

# Heathkit®

WINTER 1981



The new Digital Wall Clock  
Just one of the many  
new 1981 Heathkit  
products that will  
make your world  
a little better.



Low-cost All-In-One Computer



Microprocessor-based  
Digital Weather Computer



New Digital 5 Hz-512 mHz  
Frequency Counter



Self-paced Microprocessor Course

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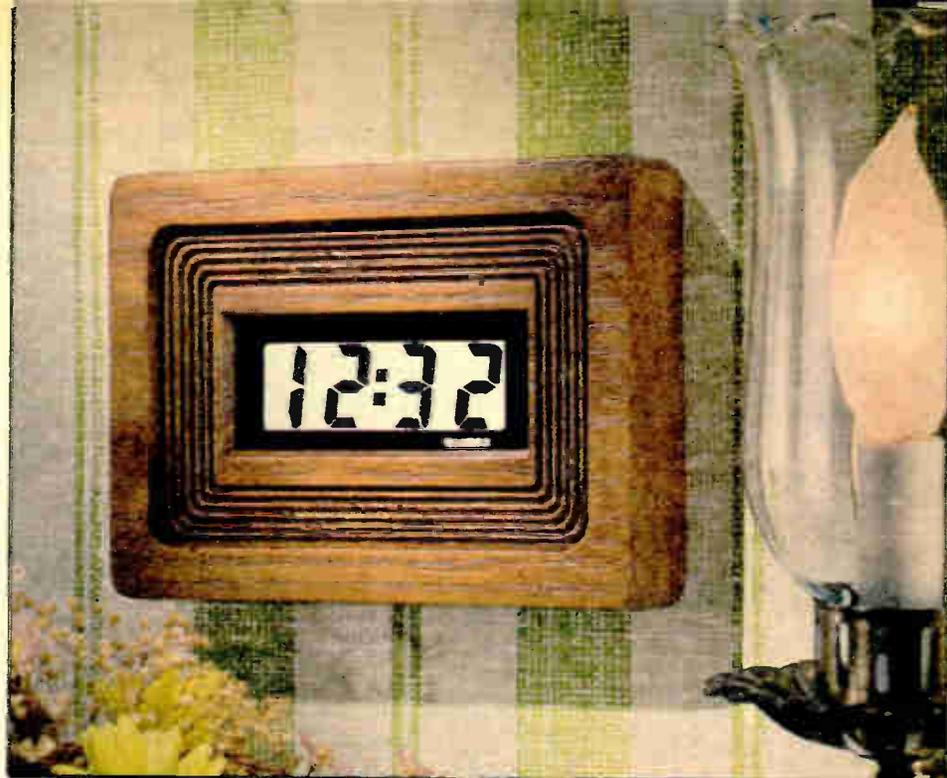
# Introducing one of the most fun-to-build kits ever — the cordless Heathkit Digital Wall Clock

**NEW**

Only  
**\$49<sup>95</sup>**



**FAST, EASY  
1-EVENING KIT**



## The Wall Clock with the time accuracy of a quartz watch

- Quartz controlled for accurate time within  $\pm 1$  minute per year
- Runs for two years on a single 1.5 V AA alkaline cell
- Big, 4 one-inch high LCD digits for easy across-the-room reading
- Displays the time in either 12-hour or 24-hour format

Now you can get the accuracy and convenience of a quartz watch for your wall, with the new GC-1720 Digital Wall Clock. Like a digital quartz watch, it uses a quartz crystal and a single, complex integrated circuit to give you on-the-dot accuracy. In fact, our GC-1720 is so precise, it tells the time within one minute a year! It's the kind of accuracy appreciated by pilots, amateur radio operators, sailors, or anyone else who likes to keep a punctual schedule.

The GC-1720 not only gives you the accuracy of an expensive quartz watch but it also features the same "set it and forget it" convenience. Once set, the GC-1720 will give you the correct time for two years on a single 1.5 V alkaline cell, or for a full year on a one 1.5 V AA-panlight zinc-carbon battery. With this kind of battery efficiency, you don't need to worry about running out to the store for frequent battery replacement.

The battery power gives you an additional advantage: It makes the GC-1720 cordless. You can put it in your office, home, cottage, sailboat, winter cabin, or any other place where wall outlets or power sources are limited. You can also place the GC-1720 just about anywhere you want in any room. You can put the clock on any wall, at any height, regardless of the location of the outlets. In addition, the cordless battery power makes the GC-1720 a reliable time instrument. It's immune to power failures caused by storms, generator failures, or accidental cord disconnections, so it always displays the correct time.

But the quartz timing accuracy and cordless convenience of the GC-1720 is where the similarities to a watch end, and the difference from other wall clocks begins. One difference starts with GC-1720's big LCD digital display. The digits are one-inch in height. Unlike many types of standard wall clocks, you can easily see these digits from a distance of thirty feet. This makes the GC-1720 an easy-to-read timepiece for the kitchen, recreation room, or any other large room.

Besides being easy-to-read, the GC-1720's display also gives you the time in either 12-hour or 24-hour formats. This feature makes the GC-1720 a valuable time instrument for amateur radio operators, sailors, pilots, or anyone else who wants an accurate time piece with a 24-hour format for logging sign-on times, navigation, or filing flight plans.

Another difference, of course, is the design of the GC-1720's rectangular case. It's made from a light-weight polyurethane material that not only looks like



Features one-circuit-board assembly for easy one-evening kit building. Also fits nicely in den, kitchen and bedroom.

wood, but also feels like wood. This simulated oak wood grain case matches the decor of most rooms. The case's light-weight design permits you to hang the clock on paneling, plaster, or wall board. And since the case measures just  $5\frac{1}{4}$ " high x  $7\frac{1}{8}$ " wide x  $1\frac{1}{2}$ " deep, it fits in places where some wall clocks can't — like between the kitchen cupboards or in the tight quarters of a sailboat.

Above all, the GC-1720 takes just one leisurely evening to assemble. All the parts mount on a single circuit board. For easy pin insertion, it comes with its own pin inserter. Add our famous, easy-to-follow manual instructions that take you step-by-step from unpacking to final time adjustment, and you have yourself an easy-to-build wall clock with the accuracy of an expensive quartz watch. An excellent starter kit for the first-time kitbuilder. One AA 1.5 V battery required. Kit GC-1720, Shpg. wt. 2 lbs. .... 49.95

**GC-1720 SPECIFICATIONS:** Accuracy:  $\pm 1$  minute per year, after adjustment according to instructions. Display: 4 digit and colon LCD, 1" digit height. Time Format: 12-hour or 24-hour. Power Requirement: One type AA 1.5 volt penlight battery (not included). Battery life: One year with zinc-carbon cell; 2 years with Alkaline cell. Dimensions:  $5\frac{1}{4}$ " H x  $7\frac{1}{8}$ " W x  $1\frac{1}{2}$ " D (13.3 x 18.1 x 3.8 cm). Net weight: 10.9 oz. (300 gm).





**FAST, EASY  
1-EVENING KIT**



## The Digital Alarm Clock — practical introduction to kitbuilding fun

- Low-cost, practical, easy-to-build starter kit
- Features a 9-minute Alarm Delay for catnaps
- Displays time in either 12- or 24-hour formats
- Flashing display alerts you to power failures
- Can be operated on either 120 or 240 VAC
- Includes handsome simulated wood-grain cabinet

A great kit idea, and a great practical gift for the first-time builder, the Digital Alarm Clock gives you extra convenience features—with space-age digital accuracy. The GC-1107 is a great, low-cost way to get into the hobby of kitbuilding.

A four-digit blue-green fluorescent readout, mounted at an easy-to-read angle, clearly displays the correct time. If a power failure interferes with the GC-1107's accuracy, a flashing display will alert you to the electrical power interruption. Digital accuracy is provided by a Metal-Oxide Semiconductor (MOS) large-scale integrated circuit, which performs all the logic functions of keeping time. Time can be displayed in either 12 or 24-hour formats, with a simple wiring change.

The GC-1107's alarm knows the difference between AM and PM, so you can reset the alarm for the next day—immediately after you get up.

The Heathkit Digital Alarm Clock sounds a pleasant electronic tone to start your day out right. If you're not yet ready to take on the world, push the Alarm Delay button for 9 more minutes of pleasant dreams. You can take up to an hour of catnaps with the Alarm Delay.

What makes it tick? You'll know when you finish this easy-to-build, practical alarm clock. The clear, step-by-step Heathkit manual guides you through this one-evening kitbuilding project, from unpacking the kit to plug-in of the finished product. A circuit description with complete schematic accompanies every Heathkit electronic kit.

Attractive modern styling, small size and solid-state dependability make the practical GC-1107 Digital Alarm Clock ideally suited for use in office, home—most anywhere you need accurate time or a reliable, pleasant wake-up.

Get started in kitbuilding today—and have the time of your life! Our Digital Alarm Clock kit includes handsome simulated wood-grain cabinet, built-in speaker, complete assembly/operation manual and more than enough solder to finish the project. The practical Heathkit Digital Alarm Clock operates on 120 or 240 VAC, 50/60 Hz. Overall Dimensions, 2.25" H x 7" W x 4.75" D (5.72 x 17.78 x 12.07 cm). Net Weight, 1.75 lbs. (.79 kg).

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

## Digital Electronic Super-Clock: looks great on floor or shelf

- Bright digital readout adjusts to room light for a charming, pleasant glow
- Handsome smoked glass shelves provide nice display for flowers, knick-knacks

The Heathkit Super-Clock adds stylish elegance with a space-age touch—anywhere in your home! This great conversation piece is housed in a handsome cabinet, finished in simulated walnut veneer and laminated with anodized aluminum corner pieces. Four ¼"-thick smoked glass shelves are great places to put books, plants or knick-knacks.

The bright 3¼"-high digits can be easily read—even in daylight. Brightness is automatically adjusted to ambient lighting for a charming, subtle effect.

The Super-Clock displays hours and minutes, with the center colon pulsing once each second. A special power failure indicator tells you to reset the clock. Set time with two easy-to-use time advance switches on the bottom of the clock chassis.

Build this distinctive clock in as little as four evenings. The clearly-written manual makes this clock an excellent project for the first-time kitbuilder.

The GC-1195 Super-Clock is a handsome addition to most any decor. For even more Old World charm, add our "Big Ben" Electronic Chimes (described at right).

Kit GC-1195, Shpg. wt. 58 lbs. .... 219.95

GC-1195/1197 SPECIFICATIONS: Format: 3½-digit (12-hour) time readout. Power Requirement: 120/240 VAC, 50/60 Hz, 30 Watts. Dimensions: GC-1195, 60.5" H x 14" W x 9.5" D; GC-1197, 6.5" H x 12.5" W x 6.25" D.



### Super-Clock in handsome shelf case

Handsome shelf version of our popular Super Clock uses the same space-age electronics as the GC-1195 Floor Clock, housed in a good-looking walnut-veneer cabinet for shelf, table or desktop mounting. Accepts optional "Big Ben" Electronic Chimes below.

Kit GC-1197, Shpg. wt. 18 lbs. .... 119.95

### Synthesized "Big Ben" Chimes

Add super sound to your Super Clock. Sounds 4 notes on the ¼-hour, 8 notes on the ½-hour, 12 notes on the ¾-hour; full 16-note passage and hour announcement on the hour. Even provides reassuring tick-tack. Volume, pitch, sound-delay controls, built-in speaker. Builds into GC-1195, GC-1197.

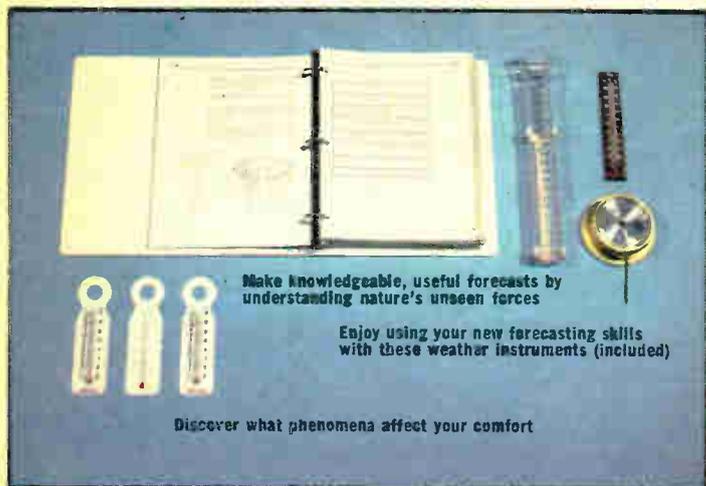
Kit GCA-1195-1, Shpg. wt. 3 lbs. .... 84.95

Credit Card Orders Call TOLL-FREE: 800-253-0570



**NEW**

## New Weather Course makes it easy to understand and predict weather!



Make knowledgeable, useful forecasts by understanding nature's unseen forces

Enjoy using your new forecasting skills with these weather instruments (included)

Discover what phenomena affect your comfort

# \$79<sup>95</sup>

- Teaches you how to predict upcoming weather conditions
- Gives you the necessary knowledge to start your own home weather station

Have you ever wondered why clouds have different forms? Do you know why they are called the sign posts of the skies? Do you know what atmospheric conditions breed tornadoes or hurricanes? You'll get the answers to these questions and more with the new Heathkit/Zenith EW-4100 Weather Course. It's a complete course that takes the mystery out of weather. It will explain nature's invisible forces and how they cause the weather to change in your area.

Not only will you understand weather, but you'll also learn how to predict it. This course comes with a small barometer, rain gauge and 3 thermometers to help you learn how to read and use weather instruments in predicting weather. Also included are a work book with map reading and forecasting exercises, a log book for documenting day-to-day weather conditions, and the step-by-step textbook that takes you from basic definitions to predicting storms.

When you finish with this course, you'll be able to:

1. Explain how the sun and earth's atmosphere affects our weather.
2. Understand how clouds form and why they precipitate.
3. Identify the different types of clouds by their shape.
4. Know what type of weather is coming by reading the clouds.
5. Learn how weather instruments operate and how to read them.
6. Identify air masses by their temperature and pressure characteristics.
7. Understand how frontal systems develop and the types of weather they bring.
8. Forecast the weather by using instrument readings and surface weather maps.

This course is so complete — it covers most every weather condition you'll encounter. It comes with an optional final examination. If you score 70% or better on the exam, you will earn 2.0 CEUs. In addition to learning about weather, you'll be able to start your own weather station and begin one of the most interesting and useful hobbies around.

EW-4100, Shpg. wt. 10 lbs. .... 79.95

**NEW**

## Radio sounds severe weather alert!

# \$44<sup>95</sup>

Storm Alarm by WeatherAlert® sounds severe weather alarm — day or night — triggered by local National Weather Service transmissions. Also get up to the minute forecasts. 120 VAC or 9 VDC battery. Measures: 1½" H x 5" W x 3" D.

EWA-4100, assembled, 2 lbs. .... 44.95

4/WEATHER

**NEW**

## Digital Wind Computer makes it easier to read wind speed and direction

# \$199<sup>95</sup> Kit

- Easier to read than dial and needle wind speed indicators
- Displays instantaneous and average wind velocity
- Recalls day and time of peak wind gusts

Here's a wind speed/direction indicator for pilots, sailors, professional meteorologists, or anyone who demands accurate wind readings for forecasting weather. The ID-1890 Wind Computer is a microprocessor-based instrument that precisely displays instantaneous or average wind and time and date.

You get complete wind velocity information with the ID-1890. Lighted indicator bars show wind direction on a 16-point compass dial. Inside the compass, two ½" LEDs tell you the wind speed. A switch permits wind speed to be displayed in mph, kph, and knots. In addition, the ID-1890 stores peak gust information — telling you the speed, date, and time the gust occurred. This means you can leave your weather station, returning later to log and report peak gusts.

Not only does the ID-1890 give you wind speed, direction, and gust information, but it also features a clock/calendar for logging. The built-in 6-digit clock/calendar alternately tells you time and date. Switchable 12 or 24-hour time formats let weather forecasters log wind velocity in Zulu or military time for official forecasts. A hold switch lets you hold just the time or date.

The wind vane and anemometer of the ID-1890 are designed to survive all kinds of weather. Both are made from non-corrosive stainless steel, aluminum, and rugged plastic. The entire transmitting assembly clamps on to antenna towers.

**ID-1890 SPECIFICATIONS:** Digital Clock/4-Year Calendar: Displays: 6-digit, 12 or 24-hour format time readout; 4-digit date readout. AM/PM indicator in 12-hour format. Time Accuracy: Determined by AC line frequency accuracy. No accumulative error. Rear Panel Controls: Clock Start/Stop, Hours/Month Advance, Minutes/Days Advance, 10 Minutes Advance, Time/Date Hold, 12/24-Hour Time Format. Wind Vector: Speed: Displays: 2 significant digits. Separate indicators show whether display is in miles per hour, knots or kilometers per hour. Memory: Date, time and magnitude or maximum gust. Accuracy: ±5% or better. Controls: Front Panel, Peak/Gust and Clear; Rear Panel, MPH/Knots/KMPH Select, Actual/Average Select. Direction: Display: One of 16 indicators arranged in a compass configuration. Marked in compass points and radial degrees. Accuracy: ±11.25 degrees. Outdoor Assembly Operating Temperatures: -40° to +158°F (-40° to +70°C).

The ID-1890 is a 4-evening kit, and runs on 120/240 VAC, 50/60 Hz current. Unit connects to an outside power supply (6.20 to 14.8 DC at 60 mA) to hold memory contents during power failures. Measures 5.5" H x 12.5" W x 4.8" D.

Kit ID-1890, Shpg. wt. 10 lbs. 199.95

Assembled Digital Wind Computer.

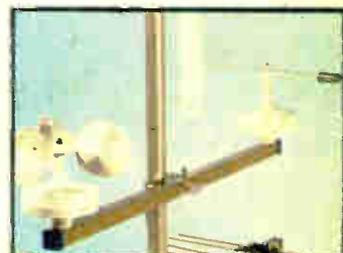
IDW-1890, Shpg. wt. 14 lbs. . . 259.95

8-Wire Cable for Wind Computer.

IDA-1290-1, 50', wt. 2 lbs. . . . 9.95

IDA-1290-2, 100', wt. 4 lbs. . . 16.95

IDA-1290-3, 150', wt. 6 lbs. . . 23.95



ID-1890 includes transmitter assembly



Credit Card Orders Call TOLL-FREE: 800-253-0570



**NEW**

## Get accurate storm warnings with this Heathkit Computerized Barometer

**\$239<sup>95</sup>**  
Kit

- Puts barometric pressure, rate of change, direction of change, time and date at your fingertips
- Remembers minimum and maximum pressure readings for tracking air masses

Now you can get all the vital barometric pressure information you need to forecast severe or pleasant weather with the ID-1990 Computerized Barometer. With its microprocessor brain, it instantly puts all the barometric pressure readings at your fingertips.

You get the current pressure, rate of change, direction of change, maximum and minimum pressures, even the date and time with the ID-1990. All the pressure and date information is displayed on two sets of 1/2" high LED digital readouts. Push a button, and the ID-1990 switches from the current pressure reading to the rate of change. A separate LED indicator light tells you if the rate is falling or rising. Press one of two buttons, and the ID-1990 will tell you either the minimum pressure or maximum pressure and the time when it occurred. A special button resets the ID-1990's memory for new minimum and maximum readings.

The ID-1990's computer not only remembers minimum and maximum readings for forecasting, but it also will instantly convert pressure readings from one unit of measurement to another. With a flip of a switch, the ID-1990 will read pressure from inches to millibars. It will even read pressure out in kiloPascals with a slight modification in wiring.

All pressure information is sent by a sensing mechanism protected against ambient temperatures. The sensor is housed in a structural foam casing to give the computer accurate readings within  $\pm 3\%$ .

In addition to being an accurate barometer, the ID-1990 is a clock/calendar. It features a switchable 12/24 hour clock format for local and official pressure reporting. The clock/calendar tells time in hours, minutes, and seconds. The date is told by month and day.

The ID-1990 runs on 120/240 VAC, 50/60 Hz household current. For power failures, it will run on an external power source which can supply 6.2 to 14 volt DC at 60 mA. (Holds memory, suspends all other functions). The display unit has a space-saving design, styled to match the other Heathkit weather instruments. It measures 5 1/4" H x 11 1/2" W x 5" D.

Kit ID-1990, Shpg. wt. 10 lbs. .... **239.95**

IDW-1990, Assembled Computerized Barometer, Shpg. wt. 8 lbs. .... **279.95**

**ID-1990 SPECIFICATIONS:** Digital Clock/4-Year Calendar: Same as ID-1890. Rear Panel Controls: Clock Start/Stop, Hours/Months Advance, Minutes/Day Advance, 10 Minutes Advance, Time/Date Hold, 12/24-Hour Format. Barometer: Displays: 4-digit readout. Separate Indicators show whether the pressure is rising or falling, and whether the display is in inches of Mercury, millibars or kiloPascals. Pressure Ranges: 28.00 to 32.00 inches Hg (inches of Mercury), 981 to 1050 Millibars or 98.1 to 105 kiloPascals. Accuracy of Reading: 29.00 to 31.00 inches Hg (inches of Mercury),  $\pm 0.03$  in Hg (15°-35°C). Memory: Date, time and magnitude of maximum and minimum pressure. Controls: Front Panel: Minimum Pressure Select and Clear, Maximum Pressure Select and Clear, Rate of Change/Hour Select; Rear Panel: Inches of Mercury/millibars/kiloPascals Select. Operating Temperatures: 59°-95°F (15°-35°C). Power Consumption: Approximately 14 watts. Net Weight: 4.8 lbs. (2.2 kg).

**NEW**

## Stay dry while the Heathkit Automatic Rain Gauge measures the rainfall for you

**\$149<sup>95</sup>**  
Kit

- Accurate rainfall readings within  $\pm 3\%$
- Tracks both short- and long-term rainfall
- Measures rainfall in inches or centimeters

The new Heathkit ID-1790 Automatic Rain Gauge allows you to measure short and long term rainfall quickly and accurately. It features an indoor display unit and an outdoor collector that automatically brings you up-to-date, precise rainfall measurements in centimeters or inches.

With the ID-1790, you don't have to go outdoors to read the rainfall! The outdoor collector catches and measures it for you. Included is a 100' water-tight cable for sending all measurements to the indoor display. You stay warm and dry, and get up-to-the-minute rainfall measurements during thunderstorms or drizzle.

