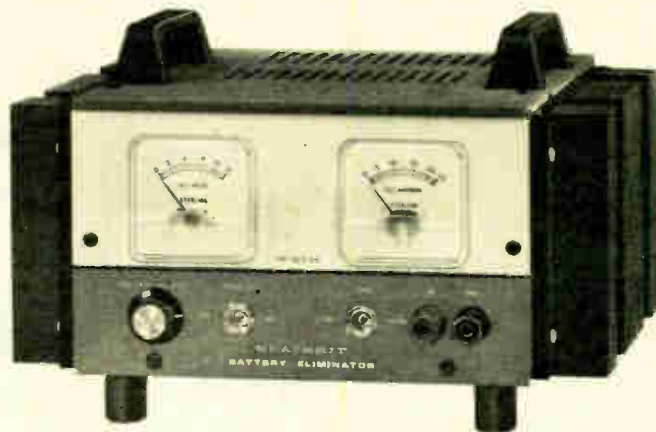
Heavy-Duty Power Supply/Battery Eliminator

\$149⁹⁵

*Provides variable 9-15 volt output
capable of 12 amps continuous,
20 amps Intermittent*

The Heathkit IP-2715 heavy duty power supply provides you with a clean, accurate voltage source necessary for the reliable service of Ham, Marine, and CB communications gear. In fact, the IP-2715 is ideal for any high current DC voltage application. Features include two easy to read front panel meters which permit the user to continuously monitor both current and voltage. Front panel adjustment allows continuously variable voltage selection from 9 to 15 VDC and a two position norm/standby switch removes voltage from the output binding posts. Output accuracy is assured by a zener diode which provides a fixed reference for accurate regulation of the output even under varying load conditions. Large double heat sinks, 4 output transistors and extra-large transformer insure accurate low ripple operation. An excellent addition to your bench.

Kit IP-2715, Shpg. wt. 31 lbs. **149.95**



IP-2715 SPECIFICATIONS: Output Voltage: variable from 9-15 VDC. Output Current: 12 amps continuous, 20 amps intermittent (per derating curve in manual). Ripple: less than 1% at full load. Regulation: less than 2% variation from no load to full load. Fuses: 7A, 3 AG slow-blow primary; 20A, 3 AG output. Power Requirements: 110-130 VAC, 7A or 220-260 VAC, 3.5 A, 60/50 Hz. Dimensions: 5 1/4" H x 11" W x 11" D.

Lab Quality SP-2700 Series Power Supplies

These supplies provide a precise, accurate source of voltage and current for all your testing and design requirements. Both feature remote programming and voltage sensing; simplified front panel operation. Digital readout types have two decade auto-ranging for high resolution.

Kit IP-2710, 30V @ 3A analog, Shpg. wt. 34 lbs. **179.95**
Assembled SP-2710, 30V analog, Shpg. wt. 34 lbs. **320.00**
Kit IP-2711, 30V @ 3A digital, Shpg. wt. 36 lbs. **239.95**
Assembled SP-2711, 30V digital, Shpg. wt. 36 lbs. **395.00**

IP/SP-2700 SERIES SPECIFICATIONS: Max. Rated Output: IP/SP-2710 & 2711: 30V, 3A. Load Regulation: Voltage: $\pm 0.05\%$ +1 mV, Current: $\pm 0.10\%$ +3.5 mA. Line Regulation: Voltage: $\pm 0.05\%$ +1 mV, Current: $\pm 0.10\%$ +1 mA. Ripple & Noise: Voltage: 1 mV RMS; 0.03% of rated output, peak-to-peak. Voltage/Current Readout (Switchable): Analog: 3 1/2", 100°, meter. Digital: 3 1/2-digit (1999), two-decade, auto-ranging, digital meter. Readout Accuracy: Voltage: Analog $\pm 3\%$ of rated output; Digital $\pm 0.5\%$ of reading ± 1 count using lab standards, $\pm 1.0\%$ of reading ± 1 count using built-in calibrator. Current: Analog - $\pm 3\%$ of rated output; Digital - $\pm 1.0\%$ of reading ± 4 count using lab standards, $\pm 1.5\%$ of reading ± 4 count using built-in calibrator. Readout Response Time: (Digital): 2 seconds to within 5 counts. Stability at Output Terminals: Voltage: $\pm (0.01\% + 1 \text{ mV})/\text{hr}$. Current: $\pm (0.05\% + 1 \text{ mA})/\text{hr}$. Stability as Displayed (Digital): Voltage: $\pm (0.1\% + 1 \text{ mV} + 1/2 \text{ count})/\text{hr}$. Current: $\pm (0.01\% + 1 \text{ mA} + 1/2 \text{ count})/\text{hr}$. Operating Modes: Constant voltage, constant current, auto-series, auto parallel. Power Requirements: 120/240 $\pm 10/20$ VAC; 60/50 Hz, 2.0/1.0 Amps max. Overall Dimensions: 5.5" H x 15" W x 13.5" D. (NOTE: Specs measured in accordance with NEMA standards (PY1-1972) after 30-minute warmup period.)

SP-2700 Series Model Specifications

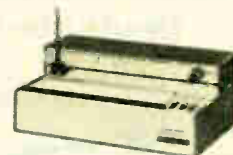
Model	Readout	Maximum Rated Output		Readout Range		Regulation	
		Voltage	Current	Voltage	Current	Load	Line
IP/SP-2710	Analog	30V	3.0A	0 to 30	0 to 3.0	(all models) voltage: 0.05% + 1 mV	(all models) voltage: $\pm 0.05\%$ + 1 mV
IP/SP-2711	Digital	30V	3.0A	0.00 to 19.99 20.0 to 30.0	0.00 to 1.999 2.00 to 3.00	current: 0.10% + 3.5 mA	current: $\pm 0.10\%$ + 1 mA



These quality supplies offer your choice of Analog or Digital Displays plus remote Current and Voltage programming!

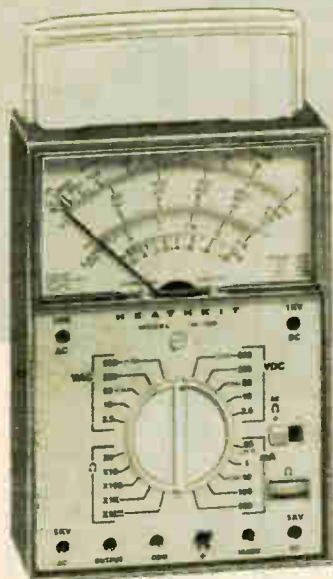
Low-cost Strip Chart Recorder

Has 1 mV or 10 mV full-scale input (selected during assembly); twelve chart speeds from 5 sec./in. to 200 min./in. Power, servo and chart switches, coarse and fine zero controls, high impedance, floating input. Zener regulated reference voltage supply. Less than 1% error, full scale. For 120/240 VAC, 60/50 Hz. 6" H x 15" W x 9 1/8" D.



Kit IR-18M, Shpg. wt. 15 lbs. **214.95**
3 rolls chart paper (140 ft./roll).
IRA-18-1, Shpg. wt. 5 lbs. **11.95**
120 ft. roll chart paper. (For slow speeds.)
SU-445-17, 2 lbs. **4.75**

High-performance Heathkit VOM's



\$79⁹⁵
Kit

Heathkit general-purpose VOM ideal for hobbyists or servicemen

- Taut-band meter with diode and fuse protected movement
- Excellent for field work—accurate enough for engineering

Here's one of the many reasons why Heathkit VOM's are first on the list of professional technicians everywhere. The IM-105 is a high-accuracy VOM that's really designed to take it—rugged enough for bench and field work—and accurate enough for engineering, design and R&D work. It's the one to have if you're a hobbyist experimenter or service tech! It's an easy, enjoyable one-evening kit too—just build up two modular circuit boards and you have it. This highly versatile IM-105 gives you a low-friction, taut-band meter with diode & fuse protected movement. Fuse in-line with the input connector is removable from front for extra convenience. Less batteries.

Kit IM-105, Shpg. wt. 3 lbs. 79.95
Assembled SM-660, (less 5 KV ranges), Shpg. wt. 3 lbs. 94.00

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. Dimensions: 7" H x 5" W x 2 1/4" D.

Heathkit Instrument Test Probes

30 kV High Voltage Probes...
IMA-100-10 Probe multiplies DC ranges of any 10-megohm meter by 100. 1000 megohm input measures voltages as low as 1V in high-impedance circuits. Banana plug connector.

Kit IMA-100-10, Shpg. wt. 1 lb. 12.95
IMA-100-11 Probe provides X100 measurement for meters with 11-megohm input impedance. (Incl. probe resistance). Phone plug, ground clip.
Kit IMA-100-11, Shpg. wt. 1 lb. 12.95
Assembled SMA-100-11, Shpg. wt. 1 lb. 16.95
IMA-1000-1 Probe provides X1000 attenuation for meters with 1-megohm input impedance. Banana plug connector.
Kit IMA-1000-1, Shpg. wt. 1 lb. 12.95



\$69⁹⁵
Kit

Our low cost high performance Digital Multimeter

- Solid-state design uses IC circuitry for a clear non blanking 2 1/2 -digit display with auto decimal positioning
- Full-function capability includes AC voltage measurement up to 700 volts
- Ease of operation makes it a pleasure to use for both beginners and advanced technicians

Here's a low-cost, high performance DMM that hams, hobbyists and service techs have been waiting for. Its full-function capability even includes AC voltage measurements up to 700 volts. Has four overlapping AC & DC voltage & current ranges and five resistance ranges. And it's hard to find better accuracy at a price this low: 1% on DC volts, 1 1/2 % on AC volts and AC/DC current, and 1 1/2 % on resistance. Lighted front-panel indicators show overrange, + and - DC voltages and current at a glance.

A solid-state design uses IC circuitry for a clear non-blanking 2 1/2-digit display with automatic decimal positioning. Its ease of operation makes it a pleasure to use for both beginners and advanced technicians. The easy assembly makes it a great project for student electronics labs. And the exclusive Heath built-in calibration standards are all that's needed for initial and periodic adjustments.

Features overload protection on all ranges, 120 or 240 VAC operation, isolated floating ground, attractive heavy-duty case to withstand rugged use, universal banana jack inputs for easy testing of all types of electronic equipment.

Kit IM-1210, Shpg. wt. 5 lbs. 69.95
Factory assembled and calibrated version of above.
SM-1210, Shpg. wt. 5 lbs. 120.00

IM-1210 SPECIFICATIONS: Functions: DC volts, DC current, AC volts, AC current, Ohms. Ranges (Full-Scale): DC volts: 0-2, 20, 200, 1,000 V; DC current: 0-2, 20, 200, 2,000 mA; AC volts: 0-2, 20, 200, 700 V rms (50 Hz to 10 kHz). AC current: 0-2, 20, 200, 2,000 mA rms (50 Hz to 10 kHz). Ohms: 0-200, 2K, 20K, 200 K, 2M ohms. Overrange: 25% on all functions. within maximum input limits. Maximum Input: 3 amperes into AC or DC mA, and Ohms (fuse protected). 700 VAC rms into Volts (except 2V range: 250 VAC rms). 1000 VDC into Volts (except 2V range; 350 VDC). "—" input may be floated 1000 VDC (700 VAC) above earth ground. Resolution (Low Range): Volts: 10 mV. Current: 10 μ A. Ohms: 1 ohm. Display: 2 1/2 -digit, 7-segment, planar, LED (light emitting diode) with overrange and negative-input indicators. Accuracy (Full Scale, ± 1 Digit): DC volts: $\pm 1\%$. DC current: $\pm 1.5\%$. AC volts: $\pm 1.5\%$. AC current: $\pm 2\%$. Ohms: $\pm 1.5\%$. Input Impedance: 1 megohm on all voltage ranges. 2.1-volt drop maximum on current ranges (except 2.5-volt: drop on 2,000 mA range). Sample Rate: Line frequency. Display Settling Time: Less than 1.0 seconds on DC volts and DC current, and less than 3.0 seconds on AC volts, AC current, and ohms; to within 5 counts. Power Requirements: 100-135 VAC, 200-270 VAC 50/60 Hz, 8 watts. Fuse Requirements: Input: 3AG, 3-ampere Line: 3AG, 1/4-ampere slow-blow. (1/4-ampere slow-blow for 240 VAC.) Dimensions (overall): 3.00" H x 8.69" W x 10.54" D. (7.62 cm high, 22.07 cm wide, 26.77 cm deep.) Weight: 3.3 pounds (1.5 kg). NOTE: Specifications are based on 30-minute warmup.

Digital Multimeters for Accuracy and Convenience



Heathkit IM-2202 Portable Digital Multimeter

\$199⁹⁵

Great low price for a digital meter with these professional features and superb specifications

Features 26 ranges—measures AC and DC volts, DC current and resistance. Has 100% overrange capability, separate voltage and current inputs for circuit protection. 2-volt full scale measurement on 1k, 10k and 1 meg ranges allow forward biased junction testing of semiconductor devices. Has 3½-digit display with leading zero suppression, automatic polarity indication and decimal placement. Assembly is not difficult, but previous kitbuilding experience is recommended. Operates on four rechargeable nickel-cadmium batteries (included), 110 or 220 VAC, or temporarily on four "C" cells.

Kit IM-2202, Shpg. wt. 8 lbs. **199.95**

IM-2202 SPECIFICATIONS: DC VOLTAGE — Range/Input Impedance: 100.0 mV/50 MΩ, 1.000 V/500 MΩ, 10.00 V/10 MΩ, 100.0 V/10 MΩ, 1000 V/10 MΩ. Overload Capability: 300 V on 100 mV & 1 V ranges; 1000 V on 10 V & 1000 ranges. Accuracy: Built-in references, ±0.5%, ±1 digit. Laboratory standards, ±0.2%, ±1 digit. AC VOLTAGE — Range/Input Impedance: 100.0 mV/10 MΩ-120 pF, 1.000 V/10 MΩ-120 pF, 10.00 V/10 MΩ-60 pF, 100.0 V/10 MΩ-60 pF, 750 V/10 MΩ-60 pF. Overload Capability: 250 V on 100 mV & 1 V ranges; 750 V on 10 V, 100 V & 750 V ranges. Accuracy: Built-in references... ±1.0%, ±3 digits; 40 Hz to 1 kHz (except 40 Hz to 10 kHz on 100 m and ranges). Laboratory standards... ±0.5%, ±3 digits; 40 Hz to 2 kHz on 750 range). DC CURRENT — Range/Voltage Drop: 100.0 μA/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mA/150 mV, 1000 mA/300 mV. Accuracy: Built-in references... ±0.5%, ±1 digit (except ±1%, ±1 digit on 1000 mA range). Laboratory standards... ±0.2% ±1 digit (except ±0.5%, ±1 digit on 1000 mA range). Overload Protection: Input coupled through 3.0 Ampere fuse to shunt diodes for overloads above approximate 1.2 Volts. AC CURRENT — Range/Voltage Drop: 100 μA/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mV, 100.0 mA/150 mV, 1000 mA/300 mV. Accuracy: Built-in references... ±1.0%, ±3 digits (except ±1.5%, ±3 digits on 1000 mA range); 40 Hz to 10 kHz. Laboratory references... ±0.5%, ±3 digits (except ±1.0%, ±3 digits on 1000 mA range); 40 Hz to 10 kHz. Overload Protection: Input coupled through 3.0 Ampere fuse to shunt diodes for overloads above approximate 1.2 Volts. RESISTANCE — Range/Test Current: 100.0 Ω/1.0 mA, 1.000 kΩ/1.0 mA, 10.00 kΩ/0.1 mA, 100.0 kΩ/1.0 μA, 1000 kΩ/10. μA. Accuracy: Built-in references... ±2%, ±1 digit. Open-circuit Voltage: 12 VDC. Overload Protection: Positive input over-voltage protection by blocking diode to 400 volts; negative input over-voltage through 0.03 A fuse and shunt diode. GENERAL — Overrange Capability: 100% on all ranges except 1000 VDC & 750 VAC. Display: 1999 maximum; seven segment planar; 0.55" high digits. Display Rate: Approximately 5 per second, non-blinking. Normal Mode Rejection: 35 dB (line operation); extended on battery operation. Common Mode Rejection: 80 dB (line operation); extended on battery operation. Power Line Isolation: May be operated 1500 V above power line ground (during line operation). Operating Temperature Range: 10°C to 40°C. Power Requirement: 110 to 130 VAC, or 220 to 260 VAC (internal selectable); 60/50 Hz; 5 watts typical during charge. Size (overall including handle folded to rear): 3" H x 8¼" W x 8" D).

NOTE: Accuracy specifications of the IM-2202 depend on use of built-in references or laboratory standard references for calibration.



Our finest 3½-digit Multimeter has the features you NEED for fast, easy and profitable service

\$269⁹⁵

One of the finest digital multimeters available anywhere — put it on your bench for professional service

Our best digital multimeter. Displays voltage, current and resistance measurements on a large, bright tube display. Five voltage and five current ranges are used for both ac and dc. The full-scale voltage ranges are 200 millivolts to 1000 volts (500 volts maximum for ac) and the current ranges are from 200 microamperes to 2 amperes. The six resistance ranges are from 200 ohms to 20 megohms. Has automatic polarity indication and decimal positioning and over-range indication, lots more! The convenience, versatility and accuracy of this modern unit make it the perfect instrument for the laboratory, the service shop, or the ham shack.

Kit IM-102, Shpg. wt. 9 lbs. **269.95**

IM-102 SPECIFICATIONS: DC VOLTMETER — 5 Ranges: 200 mV, 2V, 20V, 200V, 1000V. Input Impedance: Approx. 100 megohm on 200 mV, approx. 1000 megohm on 2 V, 10 megohm on all other ranges. Accuracy: ±2% ±1 digit with furnished DC calibrator, ±0.1% ±1 digit with lab calibration. Normal Mode Rejection: 35 dB 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 100μA, 20k with 10μA, 200k with 10μA, 2M with 1μ, 20M with 100 nA. Accuracy: With DC calibrator, ±0.5% ±1 digit on 200, 2k, 20k, 200k ranges; ±1.5% ±1 digit on 2M and 20M ranges. With lab calibration, ±0.5% ±1 digit on 200 ohm range; ±0.25% ±1 digit on 2k, 20k, 200k; ±1% ±1 digit on 2M and 20M. AC VOLTMETER (Average responding, rms calibrated) — 5 Ranges: 200 mV, 2V, 20V, 200V, 1000V. Input Impedance: 1 megohm @ 150 pF. Accuracy: With DC calibrator, ±0.75% ±1 digit for 40Hz-10kHz, ±1% ±1 digit for 10kHz-20kHz on 200 mV and 2V ranges; ±0.75% ±1 digit for 40Hz-5kHz, ±1.5% ±1 digit for 5kHz-10kHz on 20V and 200V ranges; ±1.5% ±1 digit for 40Hz-1.5kHz on 1000V range. DC AMMETER — 5 Ranges: 200μA, 2mA, 20mA, 200mA, 2A. Voltage Drop: 0.2V (nominal). Accuracy: With DC calibrator, ±0.5% ±1 digit for 2A, ±3% ±1 digit on all other ranges. With lab calibration, ±0.25% ±1 digit for 2mA and 20mA; ±0.3% ±1 digit for 200 mA; ±0.5% ±1 digit for 2A. AC AMMETER (40Hz-10kHz) — 5 Ranges: 200μA, 2mA, 20mA, 200mA, 2A. Voltage Drop: 0.2 V (nominal). Accuracy: With DC calibrator, ±1.5% ±1 digit on 2A, ±1% on all other ranges. With lab calibration, ±0.75% ±1 digit on 200μA, ±0.7% ±1 digit on 2mA and 20mA; ±0.8% ±1 digit on 200mA; ±1 digit on 2A. GENERAL — Display: Maximum count, 1999. Overrange Indication: Automatic beyond 1999. Polarity Indication: Automatic "+" or "-". Display Rate: Approx. 5 per second, non-blinking. Power Requirement: 120 or 240 VAC, 60/50 Hz, 8 W nominal. Power Line Isolation: May be operated 500 volts above power line ground (during line operation). Operating Temperature: 10°C-40°C. Size: 3" H x 7" W x 7.9" D.

NOTE: Accuracy specifications of the IM-102 depend on use of built-in references or laboratory standard references for calibration.

Heathkit VTVM's—real precision and performance



Heathkit IM-5228 Service Bench VTVM gives you "Pro" features at a low kit-form price

\$57⁹⁵
Kit

A bench-type version of the IM-5218 with PLUS features that make it ideal for service and repair

The one to have for day-in, day-out service and testing! The big 6" meter is really easy to read; separate 1.5 and 5 VAC scales make low voltage readings easy and accurate too. All calibration controls are conveniently adjustable from the front panel, so there's no need to remove the cabinet. Has the same outstanding features and performance specifications of the IM-5218 — 7 AC, DC and ohms ranges, 1% precision divider resistors, extended frequency response. All measurements are made with a single probe, and the ground test lead has an alligator clip for added convenience. Can be wired to operate from 120 or 240 VAC. Convert to solid-state with IMA-18-1, below.

Kit IM-5228, Shpg. wt. 6 lbs. **57.95**
Assembled SM-5228, Shpg. wt. 7 lbs. **130.00**

IM/SM-5228 SPECIFICATIONS: DC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 V full scale; up to 30,000 V with accessory probe. Input Resistance: 11 megohm (1 megohm in probe) on all ranges; 1100 megohms with accessory probe. Circuit: Balanced bridge (push-pull) using twin triode. Accuracy: $\pm 3\%$ of full scale. AC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 rms scales. Frequency Response (5 V range): ± 1 dB 25 Hz to 1 MHz (800 ohm source, referred to 60 Hz). Accuracy: 5% of full scale. Input Resistance & Capacitance: 1 megohm shunted by 40 pF measured at input terminals (200 pF at probe tip). OHMMETER — Ranges: Scale with 10 ohm center, X1, X10, X100, X1000, X10k, X1 meg. Measures 0.1 ohm to 1000 megohms with internal battery. Meter: 6", 200 μ A movement, polystyrene case. Battery: 1.5 V, "C" cell (not supplied). Power requirement: 120/240 VAC, 60/50 Hz, 10 W. Dimensions: 5" H x 12 $\frac{1}{4}$ " W x 4 $\frac{1}{4}$ " D.

Extend range and applications of your IM/SM-5228, 5218 with these useful test probes. Measure high voltage to 30 kV with the IMA/SMA-100-11 (page 66). For RF applications you can't beat the PK/PKW-3 RF Probe (page 71). Has a useful range from 1000 Hz to more than 100 MHz and is ideal for testing and alignment. Both probes are excellent values and the perfect addition to your service bench.

Heathkit IM-5218 — Precision Measurement with our popular, low cost VTVM

\$47⁹⁵
Kit

Make voltage and resistance tests on audio, TV, appliances, instruments, any tube or solid-state electronic equipment

Features a single test probe that makes all measurements; seven practical AC, DC volts and ohms ranges; a precision 4 $\frac{1}{2}$ " color-coded 200 μ A meter; and a convenient size for portability. 1% precision network resistors provide excellent accuracy; wide ± 1 db, 25 Hz to 1 MHz frequency response permits a variety of AC measurements. Measures both rms and p-p AC volts. Separate full-scale ranges for 1.5 and 5 volts makes low-voltage readings really easy, ideal for work with solid-state and latest digital equipment. Easy kit assembly or you can order the unit factory assembled and tested. Can be wired for 120 or 240 VAC operation. Converts easily to solid-state with IMA-18-1 below.