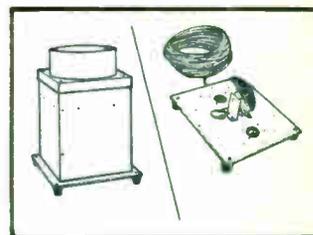
The ID-1790 gives you the accurate measurements you need. The weather-resistant outdoor collector is housed in a 14 1/2" H x 10" W x 10" D assembly that can be installed on a fence post, TV tower, or any open area for accurate readings. A protective screen over the plastic measuring tipping bucket keeps out dirt, leaves, and other natural debris that can cause errors in readings.

The ID-1790's indoor digital display takes the guesswork out of rainfall readings. Two sets of bright, red 1/2" LEDs on a glareless flat black background constantly tell you the short- and long-term rainfall. The first set of LEDs readout the long-term rainfall in .1 increments up to 99.9, and the second set displays the short-term rainfall in tenths up to 99.9, or hundredths up to 9.99, depending on the measurement system used. Both displays clear for independent tracking.

The indoor unit is designed to match the other Heathkit weather instruments. It measures 5 3/8" H x 12 1/2" W x 4 3/4" D and comes in a handsome silver plastic case with a walnut grain front panel and runs on household current (120/240 VAC, 50/60 HZ). A 9 volt back-up battery (not included) keeps the unit's memory and measuring circuits operating during power failures.

Kit ID-1790, Shpg. wt. 14 lbs. .... **149.95**

IDW-1790, Assembled Automatic Rain Gauge, Shpg. wt. 12 lbs. .... **199.95**



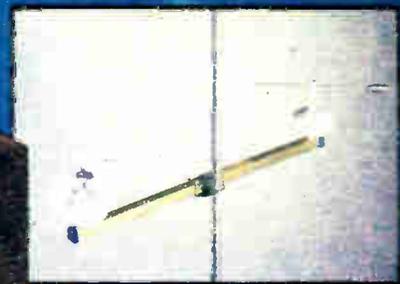
Includes outdoor collector

**ID-1790 SPECIFICATIONS:** Displays: Short Term Display: 3 digits, up to 9.99. Long Term Display: 3 digits, up to 9.99 or 99.9 — depending on wiring. Units of Measurement: Inches or centimeters of rainfall, depending on wiring. Repeatability:  $\pm 2.0$  percent for 1/2 inch per hour rate of rainfall. Operating Temperatures: Rain Collection Unit, 32 degrees F to 120 degrees F (0 degrees C to 50 degrees C); Digital Readout Unit, 32 degrees F to 120 degrees F (0 degrees C to 50 degrees C). Power Requirements: 120/240 Volts AC, 50/60 Hertz, 5 Watts; 9 Volts DC, 1.5 milliamp transistor battery keeps the ID-1790's measuring and memory circuits operating during power interruptions. Dimensions: Rain Collection Unit, 14.5" H x 10" W x 10" D (36.8 x 25.4 x 25.4 cm); Digital Readout Unit, 5.38" H x 12.5" W x 4.75" D (13.65 x 31.75 x 12.06 cm). Net Weight: Rain Collection Unit, 5.0 pounds (2.27 kilograms); Digital Display Unit, 3.5 pounds (1.6 kilograms).



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

WEATHER/5



## 1 The Digital Weather Computer is the ultimate instrument for the individual who needs accurate, instant weather information

- Get instant weather reports: Indoor/outdoor temperatures, wind speed/direction, barometric pressure, even the current time and date — all right at your fingertips
- Stores past and present weather statistics for your location

The only one of its kind, the Heathkit Digital Weather Computer uses a real microprocessor to give you instant, accurate past and present weather data. For professional weather watchers, farmers, boaters, campers, science teachers — for anyone who needs to know about the weather, the Electronic Weatherman can help you forecast future weather activity. Easy to use: A compact boom assembly mounts on your TV antenna mast and relays weather data to the computerized console indoors. The ID-4001's transmitter unit, with windcups and weathervane, features special infra-red sensing devices that are far more sensitive and reliable than old-fashioned mechanical reed switches or wipers.

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

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

**Order the Heathkit Digital Weather Computer today, kit or assembled.** And you'll have your own reliable weather reports at the touch of a button. For 120/240 VAC. 7.25" H x 16" W x 6" D (18.42 x 40.64 x 15.24 cm). Cable for Kit ID-4001 must be ordered separately (below), in the length you require. Assembled IDW-4001 includes 100 feet of cable.

Kit ID-4001, Shpg. wt. 15 lbs. .... 399.95

**Factory Assembled and Tested Digital Weather Computer.** Includes 100 feet of 8-wire cable.

IDW-4001, Shpg. wt. 22 lbs. .... 569.95

**ID/IDW-4001 SPECIFICATIONS:** Digital Clock/4-Year Calendar: Time Accuracy: Determined by accuracy of AC line. No cumulative error. Wind Vector Accuracy: 5 percent or better. Direction Display Accuracy:  $\pm 11.26$  percent (in degrees). Thermometer: Temperature Range: -40 deg. F to 158 deg. F (-40 deg. C to 70 deg. C). Accuracy:  $\pm 2$  deg. F ( $\pm 1$  deg. C). Barometer: Pressure Range: 28.00 to 32.00 in. Hg./inches of mercury (981.9 to 1050 millibars). Accuracy:  $\pm 0.075$  in. Hg./inches of mercury,  $\pm 0.01$  in. Hg./deg. C. Operating Temperatures: Outdoor Assemblies, -40 deg. F to 158 deg. F (-40 deg. C to 70 deg. C); Unit, 50 deg. F to 95 deg. F (10 deg. C to 35 deg. C).

The Electronic Weatherman can be interfaced with the H-8 Computer. For full details, write Heath's Technical Correspondence Department.

8-Wire Cable for ID-4001, 1290, 1590: IDA-1290-1, 50', 2 lbs. 9.95; IDA-1290-2, 100', 4 lbs. 16.95; IDA-1290-3, 150', 6 lbs. 23.95

## 2 Budget-priced Weather Station for instant, current reports

Whenever you need instant, electronically accurate weather information, the Heathkit ID-1290 Weather Station keeps track of indoor and outdoor temperatures, barometric pressure, wind speed/direction.

The high-accuracy thermometer reads indoor or outdoor temperatures precisely, in two-degree increments from -40°F to 120°F (-40°C to 49°C). Keep on top of changing conditions — the precision barometer indicates movements as small as 0.02 inches of mercury. Read wind speed from 0 to 90 mph, with precision 16-point resolution of wind direction.

Use the ID-1290 as a handsome desk set, or hang horizontally or vertically. Remote transmitter (windcups, weather vane, sensor) clamps to any 1 or 1½" diameter TV antenna mast, connects to cabinet with required 8-wire cable (below, left). 120 VAC, 50/60 Hz. Dimensions: Wall Mount, 7" H x 20.5" W x 2" D; Desk Mount, 7" H x 20.5" W x 6.75" D.

Kit ID-1290, Shpg. wt. 8 lbs. .... 139.95

**ID-1290 SPECIFICATIONS:** Wind Speed Accuracy:  $\pm 2$  mph, 0-30 mph range;  $\pm 5$  mph, 0-90 mph range. Indoor and Outdoor Temperature Accuracy:  $\pm 2^\circ\text{F}$  ( $\pm 1^\circ\text{C}$ ). Barometric Pressure Accuracy:  $\pm 0.05$  inches of mercury.

## 3 Keep on top of wind conditions with our Digital Wind Indicator

Outstanding accuracy and an easy-to-read digital display makes our Digital Wind Speed/Direction Indicator a must for pilots, boaters — anyone whose activities are affected by the wind.

Choose two readout modes from the three available (mph, kph or knots). Switches select mode; front panel lights show which mode is in use.

Wind direction indicator lights mark the eight principal compass points for 16-point resolution.

Includes remote transmitter. 120 VAC, 50/60 Hz. Cabinet Dimensions, 2.5" H x 7" W x 5" D (6.35 x 17.78 x 12.7 cm). Requires 8-wire cable (below, left).

Kit ID-1590, Shpg. wt. 7 lbs. .... 84.95

**ID-1590 SPECIFICATIONS:** Wind Speed: 0-99 in miles per hour, kilometers per hour or knots (choice of two). Response Threshold: 3 miles per hour. Accuracy:  $\pm 1$  digit or  $\pm 10$  percent, whichever is greater. Direction Response Threshold: Approximately 2 miles per hour. Operating Temperatures: Transmitter, -40°F to 120°F (-40°C to 49°C); Receiver, 0°F to 150°F (-18°C to 65°C).

## 4 Indoor/Outdoor Thermometer tells temperatures instantly

Monitor any two temperatures. Bright ½" high digital readout includes + and - signs, as well as indoor, outdoor indicator lights.

Select Fahrenheit or Celsius temperature readings, continuous readings of one temperature or alternate readings of both temperatures. The ID-1390 reads temperatures from -40 to 120°F (-40 to 50°C).

The 10' indoor, 75' outdoor cables, included with this easy-to-build kit, let you place sensors almost anywhere (freezer, basement, greenhouse). 120 VAC, 50/60 Hz. 2.5" H x 7" W x 5" D.

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

**ID-1390 SPECIFICATIONS:** Temperature Accuracy: -30°F to 120°F,  $\pm 2^\circ\text{F}$ ; 20° to 120°F,  $\pm 1^\circ\text{F}$ ; -30°C to 15°C,  $\pm 2^\circ\text{C}$ ; 15°C to 50°C,  $\pm 1^\circ\text{C}$ . Display: 2½-digit planar gas discharge with plus and minus signs.

## The Air Navigation Computer helps make your flying safer

3 built-in micro-processors for extra power

Accepts data for up to nine flight leg entries



To match the versatility of the Air Navigation Computer, you would have to have an on-board computer! Accepts preflight data and vectors for up to 9 separate flight legs. Computes magnetic heading, ground speed, true air speed, time to next checkpoint/destination, and estimated time of arrival — all with single keystrokes. Computes in-flight wind and updates ETAs in flight. Rechargeable batteries included. 1.75" H x 3.13" W x 6.38" D. Complies with FAA Advisory Circular No. 60-11.

Kit OC-1401, 3 lbs. .... 139.95

**Assembled OC-1401 Air Navigation Computer.** OCW-1401, 4 lbs. .... 199.95

**Custom Carrying Case Kit for OC-1401, accessories (inset above).** Power supply recharges in 15 hours. Handy pocket for operating guide. 120 VAC. 3.13" H x 12.25" W x 8" D.

Kit OCA-1401-1, 5 lbs. .... 39.95

**Assembled OCA-1401-1 Custom Carrying Case.** OCW-1401-1, 5 lbs. .... 54.95

**Leatherette Carrying Case for OC-1401.** OCA-1401-2, 1 lb. .... 4.95

## Reliable flying with high-accuracy, rugged Aircraft Clock/Timer

GMT/Zulu time on upper display; local time, 24 min./24 hr. trip timer, alarm for low fuel/checkpoint notification on lower display. 14/28 VDC. Fits std. 3½" panel mount. Kit must be returned to us for DMIR inspection before installation in your plane.

Kit OI-1154, 3 lbs. .... 99.95



## LAST CALL on Strobe Light/Beacon

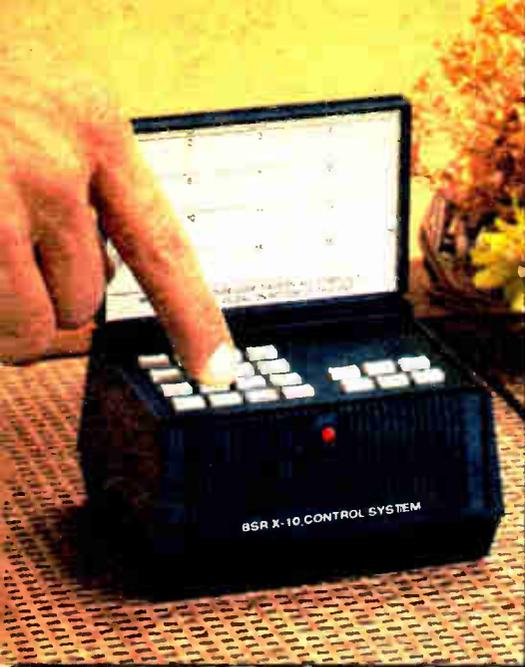
Use as anti-collision beacon, replace std. 3¾" rotating beacon. Operates from 12 VDC neg. gnd., draws 1.5 amps. Meets FAA Reg. 23.1401. Kit must be returned for FAA/PMA certification before installation. One-evening kit.

Kit OL-1155, Shpg. wt. 3 lbs. .... 89.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

WEATHER AND AVIONICS/7



## Control your lights, appliances — all from one convenient unit!

**NEW**  
**\$34<sup>95</sup>**

- Control 16 lights and appliances from one convenient location
- Dim lights to save energy
- Ward off intruders — push one button to light up the entire house
- No special wiring needed

**Ultimate home convenience:** Light that hallway, turn on the news and start the morning coffee — all from the comfort of your bed! The BSR System X-10™ controls up to 16 lights and appliances.

**Improve home security:** When you hear a noise, touch a switch on the Command Console — and all the lights turn on instantly, to scare intruders.

**No installation needed:** Just plug each component into a 120 VAC outlet. Command signals are transmitted over existing wiring, to each unit.

**Total flexibility:** Add up to 16 Lamp, Wall Switch or Appliance Modules. The Timer™ runs your house like clockwork. The Cordless Controller runs lights and appliances up to 30' from GDP-1510. All 120 VAC. Command Console, 4.75" H x 3.5" W x 3.5" D. High-impact plastic. Components sold separately.

**GDP-1510, Assembled, UL Listed, 2 lbs. .... 34.95**

The **Timer Command Console** can turn 8 lights, appliances on/off twice a day. Digital clock. Assembled, tested.  
**GDP-1520,**

2 lbs. .... **64.95**

**Cordless Controller,** for use only with GDP-1510 Command Console. Assembled and tested.  
**GDP-1511, Shpg. wt. 1 lb. .... 19.95**

**Lamp Module** turns on, off or dims incandescent lamps. For 120 VAC, 300 Watts.  
**GDP-1512, Assembled and tested, 1 lb. .... 15.95**

**Wall Switch Module** turns on, off or dims lights normally operated by wall switches. Maximum electrical capacity, 500 Watts. For 120 VAC.  
**GDP-1513, Assembled and tested, 1 lb. .... 16.95**

**Appliance Module** controls televisions, stereos, window fans and other household electrical devices. Maximum electrical load, 15 Amps resistive or ½ hp motor. Plugs into 120 VAC household outlet.  
**GDP-1514, Assembled and tested, 1 lb. .... 15.95**



Control your lights, appliances from almost anywhere in the home

## Get low-cost, reliable security with the Heathkit Informer® Ultrasonic Alarm



**FAST, EASY 2-EVENING KIT**

**\$59<sup>95</sup>**

- Ultrasonic sound waves "see" intruders up to 25 feet away
- Designed to fit in with any collection of fine books
- Use as automatic light switch to make entry brighter, safer
- Built-in delay lets you enter without setting off alarm

This book-size alarm alerts you to the presence of an intruder, up to 25 feet away from the unit. When its ultrasonic field of coverage is broken, the unit activates indoor buzzers, outdoor bells or lights. Built-in time delay allows you to enter the protected area without setting off the alarm.

Also use the Informer as an automatic light switch for your garage, basement or attic — or to alert you to a child getting out of bed.

The beautifully styled Informer will blend in with most any book collection — so intruders won't deactivate the alarm. NOTE: Since the GD-49 Ultrasonic Alarm operates on the same frequencies as some ultrasonic TV remote controls, positioning to eliminate interference may be required. For 120/240 VAC, 50/60 Hz. Overall Dimensions, 10.88" H x 2.38" W x 7.5" D.

**Kit GD-49, Shpg. wt. 5 lbs. .... 59.95**

**GDA-39-1, Indoor Buzzer Alarm, Shpg. wt. 1 lb. .... 10.95**

**GDA-39-2, Outdoor Bell, Shpg. wt. 5 lbs. .... 29.95**



**NEW**

## Now get Television AND Security in one unit!

**\$399<sup>00</sup>**

Answer the door, view the front door caller and talk safely — all through the Zenith Video Sentinel's 12" diagonal B/W TV set. Or monitor any indoor or outdoor location. Also includes camera (with stand), doorbell button (attaches to your present doorbell), intercom, 60' camera-TV cable, 25' intercom-TV cable. TV, 11.38" H x 16.25" W x 12" D.

**GDZ-620, Assembled and tested, Shpg. wt. 47 lbs. .... 399.00**

## Security Dialer automatically calls for help

**\$179<sup>95</sup>**



Hook up to your security system, and our Telephone Security Dialer calls a friend, relative, neighbor or the police. Slide switches permit easy programming of desired number. 3-digit location code. Automatic redial if line is busy. Separate microphone lets you listen to secured area. Uses four 9-volt batteries (included). 4.75" H x 11" W x 6" D (12.07 x 27.94 x 15.24 cm).

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

## Affordable Eye Spy™ Photobeam Alarm

Activates warning devices when beam is broken. Use 120 VAC devices to 300 W. Light source, mirror, relay. Relay, 5.38" H x 4.38" W x 5.25" D; Mirror, 5" H x 4" W x 2.75" D.

**Kit GD-1021, Shpg. wt. 3 lbs. .... 17.95**

**FAST, EASY 1-EVENING KIT**



**NEW**

## Minuteman II: keeps intruders out of your home or business — day or night

- Component system for total user flexibility
- Famous Delta Minuteman II System — now in kit form

No house, apartment or business is immune from burglary or vandalism. So what can you do to protect yourself, your loved ones and your property? One way to assure protection is by using Delta's Minuteman II Ultrasonic Alarm System.

**Minuteman II is a complete security system:** This space protection system uses harmless ultrasonic sound. Strategically placed, it will effectively protect your home or business. Or, if you feel the need for more security, it's expandable — because Minuteman II acts as a master control for other units you want to add. For example, you can add up to three Minuteman Sentinel Detectors — along with indoor/outdoor speakers, key-operated on/off switches, magnetic door contacts, window foil or any other closed circuit switch.

**You get safe, portable protection:** If you move, you can take your Minuteman II Alarm System with you. And because it operates on 15 VDC, there's absolutely no danger from high-voltage shocks.

**Dependable security:** Exclusive built-in safeguards prevent false alarms. And self-testing circuits allow you to assure continued, reliable operation.

**Now available in affordable, easy-to-build kit form:** The world's leader in electronic kits brings you the Delta Minuteman II Alarm System, exclusively in kit form, at prices designed to fit your budget. Easy kit assembly, with step-by-step Heathkit manuals. Separate components are described below.

### 1 Control Unit/Detector runs Minuteman II alarm system

Master Control Unit/Detector protects up to 300 sq. ft. with ultrasonic sound. Controls on/off functions, entry/exit delays, alarm timer, test circuits. Powers external alarm speakers (GDA-1800-3, below right), can initiate a telephone call through the Heathkit GD-1156 Telephone Security Dialer (page 8). Includes plug-in power transformer and provisions for perimeter, supervised, closed circuit security (window foils, magnetic door contacts). Easy kit assembly. 120 VAC, 60 Hz. Dimensions, 3.75" H x 11" W x 6" D.

Kit GD-1800, Shpg. wt. 7 lbs. .... 189.95

### 2 Minuteman Sentinel gives you addition protection

Slave ultrasonic detector protects up to 300 sq. ft. Includes 50' of 4-cond. wire. Requires GD-1800 for power, control. Dimensions, 3.25" H x 7" W x 3.25" D.

Kit GDA-1800-1, Shpg. wt. 4 lbs. .... 64.95



### 3 Key Switch provides you with remote alarm system control

Arm or disarm your Minuteman II Alarm System with this professional-looking key switch accessory. Includes loop-secure LED, to positively indicate armed and secure status — along with a special pick-resistant key and lock set. Requires GD-1800 Master Control Unit/Detector for power. Overall dimensions, 4.5" H x 2.75" W x 2" D (11.43 x 6.99 x 5.08 cm).

GDA-1800-2, Shpg. wt. 3 lbs. .... 29.95

### 4 All-Weather Speaker sounds loud wail indoors or outdoors

Produces up to 108 dB of high/low siren noise (measured at 10'). Suitable for indoor or outdoor installation. Includes 50 feet of wire for connection to GD-1800 Control Unit/Detector. Impedance, 8 ohms. Up to 2 of these speakers may be driven from GD-1800. Dimensions, 5.75" H x 5.75" W x 6.75" D.

GDA-1800-3, Shpg. wt. 3 lbs. .... 24.95



One of the most useful security devices you can buy — now available exclusively in kit form from Heath! The GD-3510 Security Light Control, by Colorado Electro-Optics, uses a passive infra-red sensor to turn on lights at night, when motion is detected. When an intruder is detected, the GD-3510 surprises him with the most recognized deterrent to crime — light. The unexpected lighting makes the intruder think that he has been observed.

You can adjust the GD-3510's 25' x 25' range to automatically light driveway, walkways and steps — to help prevent accidents and light a warm welcome for visitors — as well as for yourself.

How does this revolutionary device work? The passive infra-red sensor detects changes in temperature, when accompanied by motion. It will not trig-

ger on temperature changes without movement. When a warm-bodied object moves through the detection pattern, a relay turns on lights or devices (up to 500 watts). Unit automatically shuts off 4 minutes after all movement has ceased. Manual sensitivity control lets you adjust sensitivity to optimum level. Photo-transistor prevents unit from triggering during daylight.

Save energy, too. Night lighting is used only when needed — not all night long.

You'll enjoy this kitbuilding experience: The thorough Heathkit manual shows you how, step-by-step.

Wire yourself — or consult an electrician, when wiring to your 120 VAC, 60 Hz lighting system. Outdoor Sensor Unit Dimensions, 8.06" H x 5.25" W x 3" D.

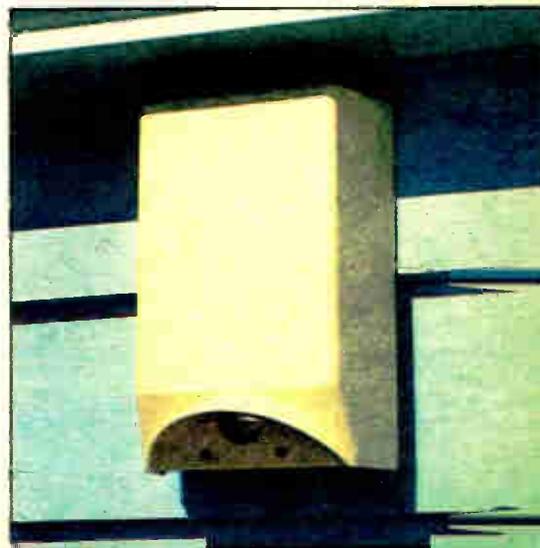
Kit GD-3510, Shpg. wt. 3 lbs. .... 139.95

**NEW**

## Security Light Control makes long, dark nights safer for you

**\$139<sup>95</sup>**

- Makes house safer at night, detects/deters intruders
- Automatically turns on lights when movement is detected



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

## Catch the kit-building fever! Try one of these kits!

If you like doing things with your hands, you'll enjoy building one of these kits. You don't need any electronics knowledge. All you need is a few simple tools and a soldering iron. We provide the rest — all the parts you need and a tested manual with step-by-step instructions. Each part is marked or identified. Each step in the manual has an exploded illustration to guide you through each stage of assembly. So, come on. Catch the kit-building fever! And get your hands into one of these fun and practical kits! And as always, "We won't let you fail."



### Programmable Doorbell greets your visitors with a song!

**\$49<sup>95</sup>**

- Plays up to 16 beats of your favorite tune
- Easy programming procedure lets you change tunes to fit your mood

Imagine the pleasant reaction and smiles on visitors' faces when they're greeted by a friendly tune! What a unique and warm way to say "welcome." What a great way to break the ice for conversation — be it a new neighbor, a guest, or an old friend.

Greet them with our preselected songs, or with one of your own. Our songbook (included) lets you program over 50 songs. They include 15 college songs to reflect your loyalty, 7 seasonal songs plus 9 Christmas songs to mark the time of year, 5 songs to commemorate special occasions, plus many more to celebrate your mood. You can even create your own melodies using the piano-styled programming section.

Programming the songs is easy. A front panel wire keyboard lets you arrange the wires to play up to 16 notes. Special speed and delay controls allow you to set the tune's tempo. There are also controls to adjust the volume and tone to your taste.

The TD-1089 takes just two evenings to assemble with our step-by-step instructions. Its rugged plastic housing measures 5 3/4" H x 8 3/4" W x 2 3/4" D. Power Requirement: 16 VAC, 50/60 Hz, from standard 10 VA doorbell transformer.

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



FAST, EASY  
2-EVENING KIT

### Rechargeable portable light floods work areas with fluorescent light

**\$37<sup>95</sup>**

- Disperses more light than narrow beam flashlights
- Rechargeable — just plug into an AC outlet. No batteries to buy
- Eliminates need for fire-hazardous kerosene lamps or candles

Unlike narrow beam flashlights, this Heathkit GD-1246A Portable Rechargeable Fluorescent Light gives you more light to do what you want to do, where you want to do it. Outdoors or indoors. It makes working in dark areas easier because you see more area around you. And its fluorescent light prevents eye strain — throwing a softer, more illuminating light than conventional flashlights.

The GD-1246A is also easier to maintain than a conventional flashlight. It contains a sealed, extended-life lead-acid battery that is simple to recharge. To rejuvenate it, just plug the charger (included) into a 120 VAC outlet for a few hours. An optional 12-volt adaptor lets you recharge the GD-1246A off your car's cigarette lighter. The GD-1246A's rechargeability ends time-consuming trips to the hardware store for expensive batteries.



FAST, EASY  
1-EVENING KIT

Because the GD-1246A is electrically powered, it's safer to use than gasoline-fueled lanterns, kerosene lamps, or candles. So you can take it on camping trips, fishing trips, or use it any other place without fear of fire or asphyxiation.

The GD-1246A is built to take the outdoors. It has a rugged metal case with a built-in easy-to-grab handle. The case measures 10 3/4" H x 3 3/4" W x 5" D. The fluorescent bulb is protected from dust and dirt by a clear plastic window. The GD-1246A is a practical kit to assemble, because it has so many uses — for camping, hunting, after dark outdoor work, and home and car emergencies.

Kit GD-1246A, Shpg. wt. 6 lbs. .... **37.95**

Kit GDA-1246-1, 12 Volt Charger for car, camper or truck, Shpg. wt. 1 lb .. **5.95**



FAST, EASY  
1-EVENING KIT

Here's a simple kit that can do so much. It puts a switch for a lamp or appliance right where you need it — at any height you want it.



Just **\$18<sup>95</sup>** Light Switch

### Turn on lights and appliances with a touch of a finger with the Heathkit Remote Control Kit

**\$18<sup>95</sup>**

- Feather touch plates can be placed anywhere you need them
- No rewiring necessary — just plug into AC outlet, and plug in lamp or appliance

Just tap the touch plate, and the Heathkit Remote Kit will turn on and off lights and appliances instantly. The touch plate lets you put a switch right where you want it. In any location. At any height.

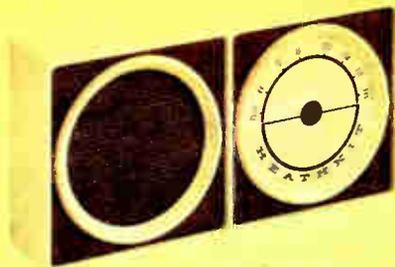
And it takes just one evening to install a Remote Kit — from assembly to setup. There's no rewiring to do. The main unit plugs between an outlet and a lamp or appliance cord. A 20' fine gauge wire and the adhesive touch plate allow you to locate a switch any place in a room.

Kit GD-1187, Remote Kit for incandescent lamps to 150 W. wt. 1 lb. .... **18.95**

Remote Kit for TVs to 225 W, fans to 180 W. Not for AM radios.

Kit GD-1287, Shpg. wt. 2 lbs. .... **19.95**





## Carry your music anywhere with this AM Portable Radio



FAST, EASY  
1-EVENING KIT

**\$16<sup>95</sup>**

• Big 3½" speaker for full sound

Take your music, news, weather, and sports with you anywhere you go with this Portable AM Radio. Built-in ferrite antenna pulls in those hard-to-get fringe area stations. The 3½" speaker sings out your music loud and clear through all volume levels. Runs on readily-available 9 volt battery (not included). Black & white plastic case. Meas: 4" H x 3¼" W x 2" D.

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

## Adjust lights with Tabletop Dimmer



FAST, EASY  
1-EVENING KIT

**\$9<sup>95</sup>**



Control brightness of table lamps and floor lamps for reading, watching TV, or personal moments. Eliminates unnecessary brightness in 3-way bulbs whose low-watt filaments are burned out, and helps bulbs last longer. Insulated plastic case with non-marring feet measures just 3¼" H x 3¾" W x 3¼" D.

Kit GD-1018, Shpg. wt. 2 lbs. .... 9.95

## Freezer Alarm prevents costly food spoilage



FAST, EASY  
1-EVENING KIT

**\$16<sup>95</sup>**



Insure your meats and other frozen foods from spoilage. Alarm beeps with pulsating red light to warn you if freezer door is ajar or if inside freezer temperature rises above +20°F. Requires 2 "C" batteries. Incl. 20' cable. 1¾" H x 3¾" W x 4¾" D.

Kit GD-1183, Shpg. wt. 2 lbs. .... 16.95

## Stop break-ins with Photo Switch



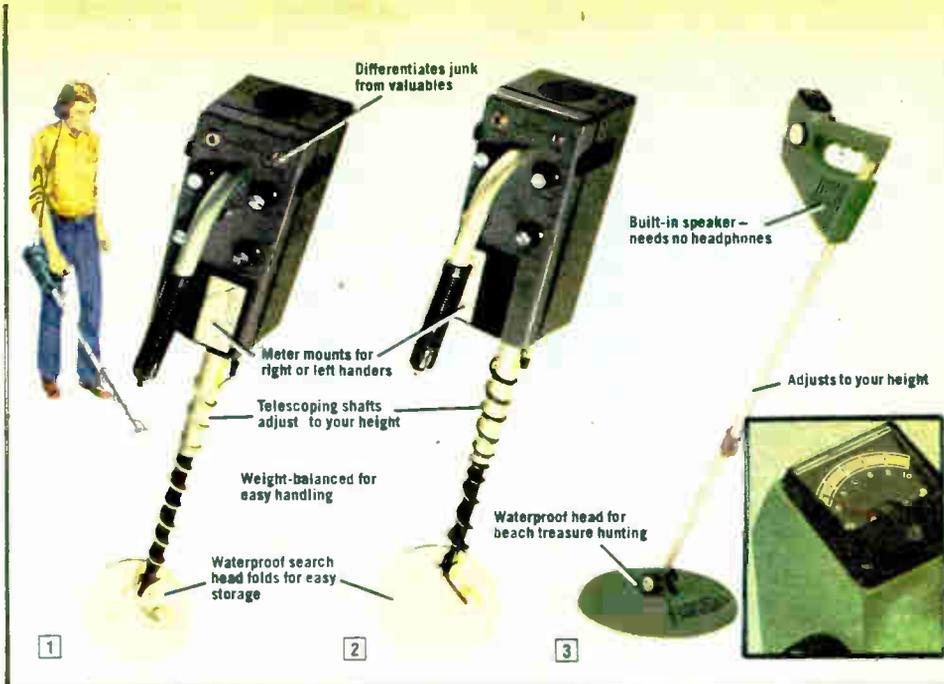
FAST, EASY  
1-EVENING KIT

**\$6<sup>95</sup>**



Reduce the chances of night burglaries with this light sensitive Switch. Turns on lamps (up to 150 W) at night; off at dawn. 3½" H x 2 11/16" W x 2 11/16" D.

Kit GD-600, Shpg. wt. 2 lbs. .... 6.95



## Find buried coins, lost jewelry in soil with these Metal Locators

Think how many times you've lost an expensive ring, change, and other valuables at the beach, park, or cottage. Then think how many other people lose their valuables, too. With Heathkit Metal Locators, you can find lost valuables. Our finest model pin-points small objects in any kind of soil—even highly mineralized soils. And even our lowest-priced model can comb ground submerged in up to two feet of water. So, order a Heathkit Metal Locator today, and find valuables other people let slip away!

### 1 The Groundtrack™— for any soil!

**Detects valuables in any kind of soil!** Yes, even in highly metalized soils that baffle conventional locators. An adjustable discrimination circuit filters out the background signals, screening out pull tabs, metal foil, bottle caps, and other ferrous and nonferrous junk items. Only the signals of coins, jewelry, and other items of value are brought to your attention. In fact, the Groundtrack's fully shielded search coil sifts out the false signals so prudently, it can detect a dime buried 6" deep in the ground!

**Pin-points your treasure.** The Groundtrack features a special induction-balance circuit normally found on units costing twice the price! With this circuit, you hear nothing until that coin, ring or other valuable metal enters the 6-inch diameter search head's field. A tone sounds, then grows louder as you approach the buried item. Search head and shaft can be submerged in water up to 2' deep. Meter deflects up for valuables, down for junk.

**Lightweight and portable.** Take it anywhere! Weighs only 3.5 lbs and is fulcrum balanced to make it feel even lighter. Telescoping shaft adjusts to your height and collapses for space-saving storage. Search head also folds for flat storage. Runs on 6 "AA" cells (not included) or the optional Nickel-Cadmium battery pack, which recharges off home current or car's cigarette lighter.

Kit GD-1290, Shpg. wt. 5 lbs. .... 199.95

GDA-1190-1, Rechargeable battery pack, Shpg. wt. 2 lbs. .... 21.95

### 2 Cointrack™ finds buried coins

**Find coins in sand and other general kinds of soil.** This Heathkit Metal Locator uses an off resonance type detector to find those evasive coins buried in sand or in other low-metalized soils. It features an adjustable discrimination circuit to distinguish valuable coins from pop-tops and bottle caps. A special pushbutton tuning lets you maintain maximum sensitivity over different kinds of conditions. The 6" diameter search head is waterproof, allowing you to cover ground submerged in water up to 2' deep.

**It's easy to carry.** You can take the Cointrack just about anywhere—to the beach, cottage, or park. It weighs only 3.4 lbs., and is weight-balanced for easy handling. The wand telescopes to accommodate your height, and collapses down to 22½" for easy carrying. The search head also folds for compact storage in car or station wagon. Cointrack requires six store-available "AA" batteries, or the optional GDA-1190-1 Nickel-Cadmium Rechargeable Battery Pack. The Pack can be charged from 120 VAC household current or car's lighter.

Kit GD-1190, Shpg. wt. 5 lbs. .... 129.95

GDA-1190-1, Rechargeable Battery Pack, Shpg. wt. 2 lbs. .... 21.95

GDA-1190-2, Headphones for GD-1190 or GD-1290, Shpg. wt. 2 lbs. .... 12.95

GDA-1190-3, Carrying Case for GD-1190 or GD-1290, Shpg. wt. 1 lb. .... 12.95

### 3 Low-cost, sensitive Metal Detector

**Here's a low-priced Metal Detector** that uses an induction balance sensing system to uncover hidden, buried metal objects. Null and attenuated sensitivity control lets you find large or small items without background interference. Easy-to-read meter and speaker (equipped with phonejack) pin-point your find. Requires 9 volt battery.

Kit GD-348, Shpg. wt. 5 lbs. .... 79.95

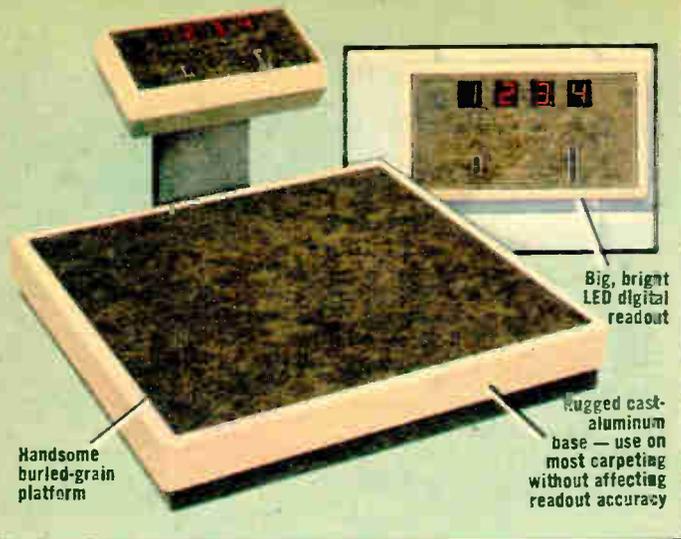
GDA-48-1, 9 volt batt. for GD-348, 1 lb. .... 5.95

GD-396, 600 ohm Superex Headphones, 2 lbs. .... 7.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

METAL LOCATORS/11



Handsome  
burled-grain  
platform

Big, bright  
LED digital  
readout

Rugged cast-  
aluminum  
base — use on  
most carpeting  
without affecting  
readout accuracy

## Heathkit Digi-Scale is a real weight-loser's helper!

- Battery-operated — weigh with space-age accuracy anywhere
- Electronic mechanism delivers weights accurate to 2/10 pound

The Heathkit Digital Electronic Scale is an ideal companion — wherever you go. It's more accurate than mechanical scales costing much more, so dieters can accurately measure daily weight loss. Take this battery-operated scale anywhere. Weigh yourself immediately after exercising — or even after a shower! The Heathkit Digi-Scale features an electronic strain-gage mechanism that eliminates mechanical weights and springs that can go out of adjustment. Rugged cast aluminum base means you can use the Digi-Scale on most carpeting, without affecting the readout accuracy. Choose readouts in pounds or kilograms. Custom mounting option places readout at eye level. Platform dimensions, 1.63" H x 11.63" W x 11.63" D.



Accurately weighs  
smaller items



Weigh the baby without  
weighing the blanket

Kit GD-1186, Shpg. wt. 9 lbs. .... 99.95

Factory Assembled and Adjusted Electronic Digi-Scale. Non-detachable readout. Reads in pounds only, in increments of 2/10 pound.

GDW-1186, Shpg. wt. 9 lbs. .... 139.95

**GD-1186 SPECIFICATIONS:** Resolution: 1 part in 3000. Accuracy: 1% or 1 count, whichever is greater. Repeatability: 0.5% of reading or 1 count. Overload Capacity: 50% of full capacity (Not damaged by weight up to 450 lbs.). Power Requirement: 6 "C" size dry cell or alkaline batteries (not supplied).

## FM Intercom for clear, reliable communications

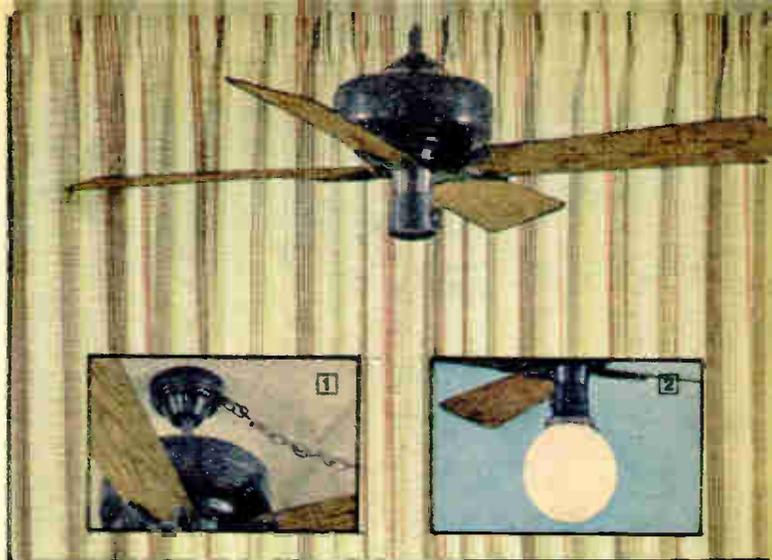
- Wireless — uses AC house wiring
- Phase-locked loop circuit assures quiet operation



Here's an intercom you can use anywhere indoors — from baby's room to laundry, from garage/workshop to kitchen — as long as the units are on the same AC power transformer. Just build, plug into an AC outlet and communicate. Pleasant call tone alerts other units. Transmit indicator lights in the talk mode. Dictate squelch locks the station in talk mode for hands-free operation. Automatic squelch helps reduce noise when not in use. 3-inch speaker. For 120 VAC, 60 Hz. Dimensions, 3" H x 8.63" W x 5.75" D. Two stations required to operate; stations sold separately.

Kit GD-1114, Shpg. wt. 3 lbs. .... each station 49.95

12/HOME PRODUCTS



## Cut heating/cooling costs with this Casablanca® Fan

- Circulates stagnant air for even heating, quiet cooling
- Adds a distinctive decorative touch to any room

The Heathkit Casablanca Fan is the nostalgic, decorative way to keep heating and cooling costs down, and assure your comfort for every season of the year. The Casablanca Fan brings heat down from high ceiling areas during heating season. And it provides whisper-quiet cooling in your home, for just pennies a day, in cooling season — by circulating stagnant air.

With its fan motor finished in a warm baked-bronze enamel, the Heathkit Casablanca Fan features chain-pull or wall switch operation, variable speed adjustment from 100-140 revolutions per minute (rpm), and 52-inch-wide blades (tip to tip). Slow-Speed Accessory (GDA-1238-4, listed below), cuts fan speed for smaller rooms, lower ceilings. For an even more charming decorative effect, add the optional Swag-Chain or Light Kits, both listed below. For 120 VAC, 60 Hz. Not recommended for ceilings under 8 feet high.

Kit GD-1238A, Shpg. wt. 24 lbs. .... 129.95

Slow-Speed Accessory. Lowers speed of the Heathkit Casablanca Fan to 50-100 rpm. Ideal for smaller rooms.

GDA-1238-4, Shpg. wt. 1 lb. .... 15.95

1 Swag-Chain Kit. Mount your Casablanca Fan most anywhere. Includes 18" antique brass swag chain, gold electrical cord and hardware.

GDA-1238-1, Shpg. wt. 4 lbs. .... 14.95

2 Decorative Light Kit. Adds Old World charm and dual purpose. Includes decorative glassware, glassware holder and mounting accessories.

Kit GDA-1238-2, Shpg. wt. 3 lbs. .... 16.95

## Ultrasonic Cleaner for delicate jobs



FAST, EASY  
2-EVENING KIT

- Cleans safely
- Uses most any cleaning solution or detergent



The Heathkit Ultrasonic Cleaner makes short work of most hard-to-clean projects. Deep clean watch parts, most jewelry, dentures or any delicate item that could be damaged or otherwise harmed by hard scrubbing, harsh cleaners or abrasives. Just fill the stainless steel tank with any detergent or cleaning solution safe for the item to be cleaned. Place the object(s) in the tank, set the timer and the GD-1151 Ultrasonic Cleaner does the rest. Easy kit assembly — takes as little as two evenings. For 120 VAC, 60 Hz. Tank measures 6" L x 4" W x 2.38" D. Overall Dimensions, 4.63" H x 5.75" W x 11" L (including lid).

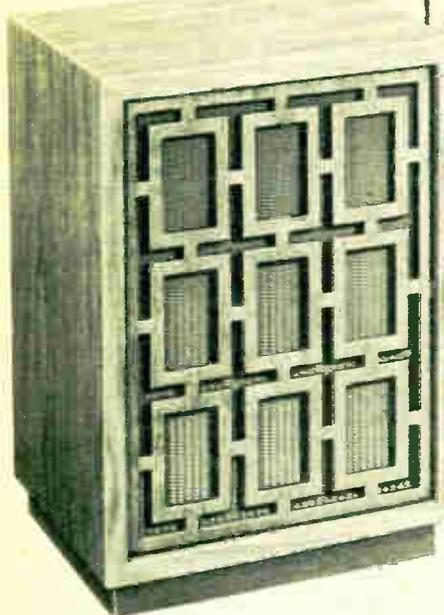
Kit GD-1151, Shpg. wt. 5 lbs. .... 99.95



Credit Card Orders Call TOLL-FREE: 800-253-0570



## Clear any room of allergy-producing dust and pollen with the improved Heathkit Electronic Air Cleaner



The new Heathkit GD-1297 Electronic Air Cleaner is the ideal way to keep your air fresh and clean, all year long — even in today's tighter, better-insulated living spaces. Cleaner air reduces the need for cleaning, painting and redecorating caused by airborne pollution that stains and soils your home. And clean air is especially important if someone in your home suffers from allergies.