Kit IM-5218, Shpg. wt. 5 lbs. **47.95**
Assembled SM-5218, Shpg. wt. 5 lbs. **120.00**

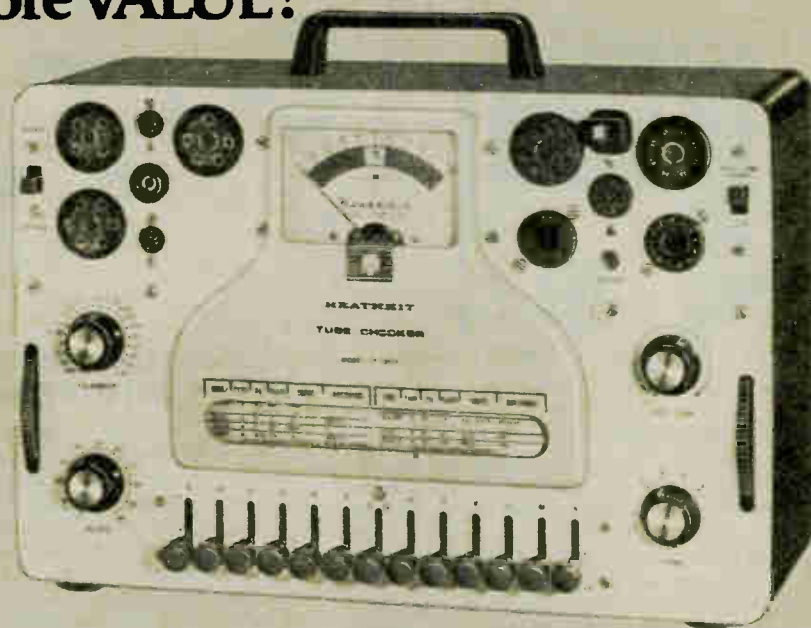
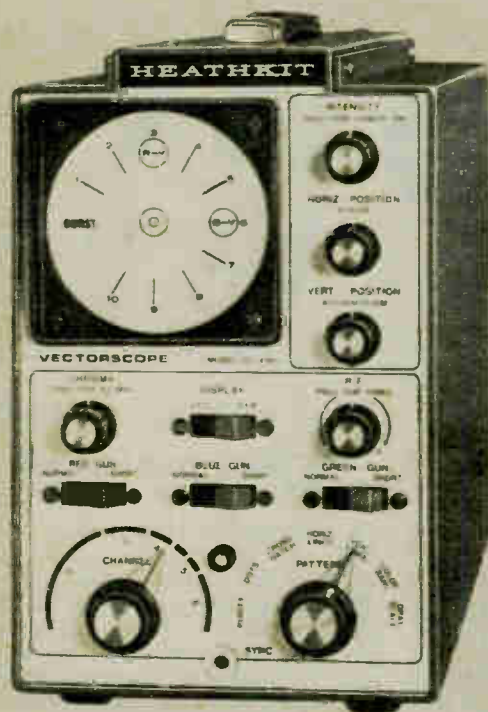
IM/SM-5218 SPECIFICATIONS: Meter Scales: DC & AC (rms): 0-1.5, 15, 50, 150, 500, 1500 V full scale. AC peak-to-peak: 0.4, 14, 40, 140, 1400, 4000 V full scale. Resistance: 10 ohm center scale x1, x10, x100, x1000, x10k, x100k, x1 meg. Measures 1 ohm to 100 megohms. Meter: 4 $\frac{1}{2}$ ", 200 μ A movement. 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 1 MHz (600 ohm source). Battery requirements: 1.5 V, size "C" cell (not supplied). Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 7 $\frac{3}{4}$ " H x 4 $\frac{1}{4}$ " W x 4 $\frac{1}{4}$ " D.

Convert your IM-5228, 5218, 18 or 28 to instant-on solid-state operation with the IMA-18-1. Two solid-state devices plug directly into tube sockets. Provides instant-on service. Helps eliminate pointer-drift corrections.

IMA-18-1, Shpg. wt. 1 lb. **19.95**

PKW-4, Wired Replacement Probe for IM-5228, 5218, 18 or 28 . . . 9.95

Heathkit Instruments give you more VALUE!



Heathkit IO-4101 Vectorscope/ Color Dot Bar Generator

\$169⁹⁵

- Combines vectorscope and color bar generator
- RF output to 50,000 microvolts

Heath's IO-4101 Vectorscope/Color Dot Bar Generator is the serviceman's dream... two outstanding instruments in one economical low cost package.

The Vectorscope displays a ten "petal" lissajous figure to accurately represent the chroma signal being fed to the TV receiver's CRT. Lets you discover at a glance missing or weak colors or improper adjustment of the burst phase transformer, reactance coil, 3.58 MHz oscillator, bandpass transformer, or color demodulation angle.

The Color/Dot Bar functions are generated in 12 patterns and include; dots, crosshatch, vertical and horizontal lines, color bars, gray scale and purity. All patterns may be presented in either the familiar 9 X 9 display or in Heath's exclusive 3 X 3 format. In addition the IO-4101 features RF output variable to 50,000 μ v, tuning for channels two through six, plus or minus going video signals, front panel sync output, 4.5 MHz crystal controlled sound carrier, lead-piercing grid jacks and front panel gun shorting switches.

Kit IO-4101, Shpg. wt. 13 lbs. **169.95**
See more TV Service Instruments on pages 74-75

IO-4101 SPECIFICATIONS: PATTERNS — Purity: Produces a snow-free raster. Dots*: 9x8 (110 small dots.) 3x3 (9 dots). Crosshatch*: 9x9 (11 vertical and 10 horizontal lines) 3x3 (3 vertical and 3 horizontal lines.) Horizontal lines*: 9x9 (10 horizontal lines) 3x3 (3 horizontal lines.) Vertical lines*: 9x9 (11 vertical lines) 3x3 (3 vertical lines.) Color bars*: 9x9 (ten standard color bars.) A visual fingerprint (voltage pattern) of all ten color bars in the form of a petal pattern is displayed for color circuit servicing. Gray scale: Provides a wide bar crosshatch pattern with six shades of brightness. **OUTPUT SIGNALS** — Video: Greater than ± 1 volt p-p composite signal for composite signal injection beyond the video detector. Sync: Greater than 3.5 volts p-p. Power requirement: 105-125 or 210-250 VAC, 60/50 Hz, 20 Watts. Dimensions: 9 1/4" H x 6 3/4" W x 14 1/2" D.

*The number of dots, lines, and bars indicated for a 9x3 display is the number displayed if the receiver under test has no overscan.

Low-cost, easy-to-use IT-3117 Tube Checker is perfect for your bench

\$139⁹⁵

- Tests for emission and shorts
- Thumbwheel chart finds tube data fast
- Great for the Bench

An excellent addition to your bench is the Heath IT-3117 Tube Checker. It's perfect for a wide variety of radio and TV repair work and at this low price you can't afford to pass it up! Performs emission testing: indicating with a large front panel GOOD?-BAD meter whether or not the tube under test is suitable for continued use or requires replacement. Short circuit tests: a glowing neon bulb quickly alerts you to internal tube element shorts or leakage. And Line test: allows you to check and adjust line voltage to insure that correct voltages are applied to tubes undergoing testing. The IT-3117 also features filament voltage, selectable in 19 steps, from 0.63 to 110 volts AC, plate connection for tubes with external anodes, and 11 sockets to accommodate such varying tube base varieties as 5-pin Nuvistors, 9-pin Novars, 7-pin miniatures, 8-pin octals and more! Operation is simple. Just select your tubes data from the IT-3117's handy rolling chart (or supplement book), flip the indicated switches and perform your tests!

Kit IT-3117, Shpg. wt. 12 lbs. **139.95**

Updated Tube Chart for all Heathkit Tube Checkers. Includes up-to-date data book for only \$6.95. Write Heath Tube Data Service, P.O. Box 377, Hewlett, Long Island, New York 11557.

IT-3117 SPECIFICATIONS: Sockets: 4-pin, 5-pin, 6-pin combination and pilot light, 7-pin miniature, octal, loctal, 10-pin miniature, 9-pin novar, 9-pin miniature, 12-pin compacron, 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:** 0.53, 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 Requirement:** 120 VAC, 50/60 Hz. **Dimensions:** 8 1/2" H x 13" W x 5 1/2" D.

New Bi-Directional Wattmeter



The IM/SM-4190 is a professional quality bi-directional wattmeter designed to inexpensively meet the needs of the RF Communications Technician. Covering the 100 MHz to 1 GHz spectrum, without costly "slugs" or elements, the 4190 is an ideal tool for use in Two-Way service/repair or by the Radio Amateur who is involved in the operation and maintenance of VHF and UHF communications equipment.

The IM/SM-4190 may be used in applications to 300 watts. Power is measured on three forward scales (30, 75, and 300 watts) and three reflected (3, 7.5, and 30 watts) and because a unique "meter driving" FET amplifier has been employed in its design, the 4190 is capable of withstanding full power overloads on both of its lower scales without causing damage to the meter movement!

To insure accurate measurement and linear operation over the 4190's entire operating range, both the RF sensing bridge and power calibration "pots" are matched for optimum performance, and factory aligned and tested. The only adjustment necessary on the part of the user is a simple "zeroing" of the meter movement.

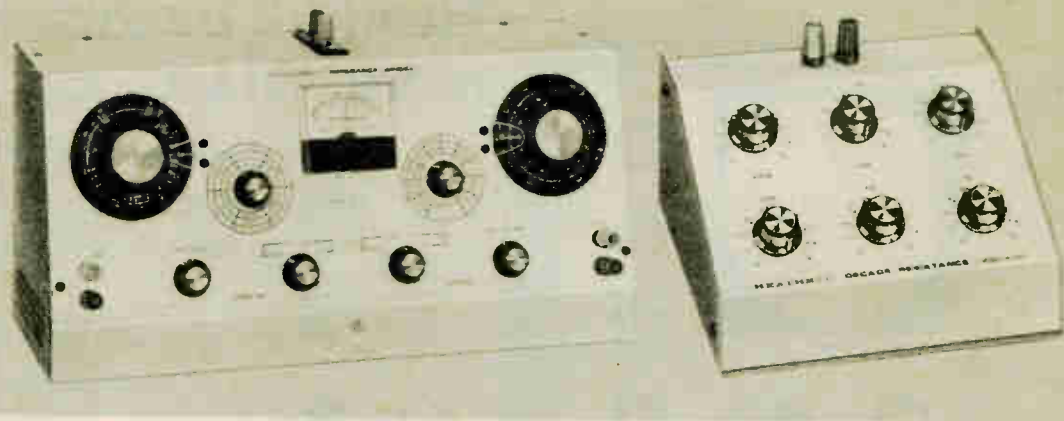
The wattmeter is equipped with N-type coax connectors to insure low high-frequency insertion loss, features extremely rugged construction, and because of its size and metal D-ring for belt attachment, is ideal for tower antenna tuning and alignment procedures. Comes with N to PL-259 adaptors. Requires 9-volt battery (not supplied).

Kit IM-4190, Shpg. wt. 3 lbs. **114.95**

Factory assembled and Tested

SM-4190, Shpg. wt. 3 lbs. **195.00**

IM/SM-4190 SPECIFICATIONS: Power Ranges: Forward: 30, 75, and 300 watts, full scale. Reflected: 3, 7.5, and 30 watts, full scale. Frequency Range: 100 MHz to 1 GHz. Impedance: 50 ohms. Accuracy: $\pm 5\%$ of full scale (30, 75 and 300 watt ranges), $\pm 7.5\%$ of full scale (3, 7.5, and 30 watt ranges). Size: 4.5" H x 4.25" W x 4.625" D. Power Requirement: 9-volt battery, NEDA 1604.



Impedance Bridge for Design and Experimentation

Has four separate bridge circuits for accurate measurement of resistance, capacitance, low and high inductance, dissipation factor of capacitors and storage factor of inductors. Has sensitive direct reading 100-0-100 microammeter and easy-access front panel binding posts for quick and convenient test setup. Ideal for the experimenter and designer or any electronics professional. Easy to follow manual makes construction a simple matter. A great value. Requires headphones or scope for alignment.

Kit IB-3128, Shpg. wt. 11 lbs. **149.95**

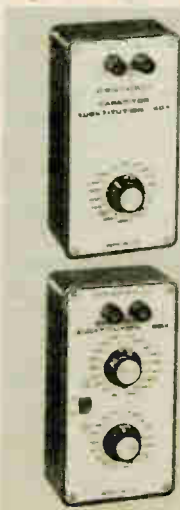
IB-3128 SPECIFICATIONS: DC Measurements: Built-in power supply. Binding posts for external supply. Meter: 100-0-100 microampere meter. AC Measurements: Built-in 1000 Hz generator. Terminals on panel for external generator. Detector: Vacuum tube detector and amplifier, using built-in meter. Terminals for external detector. Resistance: 0.1 ohm to 10 megohm. Capacitance: 100 pF to 100 μ F. Inductance: 0.1 mH to 100 H. Dissipation Factor: (D) 0.002 to 1. Storage Factor: (Q) 0.1 to 1000. Accuracy: $\frac{1}{2}\%$ decade resistors used. Power Supply: Transformer and silicon rectifier. Power Requirement: 105-125 V. or 210-250 V., 60/50 Hz, 10 watts. Dimensions: 8" H x 17" W x 6" D.

Laboratory-type Decade Resistance Box

The Heathkit IN-3117 Decade Resistance Box is an accurate laboratory-type instrument for use whenever precision resistors are required for an electrical measurement or circuit design. The extensive range of available resistance values makes the IN-3117 invaluable as a variable multiplier or shunt, a variable substitution resistor, or as a leg for AC and DC bridges. Use in conjunction with the IN-3147 below for solving complex resistance and capacitance networks where large ranges of values are necessary. Covers 1 ohm to 999,999 ohms in 1-ohm steps. Resistors are 1-watt, 0.5% tolerance. Features rugged case and binding posts for easy test set up.

Kit IN-3117, Shpg. wt. 3 lbs. **47.95**

IN-3117 SPECIFICATIONS: Range: 1 ohm to 999,999 ohms in 1-ohm steps. Resistors: precision, 0.5% accuracy, rating 1 watt. Minimum DC resistance: 0.025 ohm at terminals with all switches set at zero. Maximum current for each range: X1, 1000 ma. X10, 300 ma. X100, 100 ma. X1K, 30 ma. X10K, 10 ma. X100K, 3 ma. Dimensions: 5" H x 7 $\frac{1}{2}$ " W x 6 $\frac{1}{2}$ " D.



1 Capacitor Substitution Box

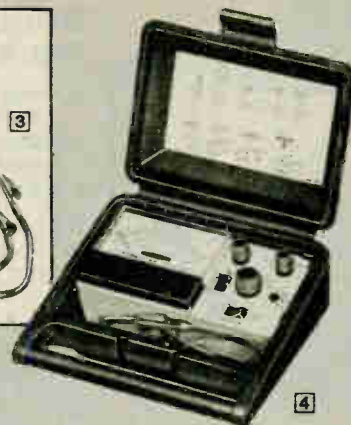
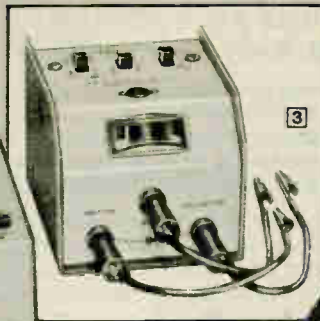
Provides switch selection of any of 18 EIA standard capacitors from 100 pF to 0.22 μ F. The special rotary switch incorporates make-before-break contacts that provide smooth changes in capacitance without "opening" or "shorting" the circuit under test. All capacitors are rated at 600 V except 3 lowest and 2 highest values are 500 & 400 V respectively. Accuracy is $\pm 5\%$ for values from 0.0001 μ fd through 0.00047 μ fd; and $\pm 10\%$ for 0.01 through 0.22 μ fd. 3" H x 3" W x 6" D.

Kit IN-3147, Shpg. wt. 2 lbs. **14.95**

2 Resistor Substitution Box

Gives you a rapid and flexible means of determining resistance values required in new electronic circuit design. Also lets you substitute resistance values directly in existing circuits during operation to determine the resistance value that will provide maximum circuit performance. Provides switch selection of any one of 36 EIA standard 10% 1-watt resistors from 15 ohms to 10 meg. 5 $\frac{1}{2}$ " H x 3 $\frac{1}{2}$ " W x 3" D.

Kit IN-3137, Shpg. wt. 2 lbs. **14.95**



1 Heathkit deluxe Digital IC Tester

A "must" for anyone working with digital IC's. Lets you determine functions of IC's, check operation against your own data sheets. Features a special high-quality "zero-force" insertion socket — the same as used in expensive production-line testers — lets you make thousands of insertions and extractions without worrying about bent pins. Exclusive "bounce-free," computer-type mercury stepping switch allows safe and easy "exercising" of multi-function IC's such as flip-flops. Has input-output jacks for each pin; neon indicators. Exceptionally easy to operate — 14- or 16-pin IC's can be installed in any position, switches and banana jacks allow each IC pin to be used as input or output. Ideal for use with the Heathkit Digital Techniques Program (page 103).

Kit IT-7400, Shpg. wt. 6 lbs. 79.95

IT-7400 SPECIFICATIONS: Pull-up Resistors: externally connected, with patch terminals. Patch Terminals: one at each pin. Selector Switches: two at each terminal, one for +5V. step, or off; the other for gas discharge or ground. Gas Discharge: allows direct driving of neon indicator lamp for high voltage decoder driver. Power Supply: 5 VDC regulated, $\pm 5\%$, 300 mA and 3.6 VDC, switch selected. Power Requirement: 100-135/200-270 VAC, 60/50 Hz, switch selected. Dimensions: 4 $\frac{1}{2}$ " H x 11 $\frac{3}{8}$ " W x 9 $\frac{1}{4}$ " D.

2 High-accuracy FET/Transistor Tester

For quick, accurate tests of conventional (bipolar) transistors, diodes, FETs, SCRs, triacs and unijunction transistors. Tests components either in-circuit using color-coded test leads supplied or out-of-circuit using built-in sockets. Shows gain (DC Beta), trans-conductance (Gm) and leakage directly. Other test functions listed below.

Kit IT-3120, Shpg. wt. 5 lbs. 59.95

IT-3120 SPECIFICATIONS: 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 h_{FE} , I_{B} , I_{E} and emitter current. Power Requirements: Two 1 $\frac{1}{2}$ V cells. (alkaline for best performance, not supplied). Dimensions: 5" H x 9 $\frac{1}{8}$ " W x 8 $\frac{1}{2}$ " D.

3 Transistor/Diode Checker

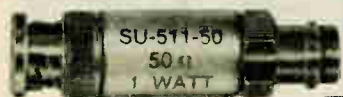
Check high and low power transistors (NPN & PNP) for shorts, leakage, opens and current gain, diodes for forward and reverse current, continuity. Uses two 1.5 V "C" cells, not supplied. 3 $\frac{1}{8}$ " H x 3 $\frac{1}{8}$ " W x 3 $\frac{3}{4}$ " D.

Kit IT-3127, Shpg. wt. 2 lbs. 13.95

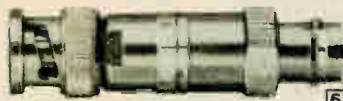
4 Deluxe Transistor Tester

For reliable in- or out-of-circuit tests. Reads DC Beta (gain) on two ranges, 2-100 and 20-1000. Measures out-of-circuit leakage, identifies NPN or PNP's. Low power — will not damage transistor or diode incorrectly connected. Not for high power or switching transistors.

Kit IT-3118, Shpg. wt. 4 lbs. 37.95



5



6



7



8



9



10

Probes and Accessories for Heathkit test instruments

5 50-Ohm Termination for frequency counters and scopes. DC to 1 GHz; power rating, 1 watt. VSWR; 250 MHz, 1.2:1; 600 MHz, 2:1.

Assembled SU-511-50, Shpg. wt. 1 lb. 17.50

6 RF Fuse in UHF BNC-to-BNC connector. Prevents burnout. DC to 500 MHz range; 50 ohms; 12:1 VSWR (max.); insertbn loss 1.80 dB max. at 500 MHz. With spare fuses.

Assembled SU-512-50, Shpg. wt. 1 lb. 50.00

7 Low capacitance scope probe provides direct or X10 attenuated operation; options for 3.3 or 1 megohm input resistance.

Kit PK-1, Shpg. wt. 1 lb. 8.95

8 RF probe for RF measurements from 1000 Hz to over 100 MHz; 11 meg input; 1000 VDC max. at tip; 90 V rms max.

Kit PK-3, Shpg. wt. 1 lb. 7.95

Assembled PKW-3, Shpg. wt. 1 lb. 9.95

9 Scope demodulator probe for distortion checks, RF & IF display. 30 V rms max., 500 VDC max. Banana plug/BNC wiring option.

Kit 337-C, Shpg. wt. 1 lb. 6.95

10 Combination X1, X10 Scope Probe. Has 2-position multiplier for X1 and X10 probe tip. DC to 15 MHz (X1) and DC to 80 MHz (X10) bandwidths. X10 risetime, 4.0 nS. Compensation range of 15-50 pF.

Assembled PKW-105, Shpg. wt. 1 lb. 29.95

PKA-101-1 Accessory Pack. Includes three assembled tips, two 6-inch ground leads and one 12-inch ground lead. For use with the PKW-101 and PKW-104 probes only.

PKA-101-1, Shpg. wt. 1 lb. 10.95

Accessory cables... for inter-connecting scopes, counters, etc. All cable is RG-58/U, 50 ohm impedance. Shpg. wt. (each), 1 lb.

Assembled SU-501-3, 3 ft., BNC/BNC 10.00

Assembled SU-501-6, 6 ft., BNC/BNC 10.00

Assembled SU-503-3, 3 ft., BNC/Banana .. 10.00



Deluxe AC Voltmeter for fast, easy audio service

- Linear scales for both volts and dB make readings easy and accurate
- High sensitivity 0-1 mV full-scale range for low-voltage measurements
- Wide dynamic range for less switching

The excellent frequency response and sensitivity of the IM-5238 allow measurement of amplifier and tuner outputs, power supply ripple, noise and much more. AC volts are measured in 12 ranges from 0-1 mV to 0-300 VAC. dB measurements can be made from -70 to +40 dBm in 12 ranges. The meter is calibrated to read standard dBm with up to 30 dB linearity, has pushbutton function switches, range selector and dB offset control.

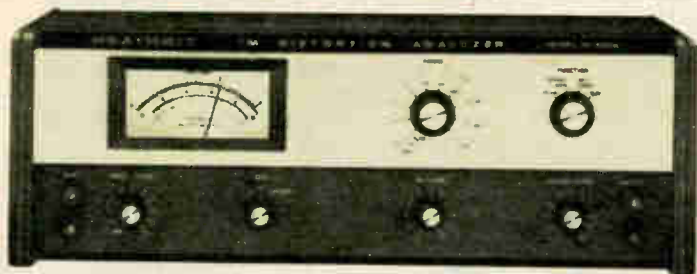
\$99⁹⁵
Kit

Kit IM-5238, Shpg. wt. 8 lbs. 99.95

Factory assembled and calibrated version of above.

SM-5238, Shpg. wt. 8 lbs. 170.00

IM/SM-5238 SPECIFICATIONS: Voltage Range (full scale): 1 millivolt to 300 volts AC, 12 ranges. Decibel Range: -70 dB to +40 dB, 12 ranges in 10 dB steps with variable offset. Input: 10 megohms, 30 pF, negative input grounded to chassis. Frequency Response: Voltage Range, 10 Hz to 1 MHz, ± 2 dB. 10 Hz to 500 kHz ± 1 dB, dB range, 10 Hz to 250 kHz ± 1 dB. Outputs: DC (proportional to input volts), 1 volt full scale. DC (proportional to log of input volts), 3 volts full scale. AC (amplified output), 1 volt peak, full scale. Scales: 0-10 volts; 0-3.16 volts; -20 to +10 dB. Accuracy: Voltage Ranges, 4% of full scale at 1 kHz plus accuracy of calibration standard. dB ranges, ± 0.5 dB at 1 kHz plus accuracy of calibration standard. Temperature Range: +10° C to +40° C. Power Requirement: 100-135 VAC, 200-270 VAC, 50/60 Hz, 20 watts. Dimensions: 5 3/4" W x 6 3/4" H x 10 7/8" D. Net Weight: 5.5 lbs.