We've improved this popular product for better performance. A new squirrel cage fan lets you enjoy peace and quiet. Three speeds deliver enough air flow to quick-clean a room (250 cubic feet per min-



**\$229<sup>95</sup>**



FAST, EASY  
1-EVENING KIT

- Eliminates 99% of all airborne pollen and 94% of all airborne particles in any room
- Squirrel cage fan runs more quietly than ever
- Designed for easier, more enjoyable kit assembly
- Operates on just pennies a day, and helps cut your home cleaning costs, too
- Portable so you can use it in any room, up to 25' x 30', wherever you need clean air!

ute), or as little as 100 cfm to maintain a constant supply of fresh air. Removable charcoal filter permits periodic replacement (see below). Electrostatic filter cleans easily in the dishwasher.

Simplified kit assembly features pre-built filter construction. And there's still no soldering! 120 VAC, 60 Hz. 26.5" H x 17.25" W x 13.5" D.

Kit GD-1297, Shpg. wt. 59 lbs. .... 229.95  
GDA-1297-1, 4 Deluxe Casters, Shpg. wt. 2 lbs. 13.95  
Replacement Charcoal Filter fits GD-1297 and former GD-1247 Cleaners. GDA-1297-2, Shpg. wt. 2 lbs., 6.95

## Electronic Air Cleaner installs in any furnace for fresher air



**\$199<sup>95</sup>**

- Automatic — works with your heating/air conditioning system
- Installs without changing ductwork



Breathe the clean, fresh air again. Removable filter is easy to clean; pads are a snap to replace. Installs on standard systems directly in place of present filters, usually without altering ductwork. For 2-zone homes, two filters may be used with single power supply. 120 VAC, 60 Hz. Power Supply Dimensions: 8" H x 12" W x 4" D (20.32 x 30.48 x 10.16 cm). Shpg. wt., 24 lbs. each. NOTE: Installation may require service by qualified electrician. Check local building codes. Kits differ in filter panel size. Check filter size capacity before ordering.

Kit GD-1196-1, 20" x 25" x 2", 1000 cfm .... 199.95

Kit GD-1196-2, 20" x 20" x 2", 800 cfm .... 199.95

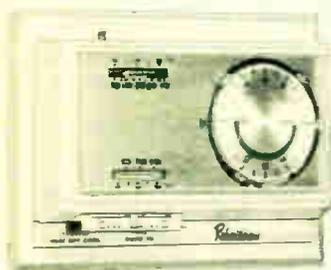
Kit GD-1196-3, 16" x 25" x 2", 800 cfm .... 199.95

Kit GD-1196-4, 16" x 20" x 2", 640 cfm .... 199.95

Extra Filters: Use order nos. above, with GDA prefix (i.e., GDA-1196-1, 20" x 25" x 2", Filter Only), Avg. Shpg. wt. 11 lbs. .... each 109.95

Accessory Air Flow Switch allows air to flow to automatically start cleaner. Required w/24 VAC systems. For 120 VAC. Kit GDA-1196-5, 2 lbs. .... 27.95

## The Robertshaw Convertible Automatic Set-Back Thermostat works for you, not against you!



**\$54<sup>95</sup>**

- Pays for itself in no time — helps you save up to 20% on heating and cooling bills
- Automatically adjusts temperature to fit your schedule
- Installs easily on most 24 VAC home heating systems

It makes good sense to replace your perfectly good thermostat with the new, assembled Robertshaw Convertible Automatic Set-Back Thermostat. Once set, it never wastes heating or cooling at night when sleeping, or while you're away. Automatically increases when you need it. Choose 1 or 2 energy-saving periods in a 24-hour time span. Self-charging, battery-powered timing device changes temperature from 1 to 10 degrees F at times you select. Uses same wiring as your old thermostat. Easy installation on 4 or 5-wire 24 VAC furnace control systems. Not for heat pumps. 3.38" H x 5.5" W x 2.13" D.

GDP-1369, Shpg. wt. 2 lbs. .... 54.95

## Programmable Setback Thermostat can help save up to 1/5 on your home heating bill



**\$39<sup>95</sup>**

- A low-cost way to keep winter fuel costs down
- Setback feature automatically reduces room temperature up to twice per day



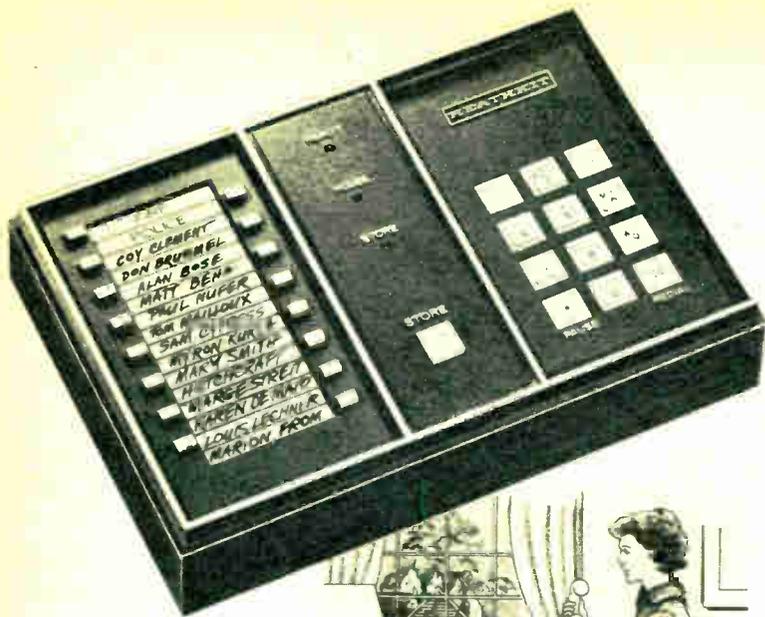
FAST, EASY  
2-EVENING KIT

The Heathkit GD-1776 Setback Thermostat automatically reduces room temperature during one or two pre-programmed periods each day. Temperature setback feature is adjustable, up to more than 10 degrees F, for periods of 1/2 hour minimum to 2 1/2 hours maximum. When each setback period ends, temperature is automatically increased to normal levels. And the GD-1776's Econ/Normal switch can override the timer. For 120 VAC. NOTE: For use only with single-stage 24 VAC heating systems. Some installations may require service by a licensed electrician. Check local building codes.

Kit GD-1776, Shpg. wt. 5 lbs. .... 39.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411



## Respond in an emergency when speed counts with the Heathkit One-Button Phone Dialer

**\$79<sup>95</sup>**

- Use just one button to call up to 16 separate phone numbers; pushbutton re-dial if line is busy
- Respond fast in any emergency situation — use memory to store fire, police, ambulance numbers
- Converts dial phones to push-button convenience

A fire or other emergency is no time to be looking for the fire department or police phone number. The Heathkit One-Button Phone Dialer comes to the rescue by dialing a vital number with the push of one button. And if the number is busy, the automatic re-dial feature lets you call the last number dialed with the push of another button.

You can program emergency telephone numbers — and still have enough memory for numbers of frequently-called neighbors, businesses, friends and relatives; the One-Button Phone Dialer can store up to sixteen full 15-digit telephone numbers (enough for all access or area codes).

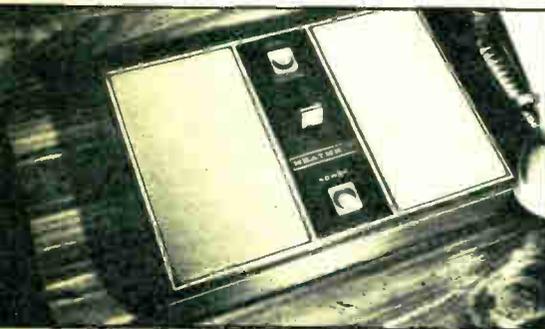
Easy programming lets you change telephone numbers quickly. A special memory-saver circuit maintains stored numbers, if your electrical power should be interrupted (9 VDC battery not included).

Converts any telephone to pushbutton convenience: the GT-1217 One-Button Phone Dialer is compatible with both standard and Touch-Tone telephone services. It complies with all FCC interconnection regulations; however, the GT-1217 cannot be used on party lines or pay telephones.

An ideal first-time kitbuilding experience, assembly is easy — and so is operation and programming. Housed in an attractive 2" H x 8.75" W x 5.75" D high-impact plastic case, our Dialer features a convenient two-color, heavy-duty label that allows you to write in the numbers you have programmed. Want to change numbers? The label is easily erasable.

Convenient: The GT-1217 ends the inconvenience of looking up every number.

Kit GT-1217, Shpg. wt. 3 lbs. .... **79.95**



## Talk or listen with both hands free when you build our Telephone Amp

**\$49<sup>95</sup>**

- Talk without lifting the receiver
- Talk from up to 10 feet away

Save time! Work with both hands while you talk on the phone. To answer the phone, simply press the power button; to hang up, just press it again. A voice-activated switch changes instantly from talk to listen. Talk from up to 10 feet away from the phone. It comes complete with 1/4" phone plug, 1 3/4" square 4-pin phone plug and 6' of 4-conductor cable for easy installation. Runs on one 9 VDC battery (not included). Impact-resistant plastic case. Requires regular telephone to initiate calls. Dimensions, 2.50" H x 8.50" W x 5.75" D.

Kit GD-1112, Shpg. wt. 3 lbs. .... **49.95**

Kit PS-2350, 120 VAC Converter, 1 lb. .... **4.95**

Kit PS-2450, 240 VAC Converter, 1 lb. .... **14.95**

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

**NEW**

## Get phone messages from anywhere!

**\$299<sup>95</sup>**

- Great for homes where both husband and wife work, or for taking calls when you're not home

Screen incoming phone calls with the Record-A-Call Remote 80A Telephone Answering System.

It's more versatile: Remote control means you can call the 80A from another phone, and hear all your messages automatically. After listening, reset the tape to the beginning — or save all previous messages, while recording new calls. Twin-cassette system means you can play back messages without listening to your own pre-recorded message each time.

Easy to use: Single-knob control. Voice-actuated, so callers won't be cut off before they're finished. Or choose fixed 30-second message time.

You can even use the 80A as a dictating machine, or record 2-way conversations using the built-in beeper. 120 VAC, 60 Hz. 3.88" H x 11.88" W x 9" D.

GDP-1237, Assembled and tested, 12 lbs. ... **299.95**



## Get super-accurate temperatures with this Digital Thermometer

**\$49<sup>95</sup>**

- Ideal for medical applications
- Reads out in just 10 seconds

Get fast, accurate temperatures for medical uses, photo processing, baby's bath and many other applications. This Digital Thermometer reads temperatures from 32° to 230° F (0° to 110° C) with ±0.2° F (±0.1° C) accuracy in the biomedical range, 0.5% accuracy overall and 0.1° F or C resolution. And it never needs calibration! Solid-state integrated circuit technology gives you accurate, 4-digit readings in as little as 10 seconds. This digital marvel weighs just 5.5 ounces, and fits comfortably in your hand for maximum versatility. A shock-resistant high-impact plastic case protects it from damage. Operates on one 9 VDC battery (not included) for up to a year under normal use. Low battery warning. 2" H x 2.5" W x 5" L.

GD-1226, Assembled and tested, 2 lbs. .... **49.95**



## Zenith® AC/DC Portable Radio for AM/FM listening



**\$37<sup>95</sup>**

- Assembled radio features excellent FM reception
- AGC on AM and FM smooths out signal variations
- Quality 3.5" speaker, tone control for rich, full sound — even outdoors
- AC or DC operation

Designed to provide years of dependable listening enjoyment, the Zenith Model R-70 Table Radio features solid-state design for low energy usage. 10 tuned circuits, 2 ceramic filters for excellent performance. Shadow Taupe/Black cabinet with bright aluminum/chrome trim. Uses 120 VAC or 3 "C" cell batteries (not included). Dimensions, 5.75" H x 9" W x 2.75" D (14.6 x 22.9 x 7.0 cm).

GRZ-70, Factory assembled and tested, Shpg. wt. 4 lbs. .... 37.95

## Assembled, rich-sounding Zenith AM/FM Table Radio



**\$74<sup>95</sup>**

- Bass Booster tuned port enhances bass reproduction
- 5.25" speaker w/ 9-oz. magnet for full sound — or use your own speaker

Tuned RF stage, AFC, AGC, external antenna connection for great reception. Lighted, easy-to-see convex tuning dial. Slide bass, treble controls. Simulated Walnut cabinet, black grille. 120 VAC. 9.5" H x 16" W x 6.5" D.

GRZ-430, Factory assembled and tested, Shpg. wt. 14 lbs. .... 74.95

## Zenith Multi-band Radio keeps you in touch



**\$99<sup>95</sup>**

- Factory Assembled and Tested
- Covers AM, FM, Low/High/UHF PSB, Aircraft bands
- AGC on AM, AFC on FM, Squelch for PSBs and Air
- AC or DC operation for true portability, versatility

Stay in touch with police, fire, aircraft — just about everything in town. Covers 30-50, 108-135, 144-174 and 450-470 MHz, as well as AM and FM. High-impact black cabinet. Includes convenient carrying strap. 8.88" H x 11.88" W x 3.88" D. Operates on 120 VAC or 4 "D" cells (not included).

SWZ-1000, Factory assembled and tested, Shpg. wt. 6 lbs. .... 99.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

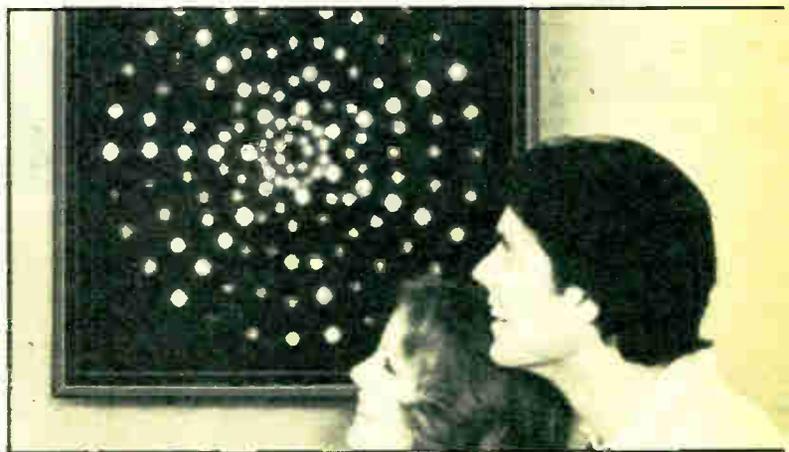


## Digital Alarm Clock Radio with rich AM/FM sound

- Stay on-time — even if your electrical power fails — thanks to the built-in fail-safe circuit
- Catnap with the 7-minute alarm delay button

Loaded with convenient features: 24-hour set-and-forget alarm, built-in 3" x 5" oval speaker for truly fine sound, and a style that fits anywhere. The GR-1075 displays time in the convenient 12-hour format. Shows AM and PM, too. A lighted decimal pulsates to indicate seconds, and also shows that the alarm is properly set. The 24-hour alarm cycle can wake you with a gentle, pulsating electronic beep — or with soft music from the AM or FM radio station of your choice. High-quality electronics, along with 300  $\mu$ V/M AM and 5  $\mu$ V FM sensitivities, make sure you'll pull in a large selection of stations, day or night. And for the sleepyhead, the clock's 7-minute alarm delay cycle will give you up to an hour of relaxing catnaps. Two 9-volt batteries (not included) take over during power failures and keep the clock counting perfect time. For 120/240 VAC, 50/60 Hz. Dimensions, 4.5" H x 13.63" W x 8.13" D (11.43 x 34.62 x 20.65 cm).

Kit GR-1075, Shpg. wt. 10 lbs. .... 149.95



## Musical Light Show adds to your sound system



FAST, EASY  
2-EVENING KIT

- 140 lights pulsate in time with the music — every tune different!
- Bach to rock — your records and tapes never said so much before

The Heathkit Light Show adds exciting sights to your sound system. Just connect it 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 lower mid-range, green for upper midrange and amber for treble (140 lights total). It's wild — the lights pulsate in time to the music, creating spokes of swirling color. Add new color and dimension to your sound system today. Buy the Heathkit Light Show. Operates on 120/240 VAC. Input is 1 volt RMS min. to 22 volts max. Line isolation provides protection. Dimensions, 22.75" H x 22.75" W x 4.5" D. Kit TD-1006, Shpg. wt. 34 lbs. .... 109.95



## Our 5280 Series of Instruments makes a perfect starter test bench

The 5280 Series of test instruments is an excellent way to assemble a truly versatile test bench, without spending a lot of money. Choose from five different 5280 Series Instruments — including an Audio Oscillator, RF Oscillator, high-performance Multimeter, RCL Bridge and Signal Tracer. And a special Power Supply can power all five instruments simultaneously.

Designed for the beginning hobbyist, student or service technician, the 5280 Series will let you work on many types of electrical and electronic equipment. You'll find that these instruments are designed with both low cost AND high quality in mind. Whether you're doing service work or just experimenting, the 5280 Series represents real value for your dollar.

### 1 Multimeter for volts/ohms/DC current

The Heathkit IM-5284 High-Performance Solid-State Multimeter gives you four different functions and a large, easy-to-read panel meter. Features include AC and DC voltage measurements to 1000 Volts and DC current measurement to 1000 milliamps, full scale. The ohmmeter function is divided into four ranges: X1 ohm, X100 ohms, X10 kilohms and X1 megohms. High-impact molded case. Power requirements are met by one "C" cell — in addition to two 9 VDC batteries or the IPA-5280-1 Power Supply. This easy-to-assemble Heathkit product includes test probes.

Kit IM-5284, Shpg. wt. 5 lbs. .... 44.95

**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. Accuracy:  $\pm 4\%$  of full scale. DC Input Resistance: 10 megohms. AC Input Resistance: 1 megohm. Dimensions: 5.75" H x 11" W x 7.75" D (14.61 x 27.94 x 19.69 cm).

### 2 RF Oscillator for radio/TV alignment

This unit, which includes probes, is suitable for use in aligning tuned stages of AM, FM and television receivers. Output is divided into five bands — from 310 kHz to 110 MHz — and features an extra 100 to 200 MHz band of calibrated harmonics. An added feature of the IG-5280 is its 1 kHz audio output. This signal, available at a front panel jack, is ideal for tracing and isolating circuit defects in receiver audio stages, and also serves as a source of internal AM modulation. Housed in a high-impact molded case, the IG-5280 is powered by two 9 VDC batteries, or by the optional IPA-5280-1 Power Supply. Easy to assemble; includes test leads.

Kit IG-5280, Shpg. wt. 5 lbs. .... 44.95

**IG-5280 SPECIFICATIONS:** RF Output: Frequency Range: 310 kHz to 110 MHz, in five bands; 100 MHz to 220 MHz on harmonics. Output Voltage: Approximately 100 mV. Internal Modulation: 1 kHz. AF Output: Frequency: 1 kHz. Output Voltage: 2.0 Volts RMS (open circuit). Dimensions: 5.75" H x 11" W x 7.75" D (14.61 x 27.94 x 19.69 cm).

### 3 Sine/Square Wave Audio Oscillator

The IG-5282 Sine/Square Wave Audio Oscillator is an instrument you'll find useful in many audio test applications. Frequency output is in four ranges, from 10 Hz to 100 kHz, in either sine or square wave modes. Use the IG-5282 as an audio signal source during signal tracing or, with the appropriate associated equipment, use the sine wave output for audio stage gain and distortion analysis. If you want to determine frequency response, you'll find the square wave output ideal (with appropriate associated equipment). Rugged, molded construction. Kit-building time is greatly reduced, because all components mount on a single circuit board.

Kit IG-5282, Shpg. wt. 5 lbs. .... 44.95

**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 Requirement: Two 9-volt batteries or the optional IPA-5280-1 Power Supply. Dimensions: 5.75" H x 11" W x 7.75" D (14.61 x 27.94 x 19.69 cm). Net Weight: 3.25 lbs.

### 4 RCL Bridge: ideal for design work

Priced right for your pocketbook; with features you can appreciate. Solid-state circuitry lets you easily determine unknown values of resistance, inductance and capacitance. Resistance is indicated in three ranges from 10 ohms to 10 megohms, inductance in three ranges from 10  $\mu$ H to 10 H, and capacitance — also in three ranges — from 10 pF to 10  $\mu$ F. Easy-to-build: single circuit board speeds assembly. Comes with molded cabinet, component clips.

Kit IB-5281, Shpg. wt. 5 lbs. .... 44.95

**IB-5281 SPECIFICATIONS:** Resistance Ranges: 10 ohms to 10 megohms, in three ranges. Inductance Ranges: 10 microhenries to 10 Henries, in three ranges. Capacitance Ranges: 10 picofarads to 10 microfarads, in three ranges. Oscillator Frequencies: 1 kHz, 10 kHz, 100 kHz. External Standard Range: 1/1 to 10/1. Power Requirement: Two 9 VDC batteries, or optional IPA-5280-1 Power Supply. Dimensions: 5.75" H x 11" W x 7.75" D (14.61 x 27.94 x 19.69 cm). Net Weight: 3.50 lbs.

### 5 Signal Tracer for audio circuits

If you have been waiting to add an audio signal tracer to your bench because the price was just too high... look again. The IT-5283 Signal Tracer makes a great, low-priced addition to your trouble-shooting arsenal. A diode-equipped RF probe (furnished with the kit) lets you quickly trace radio and television receiver and transmitter circuits to reveal component and stage failures. When you flip the probe to its straight-through (DC) position, you are able to locate defective circuitry in all types of audio components and systems with ease. In the audible position, the Signal Tracer emits a tone that changes in frequency depending on the test point voltage or resistance, thereby allowing you to easily trace signal flow through logic circuits to isolate problems.