Heathkit IM-5248 Intermodulation Distortion Analyzer **SAVE \$40**

\$139⁹⁵
Kit

- Measures distortion as low as 0.01%
- Built-in 60 Hz and 7000 Hz oscillators
- External oscillator inputs

This intermodulation distortion analyzer is designed for professional-quality audio servicing and testing. Features built-in AC voltmeter, excellent sensitivity and dB measurement capability.

Kit IM-5248, Shpg. wt. 14 lbs. Was 179.95 Now 139.95

Factory assembled version of above.

SM-5248, Shpg. wt. 15 lbs. 360.00

IM/SM-5248 SPECIFICATIONS: IM METER: Ranges: 0.1 to 100% in a 1-3-10 sequence. Readable to 0.01% plus residual. Residual: Less than 0.01% with internal generators. Accuracy: 5% full scale. Input Impedance: 1 megohm. HF Sensitivity: 100 mV minimum. Oscillator Frequencies: 60 Hz (line syncable), and 7000 Hz. Generator Amplitude: Adjustable, 100 mV to 3 volts rms (50 mV to 1.5 volts into 600 ohms), with 60 Hz and 7000 Hz at a 4:1 ratio. Impedance and Bandwidths of External Oscillator Outputs: LF -51k ohms, 10 to 500 Hz. HF -18k ohms to 25k ohms; 2 kHz to 100 kHz. Impedance of Oscillator Outputs: 1000 ohms. Connectors: 5-way binding posts. AC VOLTMETER: 10 mV to 300 volts in a 1-3-10 sequence. Input Impedance: 1 megohm. Accuracy: 5% full scale. Frequency Response: 5 Hz to 1 MHz, 3 dB. Power Requirement: 100-135 VAC or 200-270 VAC switch selected, 60/50 Hz. 15 watts. Dimensions: 5 3/4" H x 15" W x 11 1/2" D.

Put performance on your bench with this FET Multimeter

- Auto-polarity function for extra convenience
- LED display for voltage polarity
- High-Low volts/ohms functions for in, out-of circuit semiconductor checks
- Extended range for high accuracy

The IM-5225 is an FET multimeter capable of AC and DC voltage and current measurements in ranges from 0.1 to 1000 volts and 0.01 to 1000 mA. Seven ranges allow resistance measurements from 10 ohm to 10 megohm mid-scale. High and low voltage/ohms functions allow both in and out of circuit checks of semiconductor devices and resistance measurements. Features like continuous rotation range and 4-position pushbutton switches allow ease of operation and top dollar value. Add professional quality to your bench today!



4 EVENING KIT
Fast, Easy Assembly

\$129⁹⁵
Kit

Kit IM-5225, Shpg. wt. 8 lbs. 129.95

Factory assembled and calibrated version of above.

Kit SM-5225, Shpg. wt. 8 lbs. 195.00

IM/SM-5225 SPECIFICATIONS: DC Volts: nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 full-scale. AC Volts: nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 volts full-scale. DC Current: six ranges 0-0.1, 0.1, 1, 10, 100, 1000 milliamperes full-scale. AC Current: six ranges 0-0.1, 0.1, 1, 10, 100, 1000 milliamperes full-scale. Ohms: seven ranges X1, X10, X100, X10k, X100k, X1M. Power Requirements: 120/240 VAC, 50/60 Hz, 5 watts. Dimensions: 5 3/4" W x 6 3/4" H x 11 1/4" D. Weight: 5 1/2 lbs.



Heathkit IM-5258 Total Harmonic Distortion Analyzer

\$239⁹⁵
Kit

- Measures THD as low as 0.03%
- Perfect for optimum adjustment of hi-fi amplifiers and receivers

The Heathkit IM-5258 is a professional-grade total harmonic distortion (THD) analyzer. Its outstanding sensitivity and bandwidth permit measurement of THD levels as low as 0.03%, over a frequency range of 5 Hz to 100 kHz. The IM-5258 also functions as an AC voltmeter with 12 switch-selected ranges from 1 mV to 300 V full scale. Also has dB scale.

Kit IM-5258, Shpg. wt. 17 lbs. 239.95

Factory assembled version of above.

SM-5258, Shpg. wt. 16 lbs. 450.00

IM/SM-5258 SPECIFICATIONS: Frequency Range: 5 Hz to 100 kHz in 5 ranges, 5-10 Hz, 10-100 Hz, 100-1000 Hz, 1-10 kHz and 10-100 kHz. Distortion Range: reads from 0.3% to 100% full scale in 6 ranges with a 1-3-10 sequence. Residual Distortion: 0.03% or less. Input Impedance: 1 megohm/70 pF maximum. Required Input Level: 316 mV for distortion measurements. Voltmeter: 1 mV to 300 V in 12 ranges with a 1-3-10 sequence. Accuracy: 5% of full scale. Output: 100 mV for full scale meter deflection. Power Requirement: 100-135 VAC or 200-270 VAC switch selected, 60/50 Hz. 12 watts. Dimensions: 5 3/4" H x 15" W x 11 1/2" D.



3 EVENING KIT
Fast, Easy Assembly

Heathkit IG-1272 Low-Distortion Audio Frequency Generator

\$139⁹⁵
Kit

- Super-low distortion
- Flat output across entire range
- Frequency from 5 Hz to 100 kHz

The Heathkit IG-1272 provides a low-distortion sine wave output over a frequency range from less than 5 Hz to 100 kHz. It's perfect for the testing requirements of the serious audiophile, audio service shop or the audio designer. Pushbuttons select the first three significant digits of the desired frequency and also control the frequency multiplier and output attenuator. The IG-1272 can also be operated in a continuously-variable frequency mode. A level meter on the front panel allows accurate monitoring of the output. A BNC output connector helps keep noise level approximately 70 dB below signal output level. A buffered sync signal, for use with an oscilloscope or frequency counter, is available at the rear panel BNC. Includes cable, BNC, and clip leads.

Kit IG-1272, Shpg. wt. 11 lbs. **139.95**

Factory assembled version of above.

SG-1272, Shpg. wt. 10 lbs. **250.00**

IG/SG-1272 SPECIFICATIONS: Output Voltage: 0.003 to 10 volts RMS. Output Load: 600 ohms. Hum and Noise: 0.01% or less. Frequency Range: 5 Hz to 100 kHz. Output Flatness (referenced to meter) Pushbutton Mode: Within ± 1.1 dB from 5 to 20 Hz; within ± 0.2 dB from 20 Hz to 100 kHz. Output Flatness (referenced to meter) Variable Mode: Within ± 2.5 dB from 10 Hz to 100 kHz. Frequency Accuracy: Pushbuttons: $\pm 4\%$, ± 1 Hz, typical $\pm 1.5\%$. Variable; Depends on accuracy of counter being used. Distortion: 10 to 40 Hz; 0.1% or less. 40 Hz to 20 kHz; 0.04% or less. 20 kHz to 100 kHz; Rises to 0.1% at 100 kHz. Attenuation: Pushbutton combination selected, 10 to 70 dB. Attenuation Accuracy: $\pm 0.2\%$ dB. Selector Accuracy: ± 1 Hz $\pm 4\%$. Power Requirement: 120 VAC or 240 VAC, 50 or 60 Hz. 10 watts maximum. Dimensions: $5\frac{1}{2}''$ H x $11''$ W x $12\frac{1}{2}''$ D. Weight: 9.5 lbs.

Heathkit Audio Load

The ID-5252 is a must for audio service technicians, manufacturers, and the serious audiophile. It provides the correct loading required for audio amplifiers under test in accordance with manufacturers published specifications and the Institute of High Fidelity Manufacturers (IHFM). Eliminates "special order" load resistors for each amplifier you want to test. Provides audio loads of 2, 4, 8, 16 or 32 ohms. Jacks are provided for connecting a voltmeter, oscilloscope or other test instrument at the load in use. Includes test leads.

Kit ID-5252, Shpg. wt. 6 lbs. **49.95**

ID-5252 SPECIFICATIONS: Available loads (all resistors 1% tolerance): four 8-ohm, 60 W; two 16-ohm, 120 W; one 32-ohm, 240 W; one 2-ohm, 240 W; one 6-ohm, 240 W. Reactance: Less than 10% at 100 kHz. Leads: four 3-ft. #12 gauge leads, spade lugs, four jumper links. Dimensions: $4''$ H x $9''$ W x $9''$ D.



Sine-square wave Audio Generator with frequency range to 100 kHz

\$94⁹⁵
Kit

- Sine wave output available from 1 Hz to 100 kHz with low distortion
- 5 Hz to 100 kHz square wave output with fast risetime ideal for audio response testing
- Outputs available simultaneously or independently

A highly versatile, low cost addition to any bench. The IG-5218 is ideal for gain and frequency response measurements in audio amplifiers, as a signal source for harmonic distortion measurements or as an external modulator for RF signal generators.

Sine wave output, for amplifier gain and distortion measurement, is generated by a "differential amplifier" pair in conjunction with a frequency selective "notch filter". The product of this circuitry yields a clean output with a frequency range of 1 Hz to 100 kHz. Distortion levels are less than 0.1% from 10 Hz to 20 kHz. 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 and 10 V into a load of 2000 ohms or greater. Risetime is 50 nanoseconds, making the IG-5218 ideal for checking audio amplifier response or use as a trigger for digital circuitry testing.

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. Easy kit assembly, or you can order the unit factory tested and calibrated. Either way, you'll have a truly useful and versatile instrument for all your audio testing and service needs.

Kit IG-5218, Shpg. wt. 10 lbs. **94.95**

Assembled SG-5218, wired version of the IG-5218 in black & white styling, Shpg. wt. 10 lbs. **195.00**

IG/SG-5218 SPECIFICATIONS: Sine Wave Output: Output voltage: 8 ranges, 0.003 to 10 V rms (full-scale) with 10 k ohm or higher external load. 6 ranges, 0.003 to 1 V (full-scale) with 600 ohm internal or external load. dB ranges: -62 dB to +22 dB, -12 dB to +2 dB on meter and -50 to +20 dB on amplitude switch in 10 dB steps. +2 dB max. into 600 ohm load. (0 dB = 1 mW in 600 ohm). Output variation: +1 dB 10 Hz to 100 Hz. Output indications: Two voltage and one dB scale on meter. Output impedance: 10 V range: 0-1000 ohm, 3 V range: 800-1000 ohm; 1 V range and lower; 600 ohm. Meter accuracy: $\pm 10\%$ of full scale with proper load termination. Square Wave Output: Output voltage (peak-to-peak). 0.1; 1, 10 V into 2000 ohm load or higher. Output impedance: 0.1 and 1 V ranges: 52 ohm; 10 range: up to 220 ohm. Power requirement: 105-125 or 210-250 VAC, 60/50 Hz, 6 watts.

"Shirt-Pocket" size portable color Alignment Generator

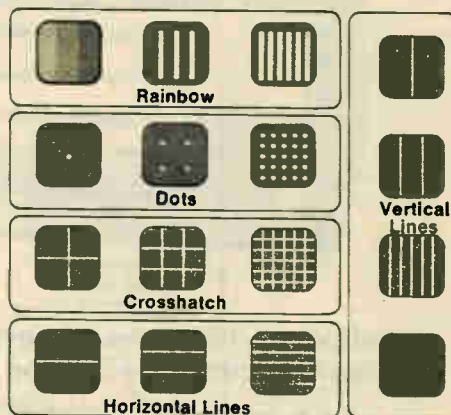
Has the versatility you NEED for complete color TV alignment and convergence — plus a special battery saver circuit for added efficiency

The IG-5240 offers outstanding performance, with crystal-controlled carrier and color oscillator for real precision, accuracy and stability. It's a versatile, low-cost service tool for hobbyist and technician alike. Simply connect its output cable to the VHF terminals of any color TV. The RF carrier frequency is calibrated for channel 4. An "on" pushbutton turns the IG-5240 on, four program slide switches select any of the 16 displays available. A color level control adjusts the color intensity of the three color patterns. A special "battery saver" timing circuit turns the display "off" automatically after a minimum of five minutes "on" to conserve battery power. The unit uses two inexpensive 9-volt transistor batteries (NEDA #1604 or equivalent), which provide a minimum of 8 hours continuous operation. Less batteries.

Kit IG-5240, Shpg. wt. 2 lbs. 69.95

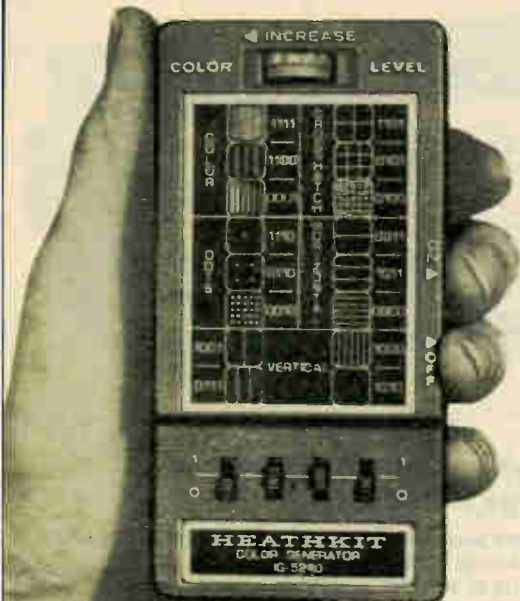
Factory assembled version of above.

SG-5240, Shpg. wt. 1 lb. 100.00

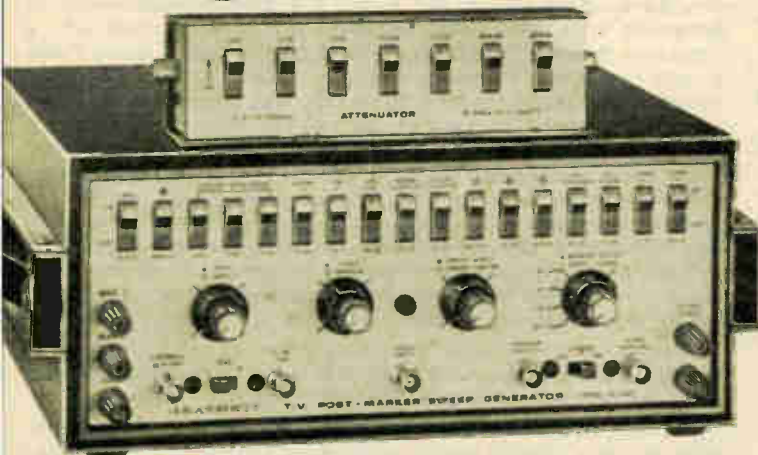


Patterns other than 1x1 may vary.

IG/SG-5240 SPECIFICATIONS: Chroma Carrier: 3563.795 kHz $\pm 0.005\%$ crystal-controlled. Master Timer: 377.616 kHz $\pm 0.005\%$ crystal-controlled. RF Carrier: Channel 4, 67.250 MHz $\pm 0.01\%$ crystal-controlled. RF Output Level: 5000 μ V min. into 300 ohms. Video Modulation: 50% (approx.) On-Time Interval: 5 minutes min. OFF pushbutton can override time out. Power Requirement: Two 9-volt transistor batteries; with 180 mA capacity (NEDA #1604). Dimensions: 5.4" L x 2.75" W x 1.15" D.



\$69⁹⁵



Heathkit Post-Marker/Sweep Generator for easy, accurate, television alignment

\$199⁹⁵

Fifteen crystal-controlled markers are provided to make video and audio alignment a breeze

The Heathkit IG-5257, TV Post-Marker/Sweep Generator offers the precision and stability that are necessary for exacting black and white or color television and FM receiver alignment. It's ideal for the bench of the service professional or home user and solid state design means reliable year after year performance.

The post marker generator provides markers that are sharp, well defined and will not alter or distort the response characteristics of circuits being aligned. Fifteen precise crystal controlled oscillators provide markers which greatly simplify alignment procedures. Four are for color bandpass adjustment, one is provided for FM receiver IF alignment and eight markers, from 39.75 to 47.25 MHz, make

television IF alignment fast and easy. In addition, video and audio carrier markers are provided for television channels 4 and 10.

Because any of the IG-5257's fifteen markers are selectable, as many as six markers may be simultaneously presented on an IF curve. Due to this unique multi-marker display, optimum bandpass shaping is easily attained.

The sweep generator circuits of the IG-5257 provide three linear ranges which cover the frequencies necessary for television and FM IF scope displays. Another feature of the IG-5257 is its diode modulator which combines outputs of both the post-marker and sweep generator to permit amplitude modulation of the video carrier by a low frequency sweep signal. This method of alignment, called Video Sweep Modulation (VSM), permits observation of the overall color bandpass response, including the effect of the video detector load circuitry.

Other features of the IG-5257 include a 400 Hz modulation tone which is extremely useful in checking out the alignment and adjustment of FM receivers and two variable voltage bias supplies which are capable of providing both positive and negative bias voltages. A multi step attenuator pad assures proper circuit impedance matching and avoids stage overload during alignment. Easy straightforward construction simplifies kit assembly and the rugged reliability of the Heath IG-5257 will make it a valued addition to your test instrumentation. Includes four coax cables, four test leads and a demodulation probe.

Kit IG-5257, Shpg. wt. 16 lbs. 199.95

IG-5257 SPECIFICATIONS: Marker frequency: 100 kHz. Marker frequencies, crystal-controlled: 3.08, 3.58, 4.08, and 4.50 MHz $\pm 0.01\%$. 10.7, 39.75, 41.25, 42.17, 42.50, 42.75, 45.00, 45.75, 47.25, $\pm 0.005\%$; 67.25 and 193.25 MHz $\pm 0.01\%$. Modulation frequency: 400 Hz. Input Impedance: External Marker/Sweep, and Attenuator—75 ohms. Trace in—220 k ohms. Output impedance: Marker Output, Sweep Output, and Attenuator—75 ohms. Scope Vert.—1 k ohms. Bias voltage: Two individually adjustable supplies: Positive or negative polarity. Sweep frequency ranges: LO Band—2.5 to 5.5 MHz ± 1 dB. IF Band—39 to 49 MHz ± 1 dB. RF band—64 to 72 MHz ± 1 dB. Attenuator: Total of 70 dB in seven steps. Power requirement: 120 V, 60 Hz AC at 4.5 watts.

Heathkit IT-5230 CRT Tester/Rejuvenator brings old and worn TV Picture Tubes back to LIFE!

\$99⁹⁵
Kit

- Tests **IN-LINE GUN** Color CRT's
- Individual meters for each color gun
- Clean and rejuvenate modes for each gun
- Heater/Cathode short indicator

The IT-5230 is a deluxe CRT rejuvenator/tester that is priced well within reach of any service shop. With it you can test, clean and rejuvenate almost all current CRT's including in-line-gun types.

Positive action pushbuttons control all tests and processes for easy operation. Individual guns can be cleaned, tested and rejuvenated by using the front panel pushbuttons. And separate meters for each gun allow easy tracking of the individual grid currents. The main power control also sets control grid voltage level. A separate heater voltage meter allows monitoring of the heater voltage supplied to the cathode of the CRT. An Indicator lamp gives visual confirmation of CRT short-circuits and the visual display restore Indicator glows brighter as the rejuvenating current is increased. To insure correct CRT restoration, a separate cleaning process is applied after rejuvenation to assure proper tube operation.

The IT-5230 is designed for portability and a transformer power supply assures reliable operation even at the low line voltages likely to be encountered in the field. A self-contained storage tray offers plenty of room for test cables and small tools.

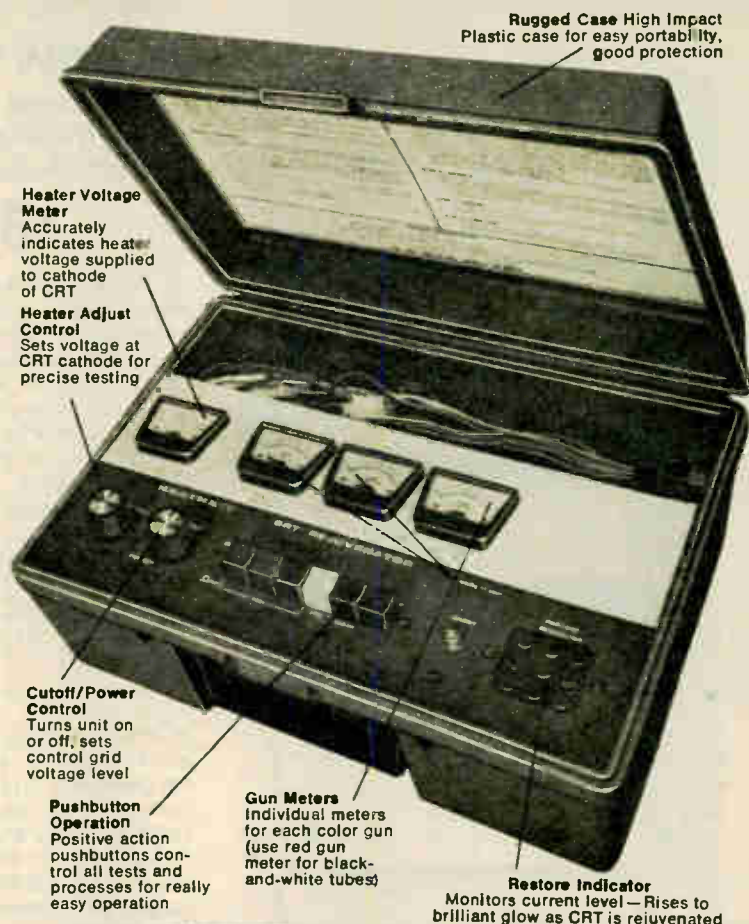
Kit IT-5230, Shpg. wt. 9 lbs. 99.95

Factory assembled version of above.

ST-5230, Shpg. wt. 9 lbs. 195.00

See page 69 for IO-4101 Vectorscope/Color Bar Generator.

IT-5230 SPECIFICATIONS: Sockets Supplied: 14-pin for 90° color tubes; 13-pin for in-line color tubes; 8-pin for black-and-white tubes; 7-pin for black-and-white tubes. Heater Supply Voltage: Variable from 2 volts to 12 volts at 1 ampere. Test Cables Supplied: 4' heavy duty. Power Requirement: 105-135 VAC, 60/50 Hz (50 watts maximum at 60 Hz). Dimensions: 5.12" high x 10" deep x 13.5" wide.



Heater Voltage Meter
Accurately indicates heat voltage supplied to cathode of CRT

Heater Adjust Control
Sets voltage at CRT cathode for precise testing

Cutoff/Power Control
Turns unit on or off, sets control grid voltage level

Pushbutton Operation
Positive action pushbuttons control all tests and processes for really easy operation

Gun Meters
Individual meters for each color gun (use red gun meter for black-and-white tubes)

Restore Indicator
Monitors current level—Rises to brilliant glow as CRT is rejuvenated

Solid state color bar and dot pattern Generator for fast, easy TV servicing

\$109⁹⁵

- Logic circuitry insures sharp stable alignment patterns
- Solid state crystal controlled time base

The Heathkit IG-5228 is THE choice for the television service professional who desires uncompromising quality in a color bar and dot generator. At the heart of the IG-5228 system is a highly stable crystal controlled Pierce oscillator which operates at a frequency of 190.08 kHz. Output from this standard is coupled to a divide chain and at various points signals are "picked" off and applied to logic circuits consisting of AND, NAND, NOR, and OR gates. The product of the divide and logic circuitry yields 12 highly stable and precise alignment patterns.