Kit IT-5283, Shpg. wt. 5 lbs. .... 44.95

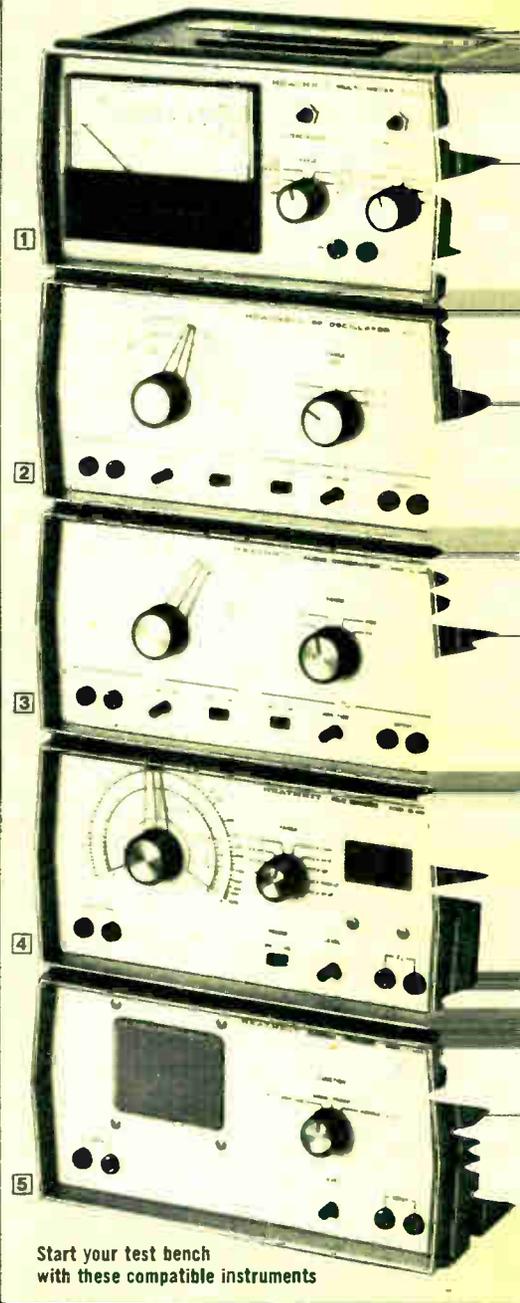
**IT-5283 SPECIFICATIONS:** Functions: Substitute speaker, AF signal tracing, RF signal tracing, Audible volt/ohmmeter. Speaker: 3", permanent magnet type. Power Requirement: Two 9 VDC batteries or optional IPA-5280-1 Power Supply. Dimensions: 5.75" H x 11" W x 7.75" D.

### 5280 Series 120/240 VAC Power Supply

Not shown. Provides all voltages required by 5280 Series Instruments from 120 or 240 VAC, without rewiring. Can power all 5 instruments simultaneously. Full wave rectification, capacitor filtering and dual integrated circuit regulators to insure correct voltage output. 6" H x 3.75" W x 3" D.

Kit IPA-5280-1, Shpg. wt. 3 lbs. .... 24.95

Your choice **\$44.95** each



Start your test bench with these compatible instruments

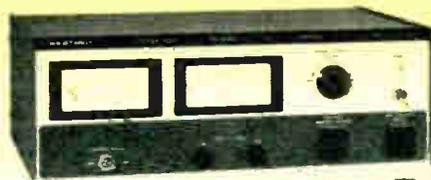


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INSTRUMENTS/17



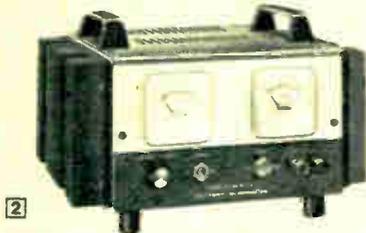
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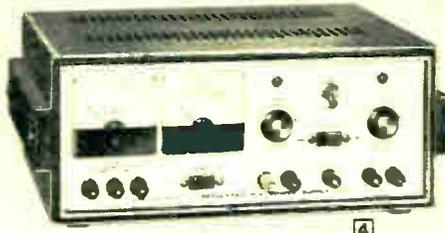
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### 1 Tri-Output Power Supply is ideal for design or experimentation

This Tri-Output Power Supply combines fixed 5 VDC output with two continuously adjustable 0-20 VDC outputs for circuit designs requiring more than one voltage supply. The outputs can be interconnected in any combination to provide both positive and negative voltages with fixed reference, or can "float." 4½" H x 10¾" W x 9" D. Kit IP-2718, 12 lbs. .... 99.95

SP-2718, Factory assembled and tested, Shpg. wt. 12 lbs. .... 185.00

**IP/SP-2718 SPECIFICATIONS:** Outputs: 5VDC 2 1.5A; A & B; 0-20 VDC @ 0.5A. Regulation: Load: less than 0.1% variation from no load to full load on 20V supplies; less than 3% variation from no load to full load on 5V supply. Line: less than 0.2% variation for line voltage change of 10V on 20V supplies; less than 0.15% variation for line voltage change of 10V on 5V supply. Power Requirement: 120/240 VAC, 60/50 Hz, 100 W full load.

### 2 Heavy-Duty Power Supply/Battery Eliminator aids service work

This Heavy Duty Power Supply features two easy-to-read front panel meters monitor current and voltage. Continuously variable voltage from 9 to 15 VDC. Kit IP-2715, Shpg. wt. 31 lbs. .... 149.95

**IP-2715 SPECIFICATIONS:** Output Voltage: variable from 9-15 VDC. Output Current: 12 amps continuous, 20 amps intermittent (per derating curve in manual). Ripple: less than 1% at full load. Regulation: less than 2% variation from no load to full load. Fuses: 7A, 3 AG slow-blow primary; 20A 3 AG output. Power Requirement: 120 VAC, 7A or 240 VAC, 3.5 A, 60/50 Hz. Dimensions: 5¼" H x 11" W x 11" D (13.3 x 27.9 x 27.9 cm).

### 3 Variable Isolated AC Supply gives you more service versatility

Provides complete isolation between AC line and any equipment plugged. 360

volt-amps of AC power. Continuous full-rated output capability. Switch-selected, individually fused 1 A, 3 A ranges. 5.5" H x 15" W x 10.5" D.

Kit IP-5220, Shpg. wt. 28 lbs. .... 139.95

### 4 Put this 0-400 VDC general-purpose Supply on your bench

Provides 0-400 VDC at 0-100 mA continuous (125 intermittent) with excellent line and load regulation. 120/240 VAC. 5½" H x 13¼" W x 11" D.

Kit IP-2717, Shpg. wt. 19 lbs. .... 149.95

SP-2717, Factory assembled & tested, wt. 19 lbs. .... 210.00

### General-purpose Power Supplies to fill your service needs

Accurate source of voltage and current for all testing and design requirements.

5 Kit IP-2710, 30 V @ 3 A analog, Shpg. wt. 34 lbs. .... 169.95

SP-2710, Assembled & tested analog, 34 lbs. .... 280.00

6 Kit IP-2711, 30 V @ 3 A digital, Shpg. wt. 36 lbs. .... 229.95

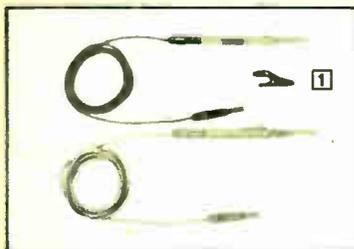
SP-2711, Assembled & tested digital, 35 lbs. .... 350.00

**SP-2700 SERIES SPECIFICATIONS:** Output Voltage: 30 V; Output Current: 3.0 A. Readout Range: Voltage: 0 to 30; Current: 0 to 3.0. Regulation: Voltage: 0.05% + 1 mV; Current: 0.10% + 3.5 mA.

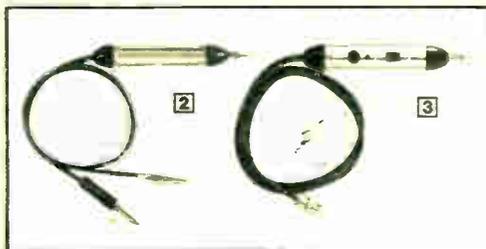
### 7 Versatile continuously variable 1-15 VDC Regulated Supply

Continuously adjustable 1-15 VDC at 500 mA output, 500 mV line and load regulation, adjustable current limiting. 120/240 VAC. 4¾" H x 5½" W x 5¾" D.

Kit IP-2728, Shpg. wt. 5 lbs. .... 29.95

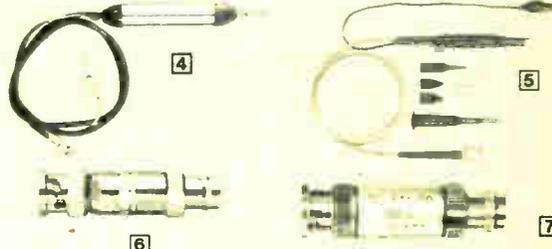


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1 Test Lead Set. 2000 V rms, 20 A max. 1.5 meter black & red cables terminated by 4mm shielded plugs, red sprung hook, red prod, black shrouded croc clip. PKW-200, Shpg. wt. 1 lb. .... 14.95

2 RF Probe for any 10 or 11 MΩ DC input voltmeter. Linear response, 1000 Hz-100 MHz. 10 MΩ banana plug, 11 MΩ phone plug. Kit PK-3A, 1 lb. .... 9.95  
PKW-3A, Assembled & tested, 1 lb. .... 14.95

3 Low capacitance Scope Probe for direct or X10 use;

options for 3.3 or 1 megohm input resistance. Banana plug/BNC option. Kit PK-1, 1 lb. .... 9.95

4 Scope Demodulator Probe for distortion checks, RF & IF display. 30 V rms max. 500 VDC max. Banana plug/BNC option. Kit 337-C, 1 lb. .... 7.95

5 Combination X1, X10 Scope Probe. 2-position multiplier for X1 and X10 probe tip. DC to 15 MHz (X1), DC to 80 MHz (X10) bandwidths. X10 risetime, 4.0 nS. PKW-105, Assembled & tested, 1 lb. .... 29.95

6 RF Fuse in UHF BNC-to-BNC connector. DC to 500 MHz; 50 ohms; 1.2:1 SWR (max.); insertion loss 1.80 dB max. at 500 MHz. SU-512-50, 1 lb. .... 60.00

7 50-Ohm Termination. DC to 1 GHz; 1 W. SWR. 250 MHz, 1.2:1, 600 MHz, 2.1. SU-511-50, 1 lb. .... 19.00

Accessory Cables. For interconnecting scopes, counters, etc. All cable is RG-58/U, 50 ohm impedance.

SU-501-3, 3 ft., BNC/BNC, assembled, 1 lb. .... 7.50

SU-503-3, 3 ft., BNC/Banana, assembled, 1 lb. .... 7.50





1

## 1 High-performance Heathkit Curve Tracer tests semiconductors quickly

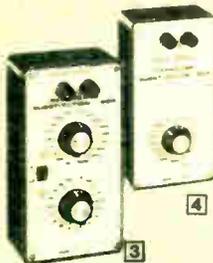
Connect the IT-3121 to an oscilloscope with horizontal sensitivity of 0.5 V/div. and vertical sensitivity of 1 V/div. and horizontal gain. Then inspect bipolar transistors, diodes, SCRs, triacs, FETs, etc. for specific applications. Extensive manual tells how to interpret displays. Extra leads included.

Kit IT-3121, Shpg. wt. 10 lbs. .... 119.95

**IT-3121 SPECIFICATIONS:** Sweep Voltage Ranges: 0-40 V at 1 amp. max. 0-200 V at 200 mA max. Sweep Voltage Sampling: 1-50 V/div.  $\pm 3\%$ . Sweep Current Sampling: .5-200 mA/div.  $\pm 3\%$ . Sweep Dissipation Resistors: 0-1M at  $\pm 10\%$ . Step Currents: .002-10 mA/step,  $\pm 3\%$ , +250 nA offset current max. Step Voltages: .05-1 volt/step,  $\pm 3\%$ ,  $\pm 5\%$  mA max. offset voltage. Calibration Source: 9 V  $\pm 2\%$  in 1 V steps. Polarity: PNP and NPN (P Channel-N Channel). Oscilloscope Requirements: Bandwidth to 20 kHz or greater. (DC-coupled oscilloscope is recommended). Power Requirement: 120/240 VAC. Dimensions: 4½" H x 11¼" W x 10" D.



2



4

3

## 2 Decade Capacitance Box for lab use

Helps you determine unknown capacitance values without the necessity for involved calculations. Covers 100 pF to 0.111  $\mu$ F in 100 pF increments. 400 VDC rating. Metal case. 4" H x 7½" W x 5" D.

Kit IN-3127, Shpg. wt. 2 lbs. .... 26.95

## 3 Resistor Substitution Box saves time

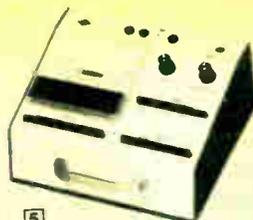
Provides for switch selection from any of 36 EIA standard 10% tolerance, 1-watt resistors from 15 ohms to 1 megohm. "Shorting type" switches with make-before-break action permit smooth selection of resistance values without opening or shorting the circuit. Metal case. 5¾" H x 3¾" W x 3" D.

Kit IN-3137, Shpg. wt. 2 lbs. .... 19.95

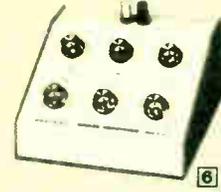
## 4 Capacitor Substitution Box cuts math

Determine values without calculations. Switch selection of any of 18 EIA standard capacitors from 100 pF to 0.22  $\mu$ F. All are rated at 600 V, except 3 lowest and 2 highest values, 500 and 400 V respectively. Accuracy is  $\pm 5\%$  for values from 0.0001  $\mu$ F through .00047  $\mu$ F; and  $\pm 10\%$  for 0.01 through .22  $\mu$ F. Rugged metal cabinet measures 3" H x 3" W x 6" D (7.6 x 7.6 x 15.25 cm).

Kit IN-3147, Shpg. wt. 2 lbs. .... 19.95



5



6

## 5 High-accuracy FET/Transistor Tester lets you test in- or out-of-circuit

For quick, accurate tests of conventional (bi-polar) transistors, diodes, FETs, SCRs, triacs and unijunction transistors. Tests components either in-circuit using color-coded test leads supplied, or out-of-circuit using built-in sockets. Shows gain (DC Beta), trans-conductance (Gm) and leakage directly on the large, easy-to-read meter. Five current ranges permit leakage measurements as low as 1  $\mu$ A and collector currents as high as 1 ampere. Push-button function switches; battery testing circuit. Housed in sturdy metal case.

Kit IT-3120, Shpg. wt. 5 lbs. .... 69.95

**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  $I_{eb}$ ,  $s$ ,  $I_{b}$ ,  $b$ ,  $s$  and emitter current. Power Requirement: Two 1½ V alkaline cells (not supplied). Dimensions: 5" H x 9¾" W x 8¾" D.

## 6 Lab-type Decade Resistance Box

An accurate, lab-type instrument for use when precision resistors are required for an electrical measurement or circuit design. It covers 1 ohm to 999,999 ohms in 1 ohm steps. Use in conjunction with the IN-3127 Decade Capacitance Box to solve complex resistance and capacitance network problems. Resistors are 1-watt, 0.5% tolerance. Housed in a sturdy, metal case the Decade Resistance Box measures 5" H x 7½" W x 6¾" D.

Kit IN-3117, Shpg. wt. 3 lbs. .... 49.95



## High quality instrument Test Probes

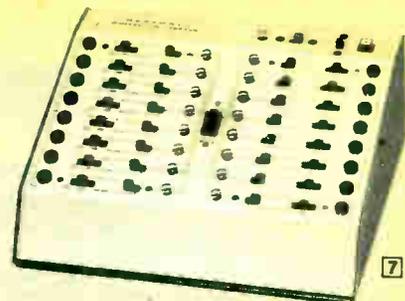
30 kV High-Voltage Probe multiplies DC ranges of any 10-megohm meter by 100. 1000 megohm input.

Kit IMA-100-10, Shpg. wt. 1 lb. .... 12.95

30 kV HV Probe. x100 measurement for meters with 11-megohm input (including probe resistance).

Kit IMA-100-11, Shpg. wt. 1 lb. .... 12.95

30 kV Probe for x1000 attenuation for meters with 1-MU input impedance. Kit IMA-1000-1, 1 lb. 12.95



7

## 7 This deluxe Heathkit Digital IC Tester is designed to save you checking time

Quality "zero-force" insertion socket, exclusive "bounce-free," mercury stepping switch, input-output jacks for each pin, neon indicators. Install 14- or 16-pin ICs in any position. Ideal for Digital Techniques Course (p. 39). Metal case. 4¾" H x 11¾" W x 9¼" D (11.75 x 28.9 x 23.5 cm).

Kit IT-7400, Shpg. wt. 6 lbs. .... 89.95

**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 +5, 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: 120/240 VAC, 60/50 Hz.

## 8 Portable Transistor/Diode Checker

Checks transistors for shorts, opens, leakage, current gain; diodes for forward/reverse current; continuity. Uses two 1.5 V "C" cells (not included). 3¾" H x 3¾" W x 3¾" D. Kit IT-3127, 2 lbs. 13.95

## High-performance Logic Probe for TTL/CMOS circuits

Convenient memory reset

Logic zero indicator

Logic "1" indicator

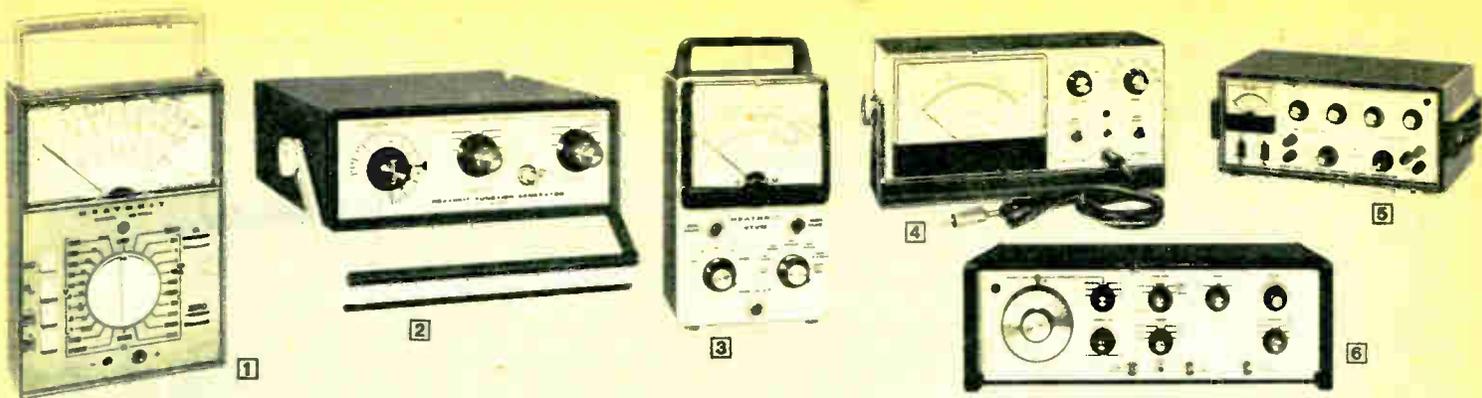
LED shows power level

Detects and indicates high and low logic levels in TTL or CMOS circuitry. Detects logic signals to 100 mHz, polarity and presence of single pulses as short as 10 nSec, and shows intermediate or "bad" logic levels. Includes 34" power leads with strain relief and color-coded mini-clips, and detachable high-frequency ground clip. ¾" H x 1" W x 9¼" L.

Kit IT-7410, Shpg. wt. 1 lb. .... 39.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411



### 1 Value-packed Solid-State FET VOM

VTVM capabilities — VOM versatility. Diode-protected 4.5" taut-band meter. Extra-wide frequency response for audio, other applications.

Kit IM-1104, Shpg. wt. 4 lbs. .... 114.95

**IM-1104 SPECIFICATIONS:** Voltage Ranges: 0.1-1000 VAC/VDC. Milliammeter Range: 0.01-1000 mA. Resistance Range: Less than 1 ohm to more than 100 megohms. dB Range: -40 to +62 dB. Power Requirements (not supplied): One 1.5 VDC D cell, four 1.5 VDC AA cells. Dimensions: 6.95" H x 4.95" W x 2.25" D.

### 2 1 Hz-1 mHz Function Generator

Generates accurate sine, square, triangular waveforms from 1 Hz-1 mHz, 10 V (p-p) signal into 50 ohm load. Needs triggered scope for calibration.

Kit IG-1271, Shpg. wt. 7 lbs. .... 139.95

SG-1271, Assembled, 7 lbs. .... 195.00

**IG/SG-1271 SPECIFICATIONS:** Attenuator: 0-50 dB, 10 dB steps; 0-20 dB min. variable,  $\pm 1$  dB. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 3" H x 7.25" W x 8.88" D (handle removed).

### 3 Measure with this low-cost VTVM

For solid-state, digital equipment. Single probe for

### 4 Save 30% on this accurate VOM

Features low-friction taut-band meter with diode/fuse-protected movement. Calibrated controls, DC polarity reversal, front panel ohms adjustment.

Kit IM-105, 3 lbs. .... Was \$99.95, Now 69.95

**IM-105 SPECIFICATIONS:** Voltage Range: 0-500 VAC/VDC. DC Current Range: 0-10 A. Resistance Ranges: X1 to X10K. dB Range: -10 to +56 dB. Batteries (not included): One 1.5 VDC, one 15 VDC. Dimensions: 7" H x 5" W x 2.25" D.

### 2 AC/DC Multimeter for field or bench

Auto-polarity; high, low volts/ohms functions for in and out-of-circuit checks of semi-conductors.

Kit IM-5225, Shpg. wt. 8 lbs. .... 139.95

SM-5225, Assembled, Shpg. wt. 8 lbs. .... 185.00

**IM/SM-5225 SPECIFICATIONS:** Voltage: 0-1 kV. Current: 0-1000 mA. Resistance: X1 to X1M. Power Requirement: 120/240 VAC. Dimensions: 6.88" H x 5.75" W x 11.25" D.

### 3 AC Voltmeter measures voltage, dBs

Excellent frequency response and sensitivity for high-accuracy measurements — and one of the only instruments of its type to feature linear scales for both voltage and decibels (dBs).

all measurements. Wide 25 Hz-1 mHz response for AC measurements. Precision 4.5" color-coded 200  $\mu$ A meter; 1% precision network resistors.

Kit IM-5218, Shpg. wt. 5 lbs. .... 69.95

SM-5218, Assembled, 5 lbs. .... 75.00

**IM/SM-5218 SPECIFICATIONS:** Voltage Ranges: 0-1500 VAC RMS, VDC; 0-4000 VAC p-p. Resistance Ranges: 1 ohm to 100 megohms. Accuracy: DC,  $\pm 3\%$ ; AC,  $\pm 5\%$ . Power Requirements: One 1.5 VDC C cell (not included) and 120/240 VAC, 50/60 Hz. Dimensions: 7.38" H x 4.69" W x 4.25" D.

### 4 Use this quality VTVM on your bench

Bench-type version of IM-5218. All calibration controls conveniently adjustable from the front panel.