Dots, cross hatch, horizontal and vertical lines, color bars, and gray scale patterns are all front panel selectable and may be generated in either 3 X 3 or 9 X 9 displays. For added stability the IG-5228's horizontal and vertical sync circuits are crystal controlled. These circuits provide pulses which accomplish blanking and insure all alignment patterns are firmly "locked" on screen.

For added convenience sync signals and two 500 W AC receptacles are also available on the front panel. A big plus of the IG-5228 is its selectable, channel 2 through 6 RF output. This carrier may be utilized in either modulated or nonmodulated modes and is a real bonus in analysis of overall receiver performance. Patterns are available for servicing both black and white or color television receivers. The IG-5228 is a perfect addition to the bench of all television technicians and Heath engineering insures year after year reliability.

Kit IG-5228, Shpg. wt. 8 lbs. 109.95



IG-5228 SPECIFICATIONS: Output signals: Video—Greater than ± 1 V peak-to-peak composite signal. RF—Variable to 50,000 μ V output, channels 2 through 6. Sync.—Greater than 3.5 V peak-to-peak signal. Control Grids (3)—Individual red, blue, and green control grid signals for viewing chroma signal demodulator phase adjustments. Power supply: full wave zener diode regulated. Input—120/240 VAC, 60/50 Hz. Output—3.6 VDC, 500 mA, zener diode regulated. Dimensions: 5½" H x 13½" W x 8" D.

Heathkit 40 kV High-Voltage Probe Meter



Makes TV tube voltage measurements fast and convenient. Measures DC voltages up to 40 kV with $\pm 3\%$ accuracy. The on-off switch on the handle protects the meter

during hookup and when the probe is not in use. Easy operation, easy assembly. 1½" H x 1½" W x 15" D.

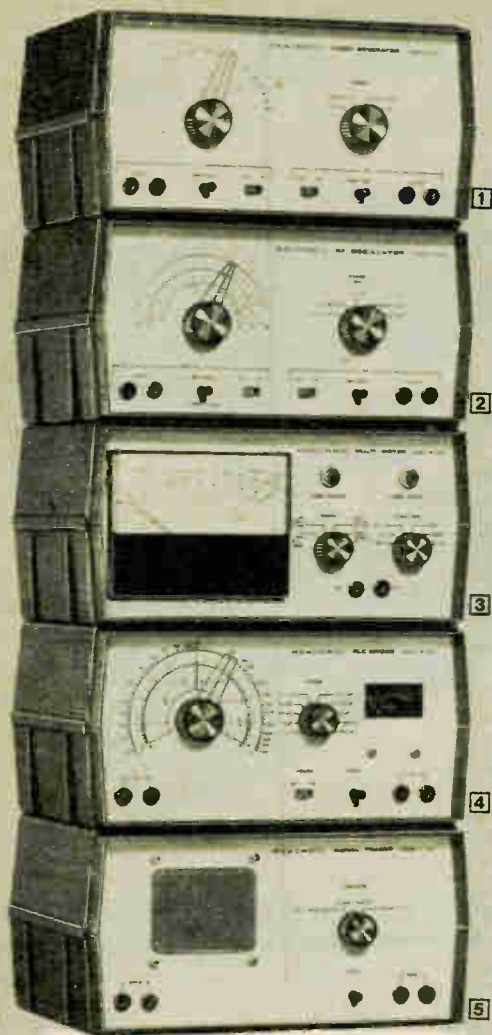
Kit IM-5210, Shpg. wt. 1 lb. 21.95

A Low Cost Start For Your Bench

Really Save! Your first bench can cost even less.

Order the IPA-5280-1 and any three 5280 series instruments and you deduct 5% from the total price!

\$39.95 Individual kit price



\$27.95

5280 Series Value

Heath's 5280 series presents an excellent low cost way to assemble your first bench. Each instrument offers simplicity of construction, good performance, and important "hands-on" learning experience. Once completed, you'll have test gear that you can not only be proud of but also gear that really gets the job done! And since they're priced at just \$39.95 each, you won't find a better value.

1 The IG-5282 Audio Oscillator, an instrument useful in many test applications, features sine or square wave output and 10 Hz to 100 kHz frequency range in four bands. Use the IG-5282 for signal tracing or, with the appropriate associated equipment, conduct such tests as stage gain and distortion analysis or frequency response and harmonic distortion testing.

Kit IG-5282, Shpg. wt. 5 lbs. **39.95**

IG-5282 SPECIFICATIONS: Frequency Output: 10 Hz to 100 kHz in four ranges. Sine Wave Output Voltage: 0-3 volts rms. Square Wave Output Voltage: 0-3 volts peak. Power Requirements: Two 9-volt batteries (not supplied) or the optional IPA-5280-1 Power Supply. Dimensions: 11" H x 5 3/4" W x 7 3/4" D. Net Weight: 3 1/2 lbs.

2 If you're doing alignment work the ideal addition to your bench is Heath's IG-5280 RF Oscillator. This unit is suitable for alignment of tuned stages in AM, FM, and television receivers. Output is in five bands, from 310 kHz to 110 MHz and features an additional 100 to 220 MHz range using calibrated harmonics. Makes a versatile addition to your bench!

Kit IG-5280, Shpg. wt. 5 lbs. **39.95**

IG-5280 SPECIFICATIONS: RF Output: Frequency Range: 310 kHz to 110 MHz in five bands, 100 MHz to 220 MHz on harmonics. Output voltage: 100 mV approx. Internal Modulation: 1000 Hz. AF Output: Frequency: 1000 Hz. Output Voltage: 2.0 volts rms (open circuit). Power Requirements: Two 9-volt batteries (not supplied) or IPA-5280-1 power supply. Dimensions: 11" W x 5 3/4" H x 7 3/4" D. Weight: 3 1/2 lbs.

3 The IM-5284 Multimeter is one of the best price/performance values ever offered by Heath! This solid-state multimeter gives you 4 different functions, an easy to read panel meter and features AC and DC voltage measurement to 1000 volts. DC current is measured to 1000 mA full scale and ohmmeter function is divided into four ranges (X1, X100, X10K, and X1M Ω). Rugged construction. Includes probes.

Kit IM-5284, Shpg. wt. 5 lbs. **39.95**

IM-5284 SPECIFICATIONS: DC Voltmeter: Ranges: 0-1, 0-10, 0-100, 0-1000 volts full scale. Accuracy: $\pm 3\%$ of full scale. AC Voltmeter: Ranges: 0-1, 0-10, 0-100, 0-1000 volts full scale. Accuracy: $\pm 5\%$ of full scale. DC Milliammeter: Ranges: 0-1, 0-10, 0-100, 0-1000 mA full scale. Ohmmeter: Ranges: X1, X100, X10K, X1M Ω . Power requirements: Two 9-volt batteries and 1 "C" cell (not supplied) or IPA-5280-1 Power Supply and 1 "C" cell. Dimensions: 11" W x 5 3/4" H x 7 3/4" D. Weight: 3 1/2 lbs.

4 The Heath IB-5281 RCL Bridge is priced right for your pocket book and has the features that you can appreciate. Rugged solid state circuitry lets you easily determine unknown values of resistance (three ranges 10 Ω to 10M Ω), inductance (three ranges 10 μ H to 10H), and capacitance (three ranges 10pF to 10 μ F). Easy single board assembly. With component clips.

Kit IB-5281, Shpg. wt. 5 lbs. **39.95**

IB-5281 SPECIFICATIONS: Resistance Ranges: 10 Ω to 10M Ω in three ranges. Inductance Ranges: 10 μ H to 10H in three ranges. Capacitance Ranges: 10 pF to 10 μ F in three ranges. Oscillator Frequencies: 1 kHz, 10 kHz, 100 kHz. External Standard Range: 1:1 to 10:1. Power Requirements: two 9-volt batteries (not supplied) or IPA-5280-1 power supply. Dimensions: 11" W x 5 3/4" H x 7 3/4" D. Weight: 3 1/2 lbs.

5 A great addition to your trouble shooting arsenal is the IT-5283 Signal Tracer. Features a dual function RF probe that lets you quickly trace and reveal stage and component failures in RF equipment. In its straight through position, you can trace all types of audio components and circuitry. Flip the IT-5283 to its audible ohmmeter position and easily trace signal flow through logic circuits.

Kit IT-5283, Shpg. wt. 5 lbs. **39.95**

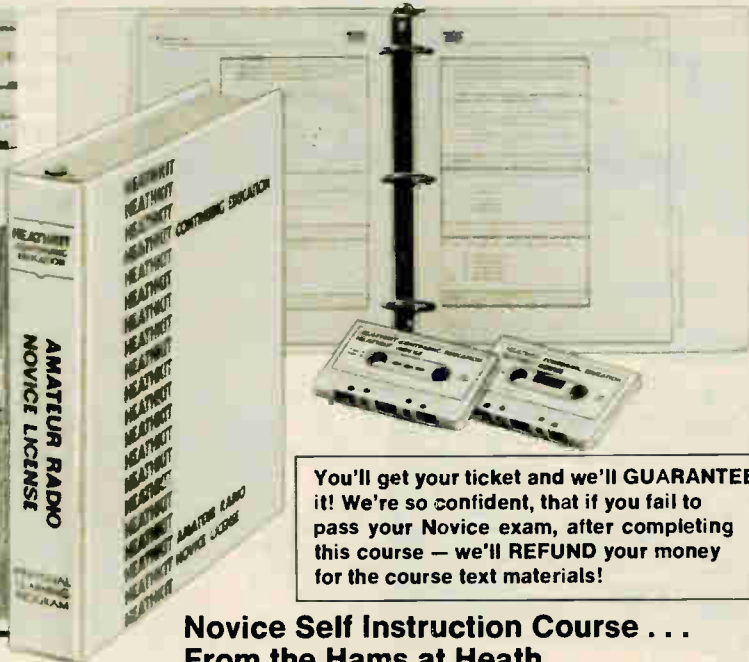
IT-5283 SPECIFICATIONS: Functions: Substitute speaker, AF signal tracing, RF signal tracing, Audible volt/ohmmeter. Speaker: 3" permanent magnet. Power Requirements: Two 9-volt batteries (not supplied) or IPA-5280 power supply. Cabinet Dimensions: 11" W x 5 3/4" H x 7 3/4" D. Weight: 3 1/2 lbs.

6 The IPA-5280-1 Power Supply provides all voltages required by 5280 series equipment. Features full wave rectification, capacitor filtering and dual integrated circuit regulation to insure correct voltage output. Powers all five instruments simultaneously and has handy switch which allows operation from either 110 or 220 VAC outlets, without rewiring.

Kit IPA-5280-1, Shpg. wt. 3 lbs. **27.95**

IPA-5280-1 SPECIFICATIONS: Output Voltage: +9 and -9VDC $\pm 9\%$. Maximum Output Current: 100 milliamps. Integrated Circuit and Diode Complement: UA78, UA79 regulator IC, IN-4002 silicon diode. Power Requirements: 100 to 135 VAC or 200 to 270 VAC, 50/60 Hz, 7 watts maximum. Dimensions: 6" H x 3 3/4" W x 3" D. Fuse: 1/16-amp, 3AG, slow-blow primary. Net Weight: 2 lbs.

Novice Courses to help you get your Ticket!



You'll get your ticket and we'll **GUARANTEE** it! We're so confident, that if you fail to pass your Novice exam, after completing this course — we'll **REFUND** your money for the course text materials!

SAVE \$4⁹⁵ when you buy our Course and Code Practice Oscillator together!

only **\$32⁹⁵** \$37.90 if purchased separately



The ideal combination — study the course and get "hands-on" Code Practice

Here's the outfit that will have you operating fast and easy. The HD-1416, described at right, is a fine little unit you'll appreciate even after you have your license; and our course is the fast, easy way to get your license.

ERS-3701, Shpg. wt. 8 lbs. 32.95

Get 10% off (up to \$10.00) on any Heathkit Amateur Radio equipment. Simply attach copy of license and proof of ERS-3701 purchase within 90 days of licensing.

BONUS GIFT CERTIFICATE

Popular Code Courses (not illustrated)

Ameco Junior Code Course. LP record with 10 lessons from start to 8 words per minute. The course prepares you for Novice and Technician Code examinations with an FCC-type code exam, a code instruction booklet, and charts for recording accuracy.
HDP-232, Shpg. wt. 2 lbs. 3.95

Ameco Senior Code Course. Contains everything above, plus twelve additional lessons to bring your code speed to 18 WPM. Prepares you for Amateur Novice, Technician, General and Conditional Code exams, as well as Commercial Second Class Telegraph Code exams.
HDP-332, Shpg. wt. 2 lbs. 7.50

Ameco Junior Cassette Code Course. As above, cassette instead of LP.
HDP-432, Shpg. wt. 1 lb. 4.95

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

"By the Word" Code Course. A fast, simple and effective way to learn Code! Three LP records teach speed and comprehension using the famous "by the word" method.
HDP-32, Shpg. wt. 2 lbs. 9.95

Same course as above, but on two cassettes instead of LP records.
HDP-132, Shpg. wt. 1 lb. 9.95

Novice Self Instruction Course . . . From the Hams at Heath

\$24⁹⁵

This deluxe course prepares you for the Amateur Radio Novice FCC exam, and provides you with helpful guidelines for setting up and operating your own station once you pass the exam. The course includes a programmed learning text, two audio cassettes to reinforce text material and provide Code practice, helpful aids for operating your station.

Course ER-3701, Shpg. wt. 7 lbs. 24.95

ECP-3801 Cassette Recorder/Player. See page 96 for details.
Shpg. wt. 6 lbs. 60.00



Heathkit HD-1416 Code Practice Oscillator

Recommended for ER-3701 Amateur radio course at left! The unit operates from a single inexpensive 9-volt transistor battery (not supplied) and comes complete with telegraph key and phone jack. Has built-in speaker, volume and adjustable internal tone control.

\$12⁹⁵ Kit HD-1416, Shpg. wt. 2 lbs. 12.95

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). Headphones 8-2000 ohms. Dimensions: 2 5/8" H x 4 1/2" W x 4 3/8" D.

"TUNE IN THE WORLD WITH HAM RADIO"

Designed to prepare you for your Novice License. Includes a tape cassette with code speeds of up to five words per minute for easy practice, and an informative booklet with details on setting up a station, equipment, exams, etc. Produced by the ARRL, the official Amateur Radio organization.

HDP-1142, Shpg. wt. 2 lbs. 7.00





1

1 Heathkit Hybrid Phone Patch

Add the versatility of phone patch capability to your shack with Heath's HD-15. Individual receiver/transmitter line gain controls simplify adjustment and the HD-15's VU meter continuously monitors the unit's output. Interfacing with your system is a simple matter. Matches 3-16 ohm speakers and hi-Z or 600 ohm inputs. VOX or PTT operation. 2½" H x 9¼" W x 3⅝" D.

Kit HD-15, Shpg. wt. 3 lbs. 39.95



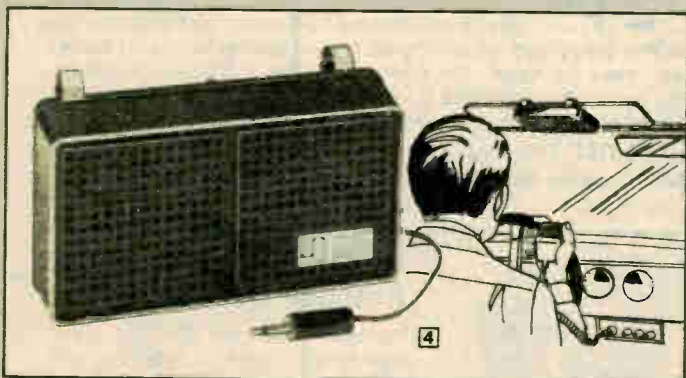
2

2 Multiple Antenna Coax Switch

Heath's HD-1234 coax switch is the ideal termination for your "antenna farm". Switches up to 4 different antennas or use it to interconnect various pieces of gear around the shack. The HD-1234 handles RF up to 2 kW PEP, grounds all outputs not in use, and has an effective operating range to 250 MHz. Insertion losses are negligible and construction is simple and rugged.

Kit HD-1234, Shpg. wt. 1 lb. 11.95

3 LAST CALL!



4

3 Heathkit Mobile Speaker for improved audio

If you're going mobile or just want to add another speaker to the shack, the HS-24 is what you need. The unit features a 4" x 6" oval speaker and its 200 to 2000 Hz response is tailored for perfect speech reproduction. Voice coil impedance is 8 ohms and the 19 gauge steel cabinet will give you years of rugged performance. Includes gimbal mount. 6½" W x 4¾" x 2½" D.

Kit HS-24, Shpg. wt. 4 lbs. 16.95

4 HDP-1228 Portable Twin Speaker

The HDP-1228 plugs directly into the external speaker jack of most transceivers, tape players, etc. It's ideal for visor mounting to overcome road and traffic noise, and it can be quickly unplugged and removed from the vehicle for theft protection. Constructed of tough, lightweight plastic, the HDP-1228 is a worthwhile addition to your vehicle's communications setup. Impedance, 16 ohms. 5¾" W x 3¼" H x 1¼" D. Fully assembled.

HDP-1228, Shpg. wt. 1 lb. 9.95

5 Heath's Original "Cantenna"

It's the one accessory you can't do without! Use the "Cantenna" to avoid unnecessary interference during tune ups or install it on your bench. It's the ideal load for transmitter maintenance and alignment, and it's light enough for easy field portability. Handles up to 1 Kw of RF with VSWRs of less than 1.5:1 to 300 MHz and less than 2:1 to 400 MHz. 50 ohm impedance. Oil filled (oil not included).

Kit HN-31, Shpg. wt. 3 lbs. 16.95

See page 70 for our new Bi-Directional Wattmeter.



5

The Heath "Cantenna" ... It's the only dummy load you'll ever need!

Only \$16⁹⁵

Excellent Books for your Amateur library



U.S. Callbook. EDP-126	14.95
DX Callbook. EDP-127	13.95
Amateur Tests and Measurements. EDP-119	5.50
91 Dipole and Long-Wire Antennas — data for 73 different antennas. EDP-180	4.95
73 Vertical, Beam and Triangle Antennas. EDP-181	5.50
ARRL Antenna Handbook. EDP-182	5.00
Radio Handbook. Offers comprehensive coverage of radio theory and operation. EDP-117	19.50

Put it Together with Accessories from Heath

Heathkit solid-state Dip Meter delivers more performance at big savings

Another Heath value triumph — a better dip meter at lower cost. The Colpitts oscillator covers 1.6 to 250 MHz in fundamentals with a MOS-FET paraphase amplifier and hot-carrier diodes for more sensitivity and a better dip. It uses a Q-multiplier for greater detector sensitivity and a responsive 150 μ A meter movement for positive resonance indications. It includes a phone jack for modulation monitoring. It's smaller and lighter than others, too. Completely portable. Whether you're checking resonant frequencies, adjusting traps, looking for parasitics, or using it as a signal generator, the HD-1250 is designed to go anywhere. It fits your hand and thanks to its solid-state design and 9-volt battery operation, it's ready to use instantly wherever you are. The custom molded gray carrying case protects the meter and the 7 color-coded, pre-adjusted, plug-in coils in transit, and makes a handy storage place. Build it in one evening. Nearly everything mounts on two circuit boards. And when you finish, you'll have the bet dip meter around — for a lot less money.

Kit HD-1250, less battery, Shpg. wt. 3 lbs. 69.95



1 Heath HM-102 HF Wattmeter/SWR Bridge

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

Kit HM-102, Shpg. wt. 3 lbs. 39.95

HM-102 SPECIFICATIONS: Frequency Range: 1.8 to 30 MHz. Wattmeter Accuracy: $\pm 10\%$ of full-scale reading. Power Capability: 10 to 2000 watts. SWR Sensitivity: Less than 10 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.



2 HM-2102 VHF Wattmeter/SWR Bridge

Features 6 or 2 meter operation, dual power/SWR scales and easy construction and calibration. Handles power to 250 watts and has nominal 50 ohm impedance.

Kit HM-2102, Shpg. wt. 4 lbs. 39.95

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. Connectors: UHF type SO-239. Dimensions: $5\frac{1}{4}$ " W, $5\frac{1}{4}$ " H and $6\frac{1}{2}$ " D. *Using a 50 Ω noninductive load.



3 Fully assembled Heathkit Desk Mike

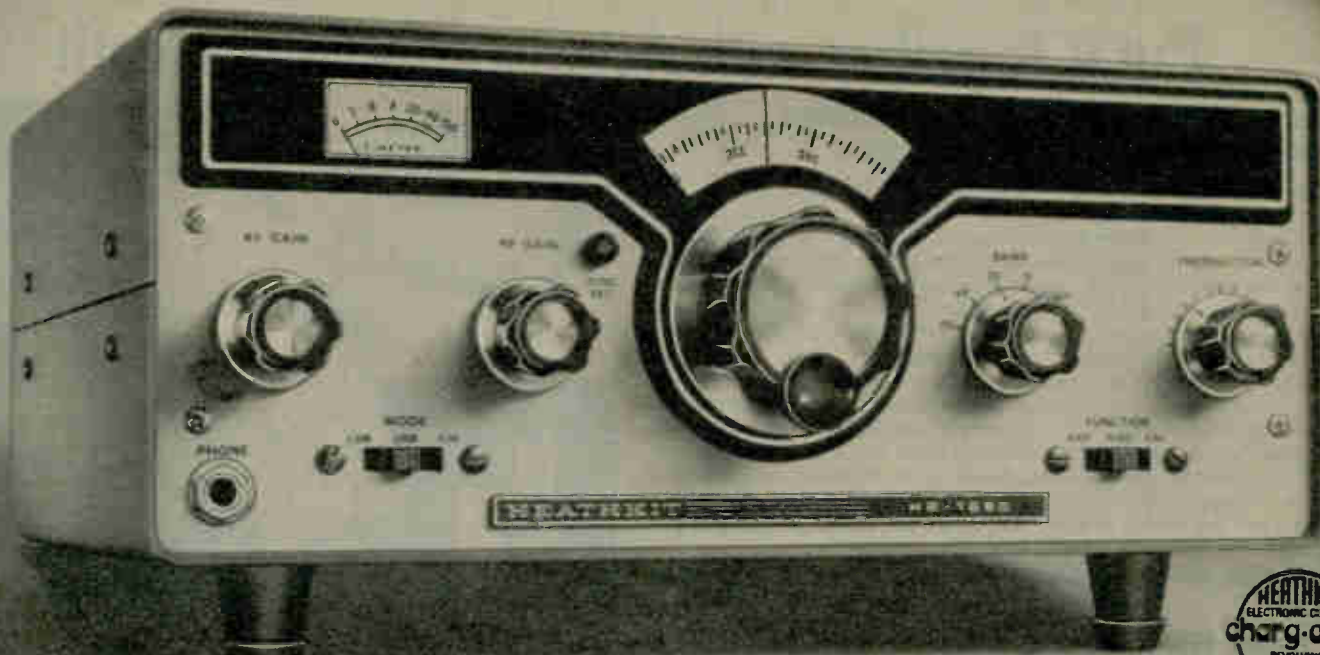
The Heath desk mike adds the professional touch to your station's operation. This Hi-Z dynamic microphone features 70-10,000 Hz response, VOX and grip-to-talk operation, and its rugged die-cast case, finished in grey and satin chrome, makes the HDP-121A the centerpiece at any operating position. Includes cables.

HDP-121A, Shpg. wt. 4 lbs. 44.95

4 Fully assembled Heathkit Mobile PTT Mike

For QSOs on the road you can't beat the GH-12A hand-held from Heath! The mike features a high impedance piezo-ceramic element, with 100 to 5000 Hz response, that's tailored for single sideband operation. Can be wired for PTT or both PTT and VOX operation. Comes complete with cable and mounting clip. Connector not included.