Kit IM-5228, Shpg. wt. 6 lbs. .... 69.95

SM-5228, Assembled, 7 lbs. .... 120.00

**IM/SM-5228 SPECIFICATIONS:** Voltage Ranges: 0-1500 VDC (up to 30 kV with accessory probe), 0-1500 VAC RMS. Resistance Range: 0.1 to 1000 megohms. Power Requirements: One 1.5 VDC C cell (not supplied) and 120/240 VAC, 50/60 Hz. Dimensions: 5" H x 12.69" W x 4.75" D.

### 5 Sine, square-wave Audio Generator

Acts as signal source for gain, frequency response

and harmonic distortion measurements; external modulator for RF generators.

Kit IG-5218, Shpg. wt. 10 lbs. .... 119.95

SG-5218, Assembled, 10 lbs. .... 185.00

**IG/SG-5218 SPECIFICATIONS:** Frequency: 1 Hz-100 kHz. Sine Wave Output: 0.003-1 VRMS, 600 ohm load; to 10 VRMS with 10K ohm or higher external load. dB: -62 to +22 dB,  $\pm 1$  dB (10-100 Hz). Square Wave Output: 0-1, 1, 10V p-p into 2K ohms or higher load. Power Requirement: 120/240 VAC. Dimensions: 5.13" H x 13.25" W x 7" D.

### 6 Lin/Log Swept Function Generator

Sine, square, triangle, swept-function waveforms. Pen lift, control signals for chart recorders. Calibration requires triggered scope.

Kit IG-1275, Shpg. wt. 15 lbs. .... 299.95

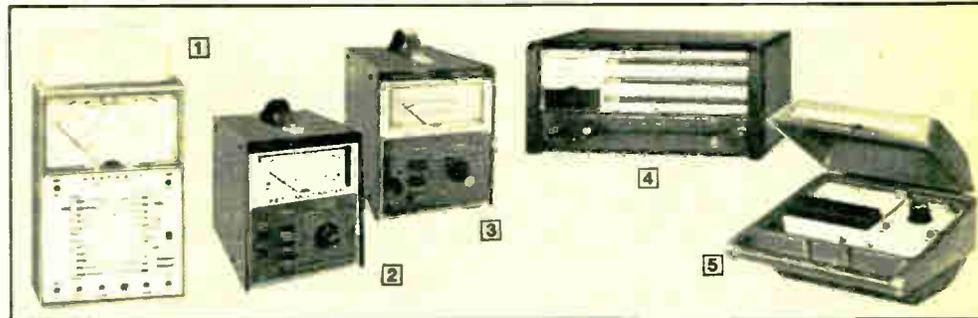
**IG-1275 SPECIFICATIONS:** Frequency Range: 0.003 Hz-3 mHz. Power Requirement: 120/240 VAC. Dimensions: 5.38" H x 15" W x 11.88" D.

Wired Replacement Probe for IM-5228 or IM-5218.

PKW-4, Shpg. wt. 1 lb. .... 10.95

Solid-State Modification Kit converts your IM-5218 or IM-5228 to instant-on solid-state operation.

IMA-18-1, Shpg. wt. 1 lb. .... 19.95



Kit IM-5238, Shpg. wt. 8 lbs. .... 99.95

SM-5238, Assembled, Shpg. wt. 8 lbs. .... 160.00

**IM/SM-5238 SPECIFICATIONS:** Voltage: 1 mV-300 VAC. dB: -70 to +40 dB. Power Requirement: 120/240 VAC. Dimensions: 6.75" H x 5.63" W x 10.88" D.

### 4 Sine-wave Audio Generator

For audiophiles, design, servicing. Low-distortion sine wave output from <5 Hz-100 kHz.

Kit IG-1272, Shpg. wt. 11 lbs. .... 169.95

**IG/SG-1272 SPECIFICATIONS:** Frequency Accuracy: Push-buttons —  $\pm 4\%$ ,  $\pm 1$  Hz, typical  $\pm 1.5\%$ ; Variable — de-

pends on accuracy of counter used. Output Voltage: 0.003-10 VRMS. Attenuation: 10-70 dB. Output Load: 600 ohms. Dimensions: 5.5" H x 11" W x 12.33" D.

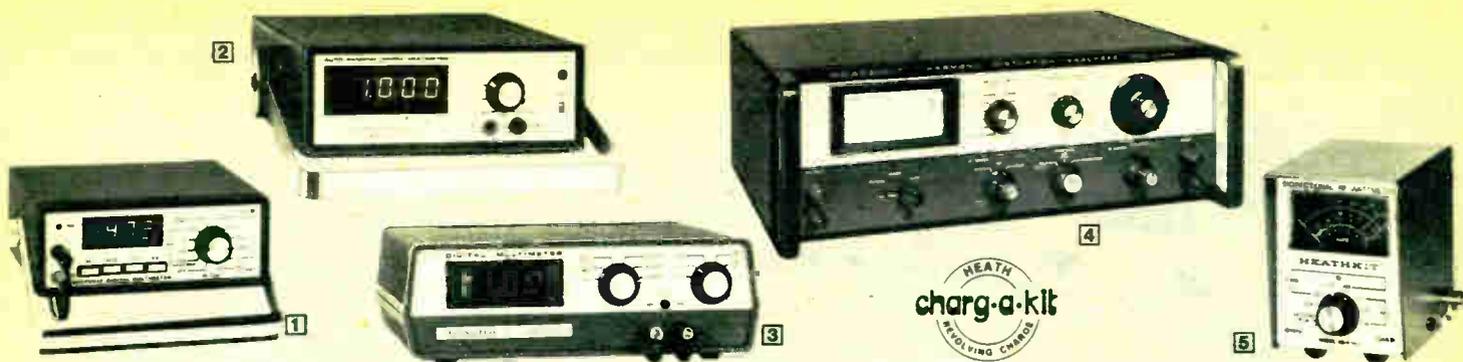
### 5 Portable VOM for fast checks

Build in just one evening! 1.5 V ohmmeter for checking semiconductors. Function switch gives both AC, DC readings without changing test lead connections.

Kit IM-5217, Shpg. wt. 4 lbs. .... 39.95

**IM-5217 SPECIFICATIONS:** Voltage Range: 0-500 VAC/VDC. Resistance Ranges: X1 (10 ohms center scale), X100, X10K, X1M. Batteries (not included): Two 9 VDC cells, one 1.5 VDC C cell. Dimensions: 5.38" H x 9.38" W x 9" D.





### ① Save \$20 on 26-Range Multimeter

Lightweight, compact and highly accurate for in-the-field use, the IM-2202 Portable Digital Multimeter has 100 percent overrange capability, separate voltage and current inputs for circuit protection. Twenty-six ranges measure AC and DC voltage, DC current, resistance. Two-volt full scale measurement on 1K, 10K and 1 meg resistance ranges allows forward biased junction testing of semiconductor devices. 3 1/2-digit display with leading zero suppression, automatic polarity indication. 120/240 VAC, 50/60 Hz. 3" H x 8.25" W x 8" D.

Kit IM-2202, 8 lbs. Was \$219.95, NOW ONLY 199.95

**IM-2202 SPECIFICATIONS:** DC Voltage Range: 0-1000 Volts. Accuracy:  $\pm 0.5\%$ ,  $\pm 1$  digit. AC Voltage Range: 0-750 Volts. Accuracy:  $\pm 1.5\%$ ,  $\pm 3$  digits. Frequency Response: 50 Hz to 1 MHz, except 50 Hz to 10 kHz on 100 mV and 1 V ranges. Current Ranges/Voltage Drops: 100  $\mu$ A/100 mV, 1 mA/100 mV, 10 mA/100 mV, 100 mA/150 mV, 1000 mA/300 mV. Accuracy: DC,  $\pm 0.5\%$  — except  $\pm 1.0\%$  on 1000 mA range; AC,  $\pm 1.0\%$  — except  $\pm 1.5\%$  on 1000 mA range. Resistance Ranges/Test Currents: 100 ohms/1 mA, 1K ohms/1 mA, 10K ohms/0.1 mA, 100K ohms/1  $\mu$ A, 1 megohm/1  $\mu$ A. Accuracy:  $\pm 2\%$ ,  $\pm 1$  digit. Normal Mode Rejection: 35 dB. Common Mode Rejection: 80 dB. Power Requirement: 120/240 VAC, 50/60 Hz. Overall Dimensions: 3" H x 8.25" W x 8" D (7.64 x 20.96 x 20.32 cm).

### ① Save \$50 on this accurate, reliable Strip Chart Recorder for lab use

Digital chart drive provides 10 chart speeds, English or metric. Four calibrated input spans. Remote capability, pushbutton chart advance, electric pen lift and switchable input filter. 120/240 VAC.

Kit IR-5204, 22 lbs. Was \$339.95, NOW ONLY 289.95  
SR-204, Assembled, 22 lbs. . . . . 465.00

**Dual-Pen Lab-Quality Strip Chart Recorder.** Uses ONLY pens listed with IR-5207 below.

SR-206, Assembled, 39 lbs. . . . . 1450.00  
Pens for IR-5204/SR-204 Recorder. Nylon tip.

SU-406-92, Red Pen, 1 lb. . . . . 3.00  
SU-406-93, Blue Pen, 1 lb. . . . . 3.00

**Chart Paper for IR-5204/SR-204/SR-205.** All 120' Inch-calibrated with 0.1" divisions, 0-100 R-L.

SU-445-17, Shpg. wt. 2 lbs. . . . . 5.95

**Centimeter-calibrated, offset 4 cm on R, 0-100 R-L.**  
SU-445-18, Shpg. wt. 2 lbs. . . . . 5.95

**IR-5204/SR-204 SPECIFICATIONS:** Chart Width: 10" (25 cm with optional metric drive). Chart Speeds: 10, 5, 2, 1, 0.5, 0.2, 0.1, 0.05, 0.02, 0.01 in/min (cm/min with metric drive). Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 5.34" H x 17.41" W x 12.31" D.

### ② 3 1/2-Digit, Auto-Ranging Multimeter

Automatically selects proper range; high accuracy; 5 AC, DC voltage ranges to 1000 V; 5 AC, DC current ranges to 2000 mA; 10 resistance ranges (low and high voltage) to 20 megohms. DC accuracy,  $\pm 0.2\%$ ; AC,  $\pm 0.4\%$  when calibrated to lab standards.

Kit IM-2212, Shpg. wt. 10 lbs. . . . . 289.95

Save 50% on Optional Rechargeable Battery Pack.  
IMA-2212-1, 4 lbs. . . . . Was \$39.95, NOW ONLY 19.95

**IM-2212 SPECIFICATIONS:** Voltage Ranges: 0-1000 VDC; 0-700 VAC. Current Range: 0-2000 mA. Resistance Ranges: Low Voltage, 0-2 megohms; High Voltage, 0-20 megohms. Power Requirements: 120/240 VAC, 50/60 Hz or IMA-2212-1. Overall Dimensions: 3.13" H x 7.50" W x 11" D.

### ③ Low-cost, accurate Multimeter

Four AC/DC voltage and current ranges, 5 resistance ranges. Overload protection on all ranges, isolated floating ground, universal banana jack inputs for easy testing of electronic equipment.

Kit IM-1210, Shpg. wt. 5 lbs. . . . . 79.95

SM-1210, Assembled, Shpg. wt. 5 lbs. . . . . 130.00

**IM/SM-1210 SPECIFICATIONS:** Voltage Ranges: 0-1000 VDC, 0-700 VAC. Current Range: 0-2000 mA. Resistance

### ② X-Y Recorder with precision, versatility

Front panel controls for easy operation. Front panel input filters with pushbutton controls let you tailor filtering to your exact requirements. Select ranges from 1 mV to 10 Volts. Accurate to  $\pm 0.5\%$  of full scale. Also features integral horizontal or vertical paper holddown, electric pen lift to zero coordinates.

Kit IR-5207, Shpg. wt. 28 lbs. . . . . 479.95

SR-207, Assembled, 30 lbs. . . . . 795.00

**Disposable Nylon Pens for SR-206/IR-5207/SR-207.**

**Pens for chart recording speeds under 1 inch/minute.**

SU-205-3, Long Red Pen, 1 lb. . . . . 3.00

SU-205-4, Long Blue Pen, 1 lb. . . . . 3.00

SU-205-6, Short Red Pen, 1 lb. . . . . 3.00

**Pens for chart recording speeds over 1 inch/minute.**

SU-205-5, Long Red Pen, 1 lb. . . . . 3.00

SU-205-7, Short Blue Pen, 1 lb. . . . . 3.00

**IR-5207/SR-207 SPECIFICATIONS:** Chart Size: 8.5" x 11" (21.59 x 27.94 cm). Sweep Speeds: 0.02, 0.1, 0.2, 1 and 2 in/sec (0.04, 0.2, 0.4, 2 and 4 cm/sec). Balance Time: Less than 1 second for full-scale deflection. Maximum Common Mode Input Voltage: 400 Volts. Power Requirement: 120/240 VAC, 50/60 Hz. Overall Dimensions: 5.63" H x 17.63" W x 12.25" D (14.30 x 44.28 x 31.16 cm).

Range: 0-2 megohms. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 3" H x 8.69" W x 10.54" D.

### ④ Pro-Quality Distortion Analyzer

Measures THD down to 0.03% from 5 Hz-100 kHz. 120/240 VAC. 5.38" H x 15" W x 11.50" D.

Kit IM-5258, Shpg. wt. 17 lbs. . . . . 229.95

Intermodulation Distortion Analyzer. Measures IMD instead of THD. Kit IM-5248, 14 lbs. . . . . 119.95

Save \$60.05 on Assembled version. SM-5248, 15 lbs. . . . . Was \$190.00, NOW ONLY 129.95

### ⑤ Rugged Bi-Directional Wattmeter

Covers 100-1000 mHz. 30/75/300 W forward, 3/7.5/30 W reflected without slugs, elements. 5% forward accuracy. N-type coax connectors, N to PL-259 adapters. Requires 9 VDC battery (not included).

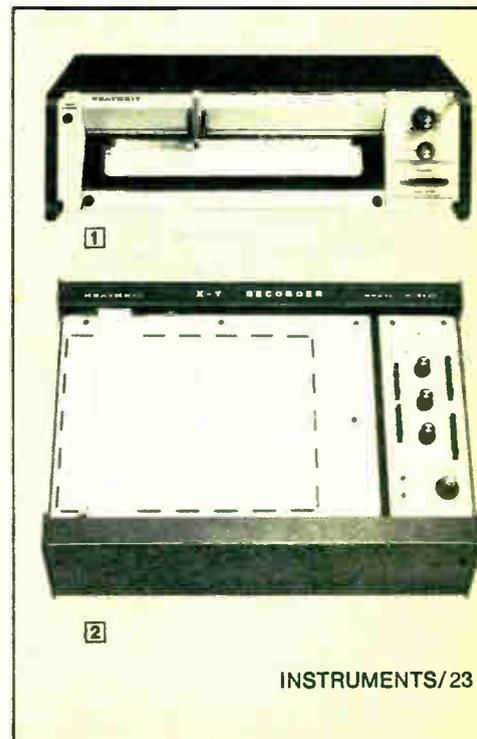
Kit IM-4190, Shpg. wt. 3 lbs. . . . . 99.95

SM-4190, Assembled, 3 lbs. . . . . 120.00

### Versatile Metric Test Lead Set

2000 VRMS, 20 A max. With 1.5 meter black, red cables terminated by two 4mm shielded plugs; red sprung hook; red prod; black shrouded croc clip.

PKW-200, Shpg. wt. 1 lb. . . . . 14.95





## Another Heathkit instrument breakthrough — this low cost 10 Hz-225 mHz Digital Frequency Counter

**\$119<sup>95</sup>**  
Kit

- Convenient single input for entire range
- Excellent typical 10 mV sensitivity
- Big, easy-to-read 8-digit display

Now you can get the quality and accuracy you're looking for from a Heathkit frequency counter — without spending a lot of money. Our engineers are constantly looking for better values you can put to good use. The new Heathkit IM-2410 Frequency Counter represents new capabilities, unavailable up to now for this budget-pleasing price.

The IM-2410 accurately measures the frequencies of input signals between 10 Hz and 225 MHz. One single input covers the entire frequency range, making the IM-2410 more convenient for you to use.

Make direct connections to the IM-2410. Or, for frequency counts without direct connections, use the optional SMA-2400-1 Swiveling Telescopic Antenna (p. 65).

The IM-2410 measures frequencies in two ranges — between 10 Hz and 50 MHz, and from 20 MHz to 240 MHz — for better resolution and accuracy. Set the versatile dual time gate switch to either 0.1 or 1.0 second ranges for even better resolution. The crystal-controlled time base provides very good long-term stability and accuracy  $\pm 1$  ppm.

The full eight-digit display is easy-to-read, and always reads out directly in MHz to provide higher resolution (as fine as 1 Hz at 50 MHz, 10 Hz at 225 MHz.)

For even easier use, the IM-2410's pivoting stand places the counter at a more convenient viewing angle. The IM-2410 Frequency Counter features a rugged and compact cabinet — made of metal for greater durability and better RFI (Radio Frequency Interference) shielding — as well as a locking swing-down bail to elevate the front of the counter to a more desirable viewing angle. Complete voltage protection assures worry-free operation.

Exceptional accuracy and simplified operation combine to make the IM-2410 a valuable instrument for the engineer, technician and hobbyist alike.

Kit IM-2410, Shpg. wt. 6 lbs. .... **119.95**  
SM-2410, Factory assembled and tested, 6 lbs. .... **159.95**

**IM-2410 SPECIFICATIONS:** Display: 8-digit LED display. Frequency Ranges: 10 hertz to 50 megahertz, 20 megahertz to 225 megahertz. Maximum Sensitivity: 25 millivolts, Root Mean Square (RMS). Typical Sensitivity: 10 millivolts, Root Mean Square (RMS). Input Impedance: 1 megohm, shunted by less than 24 picofarads. Input Protection: 150 volts AC, up to 100 kilohertz — derating to 5 volts AC from 160 megahertz to 225 megahertz. Internal Time Base Frequency: 3.58 megahertz. Stability:  $\pm 1$  part per million (ppm). Temperature Stability:  $\pm 10$  parts per million (ppm), from 0 to 40 degrees Celsius. Gate Time: 1 second or 0.1 second, switch selectable. Frequency Resolution:  $\pm 1$  hertz from 10 hertz to 50 megahertz with gate time set at 1 second;  $\pm 10$  hertz from 10 hertz to 50 megahertz with gate time set at 0.1 second;  $\pm 10$  hertz from 20 megahertz to 225 megahertz with gate time set at 1 second;  $\pm 100$  hertz from 20 megahertz to 225 megahertz with gate time set at 0.1 second. Power Requirement: 120/240 volts AC, 50/60 Hz, 25 Watts maximum. Dimensions: 3.38 inches H x 7.25 inches W x 9.5 inches D (8.57 x 18.42 x 24.13 cm).

## You will get easy one-hand operation and top performance from the Heathkit Hand-Held Digital Multimeter



3 1/2-digit LC display is easier to read

**\$94<sup>95</sup>**  
Kit

- Measures AC and DC voltage, current and resistance
- Built-in calibration references

The features you need at a price you'll like. Great for field use — pushbutton switches permit easy one-hand operation. Special alternating voltage for testing semiconductors, in-circuit resistance. Pivoting stand for bench use. 9 V alkaline battery lasts up to 200 hours, or use optional AC cords.

**IM-2215 SPECIFICATIONS:** DC Voltage: Ranges:  $\pm 200$  mV,  $\pm 2$  V,  $\pm 20$  V,  $\pm 200$  V,  $\pm 1000$  V. Accuracy: Lab standards,  $\pm 25\%$  of reading  $\pm 1$  count. Input Impedance: 10 megohms. Overvoltage Protection: 1000 VDC, 750 VAC. AC Voltage: Ranges: 200 mV, 2 V, 20 V, 200 V, 750 V RMS. Accuracy (50 and 60 Hz): Lab standards,  $\pm 5\%$  of reading  $\pm 3$  counts. Frequency Response: 2 mA range, 40 to 200 Hz; all other ranges, 40 Hz to 1 kHz. Input Impedance: 10 megohms, shunted by approximately 100 pF. Overvoltage Protection: 200 mV range, 1000 VDC, 15 seconds maximum over 300 VAC; all other ranges, 1000 VDC, 750 VAC. DC Current: Ranges:  $\pm 2$  mA,  $\pm 20$  mA,  $\pm 200$  mA,  $\pm 2000$  mA. Accuracy:  $\pm 75\%$  of reading  $\pm 1$  count. AC Current: Ranges: 2, 20, 200, 2000 mA. Accuracy:  $\pm 1.5\%$  of reading  $\pm 3$  counts, 40 Hz to 1 kHz (40 to 200 Hz in 2 mA range). Resistance: Ranges: 200 ohms, 2 kilohms, 20 kilohms, 200 kilohms, 2 megohms, 20 megohms. Accuracy: 200 ohm range,  $\pm 3\%$  of reading  $\pm 3$  counts; 20 megohm range,  $\pm 2\%$  of reading  $\pm 1$  count; all other ranges,  $\pm 25\%$  of reading  $\pm 1$  count. Power Requirement: One 9-volt battery. Dimensions: 2" H x 3.5" W x 7.5" L (5.08 x 8.89 x 19.05 cm).

Kit IM-2215, Shpg. wt. 2 lbs. .... **94.95**  
SM-2215, Assembled and tested, 2 lbs. .... **129.95**  
IMA-2215-1, Leather Carrying Case, 1 lb. .... **14.95**  
PS-2350, 120 VAC Outlet Cord, 1 lb. .... **4.95**  
PS-2450, 240 VAC Outlet Cord, 1 lb. .... **14.95**

### Get more with instrument books



**Understanding and Using Oscilloscopes.** A helpful guide covering functions, circuits and more. EDP-139 .... **7.95**

**101 Ways to Use Your Oscilloscope.** Practical applications for oscilloscopes in troubleshooting and design work. EDP-149 .... **5.50**

**101 Ways to Use Your VOM/VTVM/DVM.** Practical applications for your meter, presented in easy-to-understand text. EDP-150 .... **9.95**

**How to Use Color TV Test Instruments.** Helpful information on servicing color TV sets. EDP-138 .... **5.95**

See page 52 for complete book ordering information.