GH-12A, Shpg. wt. 1 lb. 15.95



HR-1680 High-performance SSB/CW Receiver

\$219⁹⁵

- Excellent sensitivity
- No-instrument alignment
- Operates from 12 VDC or built in AC supply

Heath's HR-1680 is an excellent choice for your first receiver. It's loaded with innovations and designs that make it an outstanding performer for not only the Novice but the seasoned amateur as well! Look at the facts. The HR-1680 covers 80, 40, 20, 15 and the lower 1 MHz of the 10 meter band and features a preselector tuned dual-conversion MOSFET front end. Less than $0.5 \mu\text{V}$ gives you a 10 dB signal plus noise over noise ratio and with that kind of performance you'll have no trouble digging but the "rare" ones or finishing your QSO "solid copy"...even with a less than ideal antenna! The IF section blends a 4-pole crystal filter and MOSFET amplifier for razor sharp selectivity and gain, and dual crystal BFO oscillators and an IC product detector give the 1680 superior LSB and USB/CW per-

formance. Both RF and IF stages are AGC controlled to prevent QSB fading and blasting. In addition, the HR-1680 features individual crystal heterodyne oscillators for excellent stability, solid-state diode bandswitching, built in 100 kHz calibrator for precise calibration and alignment, and switchable wide/narrow active audio circuitry to precisely tailor your 1680's response for SSB or CW operation.

The massive front panel tuning knob is calibrated in 5 kHz increments and the 1680's built in FET VFO gives you extremely linear and accurate coverage of the receiver's overall operating range.

Assembly is simplified with only four circuit boards to construct and a rugged chassis, with open layout and design, minimizes heating and insures long lasting precision and stability. Operates from 12 VDC or internal AC supply and can be completely aligned without external instruments.

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



Matching station speaker enhances the performance of the HR-1680

\$22⁹⁵

The HS-1661 station speaker is styled to match the features and tailored to fit the performance of the HR-1680 receiver. The unit features 300-3000 Hz response for excellent single side band and CW reproduction, 4 ohm impedance, and comes complete with cable and plug. An outstanding value!

Kit HS-1661, Shpg. wt. 5 lbs. 22.95

80

HR-1680 SPECIFICATIONS: Frequency Coverage (MHz): 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5, 28.5-29.0. Sensitivity: Less than $0.5 \mu\text{V}$ for 10 dB S+N, N for SSB operation. IF Selectivity: 2.1 kHz minimum at 6 dB down, 7 kHz maximum at 60 dB down. Overall Audio Response: Wide; 2100 Hz minimum at 6 dB down, 7 kHz maximum at 60 dB down. Narrow; 250 Hz minimum at 6 dB down, 2.5 kHz maximum at 60 dB down (center frequency approx. 750 Hz). Overall Gain: Less than $1.5 \mu\text{V}$ input for 0.25 watts audio output. Audio Output Power: 1.2 watts into a 4-ohm load at less than 10% THD. AGC Characteristic: Blocking level, 3 volts. Dynamic range, 120 dB. Time Constant, attack time less than 1 mS. Release time switch selectable at 100 μS (CW) or 1 second (SSB). Intermodulation Distortion: -60 dB. Image Rejection: 50 dB or better. IF Rejection: 60 dB or better. Internally Generated Spurious Signals: Below $1 \mu\text{V}$ equivalent antenna input except at 3.74, 21.2, 28.6 and 28.9 MHz. Frequency Stability: Less than 100 Hz per hour drift after 30 minutes warmup. Less than 100 Hz drift for 10% change in line voltage. Tuning Rate: Approx. 15 kHz per turn. Dial Accuracy: Within 2 kHz after calibration at nearest 100 kHz marker. Muting: Shorted external ground at mute socket. Sidetone Input Level: 10 mV or greater (300 mV maximum). Dial Backlash: 50 Hz or less. IF Frequencies: First IF, 8.395-8.895 MHz; Second IF 3.395 MHz. Antenna Input Impedance: 50 ohms unbalanced. Temperature Range: -10°C to +50°C. Meter Calibration: 0 to S-9 + 60 dB. Power Requirement: 120 or 240 volts AC (60/50 Hz) 27 watts maximum or 11.5 VDC to 15 VDC at 0.75 amperes maximum. Dimensions: 12 $\frac{3}{4}$ " W x 6 $\frac{3}{4}$ " H x 12" D. Net Weight: 9 $\frac{3}{4}$ " lbs.

Heathkit Linears—Packed with Power and Features

The Heathkit SB-200 has a 1 kW kick that's great for SSB

\$389⁹⁵



Put full 2 kW power in your station with the Heathkit SB-220

\$559⁹⁵



Heathkit SB-200 1 kW Linear Amplifier

- Complete 80 through 10 meter band coverage
- Fully shielded, fan-cooled amplifier compartment
- Circuit-breaker power supply protection

Delivers a full 1200 watts PEP input, 1 kW on CW. Requires only 100 watts drive, so it's ideal for use with most any popular transmitter or transceiver. And the SB-200 has the features you need for top performance.

The heavy-duty final amplifier tubes are fan-cooled for maximum tube life and completely shielded for excellent TVI protection. A pre-tuned cathode-input circuit provides maximum efficiency and low distortion. The ALC output provides automatic exciter control.

Has a built-in solid-state power supply with circuit breaker protection. The switchable front panel meter shows SWR, grid current, plate current, relative power and plate voltage. For extra operating convenience, an antenna relay automatically switches the antenna to the exciter input when the SB-200 is "off".

The sturdy yet lightweight construction of the SB-200 is achieved by using a heavy-gauge one-piece aluminum chassis that is partitioned for extra strength and isolation of components. The SB-200's clean, open chassis layout assures easy assembly.

Kit SB-200, Shpg. wt. 45 lbs. **389.95**

SB-200 SPECIFICATIONS: Band coverage: 80, 40, 20, 15 & 10 meters. Maximum power input: 1200 watts P.E.P. SSB, 1000 watts CW. Driving power required: 100 watts. Duty cycle: SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). Third order distortion: -30 db or better at 1000 watts P.E.P. Output impedance: 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. Input impedance: 52 ohm unbalanced; broad-band pretuned input circuit requires no tuning. Meter functions: 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. Front panel controls: Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. Tube complement: Two 572B/T-160-L (in parallel). Power requirement: 120 volts AC @ 16 amperes (max.), 240 volts AC @ 8 amperes (max.). Cabinet size: 14 1/8" W x 6 5/8" H x 13 3/8" D. Net weight: 35 lbs.

Heathkit SB-220 2 kW Linear Amplifier

- High-efficiency pre-tuned broadband pi-input
- Zener-diode regulated power supply
- Front-panel current and voltage meters

The one that's making Amateur Radio history because it offers more features and performance for the price! Uses a pair of conservatively-rated Eimac 3-500Z's to deliver up to 2000 watts PEP SSB input. It can be loaded to a full 1 kW on both CW and RTTY. A broadband pre-tuned pi-input delivers maximum efficiency with low distortion over the complete 80-10 meter bands. And it requires just 100 watts drive!

Tune-up couldn't be easier! Just set the band-switch, set the CW-tune/SSB rocker switch to CW-tune position, adjust tune and load controls for maximum relative power. Push the switch back to SSB and you're "on" with up to a full 2 kW input! And you've got up to a full 1000 watts on CW or RTTY.

The power supply can be wired for 120 or 240 volts. Zener diode regulated operating bias reduces idling current for cooler running and extended tube life. There's built-in circuit breaker protection and a large, quiet-running fan. Other features include ALC to prevent overdriving, front-panel switch-selected monitoring of grid current, relative power and high voltage. Kit assembly is easy and enjoyable, too.

Kit SB-220, Shpg. wt. 64 lbs. **559.95**

SB-220 SPECIFICATIONS: Band coverage: 80, 40, 20, 15 and 10 meters. Driving power: 100 W. Max. power input: SSB, 2000 W. PEP; CW, 1000 W.; RTTY, 1000 W. Duty cycle: SSB, Continuous voice modulation. CW, Continuous (maximum key-down 10 minutes). RTTY, 50% (maximum transmit time 10 minutes). Third order distortion: -30 dB or better. Input impedance: 52 ohm unbalanced. Output impedance: 50 ohm unbalanced; SWR 2:1 or less. Front panel controls: Tune, Load, Band, Sensitivity Meter Switch, Power, CW/Tune - SSB, Plate meter, Multi-meter (Grid mA, Relative Power and High Voltage). Rear panel: Line cord, circuit breakers (two 10 A). Antenna Relay (phono). ALC (phono). RF Input (SO-239). Ground post. RF Output (SO-239). Tubes: Two Eimac 3-500Z. Power requirement: 120 VAC, 50/60 Hz at 20 amp. max. 240 VAC, 50/60 Hz, at 10 amp. max. Cabinet size: 8 1/4" H x 14 7/8" W x 14 1/2" D.

HW-2036A, An improved version of our 2-meter industry standard



Shown with
optional
Micoder II
Installed

\$279⁹⁵
with standard microphone

4 MHz of Synthesized Performance

The HW-2036A 2-meter transceiver has the same exciting features and specifications as the industry leading HW-2036... with one very important difference. Our new 2036A allows you a full 4 MHz of synthesized convenience over any portion of its 143.5 to 148.5 MHz operating range. And because of this significant improvement, you'll be enjoying additional performance capabilities in your mobile operations, and the extra flexibility of Amateur combined with CAP or MARS operation, without the time consuming necessity of VCO retuning. Best of all, we've done it all at the same low price that's made our HW-2036 a value leader.



Now with synthesizer range extended to a full 4 MHz!

Two meters gets more exciting every day. With more and more mobile activity, auto-patching, hidden transmitter hunts, fantastic band openings, and newer more sophisticated repeater operations, you'll be missing out on a whole lot of fun and some really great conversations if you're stuck with a transceiver that just can't take another crystal pair.

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

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

venting transmitter key up.

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

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

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

add \$20 and get it with our Reg. \$39.95 Micoder II for auto-patch operation.

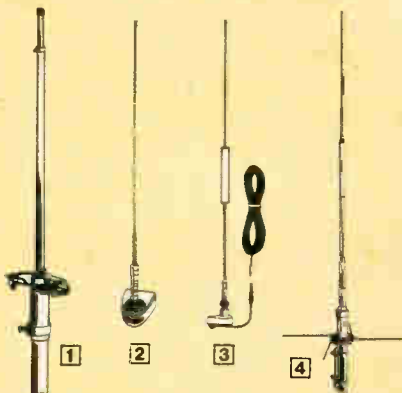
Kit HW-2036A-1, with reg. \$34.95 Micoder II.
Shpg. wt. 12 lbs. **299.95**

Kit HW-2036A-2, with standard PTT mike.
Shpg. wt. 12 lbs. **279.95**

HW-2036A SPECIFICATIONS: Receiver: Sensitivity: 0.5 μ V for 12 dB SINAD (or 15 dB of Quieting). Squelch Threshold: 0.3 μ V or less. Audio Output: 1.5 watts at 10% T.H.D. typically 2 watts. (5 kHz deviation). Image Rejection: -45 dB or greater. Spurious Rejection: -50 dB or greater. IF Rejection: -80 dB or greater. Internally Generated Spurious: Below 1 μ V equivalent. Bandwidth: 6 dB at 15 kHz min. and 60 dB at 30 kHz max. Modulation Acceptance: 7.5 kHz, min. Transmitter: Power Output: 10 watts min. at 25°C and 13.8 VDC, into a 50 Ω load. Harmonic & Spurious Output: -60 dB. Modulation: FM, 0 to 7.5 kHz, adjustable. Duty Cycle: 100% with infinite VSWR. Tone Encoder: 3 tones, 70 to 200 Hz, approx. ± 700 Hz deviation. Transmitter Offset: 0 (simplex), -600 kHz, +600 kHz with crystals supplied. Provision for one additional offset crystal. Maximum offset 1 MHz. General: Frequency Coverage: Any 4 MHz segment from 143.5 to 148.5 MHz. (Both receiver and transmitter must be aligned for the same 4 MHz segment.) Frequency Increments: 5 kHz. Frequency Stability: $\pm 0.0015\%$. Operating Temperature Range: 15° to 125° F. (-10° to 50° C). Operating Voltage Range: 12.6 to 16 VDC (13.8 VDC nominal). Current Consumption: RX: 700 mA max. squelched. TX: 2.6 A max. at 13.8 volts. Dimensions: 2 3/4" high x 8 1/4" wide x 9 3/4" deep. Weight: 6.25 lbs.

Quality base and mobile 2-Meter Antennas

Improve your 2-meter performance
with one of these quality antennas



1 Standard gain fixed. Omnidirectional. 3.75 dB gain, 1.1:1 SWR, 135-175 MHz, 100 watts, 52 ohm feed with PL-259. Mounts to 1 1/4" masts. Less coax. Preassembled.
HWA-202-11, 2 lbs. **19.95**

2 Standard gain mobile. 5/8" wavelength rear deck whip. 3.4 dB gain, 1.1:1 SWR, 100 watts, 47" radiator, 17' coax, connectors.
HWA-202-3, 2 lbs. **21.95**

3 Super gain mobile. Phased 1/4 and 5/8 wave radiators. 5.2 dB gain, 200 watts; 6 MHz bandwidth; 1.1:1 SWR. Height 65". 17' RG-58U coax, connectors.
HWA-202-9, 3 lbs. **39.95**

4 Super gain fixed. 6 dB gain. 140-150 MHz. 6 MHz bandwidth. 1.2:1 SWR. 1000 watts. SO-239 connector. 117" long. 4 radials; 21" alum. rod. For 1 1/4" mast. Less coax.
HWA-202-10, 7 lbs. **72.95**

Micoder II, Mike and Auto Patch in a hand held package!

\$39.95

- Single-chip crystal-controlled circuitry
- No-instrument alignment
- Self-powered



1 EVENING KIT
Fast, Easy Assembly

HD-1984 SPECIFICATIONS:

Operating Voltage: 9.0 VDC. Current Consumption: 12 mA. Battery Life: Approx. 6 months. Microphone Type: electret condenser. Output Level: 30 mV rms maximum. Frequency Response: 300-3000 Hz. Output Load: 10k min. Encoder Frequency Tolerance: ±1.5%. Distortion: less than 5% (harmonic plus IM). Dimensions: 3 3/4" H x 2 3/8" W x 1 3/4" D. Weight: 8 oz. (including battery).

An excellent way to avoid the inconvenience and clutter of an "outboard" tone encoder is to install the new Heath HD-1984. On one side of this neat hand held package you'll find an electret condenser microphone of superior quality. Flip it over and the HD-1984's built-in keyboard is ready to give you instant auto-patch access.

The microphone section features excellent audio characteristics and its 300-3000 Hz response is tailored for clean voice transmission. New encoder circuitry features single chip, crystal referenced, tone generation, Zener diode voltage regulation and excellent overall accuracy and stability. To indicate internal circuits are working, Micoder II incorporates a handy LED display which lights each time the keyboard is depressed and indicates that a dual-tone signal is being generated.

The Micoder is completely self-contained and operates from its own 9-volt battery (not supplied). Comes complete with 6 foot coiled microphone cable and hanger clip. Single board assembly speeds construction and solid state circuitry means years of reliable performance. An ideal gift for every 2-meter enthusiast! Easy single-step NO-INSTRUMENT alignment! Can be used with any high-impedance mike input.

Kit HD-1984, Shpg. wt. 2 lbs. **39.95**

Low-Cost HWA-2036-3, Clean Solid-State Regulation and Top Performance



Heath's HWA-2036-3 Power Supply was designed to be the perfect voltage source for your HW-2036, HW-202 and many other types of transceivers as well. The supply features a beefed up transformer

for higher current operation (up to 2.7 A, 40% duty cycle at 13.8 VDC), full wave rectification, and rugged construction for year after year reliability and performance.

Regulation, adjustable from 12.5 to 14.5 VDC, is accomplished by a Darlington pair and single chip IC circuitry. This solid-state control loop senses supply output, compares it to internal reference, and re-biases for correct voltage output.

The pass transistor is chassis mounted for cooler, more efficient operation and both transformer primary and regulated output are fused for optimum power supply protection. With Heath's excellent manual and illustration booklet, construction is a simple matter and you'll be ready to power up in no time!

Kit HWA-2036-3, Shpg. wt. 7 lbs. **39.95**

HWA-2036-3 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (Adjustable internally from approx. 10 to 15 VDC). Output Current: 2.7 amps, intermittent, 20 minutes max. (1.8 amps continuous). Regulation: better than 1% from no load to full load. Ripple: better than 0.1% at 2.7 amps. Transistor, IC and Diode Complement: one 2N3055 Pass Transistor, one MPSU05 Driver Transistor, four IN4002 silicon diodes, one IN2071 silicon diode, one UA78GM3C IC voltage regulator. Power Requirements: 110 to 130 VAC or 220 to 260 VAC, 60/50 Hz @ 80 watts full load. Dimensions: 3" H x 7 1/4" W x 10" D including switch and feet. Net Weight: 5 lbs.



HW-8, It works the world on a couple of watts!

\$139⁹⁵

- 0.2 μ V gives you readable signals
- 4 Band CW Operation
- Front panel Relative Power Meter

When was the last time you worked the coast, snagged a YV or exchanged reports with a DJ6...all with just three watts? If you've never tried it, you're in for some real excitement and challenge. It takes a good rig though, one with excellent performance and specifications, and probably the best QRP rig going is Heath's HW-8.

Look at the receiver. As little as 0.2 microvolts in at the antenna terminal gives you a readable signal. Hum and microphonics are minimal. Couple that with a tunable preselector, direct conversion with RF amplification, a balanced product detector followed by active audio processing, and you've got a hot little receiver that's going to dig in and dig out the stations you're chasing!

The transmit section's the same story...performance! You'll get a minimum of 3 watts in 80 through 20 and 2.5 in on 15. Each band is individually selected and crystal controlled heterodyne circuitry insures accurate frequency mixing. The HW-8's VFO features an MPF-105 FET in a temperature compensated Hartley configuration. This

design approach provides overall stability and covers the units 3.5-3.75; 7.0-7.25; 14.0-14.25; and 21.0-21.25 MHz operating ranges with excellent accuracy.

Operating convenience wasn't forgotten either. The HW-8 features an RF and AF gain control, solid state band switching and full break-in CW operation including, adjustable T/R delay. Operate your HW-8 from its optional AC supply or take it to the mountain top and run on batteries. HW-8 and QRP — it's your most exciting challenge.

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

Kit HWA-7-1, AC Power Supply, Shpg. wt. 4 lbs. **18.95**

HW-8 SPECIFICATIONS: TRANSMITTER — DC Power Input: 3.5 watts (80 M); 3.0 watts (40 M); 3.0 watts (20 M); 2.5 watts (15 M). Frequency Control: built-in VFO. Frequency Stability: Less than 150 Hz/hour drift after 60 minute warm-up. Output Impedance: 50 Ω , unbalanced. Spurious & Harmonic Levels: -35 dB or better. Offset Frequency: approx. -750 Hz, fixed on all bands. **RECEIVER** — Sensitivity: 0.2 μ V for readable signal; 1 μ V or less for 10 dB S+N/N. Selectivity: wide, -750 Hz @ -6 dB narrow, -375 Hz @ -6 dB. Audio Output Impedance: 1000 Ω , nominal. **GENERAL** — Frequency Coverage: 3.5-3.75 (80 M); 7-7.25 (40 M); 14-14.25 (20 M); 21-21.25 MHz (15 M). Frequency Stability: less than 100 Hz/hour drift after 30 min. warmup. Power Requirement: 12-16 VDC, 90 mA, receive; 430 mA, transmit. Dimensions: 9 1/4" x 8 1/2" x 4 1/4". Net Weight: 4 lbs.



HD-1410 Solid State Electronic Keyer

\$59⁹⁵

3 EVENING KIT
Fast, Easy Assembly

- Selectable 10-35 or 10-60 wpm
- Adjustable paddle travel and tension

"Iambic" operation, self-completing dots and dashes and a precision feel combine in the HD-1410 to give you the perfect "fist". Operates from 120 VAC or 12 VDC and features built in speaker, adjustable side-tone and low profile styling. An excellent accessory for your SB-104A, HW-8 or HW-101. 3" H x 5" W x 7 1/2" D.

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

84



Field Strength Meter for faster adjustments

\$13⁹⁵

- Built-in and external antennas
- Front panel sensitivity control
- 1.8 to 250 MHz range

A must for ham, citizens band and marine radio operations. Makes transmitter and antenna (beams, dipoles, verticals etc.) adjustments quicker and more precise. Operates anywhere in the 1.8 to 250 MHz spectrum and is an ideal companion for your HW-8. 2 1/2" H x 4 1/8" W x 4 3/8" D.

Kit HD-1426, Shpg. wt. 2 lbs. **13.95**



HW-101...Lets You Explore the World

\$349⁹⁵ *The unbeatable price/performance leader... HW-101*

The Heath HW-101 gives you full coverage 80 through 10 meter operation at a price that's *unbeatable!* It's an excellent first rig for the Novice, yet you'll find it packed with the features and performance that every Ham will appreciate.

Look over its clean front panel styling...power up, flip the mode switch. Instantly you've got your choice of USB, LSB, or CW operation. Key the transmitter, VOX or PTT, and you command a high performance pair of 6146s that'll pump a clean 180 watts PEP in on phone or 170 watts in on CW. Spin the massive main tuning knob and a solid 36:1 Jackson drive opens the bands and lets you explore with ease. Up on 15 make the HW-101's fantastic 0.35 μ V sensitivity work for you. While on 80 and 40 you'll rapidly come to appreciate the 101's crystal IF filtering as it cuts away the QRM and lets you enjoy your QSOs. And if you've got a "sked" to make, with a net or your pal, switch in the 100 kHz calibrator and let it put your HW-101's FET VFO exactly where you want to be. The HW-101, it's an unbeatable deal at an unbeatable price.

Kit HW-101, Shpg. wt. 22 lbs. 349.95

SBA-301-2, 400 Hz CW crystal filter, Shpg. wt. 1 lb. 32.50

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. Output impedance: 8 ohm speaker, and high impedance headphone. Power output: 2 watts with <10% distortion. Spurious response: Image and IF rejection >50 dB. TRANSMITTER: DC power input: SSB 180 watt PEP (normal voice, continuous duty cycle). CW 170 watts (50% duty cycle). RF power output: 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 ohm non-reactive load). Output impedance: 50 ohm to 75 ohm with <2:1 SWR. Oscillator feed-through or mixer products: 45 dB below rated output; Harmonic radiation: 40 dB below rated output. 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 0.1 mA final grid current. GENERAL: Frequency coverage: 80-10 M amateur bands. Frequency stability: <100 hertz per hour drift after 45 minutes warmup from normal ambient conditions. <100 Hz for \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 0.05% maximum ripple; -115 volts at 10 mA with 0.5% maximum ripple; 12 volts AC/DC at 4.76 amps. (see fixed & mobile power supplies below). Cabinet dimensions: 6 $\frac{1}{4}$ " H x 14 $\frac{1}{4}$ " W x 13 $\frac{3}{4}$ " D.

*Triple Action Level Control.



HP-13B Mobile Power Supply

SAVE \$20

Puts your HW-101 on the road. Circuit breaker protection. Shpg. wt. 7 lbs.

Kit HP-13B Was 89.95 Now 69.95

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. 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 0.05% 150 mA. Fixed Bias: -130 VDC @ 20 mA. Dimensions: 7 $\frac{3}{4}$ " W x 7 $\frac{3}{4}$ " L x 2 $\frac{3}{4}$ " D. All voltages referenced at 13 VDC.

Heathkit HP-23C Fixed Station AC Power Supply

\$62⁹⁵

Provides fixed station operation of your HW-101, older Heath transceivers, many others as well

Provides the operating voltages for the HW-101 as well as those necessary for the operation of many older Heath transceivers. Has high voltage and two internally selectable low B+ taps. Also provides fixed bias and 12.6 filament voltage. The HP-23C features excellent bias supply filtering and extremely low ripple content on both high and low voltage outputs. Open chassis layout and design provides cool, efficient operation.

Kit HP-23C, Shpg. wt. 18 lbs. 62.95

HP-23C SPECIFICATIONS: Power requirements: 120/240 VAC, 60/50 Hz, 350 watts maximum. High voltage output: 820 VDC no load; 700 VDC @ 250 mA \pm 10%. AC ripple. Less than 1% @ 250 mA. Duty cycle: 150 mA continuous to 300 mA @ 50%. Low voltage output: (High tap) 350 VDC, no load; 300 VDC @ 150 mA \pm 10%. (Low tap) 275 VDC, no load, 250 VDC @ 100 mA; \pm 10%. Less than 0.05% 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 VAC @ 5.5 amps. Dimensions: 9" L x 4 $\frac{3}{4}$ " W x 6 $\frac{3}{4}$ " H.





The new, improved Heathkit SB-104A—The Ultimate

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

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

product detection. Received audio quality is outstanding, precisely tailored for SSB and CW reproduction. And to make your QSOs more enjoyable, by reducing the nuisance of QSB, you can switch select either fast or slow AGC action.

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



SB-104 A Specifications

GENERAL:

Frequency Coverage: 3.5 MHz through 29.7 MHz amateur bands, 15 MHz WWV receive only.

Frequency Stability: Less than 100 Hz/30 min. drift after 30-min. warmup; less than 100 Hz drift for $\pm 10\%$ change in primary voltage.

Readout Accuracy: Within ± 200 Hz ± 1 count.

TRANSMITTER:

RF Power Output: High Power (50-ohm non-reactive load). SSB: 100 watts PEP ± 1 dB; CW: 100 watts ± 1 dB. Low Power SSB: 1 watt PEP (minimum); CW: 1 watt (min.).

Output Impedance: 50 ohms, less than 2:1 SWR.

Carrier Suppression and Unwanted Sideband Suppression: -50 dB down from 100 watt single-tone output at 1000 Hz reference.

RECEIVER:

Sensitivity: $0.5 \mu\text{V}$ for 10 dB S + N/N for SSB.

Selectivity: 2.1 kHz minimum at -6 dB, 5 kHz max. at -60 dB. (2:1 nominal shape factor).

CW Selectivity: (with accessory CW filter) Selectable 2.1 kHz/400 Hz.

IM Distortion: -65 dB min.; -57 dB typ. with noise blanker.

Image Rejection: -60 dB min.

Dimensions: $5\frac{3}{4}$ " H x $14\frac{1}{32}$ " W x $13\frac{7}{8}$ " D.

in Amateur Radio Technology

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

Add the matching SB-614 Station Monitor, SB-634 Five-Function Console, SB-604 Speaker, SB-644A Remote VFO and the SB-230 1 kW Conduction-Cooled Linear and your SB-104A becomes the center of your ultimate station — ready to give you years of great QSOs, exciting DX and all around performance! Operates from a charging 12 VDC auto electrical system or the HP-1144 Power Supply.

Kit SB-104A, Shpg. wt. 29 lbs.	699.95
Kit SBA-104-1, Noise Blanker, Shpg. wt. 1 lb.	29.95
Kit SBA-104-3, 400 Hz CW crystal filter, Shpg. wt. 1 lb.	42.95
Kit SBA-104-2, Mobile mount, Shpg. wt. 6 lbs.	Was 39.95 Now 32.95

SB-604 Station Speaker

Designed to match the SB-104A Transceiver. Cabinet is large enough to house the HP-1144 AC Power Supply, too. 5" x 7" oval speaker is response-tailored for SSB. Frequency response: 300-3000 Hz. Connector plug and cable are included. Dimensions: $7\frac{1}{8}$ " H x $10\frac{1}{8}$ " W x 14" D.

Kit SB-604, Shpg. wt. 8 lbs. . . . 39.95



HP-1144 Fixed Station Power Supply

120 or 240 VAC operated supply provides 13.8 VDC required by SB-104A Transceiver. Full-wave bridge circuit has triple Darlington regulation with an IC which samples at the transceiver, compares and automatically maintains a fixed voltage — almost no change in voltage from no load to full load. Mounts inside SB-604 speaker cabinet. Kit HP-1144, Shpg. wt. 27 lbs. 99.95

Presenting Heathkit Computers—the Hardware/Software Systems you NEED to get up and running right!

The new value standard in personal computing systems featuring two powerful computers with exclusive Heath-designed software plus full documentation and service support

Heath company has been interested and involved in personal computing since we first marketed an analog computer system all the way back in 1957. This continuing interest, along with recent technological developments that have made personal computing systems a practical reality to the general public, has resulted in two "total design" computer systems that give you more power, performance and reliability for your computer dollar. The Heathkit computer systems give you everything you need to get up and running fast, with complete peripherals, I/O accessories, memory expansion and easy-to-use systems software, plus documentation that's the finest available anywhere.

Total System Design! The Heathkit computer line, both hardware and software, has been designed from the ground up to be a total computing system that meets the needs of both the beginning and advanced computer hobbyist. The two mainframes are based on performance-proven microcomputers, the 8080A and the LSI-11. These CPU's were chosen because of their world-famous performance, reliability and efficiency, and the tremendous amount of existing software, documentation and source materials that are available. The Heath-designed CRT terminal, paper tape reader/punch, and serial and parallel interfaces make total system setup fast and easy, and the Heath-designed software provided assures immediate usefulness and versatility.

Superior Software! Each Heathkit computer system is supplied with complete systems software to help you start writing your own programs right away. Software is the "heart" of any computer system, and because the Heathkit software has been designed specifically for the Heathkit hardware, you get a complete computer system of unparalleled efficiency, versatility and effectiveness!

Superior Documentation! Heath company is world-famous for the accuracy and clarity of its instruction manuals. The Heath computer line continues this well-deserved reputation. Assembly, operations and software manuals are written with easy-to-understand step-by-step instructions and full illustrations that leave nothing to chance or interpretation. Simply follow the instructions in the manual and you'll be up and running fast.

Service and Support! As in all Heathkit products, easy self-service and troubleshooting are definite benefits that can re-

sult in substantial cost-savings over the life of the product. These considerations, along with nationwide service and technical assistance at Heathkit Electronic Centers or the Heathkit factory, mean that you have the most reliable protection for your computer investment available anywhere.

System Versatility! Both Heathkit computers offer full expansion potential and adaptability to meet any application. Mass storage capability is available in both audio cassette and paper tape format on the H8 and in paper tape format on the H11. Additional memory expansion boards can be added to either unit, along with an expanding number of I/O devices.

Continuing Development. Heath will continue to design and develop new compatible products to make their computer systems even more valuable to you. Coming in the future will be — floppy disk storage, hard copy printer, additional memory and I/O interfaces and self-instructional courses in programming. All Heathkit computer users are eligible for HUG, the Heath User's Group. Heathkit H11 customers are also eligible to join DECUS™, the Digital Equipment Computer User's Society.

We're confident you'll find the Heathkit computer line one of the most intelligent, sensibly developed and complete product lines available today. It offers you total versatility and expansion capability to go wherever your imagination and programming prowess takes you. And, in the Heathkit tradition, it offers the best price/performance and reliability combination you'll find anywhere.



THE HEATHKIT H8 COMPUTER

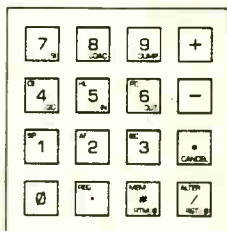
The powerful, easy-to-use personal computer with the "intelligent" front panel featuring octal entry keyboard and digital readout — plus a fully wired and tested 8080A CPU and system software (BASIC, assembler, editor and debug) at no extra cost!

\$395⁰⁰ Requires at least one H8 memory board to operate
Kit

6 EVENING KIT
Fast, Easy Assembly

The Heathkit H8 Computer is a powerful 8-bit machine based on the 8080A CPU. It's combination of unique features and low cost makes it an outstanding value among general purpose computers. Because of its expansion capabilities, its a computer system you can stay with. Unlike many of the so-called low-priced "all-in-one" packaged systems, the H8 lets you add memory and peripherals to increase its power and versatility as you increase your programming prowess.

The 16-key front panel keyboard provides octal data entry giving you direct access to registers and memory, one-button program load and dump, and I/O keys for direct communication with any port. Because of this intelligent front panel, the H8 and a simple 4K of memory makes a ideal computer trainer.



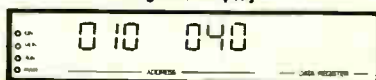
The 9-digit octal readout gives you far more information than conventional computers. Memory, register and I/O port displays are continuously updated even while your programs are executing for direct monitoring of program activity.



Memory Display



Register Display



I/O Port Display

Complete front panel functions include display and alter of memory locations, display and alter of registers, dynamic monitoring of memory locations or registers, program execution control, automatic tape load and store through a built-in routine that permits one-button program loading or dumping, and write or read any I/O port.

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



Complete systems software included!

Other features of the H8 include: exclusive Heath-designed 50-pin fully buffered bus; mother board with positions for up to 9 plug-in circuit boards that accept the CPU, front panel memory, I/O and other accessory cards; built-in convection cooled power supply; built-in speaker for audible feedback and special effects; front panel status lights and more. The CPU board is fully wired and tested for easy system setup and kit assembly. The H8 is housed in a heavy-duty metal cabinet with modern, high-impact structural foam side panels. 16¼" W x 6½" H x 17" D. Switch-selected 120/240 VAC, 50/60 Hz. Requires at least one H8-1 memory board to operate.

Kit H8, Shpg. wt. 30 lbs. 395.00



H8-1 Memory Board. 8Kx8 memory card supplied with 4K memory, plugs directly into H8 bus. Features maximum storage capacity of 8192 8-bit words. Uses modern 4Kx1 static memory IC chips for easy assembly and service. Access time, less than 450 nS. With on-board regulators, heat sinks and full buffering. Expandable to 8K memory with H8-3 chip set below.

Kit H8-1, Shpg. wt. 2 lbs.
Was 150.00 Now 135.00

H8-3 Chip Set. Kit of eight 4K static memory IC's. Expands H8-1 to full 8K storage. With sockets.

Kit H8-3, Shpg. wt. 1 lb. Was 100.00 Now 90.00

H8-2 Parallel Interface. Connects H8 to any parallel device such as a paper tape reader/punch (required for H10, page 95 or line printer. Has three independent parallel ports, each with 8 bits input and 8 bits output and universal handshaking capability. Compatible with all Heath software. 390 mS maximum transfer time. With diode-clamped inputs, buffered outputs and full interrupt capability.

Kit H8-2, Shpg. wt. 3 lbs. 160.00

H8-5 Serial I/O and Cassette Interface. Connects the H8 to serial devices such as the H9 video terminal (page 94) or the H36 DEC Writer II (page 96). Features jumper selectable data rate from 110 to 9600 baud, plus common input/output interfaces including 20 mA current loop and EIA RS-232C compatible levels. The cassette recorder interface permits use with the Heathkit ECP-3801, page 96. Uses the popular Byte/Manchester recording format but runs at 1200 baud.

Has control lines for remote start and stop of two cassette units to allow separate record and playback for easy program or file editing. Also has full interrupt capability. LED test circuit for easy board setup and overall system servicing. Fully compatible with all Heath software.

Kit H8-5, Shpg. wt. 3 lbs. 120.00

NOTE: Proper operation of the H8-5 is assured only if you use the Heath ECP-3801 cassette player/recorder and Heath-recommended recording tape (ECP-3802, page 96). Heath is not responsible for improper operation associated with other cassette units.

Enhanced Benton Harbor BASIC: An enhanced and more powerful version of the BASIC supplied with the H8 (see next page for description). It provides even faster operation and includes character strings, additional convenience commands and math functions, dynamic storage allocation, access to real time clock, keyboard interrupt processing, expanded error messages and recovery ability, LED display control and key pad support. A minimum of 12K memory is required to run this BASIC, 16K is preferred if full use is to be made of its capabilities.

HC-8-13 (1200 baud audio cassette). Includes file capabilities which allow saving data generated by BASIC programs to permit multiple programs to work on the same data base, or a single program to work on several data bases. Shpg. wt. 1 lb. 20.00

H8-14 (fan-fold paper tape) No file capability. 1 lb. 10.00

Paper Tape Systems Software: A paper tape version of the systems software supplied with the H8 computer. It consists of four fan fold paper tapes, one each for Benton Harbor BASIC, HASL-8 assembler, TED-8 editor, and BUG-8 debug. For use with the H10 paper tape reader/punch or other paper tape I/O equipment. See next page for complete software description.

H8-15, Shpg. wt. 1 lb. 20.00



Coming
Soon!
H8 Floppy
Disk
See page
96

The H8 software is the "heart" of your computer system

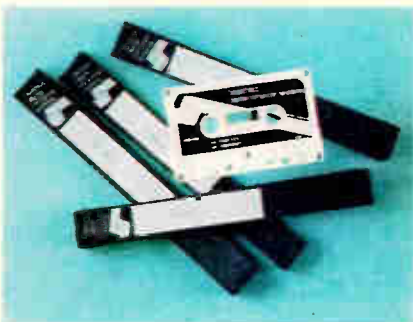
The software supplied with the H8 computer has a number of features that make it easier to use and more practical than other systems. Automatic "command completion" simplifies typing; dynamic syntax checking instantly alerts you to errors and a special user configura-

tion lets you really personalize your system. H8 software is memory efficient to give you more computing power for your memory dollar, has modular design for easy expansion, and is thoroughly documented for easy programming and maximum effectiveness.

Software supplied with the H8 computer includes:

PANEL MONITOR (PAM-8).

This ROM program monitor controls the front panel and permits you to load, execute and debug programs written in 8080 machine language. It provides memory contents display and alteration, register contents display and alteration, program execution control, self-contained bootstraps for one-button program loading and dumping, and port input and output routines.



BENTON HARBOR BASIC. This conversational programming language uses simple English statements and familiar algebraic equations to perform operations and solve problems. It is compact enough to run in the Heathkit H8 with limited memory, yet powerful enough to satisfy most problem-solving requirements. Requires a minimum of 8K memory. Extended Benton Harbor BASIC is also available, order from page 90.

ASSEMBLY LANGUAGE (HASL-8). This two-pass absolute assembler lets you create source programs using letters, numbers and symbols to generate efficient machine language code. It assembles the source program into a listing and an object program in binary format executable by the H8. A minimum of 8K memory is required.

TEXT EDITOR (TED-8). Converts the H8 computer and terminal into a powerful typewriter for generating text and editing. It prepares the source code for H8 assembly language, BASIC and other languages, and can be used to prepare reports, write letters and edit manuscripts. Requires a minimum of 8K memory.

CONSOLE DEBUGGER (BUG-8). This enhanced and extended version of the front panel monitor allows entry and debugging of user machine language programs via an external terminal. It features single or multiple stepping through programs, breakpointing, load and dump from tape storage. It requires 3K memory plus user program.



Buy a complete computer system and SAVE!

You can choose a complete computer system consisting of the H8 computer, one major peripheral, plus memory and accessories, and deduct 5% from the purchase price (excluding shipping and handling charges). Choose one of the Heath-recommended systems below (which already have the discount calculated for you), or "roll your own" with system components you select!

H8 System One: The minimum recommended H8 system. Includes H8 computer, one H8-1 4K memory, H8-3 4K Chip Set, H8-5 Serial I/O and Cassette Interface, H9 Video Terminal and ECP-3801 Cassette Recorder/Player. If purchased separately, \$1350.00. **Heath System Price is \$1282.50.**

H8 System Two: A deluxe H8 System. Includes H8 Computer, Two H8-1 4K Memories, Two H8-3 4K Chip Sets, H8-5 Serial I/O and Cassette Interface, H9 Video Terminal, ECP-3801 Cassette Player/Recorder and HC-8-13 Extended BASIC in Cassette Form. If purchased separately, \$1595.00. **Heath System Price is \$1515.25.**

HM-800 Manual Set. Here's your chance to LOOK before you buy, and with no risk! The HM-800 manual set includes the complete assembly and operations manuals for the H8 Digital Computer, H8-1 memory card, H8-2 parallel interface; H8-3 4K Expansion Chip Set; H8-5 Serial I/O and Cassette Interface; H9 Video Terminal and H10 Paper Tape Reader/Punch. The complete H8 software documentation is also included! All in handsome 3-ring binder that's handy for reference and additional information. You can deduct the price of the manual set when you buy your H8.

HM-800, Shpg. wt. 11 lbs.25.00

THE HEATHKIT/DIGITAL H11 COMPUTER

Two of the finest names in modern electronics, Heath and Digital Equipment Corporation (DEC) combine to bring you one of the world's first 16-bit computers priced within reach of the general public! Equivalent commercial versions of this powerful computer would cost \$1000's of dollars more!

New lower
memory
prices!

SAVE
\$50⁰⁰

The Heath/DEC H11 combines the advanced, performance-proven hardware and software of the LSI-11 with Heath's expertise in kit design and documentation to bring you a personal computer of almost incredible power and versatility. Together with its total-system peripherals and complete systems software, you have a computing machine that will provide you with years of practical and effective service.

The H11 features an electrically superior bus with 38 high-speed lines for data, address, control and synchronization. Data and control lines are bidirectional, asynchronous, open-collector lines capable of providing a maximum data transfer rate of 833K words per second under direct memory access operation.

The fully assembled and tested KD11F board contains the LSI-11 CPU, a 4096 x 16 read/write MOS semiconductor memory, DMA operation; and it executes the PDP-11/40 instruction set with over 400 powerful instructions. Additional memory cards can be added to expand memory capacity up to 20K in the H11 cabinet (32K words total).

Has single-level, vectored automatic priority interrupt, real-time clock input signal line, ODT/ASCII console routine/bootstrap resident in microcode. The backplane card guide assembly holds the microcomputer and up to six I/O and memory modules. The backplane/card guides are fully compatible with all standard DEC LSI-11 accessories.

The H11 is supplied with versatile PDP-11 software (see next page for full description). This software is supplied in paper tape format and requires a minimum of 8K memory, with 12K to 16K total memory recommended for maximum capability. See software license agreement, next page. Rugged metal cabinet with high-impact plastic sides measures 19" W x 6 1/2" H x 17" D. For 110/220 VAC, 50/60 Hz.

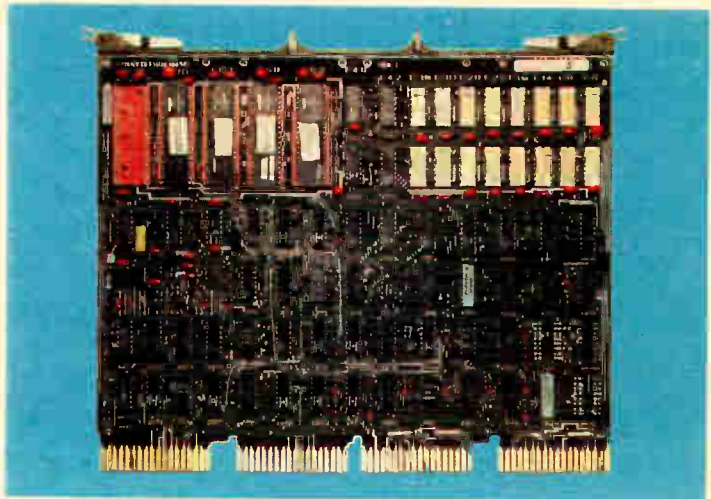
Kit H11, Shpg. wt. 34 lbs. 1350.00

SAVE \$50! H11-1 4K Memory Expansion Module: Plugs into H11 backplane, adds 4K x 16-bit word capacity to H11 memory. Uses high-reliability 1Kx4 static MOS RAM chips. Access time is less than 500 nS. Has decode circuitry for operation on 4K address boundaries. Handle for easy removal and insertion. Compatible with PDP 11/03 and other LSI-11 backplane machines.

Kit H11-1, Shpg. wt. 2 lbs. Was 295.00 Now 245.00

NOTE: DEC, DIGITAL, FOCAL AND PDP ARE REGISTERED TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION.

H11-2 Parallel Interface: General-purpose parallel interface featuring 16 diode-clamped latched data input lines, 16 latched output lines, 16-bit word or 8-bit byte data transfers. Has LSI-11 bus interface and control logic for interrupt processing and vectored addressing; control status registers compatible with PDP-11 software routines. Four control lines for output data ready, output data accepted, input data ready and input data accepted logic operations. Maximum data transfer rate, 90K words per second under program control. Maximum drive capability, 25-ft. cable. Plugs into H11 backplane, can be used with DEC PDP-11/03 and other LSI-11



Fully Assembled and tested KD11F board

backplane machines. Also compatible with TTL or DTL logic devices. The H11-2 is required for interfacing the H11 to the H10 Paper Tape Reader/Punch.

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

H11-5 Serial Interface: Universal asynchronous receiver/transmitter serial interface module for use between LSI-11 bus and serial devices such as the Heathkit H9 video terminal (page 94) or LA36 teleprinter (page 96). Has optically isolated 20 mA current loop and EIA interfaces; selectable baud rates of 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2400, 4800 and 9600. Plugs into H11 backplane, fully compatible with PDP 11/03 and other LSI-11 backplane machines. With all mating connectors.

Kit H11-5, Shpg. wt. 2 lbs. 100.00

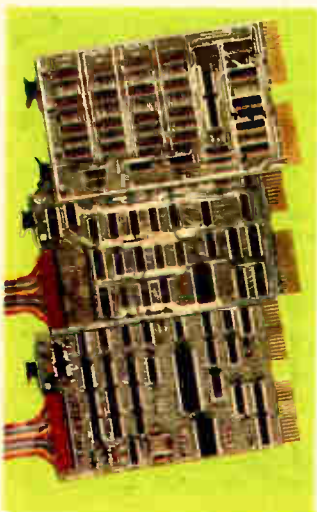
H11-6 Extended Arithmetic Chip: Adds powerful arithmetic instructions to the LSI-11, including fixed point multiply, divide and extended shifts plus full floating point add, subtract, multiply and divide. Helps minimize or eliminate arithmetic sub-routines, speeds up program execution and eases program development. Saves memory space too. 40-pin dual-inline package IC plugs into socket on KD11F board.

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

Manual Set for H11 Computer: Includes complete assembly and operation manuals for the H11 Digital Computer, H11-1 4K memory board, H11-2 parallel interface, H11-5 serial interface, H9 CRT terminal, and H10 paper tape reader/punch. Also includes complete software documentation — monitor, editor, assembler, linker, BASIC, FOCAL and related software. In handsome 3-ring binder.

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

NOTE: The price of the manual set can be deducted when you order an H11. Manuals are included with each kit.





**H11 Dual
Floppy Disk!
Coming Soon
See page
96**

POWERFUL HEATH/DEC PDP-11 SOFTWARE AT NO EXTRA COST!

The H11 includes a sophisticated software package that lets you get your computer up and running with practical programming capabilities. This paper tape based software would cost over \$1200 if purchased separately. A minimum of 8K memory is required to run the software. The programs include:

ED-11. Assists you in the creation and modification of ASCII source tapes, also used to write assembly language programs and for general text editing or word processing functions.

PAL-11S. Relocatable assembler converts ASCII source tapes into relocatable binary modules. This lets you create programs in small, modular segments for easier coding and debugging. These binary modules serve as inputs to LINK-11S.

LINK-11S. Link editor which links the modules created by the PAL-11S into a load module ready for execution on the H-11. The module is loaded into the H-11 via the Absolute Loader.

Absolute Loader. Loads absolute binary tapes into the H11 memory for execution.

ODT-11X. Lets you debug the programs which you have created. Permits modifying and controlling program execution "on the fly" for quick, efficient debugging.

IOX. I/O executive program permits I/O programming without developing device-driving programs. Links to your programs using the LINK-11S. For use with high speed paper tape reader/punch and line printer.