Your best buy in a hand-held, solid-state DMM



Metal case for added durability, better RFI shielding

Large, easy-to-read LED display has 8 digits for higher resolution

Measure signals from 5 Hz-512 mHz, period of signal, frequency B divided by frequency A

Two ranges for added versatility: 5 Hz-50 mHz and 40 mHz-512 mHz

50 ohm input for high-frequency signals

1 Megohm input for low-frequency signals

Standby mode for maximum accuracy—the minute you turn the counter on

Trigger level control for stable, more accurate counting of most any signal



## This low-priced Portable 5 Hz-512 mHz Frequency Counter gives you digital accuracy!

**NEW**



FAST, EASY  
4-EVENING KIT

**\$239<sup>95</sup>**  
Kit

- Extra-wide frequency range for maintenance of UHF, VHF radios
- Crystal-controlled time base for excellent long-term stability and accuracy

- Features four gate times and 8-digit resolution to give you more precise readings
- Provides you with two separate inputs and trigger level control for added versatility

UHF capability up to 512 mHz, low-frequency capacity down to 5 Hz and a budget-pleasing price are all yours when you choose the newest Heathkit Digital Frequency Counter. Service technicians and do-it-yourselfers will find its extended frequency range ideal for servicing UHF 2-way radios now used by police and fire departments — as well as most other communications equipment.

Our engineers have designed more features and added capabilities into this laboratory quality Heathkit instrument. For example, the IM-2420 can do more than measure the frequencies of input signals — its period function can give cycle time in seconds, while the frequency ratio function provides the ratio between two input frequencies.

Make more accurate measurements: A standby power switch can keep the crystal oven warm, giving you maximum frequency accuracy as soon as the IM-2420 is turned on. Proportionally-controlled crystal oven keeps the internal time base extremely accurate — within 0.1 part per million (ppm) — over a wide temperature range. The crystal-controlled time base provides excellent long-term stability, with drift controlled to less than 1 ppm per year. And the external time base jack allows the use of an external time base signal.

Four gate times and a large, 0.43" (1.09 cm)-high, 8-digit LED display provide the resolution you need to measure UHF signals. The pivoting stand places the IM-2420 at a comfortable, convenient viewing angle.

The IM-2420's excellent 4-15 mV typical sensitivity, over the entire 5 Hz-512 mHz range, allows counting of weak signals. Trigger level control assures stable counting when noise is present, and provides more accurate measurement of complicated waveforms. Effective limiting circuits at both inputs (5 Hz-50 mHz and 40 mHz-512 mHz) make sure counting is stable, even when the input signal level varies by as much as 60 dB.

Measure signals with a direct connection. Or, for frequency counts without a direct connection, order the SMA-2400-1 Swiveling Telescopic Antenna (right).

Extra protection is built into the IM-2420, too. Its rugged, compact metal cabinet provides improved shielding from radio-frequency interference (RFI). Full voltage protection assures worry-free counting.

Kitbuilding is easy: the IM-2420 takes as little as four evenings to build, with a fully detailed Heathkit manual to guide you along the way, step-by-step. ICs are standard and easily available, for faster servicing.

Kit IM-2420, Shpg. wt. 9 lbs. .... 239.95

SM-2420, Assembled 5 Hz-512 mHz Frequency Counter, Shpg. wt. 9 lbs. . . 299.95

**NEW! Swiveling Telescopic Antenna for IM-2400, IM-2410, IM-2420 Counters.** Also use on many 2-meter transceivers. Chrome-plated brass antenna provides significant performance improvements over similar antennas. Enhance counter sensitivity by tuning to the proper frequency — by extending or retracting the telescoping sections. Right angle version, includes BNC connector.

SMA-2400-1, Assembled, Shpg. wt. 1 lb. .... 9.95

**IM/SM-2400 SPECIFICATIONS:** Inputs: Frequency Ranges: 5 Hz to 50 mHz, and 40 mHz to 512 mHz. Sensitivity: 25 mV RMS guaranteed, 4 to 15 mV RMS typical. Input Impedance: 5 Hz to 50 mHz range — 1 megohm shunted by less than 25 pF; 40 mHz to 512 mHz range — 50 ohms nominal. Input Protection: 5 Hz to 50 mHz range — 250 VRMS to 100 kHz, derating to 25 VRMS at 50 mHz; 40 mHz to 512 mHz range — 5 VRMS. Period Measurement Mode: Input: 5 Hz to 50 mHz only. Range: 5 Hz to 10 mHz. Sensitivity: 25 mV RMS guaranteed, 4 to 15 mV RMS typical. Display Resolution (Least Significant Digit): 100 nS to 0.1 mS, in decade steps. Ratio B/A Measurement Mode: Input Frequency Limits: 5 Hz to 25 mHz, and 40 mHz to 512 mHz. Effective Measurement Range: From 1.6 to 1.024 x 10(8), guaranteed. Sensitivity: 25 mV RMS guaranteed, 4 to 15 mV RMS typical. Time Base: Frequency: 10 mHz. Setability: To within 0.2 part per million (ppm). Temperature Stability: 0.2 ppm, from 32 deg. F to 104 deg. F (0 deg. C to 40 deg. C). Crystal Aging Rate: Less than 1 ppm per year. Oven Operating Temperature: 167 deg. F, ± 9 deg. F (75 deg. C, ± 5 deg. C). Warm-Up Time From Cold Oven (unplugged) Start: 10 minutes to within 1.0 ppm; 20 minutes to within 0.1 ppm. External Input: TTL or 2.5 volts RMS from 50 ohm source (10 megahertz). Input Protection: Any voltage with peak-to-peak limits between -3.5 volts and +10 volts. Output: Will drive 2 standard TTL (i.e., 7400) loads. Short circuit protected. General: Gate Times: 0.01 second, 0.1 second, 1 second and 10 seconds (switch-selectable). Sampling Rate: Every 0.1 second, 0.33 second, 1 second or 10 seconds. LED Display: Eight digits. Power Requirement: 120/240 VAC, 50/60 Hz; 6 watts maximum in STBY mode, 40 watts maximum in ON mode. Dimensions: 4.25" H x 10" W x 12.5" D (10.8 x 25.4 x 31.8 cm).



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

# The Heathkit IM-2400 brings quality to hand-held frequency counters — take it wherever you need to know the value of a frequency

**\$139<sup>95</sup>**  
Kit

- Uses 5 nickel-cadmium batteries (included) and line current with available eliminator/chargers
- Batteries are housed inside the counter to provide TRUE portability
- Wide 50 Hz to 512 MHz frequency range

Modern engineering and sub-miniaturization bring you the first hand-held Heathkit Frequency Counter — the IM-2400. The most compact Heathkit Frequency Counter ever combines in-the-field versatility with bench-standard accuracy. Use the IM-2400 in cars, trucks, aircraft, boats — anywhere you need an accurate frequency reading. Communications service technicians and Amateur Radio enthusiasts will find it ideal for servicing mobile radio equipment.

The IM-2400 measures frequencies from a large portion of the radio spectrum — from 50 hertz to 512 megahertz, in two ranges. Accuracy and long-term stability are assured with a crystal-controlled 10 megahertz time base. The excellent typical sensitivity of 10 millivolts, RMS (as well as the guaranteed sensitivity of 25 millivolts, RMS) over the entire range of the IM-2400 means you'll be able to read weak signals, too. Measure frequency by connecting the IM-2400 directly to the component under test. Or, for counting without any connections, use the optional SMA-2400-1 Swiveling Telescopic Antenna (described below). Full voltage protection is built into the IM-2400 Counter for worry-free operation.

The big, 7-digit LED display is easy to read and gives you better resolution. Automatic decimal placement and zero blanking assure mistake-free readings.

You get true portability with the Heathkit IM-2400 Hand-Held Frequency Counter. The batteries are located INSIDE the housing. There are no external battery packs to make handling the IM-2400 awkward.

Five rechargeable 1.2 volts DC, AA-size nickel-cadmium batteries are included with this frequency counter — making the IM-2400 an even better value. You'll be able to use these batteries over and over — up to hundreds of charges on the same set of batteries — to save on battery replacement costs. And use line current — and recharge the batteries at the same time — with the available battery eliminator/chargers below (PS-2404 for 120 VAC, PS-2405 for 240 VAC — one required for proper operation).

For bench use, the IM-2400 includes a pivoting stand which supports the counter at a more convenient viewing angle. Find out how portable a frequency counter can really be. Order the IM-2400 Hand-Held Frequency Counter today.

Kit IM-2400, Shpg. wt. 3 lbs. .... **139.95**

SM-2400, Factory assembled and tested, Wt. 2 lbs. .... **179.95**

Swiveling Telescopic Antenna for IM-2400, IM-2410 Counters. Also use on many 2-meter transceivers. Chrome-plated brass antenna provides significant improvements in performance over similar antennas. Enhance counter sensitivity by tuning the antenna to the proper frequency — by extending or retracting the telescoping sections. Right angle version, with BNC connector included.

SMA-2400-1, Assembled, Shpg. wt. 1 lb. .... **9.95**

NEW! 120 VAC Battery Eliminator/Charger for IM-2400 Counter.

PS-2404, Shpg. wt. 1 lb. .... **4.95**

NEW! 240 VAC Eliminator/Charger for IM-2400 Counter.

PS-2405, Shpg. wt. 1 lb. .... **12.95**

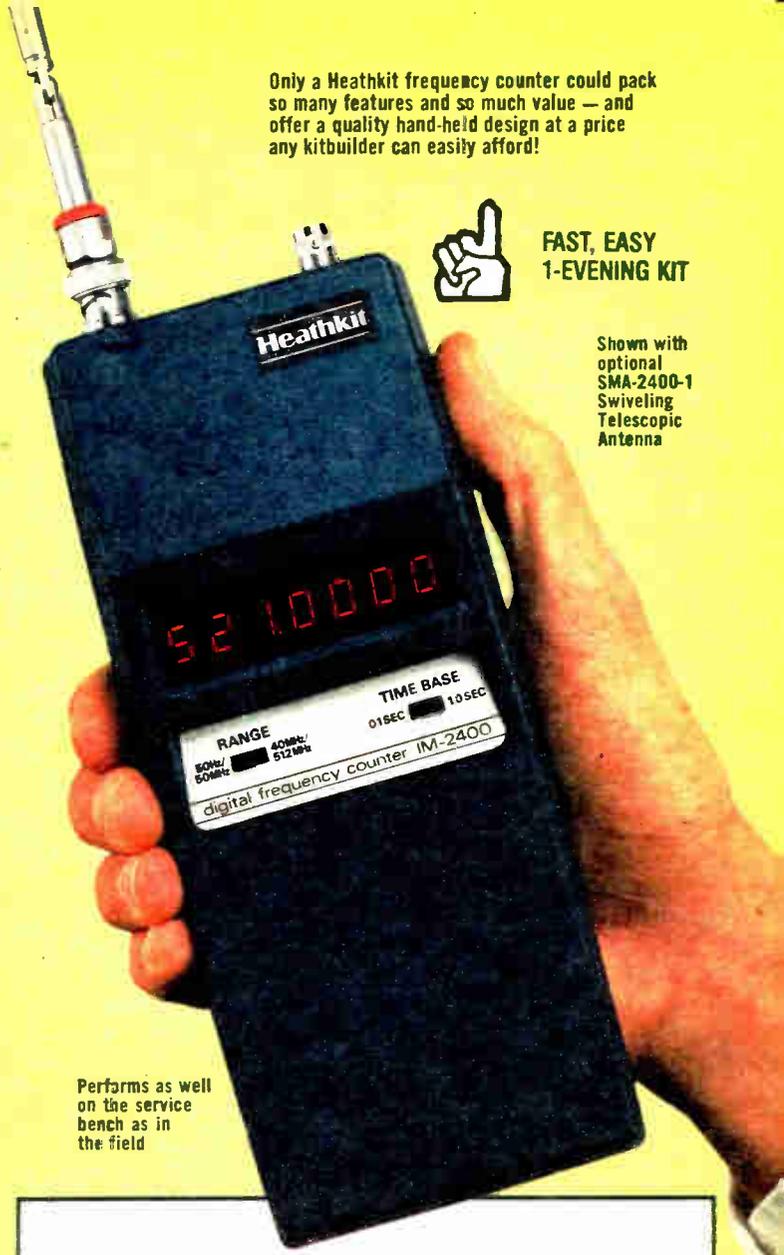
**IM-2400 SPECIFICATIONS:** Inputs: Frequency Ranges: 50 hertz to 50 megahertz, and 40 megahertz to 512 megahertz. Sensitivity: 50 hertz to 50 megahertz range — 25 millivolts, Root Mean Square (RMS) guaranteed, 10 millivolts RMS typical; 40 megahertz to 512 megahertz range — 25 millivolts RMS guaranteed, 10 millivolts RMS typical. Input Impedance: 50 hertz to 50 megahertz range — 1 megohm shunted by less than 24 picofarads; 40 megahertz to 512 megahertz range — 50 ohms. Input Protection: 50 hertz to 50 megahertz range — 150 volts RMS to 100 kilohertz, derating to 10 volts RMS at 50 megahertz; 40 megahertz to 512 megahertz range — 5 volts RMS. Time Base: Frequency: 10 megahertz. Setability: +1 part per million (ppm). Temperature Stability: +10 parts per million (ppm), from 0 degrees C to 40 degrees C. General: Gate Time: 1 second or 0.1 second (switch-selectable). Resolution: 50 hertz to 50 megahertz range — 10 hertz with time base set at 1.0 second, 100 hertz with time base set at 0.1 second; 40 megahertz to 512 megahertz range — 100 hertz with time base set at 1.0 second, 1 kilohertz with time base set at 0.1 second. Power Requirement: Five 1.2 volts DC, AA-size rechargeable nickel-cadmium batteries, 120 volts AC with optional PS-2404 Battery Eliminator/Charger; 240 volts AC with optional PS-2405 Battery Eliminator/Charger. Overall Dimensions: 1.63 inches H x 3.38 inches W x 8.38 inches L (4.1 x 8.6 x 21.3 cm). Net Weight: 0.81 pound (0.37 kilogram), including five AA-size nickel-cadmium batteries.

Only a Heathkit frequency counter could pack so many features and so much value — and offer a quality hand-held design at a price any kitbuilder can easily afford!



**FAST, EASY  
1-EVENING KIT**

Shown with optional SMA-2400-1 Swiveling Telescopic Antenna



Performs as well on the service bench as in the field

## Extra value is built into the IM-2400 Frequency Counter



Large-scale integration with CMOS technology make this hand-held frequency counter possible

The IM-2400's time base is precision-controlled by a crystal. As a result, you'll get very good long-term stability and accuracy with the IM-2400.

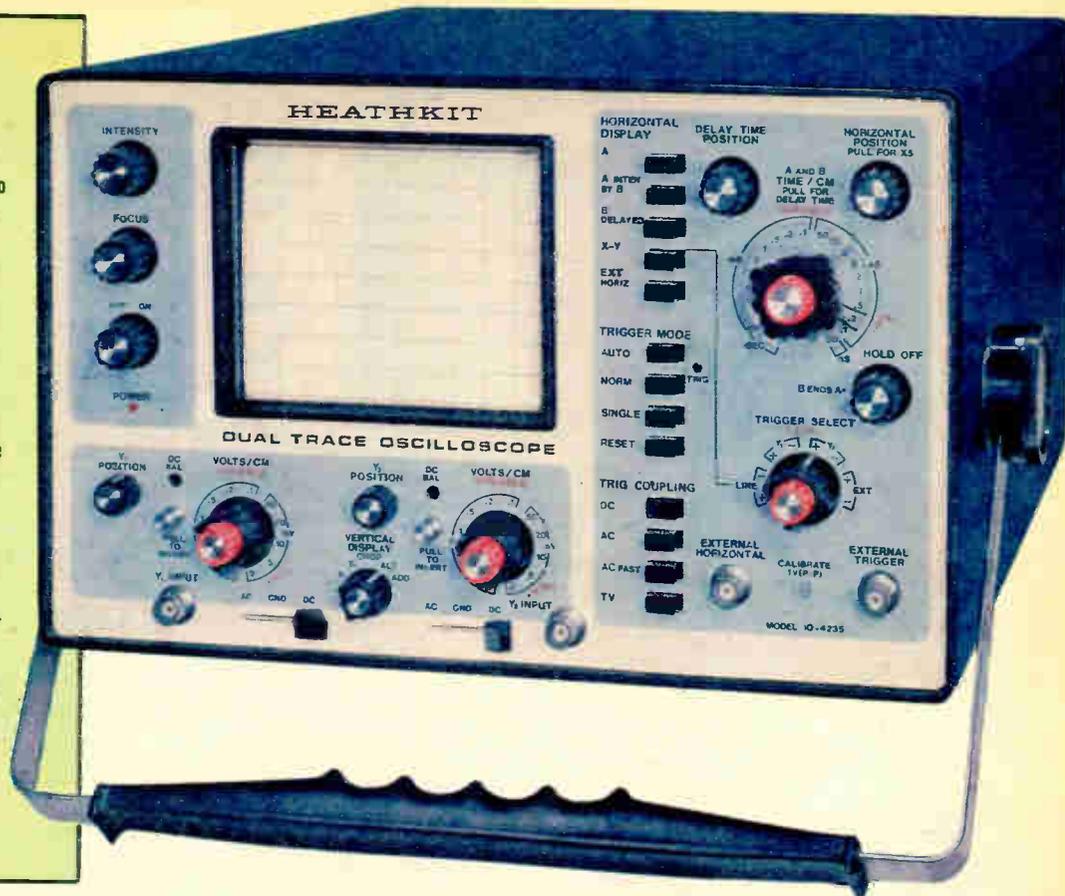
The easy-to-read 7-digit Light-Emitting Diode (LED) display is  $\frac{3}{8}$ " high to provide more legible readings. The LED display plugs into a socket for easy replacement.

All integrated circuits (ICs) are inserted into sockets for easier replacement. Both the LED display and all ICs are standard and easily available.



## The finest Heathkit Scope — DC-35 mHz range, dual-trace capability, low price

- Dual-trace capability lets you monitor two signals simultaneously
- Also has a single-sweep function for observing random signals
- Capable of triggering to two times the specified vertical bandwidth
- Vertical delay lines allow you to observe leading edges of input signals
- Rise time of less than 10 nS, to handle complex, fast-rising input signals
- Sweep speeds from 50 nS/cm to 0.2 seconds/cm, plus 5X expansion, gives the 10-4235 an effective sweep speed of 10 nS/cm at the highest sweep rate
- Smooth rolloff allows observation of input signals above 50 megahertz
- Algebraic ADD can invert either channel to observe differential signals
- Unique TV coupling feature triggers alternate fields for steady VITS display
- 8 x 10 cm mesh CRT, with internal graticule for parallax-free measurements
- 10 kV post-acceleration voltage for fast writing and our brightest display
- Kit assembly is simplified with a step-by-step Heathkit assembly manual
- Portable, includes carry handle — take this lab-quality instrument anywhere



## The deluxe 10-4235 is one of the most versatile oscilloscopes available anywhere!

**\$949<sup>95</sup>**  
Kit

- Ideal for observing or measuring virtually any waveform, from simple sine wave signals of stereo components and television to highly complex waveforms of state-of-the-art devices

The 10-4235 is the most advanced oscilloscope our engineers have ever developed! Compare the top-of-the-line Heathkit oscilloscope with others in its price range: you'll find that the 10-4235 is unmatched in performance, features and quality. You can even compare the sophistication and versatility of the 10-4235 with other oscilloscopes that cost hundreds of dollars more.

This laboratory-quality oscilloscope is a perfect addition to anyone's service bench, at an affordable price. The Heathkit 10-4235 fulfills the requirements of the service technician, electronics designer and serious hobbyist.

The 10-4235's delayed-sweep circuit uses a separate time base to separate a faster sweep, which displays a selected portion of the normal waveform. The start and length of the delayed sweep are user-controlled, so any given portion of the normal waveform can be displayed at a much higher rate.

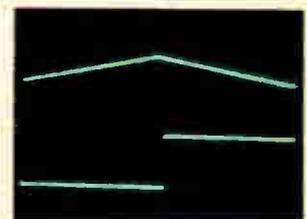
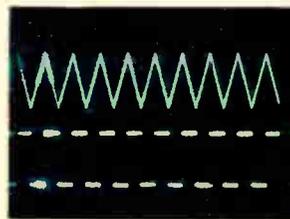
The 8 x 10 cm mesh CRT features 10 kV post-acceleration voltage — 2½ times greater than any other scope we've offered — to give you greater writing speeds and a truly bright display. And the CRT has an internal graticule to provide more parallax-free measurements.

Also features fully regulated power supplies, capabilities to operate on lower line voltages, a front panel 1 Volt square wave output, a variable hold off control, a Z axis and an easy-to-grip carrying handle. Calibration requires a precise source of square waves, like the IG-4505 (p. 28), and a DC voltmeter.

Kit 10-4235, Shpg. wt. 52 lbs. .... **949.95**

Factory assembled and tested version of above.

S0-4235, Shpg. wt. 38 lbs. .... **1295.00**



The delayed sweep takes the user-selected portion of the desired waveform (intensified portion in left photo) and magnifies it the desired number of times, to allow for closer examination (as seen in photo at right).

**10-4235 SPECIFICATIONS:** VERTICAL: Sensitivity: 2 mV/cm to 10 V/cm. Positions: 12 steps in a 1-2-5 sequence. Variable: Continuous between steps to approx. 30 V/cm. Accuracy: Within 3% (20° C to 30° C); Within 5% (10° C to 40° C), referred to 1 V/cm. Vertical Response: DC Coupling: DC to 35 mHz (-3 dB). AC Coupling: 1 Hz to 35 mHz. Rise Time: 10 nS. Overshoot: Less than 3%. Delay Line: Allows display of at least 20 nS of pre-triggered waveform. Vertical Input: Impedance: 1 megohm, shunted by 30 pF. Vertical Modes: Y1, Y2, Y1 and Y2 chopped, Y1 and Y2 alternate, algebraically add (±Y1) + (±Y2). HORIZONTAL: Time Bases: Ranges: 50 nS/cm to S/cm. Positions: 21 steps in a 1-2-5 sequence. Variable: Continuous between ranges to approximately 600 mS/cm. Accuracy: Within 3% (20° C to 30° C); Within 5% (10° C to 40° C), referenced to 1 mS/cm. External Horizontal: Sensitivity: Approximately 0.1 V/cm. Impedance: 1 megohm. Polarity: Positive input causes right-hand deflection. Frequency Response: DC to greater than 2 mHz (-3 dB). Connector: BNC. X-Y: X Channel: Same as vertical, except response is limited to 2 mHz and has no delay line. Y Channel: Same as vertical. Phase Shift: Less than 8 at 100 kHz. TRIGGER: Source: Y1, Y2, EXT, Line. Coupling: AC, DC, AC Fast, TV. Modes: Automatic Baseline, Normal, Single Sweep. Hold Off: Variable, including a "B ends A" position. External Trigger: Sensitivity: 100 mV at 50 mHz. GENERAL: CRT Phosphor: P31. CRT Acceleration Potential: 10 kV, regulated. Z Axis: Full on to Full off, 0 to 5 V. Positive voltage decreases intensity. Power Requirement: 120/240 VAC, 50/60 Hz, 85 Watts (at 120 VAC). Dimensions: 7.75" H x 13.75" W x 19.75" D (19.69 x 34.93 x 50.17 cm), handle folded. Net Weight: 30 lbs. (13.6 kg).