DUMP-AB and DUMP-R. Lets you dump absolute binary contents of memory to the paper tape punch.

BASIC. DEC's powerful version of standard Dartmouth BASIC interpreter uses English-type statements and mathematical symbols to perform operations. Immediately translates, stores and executes the program. Includes string capability.

FOCAL™. DEC's own interpretive computer language which combines simplicity with computing power. Ideal for most scientific, engineering and math applications. FOCAL™ programs can be written and executed easily. Both 4K and 8K versions are included.

Buy a complete H11 system and SAVE! You can choose a complete computer system consisting of the H11 computer, one major peripheral, plus memory and accessories, and deduct 5% from the total price (excluding shipping and handling charges). See the Heath recommended systems below or "roll your own" with components YOU select!



H11 System One: The minimum recommended H11 System. Includes H11 Computer, H11-1 4K Memory (for a total of 8K memory), H11-2 Parallel Interface, H11-5 Serial Interface, H9 Video Terminal and H10 Paper Tape Reader/Punch. If purchased separately, \$2715.00. **Heath System Price is \$2579.25.**

H11 SPECIAL SYSTEM OFFER! A deluxe H11 system discounted even MORE than 5% to really save you money! Consists of H11 Computer, H11-1 4K Memory (for a total of 8K memory), H11-2 Parallel Interface, H11-5 Serial Interface, H10 Paper Tape Reader/Punch and H36 LA36 DEC Writer II. If purchased separately, \$3715.00.

YOU SAVE \$265!

Special System Price is \$3450.00

HS-11 Computer System. Shpg. wt. 78 lbs. \$3450.00

HEATH/DEC Software License Agreement: This form MUST accompany your H11 computer order.

CUSTOMER SUBLICENSE GRANT

HEATH COMPANY (hereinafter referred to as HEATH) pursuant to a license agreement with Digital Equipment Corporation (hereinafter referred to as DIGITAL) does hereby grant to CUSTOMER a non-transferable and non-exclusive sublicense to use the Binary Software Program(s) PTSP-11 Paper Tape System, FOCAL/PTS Language Processor, BASIC/PTS Language Processor (hereinafter singularly and/or collectively referred to as "Soft-

ware;) on the following terms and conditions.

Software is furnished to CUSTOMER for use on a single CPU only and may be modified, or copied (with the inclusion of DIGITAL's copyright notice) only for use on such CPU. The CUSTOMER shall not provide or otherwise make available the Software or any portion thereof in any form to any third party without the prior approval of DIGITAL. Title to the ownership of the Software shall at all times remain with DIGITAL.

THE HEATHKIT H9 VIDEO TERMINAL

\$550⁰⁰

One of the lowest-cost ASCII terminals available anywhere — features a bright 12" CRT display with twelve 80-character lines, 67-key keyboard, all standard serial interfaces, plus a fully wired and tested control board and a wiring harness for simplified assembly.

The H9 video terminal is a general-purpose peripheral designed for use with the Heathkit H8 or H11 computers. It provides keyboard input and a CRT for the convenient entry and display of computer programs and data. It can be used with any computer in dedicated stand-alone applications or in time-sharing systems.

Character format is standard upper case 5x7 dot matrix. The long form display is twelve 80-character lines. The short form display is forty-eight 20-character lines in four 12-line columns. An automatic line carry over feature executes line feed and return when line exceeds character count on both long and short-form displays. A built-in oscillator/speaker generates a 4800 Hz tone and serves as audible end-of-line warning.

Auto-Scrolling is featured in both long and short-form. In the long form, as the line enters at bottom, the top line scrolls off screen; in the short form, as the column enters from the right, the left column scrolls off screen. Auto-scrolling can be defeated with a front panel switch. The cursor mark indicates the next character to be typed for accurate positioning. Cursor controls include up, down, left, right and home. Serial data baud rates are selectable from 110-9600. Baud rate clock output and reader control are available on the rear panel connector.

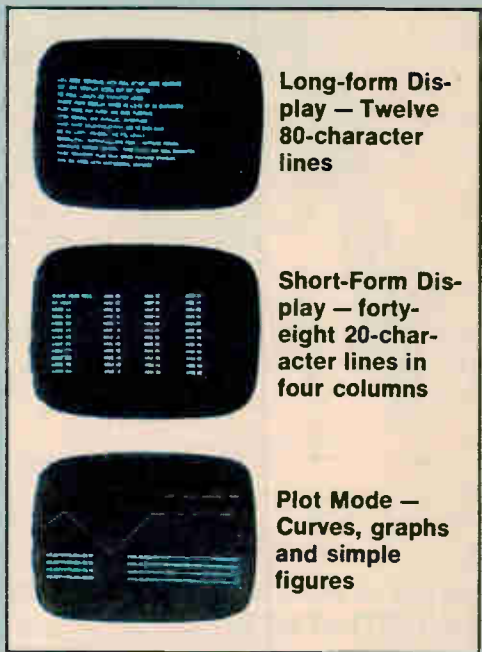
The erase mode permits automatic full page erase or erase to end of line starting at cursor position. A transmit page function allows a full page to be formatted, edited and modified, then transmitted as a block of continuous data.

The plot mode permits graphs, curves and simple figures to be displayed. Plotting can be accomplished via the front panel keyboard or from external inputs.

The H9 serial interface provides EIA RS-232C levels, a 20 mA current loop and standard TTL levels. Parallel interfacing includes standard TTL levels, 8 bits input and 8 bits output and 4 handshaking lines for connection to H10.

Ultra-compact size, only 12½" H x 15⅝" W x 20¾" D, makes the H9 ideal for desktop or console applications. For 110 VAC, 60 Hz or 230 VAC, 50 Hz.

Kit H9, Shpg. wt. 50 lbs. 550.00

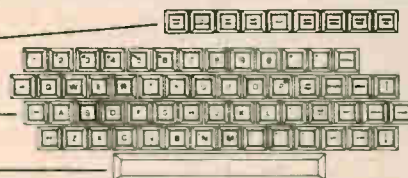


Full ASCII 67-Key Keyboard

Function keys are positioned away from keyboard to prevent miskeying.

Typewriter keyboard for easy, more accurate input.

Wide, easy-to-use space bar aids accurate typing.



THE HEATHKIT H10 PAPER TAPE READER/PUNCH

\$370⁰⁰

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HEATH COMPANY

By _____

CUSTOMER

By _____

94

Customer's Signature

William F. Johnson





A general-purpose mass storage peripheral designed for use with the H8 and H11 computers plus any other computer. Features a heavy-duty built-in power supply, totally independent punch and reader and a copy mode for fast, easy tape duplication.

- Solid-state reader with stepper motor
- Precise ratchet/solenoid drive for high accuracy and consistent punching
- Totally independent punch and reader
- Copy mode for easy tape duplication
- Heavy-Duty Built-in power supply
- For Heathkit H8 and H11 computers, others too
- Styling matches H8 and H11 computers for total system design
- Includes 24-pin interface connector and mating cable

The H10 paper-tape reader/punch is a general-purpose mass storage peripheral using reliable low-cost paper tape. It's fully compatible and styled to match the H8 and H11 computers, and it works reliably with any other computer through a parallel interface. The H10 uses standard 1" wide roll or fan-fold 8-level paper tape. Standard punched

paper tape gives you the reliability, durability and trouble-free handling you need for effective mass storage of programs and data.

The reader reads tape up to a maximum rate of 50 characters per second. A full sensitivity adjustment on each channel permits any color, thickness, quality (oiled or unoled) paper tape to be used. Sensitive Darlington photo transistors and an incandescent lamp reader head provide reliable reading. The powerful stepper motor drive insures accurate tape positioning and movement.

The punch operates up to maximum speed of 10 characters per second. Ratchet/solenoid drive and solenoid control of punches provide high-accuracy and consistent punching.

Controls include power on-off, read and punch start. A feed control feeds blank tape through the punch for leader tape, a copy control provides fast, easy tape duplication.

Interfacing is provided by separate 8-bit parallel input and output buses with standard TTL logic levels and handshaking lines for both reader and punch. A rear panel 24-pin interface connector and mating cable are supplied.

Accessories include holder for roll paper tape, chad collector tray and collector box for fan-fold tape, 8" roll 900 ft. blank paper tape. Cabinet with metal top and rugged steel chassis, 12 $\frac{1}{2}$ " H x 9 $\frac{3}{4}$ " W x 19 $\frac{1}{2}$ " D. For 110-130 VAC, 60 Hz or 220-240 VAC, 50 Hz.

Kit H10, Shpg. wt. 29 lbs. **370.00**

Three Rolls Blank paper tape, each 8" diameter, 900-ft. min.

H10-2, Shpg. wt. 5 lbs. **10.00**

Three Boxes Fan-Fold Tape. Approx. 1000 ft. each.

H10-3, Shpg. wt. 5 lbs. **15.00**



LA36 DEC Writer II Printer Terminal

The famous LA36 DEC Writer II with true 30-cps throughput, variable-width forms handling, 128-character upper/lower case set, and extra-quiet operation. Fully assembled, factory tested and ready to use!

\$1550⁰⁰

**Fully Assembled!
Prepaid Shipment!**

The LA36 is an advanced technology teleprinter offering fast, reliable operation at one of the best price/performance ratios in the industry. It features a 7x7 dot matrix print head for crisp, clear character formation; switch selectable 10, 15 and 30 cps printing speeds; variable width forms handling from 3" to 14 $\frac{7}{8}$ " wide; adjustable left and right hand tractors for precise margin positioning; half or full duplex operation; ANSI-standard multi-key rollover and a typewriter-like keyboard.

Handles up to 6-part forms with a .020" maximum pack thickness. Print format is 132-column, with 10 characters per inch horizontal spacing and 6 lines per inch vertical spacing. Uses the entire 128 character ASCII upper/lower case set with 96 printable characters. A CAPS-lock key simplifies data entry. A parity check on output prints a replacement character, strappable to odd, even or none with mark or space. Also has last-character visibility feature.

The integral 20 mA current loop interface makes the LA36 compatible with both the H8 and H11 computers, as well as most other hobby and personal computers. Operates on 90-132 VAC or 180-264 VAC for reliable performance even under brown-out conditions. With connecting cable and integral stand for easy setup. Overall size, 27 $\frac{1}{2}$ " W x 33 $\frac{1}{4}$ " H x 24" D.

The H36 (LA36 DEC WRITER II) is shipped Motor Freight, prepaid to your nearest terminal within the Continental U.S. Include your phone number on order for notification of arrival. Arrangements for home delivery may be made at no extra charge in most cases. NO C.O.D. ORDERS ACCEPTED.

H36 DEC Writer II 1550.00

Fully Assembled Cassette Recorder/Player Mass Storage Peripheral

Heath-recommended cassette recorder for use with H8 computer and H8-5 serial I/O and cassette interface. Provides complete mass storage capability on easy-to-handle standard cassettes. Assembled and tested, not a kit.

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

Heath-recommended high output, low noise, premium-grade audio recording tape. Pack of three 30-min. cassettes.

ECP-3802, Shpg. wt. 1 lb. per pack 6.00

NOTE: Proper operation of the H8-5 and H8 software is assured only with the use of the ECP-3801 cassette recorder/player and ECP-3802 tape. Heath does not assume responsibility for improper operation resulting from the use of other cassette units.

H36-1 Fan-fold Paper for H36. Standard 14 $\frac{7}{8}$ " x 11" white and green, single-part, lined paper. 3450 sheets per carton.

H36-1, Shpg. wt. 50 lbs. 35.00

H36-2 EIA Interface. Provides EIA RS232-C Interface for LA36. 9-ft. cable with 25-pin data-set type connector is also supplied. (DEC designation, LAXX-KG.) **H36-2, Shpg. wt. 1 lb. 70.00**

H36-3 Acoustic Coupler. Provides hookup to phone lines for time-sharing. Mounts in LA-36 with hardware provided. (DEC designation, LAXX-LM). **Kit H36-3, Shpg. wt. 10 lbs. 260.00**



H8, H11 FLOPPY DISK SYSTEMS — COMING SOON!

The H8 Floppy Disk, (WH17) features both single and dual versions using the popular mini-floppy drive. The storage media is a standard 5.25" diskette, hard-sectored, 40-track with ten sectors per track and 256 bytes per sector for a total storage capacity of 102,400 bytes. Access time is typically less than 350 mS. The operating system includes all present H8 software including extended Benton Harbor BASIC plus the executive. The system has complete file capabilities and device-independent drivers that allow peripheral connection without I/O programming. This completely wired and tested unit will be shipped in June, with a kit version available later.

The H11 Floppy Disk, (WH27) features both single and dual drive versions. The controller/interface card plugs into the H11 backplane and includes ROM boot loader. The H27 is fully compatible with the H11 as well as the DEC PDP 11/03 and other LSI-11 based systems. An operating system will also be available; it includes all present H11 software and including BASIC and FOCAL plus executive with file handling capability. The fully assembled and tested version will be available late in 1978, a kit version will be available later.

HUG — The Heath User's Group

Get even more fun and excitement from your personal computer by joining the Heath User's Group (HUG). The group provides a newsletter, program library and puts you in contact with other Heath computer owners. Details are included with each computer and peripheral. H11 computer owners are also eligible for DECUS, the Digital Equipment Computer User's Society.

Microprocessor Course and Computer Trainer

If you're involved in scientific or electronic pursuits, microprocessors are becoming a way of life and a dominant factor in your success or failure. The EE-3401/ET-3400 course and accompanying trainer is the way to learn microprocessor operation and application techniques. EE-3401 uses proven self-instructional techniques to teach programming, interfacing and related topics. The ET-3400 Trainer provides the ideal platform for experimentation and later, your own prototyping and design. This is a learn-package you can't afford to miss.

1 Learn Microprocessor Operation, Application and Interfacing

\$89⁹⁵

Covers microprocessor basics, computer arithmetic, programming, interfacing and much more, requires knowledge of electronics equivalent to Heath's Digital Techniques Course

Using Heath's proven self-instruction techniques, EE-3401 adopts a three phase approach to guide you, step-by-step, through the complexities and power of machine language programming, hardware I/O interfacing and microprocessor theory and design applications. The first section, presented in 8 lessons, utilizes concise self-study texts to cover: Number systems and codes, micro-computer basics, computer arithmetic, introduction to programming, the 6800 microprocessor (part I), the 6800 microprocessor (part II), interfacing the microprocessor, (part I), and interfacing the microprocessor (part II). Colorful audio and visual presentations are combined in the second section, six lessons to further enhance your knowledge of such subjects as programming, designing with microprocessors and semiconductor memories. The third section of EE-3401 provides 19 informative experiments through which valuable "hands-on" experience is gained. The ET-3400 Trainer is utilized and experiments are divided into programming and interfacing applications. Experiments cover program branches, address decoding, arithmetic and logic instructions and introduction to the peripheral interface adaptor and much more. EE-3401 comes complete with 62 electronic components including two 2112 256X4 RAM's, 6820 PIA interface chip. 1406 digital-to-analog converter, 741 and 301 op amps, and a variety of other microprocessor oriented devices. No additional components are necessary to carry out the experiments provided with this program. Upon passing the optional final exam (passing grade 70%) you will receive a Certificate of Achievement and 8.0 CEU's.

Course EE-3401, Shpg. wt. 10 lbs. **89.95**

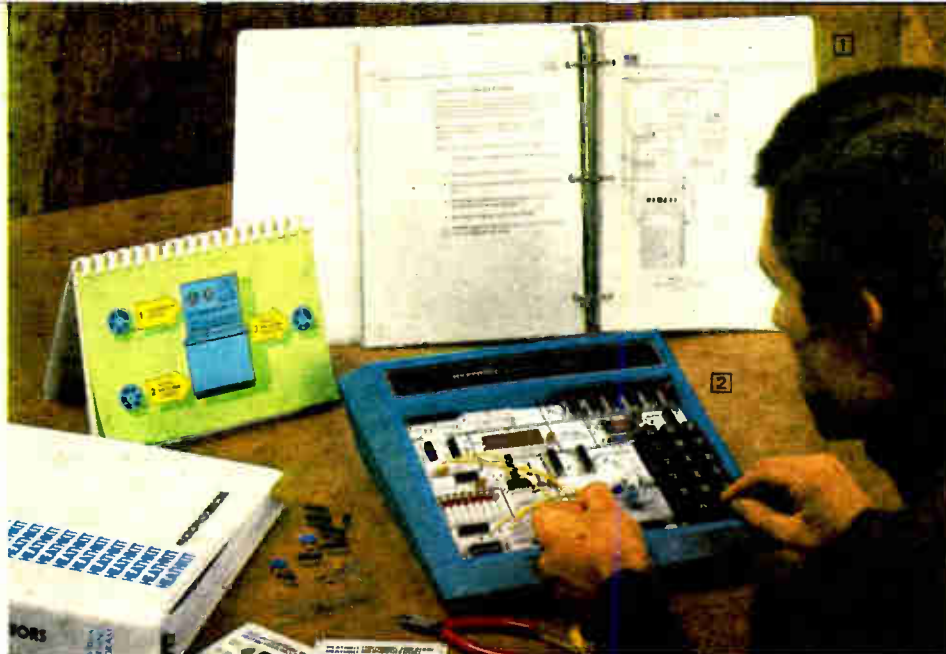
Save **\$9⁹⁵**

\$279⁹⁵

If purchased separately, \$289.90

SAVE when you order the Microprocessor Course with the ET-3400 Microprocessor Trainer.

ETS-3400, Course and Trainer Together,
Shpg. wt. 16 lbs. **279.95**



2 Digital Microprocessor trainer for experimentation and design



- Uses 6800 Micro-processor
- Built-in 1k ROM monitor program
- 256 bytes of RAM
- Breadboarding socket for prototyping

\$199⁹⁵

Use with Course EE-3401 for an up-to-date computer education

Functioning as a miniature digital computer, the ET-3400 Microprocessor Trainer has been designed to compliment your EE-3401 Microprocessor Course and provide an ideal platform upon which you may easily and enjoyably expand your knowledge of microprocessor programming and interfacing techniques. In addition, the ET-3400 provides you with plenty of breadboarding capability for experimentation, prototyping and system design.

The ET-3400 is based on the popular 6800 microprocessor and key features include: 1. A built-in 1k ROM monitor program for controlling unit operation. 2. 6 digit hexadecimal 7 segment LED display for address and data readout. 3. 17 key hexadecimal keyboard for entering programs, data and control of the unit. 4. 256 bytes of random access memory (RAM), expandable to 512 bytes with RAM's supplied in course. 5. Breadboarding socket for prototyping, interfacing and memory circuits. 6. 8 buffered binary LEDs for display of breadboard logic states. 7. 8 SPST DIP switches for binary input to breadboarded circuits. 8. +5, +12 and -12 VDC power supply outputs. 9. All microprocessor address, data, and control buses buffered and terminated on the front panel for ease of connection to prototyped circuits. 10. Provision for a 40 pin external connector for extending memory and I/O capability.

Trainer Kit ET-3400, Shpg. wt. 6 lbs. **199.95**



HEATHKIT SELF-INSTRUCTIONAL COMPUTER COURSES

These Heathkit self-instructional courses are designed to help you get the most from your computer investment, whether you buy your computer hardware from Heath or anywhere else. While many predeveloped software programs are available, the only way to realize the full value of your personal computer is to learn programming yourself. These courses use the PROVEN Heathkit individual learning techniques to give you a thorough understanding of programming, even if you have no prior knowledge or experience. They'll show you exactly how to make your personal computer system really personal!

BASIC PROGRAMMING SELF-INSTRUCTIONAL COURSE

This course teaches you how to program your computer using the popular BASIC language. BASIC (Beginner's All-Purpose Symbolic Instruction Code) is essential for hobby and personal computing; it is also widely used in education and business. The course covers all formats, commands, statements and procedures plus the creative aspects of computer programming, so you can make practical use of it in solving problems and creating your own unique programs. Like other Heathkit self-instructional courses, it uses programmed instructions backed by

practical hands-on computer experiments and demonstrations to reinforce and personalize the text material. An optional final exam (passing grade 70%) brings you a Certificate of Achievement and 3.0 Continuing Education Units* While the BASIC course is keyed to Heathkit computers, it is also equally applicable to any computer system using BASIC.

EC-1100, Shpg. wt. 6 lbs. **29.95**

*Continuing Education Units (CEU's) are nationally recognized means of acknowledging participation in non-credit adult education.

COMPLETE COMPUTER LIBRARY

Microcomputer Dictionary and Guide (Matrix). Definitions and basic info on computers and related topics. **EDP-218** **17.95**

Introduction to Microcomputers Vol. I. (Osborne). **EDP-224** **7.50**

Introduction to Microcomputers Vol. II. (Osborne). Complete descriptions of all popular microprocessors. **EDP-225** **15.00**

How to Buy and Use Minicomputers (Sams). A fundamental text on operation. **EDP-227** **9.95**

TV Typewriter Cookbook (Sams). Good text explaining I/O terminals, interfacing, etc. **EDP-226** **9.95**

Bugbook III (E&L). Superior reference source on 8080 interfacing and programming. Includes experiments. **EDP-231** **15.00**

Bugbook IIA (E&L). Serial I/O concepts and terminal interfacing. **EDP-232** **5.00**

8080 Programming for Logic Design (Osborne). **EDP-229** **7.50**

8080 Software Gourmet Guide and Cookbook (Scelbi). Excellent source for 8080 programs and subroutines. **EDP-228** **9.95**

Practical Microcomputer Programming: 8080 (Northern Technology). Machine/Assembly programming. **EDP-235** **21.95**

6800 Programming for Logic Design (Osborne). **EDP-230** **7.50**

6800 Software Gourmet Guide and Cookbook (Scelbi). Excellent source of commonly used 6800 programs. **EDP-233** **9.95**

6800 Microprocessor Applications Manual (Motorola). Comprehensive review of typical 6800 applications. **EDP-244** **25.00**

M6800 Program Reference Manual (Motorola). **EDP-245** **3.00**

98

Minicomputer Systems: Organization and Programming (Prentice-Hall). Emphasis on the PDP-11. **EDP-238** **17.95**

PDP-11 Programming (Algonquin). A programmed instruction text teaching operation and programming of the PDP-11. **EDP-239** **5.00**

The Minicomputer in the Laboratory (Wiley). Operation, programming and applications of PDP-11 computers. **EDP-246** **19.50**

Assembly Level Programming (Lexington). **EDP-236** **14.95**

101 BASIC Computer Games (DEC). A classic. Have fun with your computer. **EDP-237** **7.50**

BASIC Software Library, Vol. I. Complete lists of BASIC applications, bookkeeping games, pictures (graphics). **EDP-240** **24.95**

BASIC Software Library, Vol. II. Math, engineering, plotting and statistical programs in BASIC. **EDP-241** **24.95**

BASIC Software Library, Vol. III. Advanced business applications programs in BASIC. **EDP-242** **39.95**

BASIC Software Library, Vol. IV. Games and business applications programs in BASIC. **EDP-243** **9.95**

BASIC Software Library, Vol. V. Games, graphics, and useful math programs in BASIC. **EDP-251** **9.95**

Minicomputers: Structure and Programming (Hayden). **EDP-260** **13.95**

BASIC Workbook (Hayden). **EDP-261** **5.50**

Your Home Computer (Dymax). **EDP-252** **6.00**

Home Computers. 210 Questions and Answers.

Vol. I. Hardware (Dillithium). **EDP-253** **7.95**

Vol. II. Software (Dillithium). **EDP-254** **6.95**

Some Common BASIC Programs (Osborne). **EDP-255** **7.50**

How to Program Microcomputers (Sams). **EDP-256** **8.95**

APPLICATIONS SOFTWARE FOR YOUR H8

The H8 Digital Computer is supplied with complete systems software that provide you with everything you need to develop your own specific applications programs. However, you can make your computer immediately useful by using the programs below. These programs represent the beginning of a complete series of application software packages that will allow you to get immediate value from your computer system without a time consuming software development effort on your part. Described below are a series of game packages that make your computer an excellent source of entertainment and leisure time activities. These games are supplied on H8 compatible 1200 baud audio cassettes.

BIORHYTHM. This popular applications program computes standard biorhythm information and plots sinusoidal curves of your physical, emotional, and intellectual characteristics over a given time period. The biorhythm program will show you your ups and downs and will tell you your good and bad days. It will help you plan your activities. While this program is not a game, it is an entertaining activity that you and your friends and family will enjoy. The program runs under extended BASIC and requires 16K of RAM. **PA-82**, Shpg. wt. 1 lb. **10.00**

SPACE WAR. This is perhaps the most popular computer game available. It allows you to guide, control and command the Starship Enterprise in its travels through the galaxy, fighting Klingons and solving a variety of problems. A truly challenging, sophisticated and entertaining computer game. Requires 24K RAM. **PA-83**, Shpg. wt. 1 lb. **10.00**

GAME SET #1. This software package lets you play 8 popular computer games. These games include Craps, Orbit, Tic Tac Toe, Nim, Hexapawn, Hangman, Hmrabi, and Derby. 8K RAM or more is required. These games will provide hours of entertainment for you and your family. **PA-84**, Shpg. wt. 1 lb. **10.00**

Amateur Radio Novice License Course

From Heath — world leader in Amateur Radio Equipment — a self-instruction course guaranteed to help you get your Novice ticket! In fact, it's so effective that if you fail to pass your FCC exam after completing the course — we'll REFUND your money for the course text material!

\$24⁹⁵ *There's no better way to learn about Amateur Radio!*



Now — for CB'ers, electronic hobbyists, anyone interested in operating world-wide two-way Amateur radio equipment — Heath makes it easier than ever! This deluxe course prepares you for the Amateur Radio Novice FCC exam, and provides you with helpful guidelines for setting up and operating your own station once you pass the exam. The course includes a programmed learning text, two audio cassettes (see page 96 for cassette recorder player) to reinforce text material and provide Code practice, helpful aids for operating your station.

Course ER-3701, Shpg. wt. 7 lbs. 24.95

\$32⁹⁵

SAVE \$4.95! ER-3701 and HD-1416 Code Practice Oscillator, plus 10% discount certificate (see pg. 77). If purchased separately \$37.90.

SAVE \$4⁹⁵

ERS-3701, Shpg. wt. 8 lbs. 32.95



Effective soldering manual and kit

• Invaluable for Novice Kitbuilders

Heath's new EI-3133 Soldering Manual and Kit teaches you the techniques necessary for high reliability soldering in all electronics applications. Using a proven programmed instruction format, the text covers mechanical connection, tinning, temperature control and much more. And to give you "hands-on" experience for really effective learning, a handy practice kit has been included. Great for individuals or schools and industry and a great first kit-building experience. Requires soldering iron and small hand tools.

Course EI-3133, Shpg. wt. 2 lbs. 9.95

ONLY
\$9⁹⁵



Convenient Laboratory Breadboard

\$89⁹⁵



Makes basic circuit designing a breeze. Solderless sockets and a built-in power supply makes hook-up and teardown quick and easy. It can even be used to test electronic components.

Kit ET-3300, Shpg. wt. 5 lbs. 89.95

Assembled ETW-3300, Shpg. wt. 6 lbs. 150.00

ET-3300 SPECIFICATIONS: OUTPUTS: +5 VDC @ 1.5 amps; +12 VDC @ 100 mA; -12 VDC @ 100 mA. REGULATION: Load: Less than 2% variation from no load to full load on all supplies. CURRENT LIMITING: Fixed current limiting of each supply at rated current provides short-circuit protection. POWER REQUIREMENT: 120/240 VAC 60/50 Hz 30 watts at full load. SIZE: 3½" H x 12" W x 12" D.

Heathkit Self-Instruction Electronics Courses

A truly effective way to learn electronics quickly

The self-paced learning system designed to teach anyone about electronics

The people at Heath Company are experts in teaching complex subjects in a manner that just about anybody can understand. It's only natural that a company with years of experience should be the one to educate you in the exciting world of electronics. The Heath Continuing Education Series is designed to teach you everything you need to know about electronics technology in the shortest, simplest way possible. Thousands of people have already discovered the many advantages of the Heathkit learning method: Simple, straightforward instructions that take you step-by-step through the subject material *at your own pace*; crystal clear illustrations; audio records (or optional cassettes) to reinforce important concepts; hands-on experiments with electronic components and optional trainers; self-evaluation quizzes to gauge your progress; an optional final exam to test your overall comprehension; a Certificate of Achievement and award of Continuing Education Units when the final exam is successfully completed (passing grade 70%).

Heath's Self-Instruction Electronics Courses are complete self-contained learning systems. All you need is a record or cassette player, small hand tools and a VOM such as the IM-5284 on page 76. If you happen to have difficulty in understanding something, a complete staff of technical consultants is at your disposal just by dialing your phone or writing a letter. And one other important thing; The course and the trainer may qualify for a Federal Tax Deduction.

Treasury Regulation 162-5 permits an income tax deduction for educational expenses undertaken to: (1) maintain or improve skills required in one's employment or other trade or business, or (2) meet express requirements of an employer or a law imposed as a condition to retention of employment, job status or rate of compensation. In many instances, your employer may reimburse you in part or in total for taking these courses.

Learning electronics has never been easier, more economical, or more fun

Whether you're a total beginner or just brushing up, you'll enjoy these courses. And you'll appreciate the many benefits that come from an education in the dynamic field of electronics. Read on and get started today in what could prove to be a whole new way of life.

Experimenter/Trainers for hands-on learning



It's an acknowledged fact that you learn by doing. That's why we've made available two optional Experimenter/Trainer kits. They're essential for the projects and experiments you'll be doing with your courses. And after you've completed the courses, they're invaluable for "breadboarding" your own design projects.

CEU's

After completing your course studies, you may choose to take the optional final exam. A passing grade of 70% or better on the exam earns you a Certificate of Achievement and Continuing Education Units (CEU's). CEU's are a nationally recognized means of acknowledging your participation in formal non-credit adult education. The Certificate of Achievement you receive is handsome enough for framing and serves as a permanent record of your accomplishments.



Money-Back Guarantee

We're sure that you'll enjoy taking these courses and we know that you'll benefit from them as well. We're so sure, in fact, that if for any reason you're dissatisfied, Heath Company will refund the full purchase price of the text material (less trainer).

Courses start as low as
\$39⁹⁵
(less trainer)

Course 1: DC Electronics

A basic introduction to electrical fundamentals, theory and practice. You learn how to solve basic problems involving voltage, current, resistance and power; build and experiment with DC circuits of your own design; explain the relationship between voltage, current and resistance and much more.

Your first step on the way to a complete understanding of electronics, Course 1 covers the following: Electron theory; current flow; voltage; resistance; Ohm's Law; magnetism; electrical measurements; network theorems; inductance and capacitance. In addition to that mentioned above, you will learn the relationship between electricity and magnetism and you will be able to solve basic electronic problems involving current, voltage, resistance and power, convert from one metric prefix to another and work with powers of ten, build and experiment with basic DC circuits of your own design, explain the construction, operation and function of resistors, potentiometers, switches, fuses, relays, capacitors, inductors and batteries. You will also be able to use a multimeter to measure voltage, current and resistance, draw equivalent circuits using a diagram as a guide, and construct DC circuits from a schematic diagram. As you complete each section of the course, quizzes let you test your retention. Ultimately, you have a detailed knowledge of basic DC electronics in

just a very short time. Includes text, records and 56 electronic components for 20 experiments.

If you choose to take the optional final exam, a passing grade of 70% or better earns you 2.0 Continuing Education Units and a Certificate of Achievement. Course 1 paves the way for Heath's more advanced electronics courses and could very well open up a new world of opportunity for you. Get started today in an exciting field that is full of reward for the well-educated person. You won't be sorry you did.

COURSE ONLY \$39⁹⁵	Course EE-3101, Shpg. wt. 6 lbs.	39.95
	EAA-3101, Optional Cassettes*, Shpg. wt. 2 lbs.	6.95
	SAVE \$9.95! EES-3101, Program with Kit Trainer. Shpg. wt. 18 lbs.	94.95

Course 2: AC Electronics

Explains alternating current principles and theory. You'll learn how to analyze AC circuits containing resistance, capacitance and inductance; explain the operation of series and parallel resonant circuits; explain basic transformer and AC generator operation and more.

Course 2 covers AC fundamentals; AC measurements; capacitive circuits; inductive circuits; trans formers and tuned circuits. In addition to that mentioned above, you will learn to explain the difference between AC and DC, describe the operation of a simple AC generator, explain basic transformer action, explain the operation of series and parallel resonant circuits, determine the average or effective value of an AC sine wave when its peak or peak-to-peak value is known, determine the frequency of an AC waveform when its period is known, explain how AC meters are used to measure current, power and voltage, analyze simple AC circuits that contain resistance or a combination of resistance, capacitance or inductance. describe the electrical properties of capacitance and inductance and more. Course

1 or equivalent knowledge is the prerequisite for this course. Includes text, records and 16 electronic components for 8 experiments.

If you choose to take the optional final exam, a passing grade of 70% or better earns you 1.5 Continuing Education Units and a Certificate of Achievement. With Course 2 completed, you have the basis for understanding the more complex areas of modern electronics.

COURSE ONLY \$39⁹⁵	Course EE-3102, Shpg. wt. 6 lbs.	39.95
	EAA-3102, Optional Cassettes*, Shpg. wt. 2 lbs.	6.95
	SAVE \$9.95! EES-3102, Course with Kit Trainer. Shpg. wt. 18 lbs.	94.95

Heathkit Basic Experimenter/Trainer Kit

For the Heathkit DC, AC, Semiconductor and Electronic Circuits courses — helps you perform each experiment* quickly and easily. And after you finish the course, it's ideal for "breadboarding" your own design projects. Has solderless breadboarding sockets, 2-range variable sine and square wave (200-20,000 Hz) signal source, dual-variable power supplies for positive and negative voltages (both variable over 1.2 to 16 volts, 120 mA, both regulated and short-circuit protected), 1k and 100k linear potentiometers. Center tapped transformer provides 30 V rms, 60 Hz for line experiments. For 120 VAC, 60 Hz or 240 VAC, 50 Hz.

Kit ET-3100, Shpg. wt. 5 lbs. 64.95
ETW-3100, Factory Assembled Trainer. Shpg. wt. 5 lbs. 109.95

\$64⁹⁵
Kit



*Optional Cassettes duplicate material on records, but in convenient, easy-to-use cassette format.



Course 3: Semiconductor Devices

The heartbeat of solid-state electronics; semiconductors. Learn about the technological revolution that reshaped the electronics world. When you've finished Course 3 you'll be able to name the primary advantages that semiconductors have over vacuum tubes; explain how most important semiconductors operate and how they are constructed; recognize the schematic symbols used to represent the wide variety of semiconductors now in use and a great deal more.

Learn how semiconductor devices are used in actual circuits

- **Bipolar Characteristics**
- **FET's**
- **Thyristors**
- **IC's**
- **Optoelectronic Devices**
- **Fundamentals**
- **Diodes**
- **Zener Diodes**
- **Special Diodes**
- **Bipolar Transistor Operation**

One of the most important of the Heathkit Self-Instruction Courses, Course 3 covers semiconductor fundamentals; diodes; Zener diodes; special diodes; bipolar transistor operation; bipolar characteristics; field effect transistors; thyristors; integrated circuits and optoelectronic devices. You'll learn in addition to what is mentioned above; how to describe the electrical characteristics of semiconductor materials, how to properly handle sensitive semiconductor materials, how to recognize the most commonly used semiconductor devices, and how to test various semiconductors for proper operation. Proceed step-by-step at the rate you establish, in a no pressure learning environment that lets you study when you have the time

and progress when you feel you're ready. We think it's one of the easiest ways to learn this challenging course. Prerequisites are Courses 1 and 2 (or equivalent knowledge). Included are texts, records and 27 electronic components for 17 experiments.

If you choose to take the optional final exam, a passing grade of 70% or better earns you 3.0 Continuing Education Units and a Certificate of Achievement. The knowledge gained in Course 3 is invaluable to anyone interested in today's state-of-the-art electronics technology.

COURSE ONLY \$39⁹⁵	Course EE-3103, Shpg. wt. 6 lbs.	39.95
	EEA-3103, Optional Cassettes*, Shpg. wt. 2 lbs.	6.95
	EES-3103, Course with Kit Trainer, Shpg. wt. 18 lbs.	94.95

SAVE \$34⁸⁰	ETS-3114, All four programs and Kit Trainer, Shpg. wt. 31 lbs.	209.95

Course 4: Electronic Circuits

Teaches you basic transistor circuitry including amplifiers, oscillators, filters and pulse shapers; explains amplitude and frequency modulation; shows you how to construct transistor and integrated circuit amplifiers, oscillators and other common solid state circuits.

Explains the operation of all the most common solid-state electronic circuits

- **Basic amplifiers**
- **Typical amplifiers**
- **Operational amplifiers**
- **Power supplies**
- **Oscillators**
- **Pulse circuits**
- **Modulation**

Course 4 instructs you in the operation of all the most common solid state electronic circuits. You study basic amplifiers; typical amplifiers; operational amplifiers; power supplies; regulators; oscillators; pulse circuits; modulators and demodulators. In addition to that mentioned above, you will learn to analyze and design simple inverting and non-inverting amplifiers that use operational amplifiers, discuss the basics of oscillation and identify and describe the operation of commonly used LC, RC and crystal oscillators. You will learn about pulse circuits and multivibrators. Then you will study amplitude and frequency modulation including SSB. You will also

learn how to use a voltmeter and an oscilloscope to analyze the operation of electronic circuits. Course 4 brings all the theory of your first three courses together and shows you how it applies in actual circuit operation. Prerequisites are Courses 1 through 3 (or equivalent knowledge). Included are texts, records and over 110 electronic components for 18 experiments.

If you choose to take the optional final exam, a passing grade of 70% or better earns you 4.0 Continuing Education Units and a Certificate of Achievement.

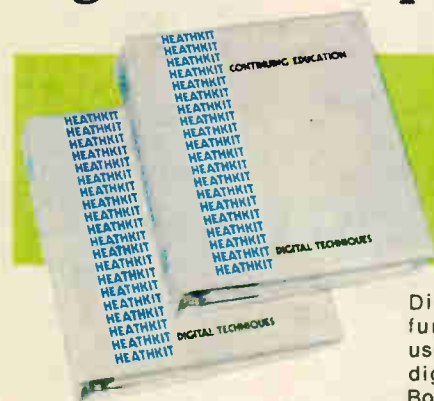
COURSE ONLY \$49⁹⁵	Course EE-3104, Shpg. wt. 8 lbs.	49.95
	EEA-3104, Optional Cassettes*, Shpg. wt. 1 lb.	6.95
	EES-3104, Course with Kit Trainer, Shpg. wt. 14 lbs.	109.95

*Optional Cassettes duplicate materials on records, but in convenient, easy-to-use cassette format.

Digital Techniques

The most advanced of Heath's courses and the nucleus of future electronics; digital electronics. You'll learn the operation of digital logic circuits and the major applications of digital techniques in electronics. Everything from TTL and CMOS to ROMs, PLAs, microprocessors and computers.

- **Introduction: techniques and uses, binary numbers, digital codes.**
- **Semiconductor Devices for Digital Circuits.**
- **Digital Logic Circuits: AND gates, OR gates, NAND/NOR logic, etc.**
- **Digital Integrated Circuits: TTL, ECL, CMOS, NMOS, PMOS, how to choose.**
- **Boolean Algebra.**
- **Flip-Flops and Registers: latches, D & JK flip-flops, storage registers, applications.**
- **Sequential Logic Circuitry: binary, BCD modulo N, up/down, counters, dividers, shift registers.**



Digital Techniques covers fundamentals and theory; uses; digital logic circuits; digital integrated circuits; Boolean algebra; flip flops and registers; sequential logic cir-

cuitry; combinational logic circuitry and digital design. You'll also learn to discuss the advantages of using digital techniques, to convert between binary and decimal number systems and to recognize the binary codes, discuss the operation and applications of binary and BCD counters, shift registers and other sequential logic circuits; use Boolean algebra to express logic operations and minimize logic circuits in design, name the major components used in implementing digital circuits and explain how they operate, explain the operation of flip-flops, design both combinational and sequential logic circuits for a given application from definition and concept to the selection of the integrated circuits and discuss the operation and application of digital counters in time and frequency measurements. Average completion time for Course 5 is 40 hours. A prior knowledge of electronics (such as the Heathkit Courses 1 thru 4) is required but the course can be successfully completed by those with math or science backgrounds. Includes texts, records and 44 electronic components for 24 experiments. The ET-3200 Digital Trainer is required for performing the experiments. If you choose to take the optional final exam, a passing grade of 70% or better earns you 4.0 Continuing Education Units and a Certificate of Achievement.

Course **EE-3201**, Shpg. wt. 8 lbs. 54.95

EEA-3201, Optional Cassettes*, Shpg. wt. 2 lbs. 6.95

Note: Heath recommends the use of the IM-5284 multimeter (page 76) and an oscilloscope such as the IO-4541 (page 59) with this course.

Versatile Digital Trainer

A must addition to your EE-3201 Digital Techniques course. The ET-3200 Trainer rounds out your education and provides the "hands-on" experience necessary for your proper understanding of digital devices and operations. Use the ET-3200 to perform all the experiments in the Heath Digital Techniques Course develop projects, build and test prototypes, verify circuit operation and check digital IC's. Has solderless breadboard sockets for experimentation and design, four binary data switches, 2 "no-bounce" switches to pulse logic circuits, 3-frequency pulse clock generator and 4 LED's for visual indication of logic states. The ET-3200 also contains three regulated power supplies with outputs of +12 VDC @ 100 mA, -12 VDC @ 100 mA and +5 VDC @ 500 mA. Each output features current limiting and is overload protected for safe operation. Breadboard sockets accommodate up to eight 14 or 16-pin dual-in-line ICs, also 24, 28, and 40-pin DIPs. For 120 VAC, 60 Hz.

Kit **ET-3200**, Shpg. wt. 6 lbs. 84.95
ETW-3200, Factory assembled, Shpg. wt. 6 lbs. 129.95



SAVE \$9⁹⁵

\$129⁹⁵

If purchased separately, \$139.90

SAVE when you order the Digital Techniques course with the ET-3200 Digital Trainer.

EES-3201, Course and Trainer Together, Shpg. wt. 18 lbs. 129.95

Famous Heath Electronics Courses, now designed for Classroom Use

Completely repackaged for the classroom, Heath's excellent series of electronics courses lets the instructor combine an expertly formulated learning package with his own wealth of personal knowledge to give the student a truly unique learning experience. These new

The **textbook** offers well ordered comprehensive coverage of course material and includes self test questions and programmed instruction reviews.

The **student workbook** contains detailed chapter examinations and is keyed to text and laboratory experiments which graphically demonstrate important subject material.

courses are very economical and are ideal for use by schools and industry.



To round out the learning experience parts packages are available which contain the components necessary to perform outlined experiments. Note: The ET-3100 electronics trainer and ET-3200 digital trainer are recommended for use in course exercises.

Contact Heath Company for quantity discount schedule on the above courses. Free brochures are available detailing course objectives and outlines.

Course	Text	Price	Workbook	Price	Instructors' Guide	Price	Parts	Price
DC Electronics	EB-6101	15.95	EB-6101-40	6.95	EB-6101-50	8.95	EB-6101-30	13.95
AC Electronics	EB-6102	15.95	EB-6102-40	6.95	EB-6102-50	8.95	EB-6102-30	8.95
Semiconductor Devices	EB-6103	15.95	EB-6103-40	6.95	EB-6103-50	8.95	EB-6103-30	8.95
Electronic Circuits	EB-6104	17.95	EB-6104-40	7.95	EB-6104-50	8.95	EB-6104-30	19.95
Digital Techniques	EB-6201	19.95	EB-6201-40	9.95	EB-6201-50	8.95	EB-6201-30	17.95

Complete course outlines, objectives, chapter examinations, and guide to final exam preparation are presented in the detailed instructor's guide.

EB-6102 and 6103 series available April, 6104 and 6201 series available May, 1978.



Kits To Make Your Home Unique!



New Casablanca Ceiling Fan

\$109⁹⁵

- Adjustable speed
- Money saving kit-form

Bring back the nostalgia of the good-old-days with our new GD-1238 Casablanca Fan. This delightful fan offers the perfect "decorator's" touch to the family room, porch, or patio and at the same time brings whisper-quiet cooling to your home, for just pennies a day. Can also be used to bring heat down from high ceiling areas during heating season. With its fan motor done in a warm baked bronze enamel, the GD-1238 features chain pull switch operation, variable speed adjustment, and 52 inch blades (tip to tip). Each blade is dynamically balanced for vibration free cooling, and all are finished in a convincing simulated wood grain. For an even more charming effect add the optional Lamp or Swag-Chain kits. Fan and optional lamp can be operated independently.

Kit GD-1238, Shpg. wt. 24 lbs. **109.95**

Swag-Chain Kit

Mount your Casablanca fan most anywhere. Includes: 18' antique brass swag chain, gold electrical cord, and all necessary hardware.

GDA-1238-1, Swag Chain kit Shpg. wt. 3 lbs. **14.95**



Light Kit

Adds old world charm and dual purpose to your fan. Kit includes: glassware, glassware holder and all required mounting accessories.

GDA-1238-2, Light Kit Shpg. wt. 3 lbs. . . **15.95**



For location of Heathkit Electronic Center nearest you, see pgs. 2-3.

Retail prices herein effective March 11, 1978. Printed in U.S.A. Prices and specifications subject to change without notice. Special offers and sale prices good thru June 2, 1978. Schlumberger Products Corporation cannot be responsible for typographical or pictorial errors.



Electronic "Digi-Scale"

\$109⁹⁵

Electronic Precision Kit — no springs, weights

Digi-Scale is an electronic digital readout "weighing machine" that shows your weight in big, bright, computer-like LED's. Even with a 300-lb. capacity, it can be wired to read out to 1/10th or 2/10ths of a pound (or it can be wired to read out in kilograms).

Uses solid-state circuitry and a strain-gauge transducer element like those used in expensive electronic laboratory scales. Has handsome wood grained vinyl-covered platform. Battery-operated, so it's safe to use even after a shower.

The kit includes extra cable so you can place the readout on a wall, at eye level, anywhere it's convenient. Operates on six inexpensive "C" cells, not included. Platform size, 11½" x 11½" x 1½". Readout/control, 6" x 3½" x 1½".

Kit GD-1186, Shpg. wt. 9 lbs. **109.95**

Factory assembled and adjusted GD-1186 — readout non-detachable.

GDW-1186, Shpg. wt. 9 lbs. **139.95**



Full-size home Pinball Machine

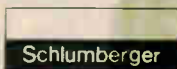
\$629⁹⁵

The fabulous computer-controlled Bally Fireball® pinball game

Look at these unusual fun features: Scoring is displayed on a bright red LED readout and a computer synthesizer plays seven different tunes when extra scores or bonuses are won. The scores of up to four players are stored in the computer's memory and displayed automatically. Ball return is automatic. Bonus balls are also awarded automatically. A "skill" control allows you to program the machine for the beginner or the advanced player. The colorful playfield is the same size as a commercial machine. "Thumper Bumpers", "Slingshots" and player-controlled flippers give you plenty of ball action. Components used in the GD-1110 are the same as used in commercial machines for outstanding reliability.

Kit GD-1110, Shpg. wt. 166 lbs.

Motor Freight **629.95**



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