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

INSTRUMENTS/27



**\$399<sup>95</sup>**

## Use this Dual-Trace DC-10 MHz Oscilloscope for electronic servicing and design work

If you're looking for a dual-trace oscilloscope to round out your test bench, look no further. The 10-4550's extra-bright trace allows easy reading, even in high ambient light. The two vertical input channels have a maximum sensitivity of 10 mV/cm to give you accurate measurements.

To maximize ease of operation, input channels are displayed, chopped or alternated, as selected by the time base switch — automatically! Exact X-Y operation assures you of precise phase measurements. 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 10-4550's digitally-controlled time base provides automatic triggering, so no stability control is necessary and fewer adjustments are required. Facilities are also included to help determine the frequency of a waveform.

## Extra-value features are designed into the 10-4550 for greater flexibility and versatility

- Excellent choice for TV service, electronics experimentation and design
- Two vertical input channels, each with maximum sensitivity of 10 mV/cm
- Sensitivity adjustable from 10 mV/cm to 20 V/cm with 1-2-5 sequenced attenuator
- Has 19 digitally-controlled, calibrated time base steps, ranging from 0.2  $\mu$ S/cm to 0.2 S/cm, in 1-2-5 sequence
- Expand any sweep speed five times, up to a maximum sweep speed of 40 nS/cm
- Trigger select switch and level control for precise triggering at any point on positive or negative slopes of trigger signal
- Calibrated 1 V peak-to-peak square wave, at front panel, for easy probe compensation
  - Features CRT with extra-bright trace
  - Mu-metal shield eliminates errors caused by electromagnetic interference
  - Fully-regulated high-voltage power supply
  - Just four printed circuit boards mean faster, easier kit assembly

Improved circuitry, featuring just four printed circuit boards, makes building the 10-4550 easy. Assembled X1/X10 Scope Probe (PKW-105) available on page 18. Calibration requires precise source of square waves, such as the IG-4505 or IOA-4510-1 Scope Calibrators (both below).

Kit 10-4550, Shpg. wt. 27 lbs. .... **399.95**  
 SO-4550, Assembled and calibrated, Shpg. wt. 25 lbs. .... **650.00**

**10/SO-4550 SPECIFICATIONS:** VERTICAL: Deflection Factor: Sensitivity: 10-20 mV/cm, 11 steps in 1-2-5 sequence. Variable: Continuous between steps to approximately 60 V/cm. Accuracy: 3%. Vertical Response: DC Coupling: DC-10 MHz. AC Coupling: 2 Hz-10 MHz. Rise Time: 35 nS. Overshoot: Less than 5%. VERTICAL: Sensitivity: 10-20 mV/cm. Attenuator: Vertical Input: Impedance: 1 megohm shunted by 38 pF. Maximum Input: 400 V. HORIZONTAL: Time Base: Ramp: 200 nS/cm to 0.2 S/cm, 19 steps in 1-2-5 sequence. Variable: Continuous between steps to approximately 0.6 S/cm. Accuracy: 3%. Magnifier: X5 (adds additional 2% to sweep accuracy). EXTERNAL: Sensitivity: Approximately 0.1 V/cm. Impedance: Approximately 100 kilohms. Frequency Response: DC to 1 MHz. Connector: BNC. TRIGGER: Internal: Automatic: Adjustable over 10 divisions. Normal: Adjustable over 10 divisions. Slope Selection: + or -. Impedance: 1 megohm, 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. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 6.9" H x 12.9" W x 19.3" D (17.53 x 32.77 x 49.02 cm).

## High-Quality Accessories make your oscilloscope even more versatile

### 1 Switch adds dual-trace capability

The ID-4101 Oscilloscope Switch Kit is the inexpensive way to add dual-trace versatility to any single-trace scope with an external trigger. Features include simultaneous display of two separate input signals for comparison, observing phase relationships or other uses. You can also use the ID-4101 as an impedance coupler, preamp or square wave generator in experimental circuits. Sync output on each channel locks the sweep to either signal. DC coupling feature means additional versatility.

Kit ID-4101, Shpg. wt. 5 lbs. .... **57.95**

### 2 Low-Priced Oscilloscope Calibrator

The IOA-4510-1 is an easy-to-build, easy-to-operate oscilloscope calibrator for use with the Heathkit

10-4510 and 10-4530 Oscilloscopes. It provides everything you need, including a crystal-controlled time base, to accurately calibrate your 10-4510 or other oscilloscope up to 15 MHz. Draws operating power from the 10-4510, or an external 6 VDC source.

Kit IOA-4510-1, Shpg. wt. 1 lb. .... **14.95**

### 3 Deluxe DC-35 MHz Scope Calibrator

A practical oscilloscope calibrator at a sensible price. Provides all of the waveforms necessary to adjust sweep speeds, vertical calibration, delay line terminations, high-frequency compensation and attenuator compensation for oscilloscopes with bandwidths of up to 35 MHz. Round out your test bench today with an accurate source of square waves.

Kit IG-4505, Shpg. wt. 4 lbs. .... **49.95**





## Dual-trace versatility, single-trace price: the Heathkit IO-4205 DC-5 mHz Oscilloscope

**\$289<sup>95</sup>**  
Kit

- Dual-trace capability allows two signals to be compared simultaneously, giving you extra flexibility
- 10 mV/cm vertical input sensitivity makes this oscilloscope ideal for most measurement applications
- Fully-regulated, low-voltage power supply for added stability

Dual-trace capability makes the Heathkit IO-4205 ideal for making comparisons, or for timing functions on solid-state digital equipment. And you get controls and features not usually found in other oscilloscopes.

The dual-trace feature is essential for the sophisticated servicing required by many of today's modern electronic devices. It lets you compare two signals simultaneously for input-output comparisons, checking phase relationships and other timing functions. This dual-trace feature, combined with the IO-4205's DC to 5 mHz bandwidth and excellent vertical input sensitivity of 10 mV/cm, lets you use this scope for nearly all waveform applications.

A stable triggering circuit is used for solid waveform displays — not the recurrent type sweep usually found on other scopes in this price range. A special trigger selector feature allows the IO-4205 to easily trigger on the vertical component of a complex TV signal. Select an external time base, or any one of 7 calibrated internal time bases from 0.2  $\mu$ S/cm to 200 mS/cm.

Accurate measurements can be easily made on the bright, easy-to-read 8 x 10 cm CRT screen. The IO-4205's fully-regulated, low-voltage power supply provides accurate voltage and current, even under varying line and load conditions. Partial mu-metal shielding helps eliminate possible display errors caused by stray magnetic fields and other interference.

The IO-4205's easy-to-operate controls and front panel inputs make it one of the most versatile oscilloscopes you'll find anywhere. And when you build it yourself, you get the economy of kit value, too. Calibration required. 120/240 VAC, 50/60 Hz. Draws just 50 watts. 8" H x 13" W x 17" D.

Kit IO-4205, Shpg. wt. 29 lbs. . . . . 289.95  
SO-4205, Assembled and tested, Shpg. wt. 20 lbs. . . . . 450.00

**IO/SO-4205 SPECIFICATIONS:** VERTICAL: Bandwidth: DC to 5 mHz,  $\pm 3$  dB. Sensitivity: 10 mV/cm. Attenuator: 1-2-5 sequence, calibrated and variable. Rise Time: 70 nS. Overshoot: Less than or equal to 5% at 1 kHz. Impedance: 1 megohm, shunted by 38 pF. SWEEP: Type: Triggered. Range: 200 mS to 0.2  $\mu$ S in 7 steps, plus variable. Trigger Source: Y1, Y2, External, Line. Trigger Modes: AC, DC, or TV; + or - slope; Automatic or Normal. HORIZONTAL: Sensitivity: 0.1 Volts/Centimeter. Bandwidth: DC to 1 megahertz. Impedance: 1 megohm, shunted by 50 pF. External Horizontal Input: X1 and X10 attenuator, as well as variable. GENERAL: CRT: 5DEP31F, 8 x 10 cm viewing area, blue-green medium-persistence phosphor, 5-inch round flat-face tube. Accelerating Potential: Approximately 1.6 kV. Graticule: Screened, 8 x 10 centimeters.

## Here's a Heathkit Professional DC-5 mHz Scope that's priced just right for the hobbyist!

**\$239<sup>95</sup>**  
Kit

- Your choice of an external time base, or one of seven calibrated internal time bases, for extra versatility
- High-brightness 8 x 10 cm CRT screen for easy reading, even on highly complex television signals
- Mu-metal shielding helps reduce display errors

Now, you can put a professional single-trace oscilloscope on your test bench — at a price you can afford. The versatility and excellent design of the IO-4105 make it ideal for virtually any single-trace scope application.

A stable triggering circuit is used for solid waveform displays. And the IO-4105 can trigger on the vertical component of a television signal, thanks to a special feature of the trigger selector control which allows low frequencies to pass, while high frequencies are rejected.

Either internal or external time bases can be used with the IO-4105. Internal time bases can either be variable, or in one of seven steps ranging from 0.2  $\mu$ S/cm to 200 mS/cm. External inputs from DC to 1 megahertz are accepted by the horizontal amplifier. The IO-4105's vertical input sensitivity is an excellent 10 millivolts/centimeter. Combined with attenuation up to 20 V/cm in eleven calibrated steps, this means that the Heathkit IO-4105 Oscilloscope can accept a wide range of input signals.

Accurate control between the calibrated input sensitivity levels is accomplished by a variable gain control. A clear, easy-to-read 8 x 10 cm CRT screen, with an accelerating potential of approximately 1.6 kV, provides bright displays.

Drawing just 50 watts, the Heathkit IO-4105 can operate on either 120 or 240 VAC. A fully-regulated, low-voltage power supply ensures accurate voltage and current — even under widely varying conditions. And mu-metal shielding reduces interference from stray magnetic fields, for fewer display errors. Calibration required. 120/240 VAC. 8" H x 13" W x 17" D.

Kit IO-4105, Shpg. wt. 31 lbs. . . . . 239.95  
SO-4105, Assembled and tested, Shpg. wt. 19 lbs. . . . . 375.00

**IO/SO-4105 SPECIFICATIONS:** VERTICAL: Bandwidth: DC to 5 mHz,  $\pm 3$  dB. Sensitivity: 10 mV/cm, adjustable to 20 mV/cm in 11 ranges. Attenuator: 1-2-5 sequence, calibrated and variable. Rise Time: 70 nS. Overshoot: Less than or equal to 5% at 1 kHz. Impedance: 1 megohm, shunted by 38 pF. SWEEP: Type: Triggered. Range: 200 mS to 0.2  $\mu$ S in 7 steps, plus variable. Trigger Source: INT, Ext and Line. Trigger Modes: AC, DC or TV; + or - slope; Automatic or Normal. HORIZONTAL: Sensitivity: 0.1 V/cm. Bandwidth: DC to 1 MHz. Impedance: 1 megohm, shunted by 50 pF. External Horizontal Input: X1 and X10 attenuator and variable. GENERAL: CRT: 5DEP31F, 8 x 10 cm viewing area, blue-green medium persistence phosphor, 5-inch round flat-face tube. Accelerating Potential: Approximately 1.6 kV. Graticule: Screened, 8 x 10 centimeters.



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

INSTRUMENTS/29

**Your whole family will enjoy building...  
and playing the beautiful-looking,  
beautiful-sounding Heath/Thomas Organ**

Beautiful music is within your budget's reach with the TO-2130 — Thomas' most popular organ. Build it yourself, in six evenings, and save compared to assembled models. Then, it's easy for your entire family to make rich, beautiful music with the TO-2130. Color-Glo keys and a complete playing guide show you the way. Single-finger chords let you add other accompaniment. Twelve chords and ten voices give you the exciting sound of a complete orchestra.

**\$999<sup>95</sup>**

- Build it yourself and save compared to assembled models
- Rich, beautiful sound — 12 chords, 10 voices

Everyone in your family can play — and enjoy — the Heathkit/Thomas TO-2130 Organ right away. Quick-learn features such as Color-Glo keys, color-coordinated music, rhythm, one-finger chords and an easy-to-follow instruction manual make the TO-2130 easy... and a real delight to play — even for youngsters or grownups who have never made music before!

Advanced electronics design puts an entire orchestra at your fingertips. Single-finger chords leave your hands free to add other musical accompaniment, while the convenience of your TO-2130's Memo-Chord lets you convert any of the 12 single-finger Speak-Easy chord keys into any one of a dozen different major chords. Memo-Chord not only selects and memorizes the correct chord and bass pedal notes, but even holds them until you press another chord key.

The Color-Glo keys light up to help you identify chords and keys, so anyone can begin playing immediately without need for previous musical training. Music in the instruction booklet is color-coordinated to the Color-Glo keys, making the TO-2130 such a breeze to play, even the kids can learn in no time.

You can register any of five Solo Voices, separately or in combination, for brilliant musical effects. Four Accompaniment Voices provide beautiful harmonic backgrounds. And the TO-2130's Fancy Voice combines with the Solo Voices to yield even more special musical effects.

Use the Fancy Foot pre-programmed pedal to add a distinctive professional quality to your musical arrangements. The Fancy Foot feature creates a rhythmic bass pedal pattern for each rhythm pattern you choose.



Orchestral Presence produces a vibrant string ensemble effect by itself. Or add the tremulants feature with one or more of the Solo Voices to add brilliance to your music. And, your TO-2130 even lets you add one or more of the Accompaniment Voices to Orchestral Presence to create a rich, full orchestral sound that will have you playing like a professional musician.

The TO-2130's Organ Ensemble feature creates an orchestral chorus effect, while an Expression Pedal lets you add color and dimension to your music by controlling the overall sound output.

It's easy to build the TO-2130, too — you can begin making beautiful music in as little as six evenings. A completely detailed Heathkit assembly manual, shows you every step of the way, from start to finish.

Making beautiful music was never easier. The TO-2130's cabinet and matching padded bench are attractively hand-crafted in a walnut veneer finish.

Kit TO-2130, 201 lbs., Motor Freight ..... **999.95**

**TO-2130 SPECIFICATIONS:** KEYBOARDS: Solo: 37 keys, C2 through C5; Accompaniment: 37 keys, C2 through C5; Pedals: 13, C1 through C2. VOICES: Solo: Flute, Trombone, Oboe, Violin; Accompaniment: Melodia, Horn (piano when rhythmic), Diapason (guitar when rhythmic), String (harp/sichord when rhythmic); Pedal: Flute (combination 16' and 8'). RHYTHMIC PATTERNS: Waltz, Foxtrot/Swing, Rock, Latin. POWER AMPLIFIER: 30 watts RMS. SPEAKER: 8 ohm permanent magnet type (headphone jack for private listening provided). POWER REQUIREMENT: 120 VAC, 50/60 Hz, 125 W. DIMENSIONS: 37" H x 39" W x 21½" D (94 x 99 x 55 cm).



**FAST, EASY  
1-EVENING KIT**

**The Heathkit Electronic Metronome is the ideal aid for music students and teachers**

**\$229<sup>95</sup>**

- Adjustable tempo between 40 and 216 beats per minute for more efficient practice
- Features a handsome cherry finish birch cabinet with non-marring felt feet

When a student (and parents) invest a great deal of time, energy and money in music lessons, it makes sense to practice efficiently. The Heathkit Electronic Metronome is designed for exactly that purpose. This handsome addition to the music room maintains a steady beat so the student can practice at the correct tempo. The Electronic Metronome's tempos can be adjusted between 40 and 216 beats per minute with the convenient front panel control. And volume can be adjusted, too, with a rear panel control. The Electronic Metronome even includes a handy chart that goes on the bottom of the cabinet, so the musician can relate the number of beats per minute to tempos in differ-

ent time signatures. It's the practical way to practice music.

As attractive as it is practical, the Heathkit Electronic Metronome is housed in a handsome cherry finish birch cabinet with non-marring felt feet. Easy, one-evening assembly makes it an ideal kit for the beginning builder. As with all Heathkit electronic kits, this one comes with an easy-to-follow, step-by-step instruction manual. And the kit even includes all the solder you will need. The Electronic Metronome operates on two 9 volt batteries (not included). It measures 6¾" H x 3¾" W x 4" D.

Kit TO-1257, Shpg. wt. 2 lbs. .... **22.95**



## Let your whole family enjoy the exciting Heathkit Screen Star Projection TV System — the ultimate in TV viewing

**\$2195<sup>00</sup>**

Enjoy television viewing like never before when you choose the exciting Heathkit Screen Star

Projection TV System. Sports, your favorite shows, even the news will take on new dimensions. Thrill your family and friends with a sharp clear picture that's 8 times larger than the one you now watch\*. Television never looked so good.

- Now available for immediate delivery
- Three-tube projection for a brighter, more lifelike picture
- 6-foot diagonal high-reflectivity, washable viewing screen for a big, bright, lifelike image
- Full 5 watts of clear, low-distortion sound
- Single antenna input for better reception
- Fast and easy kitbuilding experience
- Built-in adjustments for easy self-servicing

There's nothing better than the Heathkit Screen Star Color Television Projection System for bringing the theater-like realism of sporting events, movies and entertainment specials into your living room.

When you choose the Screen Star, you get more performance for your TV dollar. Three-tube projection gives you a brighter, more vivid color picture and provides a wider viewing angle from the screen. Both the high-resolution picture tubes and quality-crafted lenses are the finest available, giving you state-of-the-art color reproduction. Each tube beams its image through its own 127mm f1.0 lens to give you a beautiful color picture.

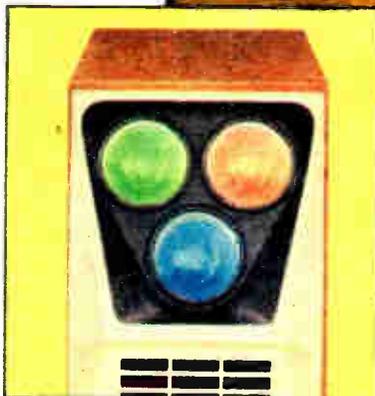
This image is projected onto a 6-foot diagonal, high-reflectivity viewing screen. The durable, washable screen can be mounted on any wall (brackets provided). Or to make your screen free-standing and portable, use the optional GRA-4000-1 Screen Stand.

The Screen Star's electronics provide a lifelike image for years to come! Automatic Fine Tuning (AFT) and an exclusive Heath LC filter keep your picture in tune from channel to channel. In fact, the IF amplifier never needs realignment. Special black level clamps help faithfully reproduce every scene, whether it's outdoor sun or moonlight. These clamps maintain accurate brightness levels. Bridge-type power supplies and a ferro-resonant power transformer maintain constant brightness and picture size — even during voltage brownouts.

One antenna connection means clearer reception with less troublesome interference. An internal UHF/VHF splitter and complete shielding of the tuners make the GR-4000 ideally suited for cable TV. (If you don't have cable, get the best reception of TV stations in your area with the antennas, rotors and accessories on page 34.)

The special video input/output panel, with an auxiliary 120 VAC outlet, lets you directly connect a video cassette recorder like the Zenith Video Director (page 34). Direct connection means higher-quality video.

Hear true high-fidelity sound: The Screen Star's audio system produces a full 5 watts of sound — as beautiful, rich, clear and distortion-free as the picture. Listen through the large 6" x 9" speaker. Or use the external speaker jack or the VCR audio output jack to connect to your stereo system for even better sound.



Three-tube projection and highest-quality f1.0 lenses combine to beam a brighter, clearer color picture.



The Screen Star uses state-of-the-art technology to bring you a breathtaking big-screen picture! (Simulated TV picture)

All projector controls are easy to find: Illuminated indicators instantly tell you which of the 82 UHF and VHF channels you're tuned to. Convergence adjustments and focus controls are on top of the chassis.

Move the Screen Star from room to room: Smooth-rolling casters let you move the projector anywhere — store it out of the way, when not in use. And when you select the optional Screen Stand, the lightweight screen can be moved about with the same ease.

Heath's easiest-to-build color TV: Picture tube, yoke, lens units, high-voltage supply and tuners are factory assembled and adjusted for easier kitbuilding.

Spend less on service bills: Complete self-servicing manual shows you how to service the GR-4000. Built-in self-service features make maintenance and repair faster, simpler. Convergence controls are conveniently located on upper chassis. Built-in crosshatch generator, test meter make kitbuilding and servicing easier. Complete technical support is always available. And a 90-day limited warranty covers all parts.

Order the Screen Star Color TV Projection System today. Your television viewing will never be the same again.

GR-4000, 190 lbs., Mtr. Frt. .... 2195.00

Screen Stand for GR-4000 Color Television Projection System.

GRA-4000-1, 20 lbs., Motor Freight ..... Was \$84.95, NOW ONLY 79.95

GR-4000 SPECIFICATIONS: Antenna Impedance: 75 ohms coaxial, with internal UHF/VHF splitter. Tuning Range: UHF Channels 14 through 83, VHF Channels 2 through 13. AFT Pull-In Range: 0.7 to -1.8 mHz. Audio Output: 5 Watts at speaker and external 8 ohm speaker jack. Total Harmonic Distortion: Less than 0.5%. Video IF Bandwidth: 4.08 mHz at 6 dB down. Video Cassette Recorder Facilities: 1 Volt composite video in/out at 75 ohms, 0.75 VRMS audio in/out at 600 ohms. Projector Distance from Screen: Approximately 98 inches (249 cm). Power Requirement: 120 VAC, 60 Hz. Projector Dimensions: 28" H x 16.25" W x 32" D (71.12 x 41.28 x 31.28 cm). Screen Dimensions: 45" H x 60" W (114.3 x 152.4 cm). (\*If your present TV is 25" diagonal or smaller.)

Alaska, Hawaii and Michigan Residents: Call 616-982-3411





## The Heathkit GR-2001 Computer TV System gives you incomparable color TV viewing enjoyment

"The programmable automatic channel selection feature...sets this set aside from all the others on the market."

— Radio Electronics

"The (optional) programmer puts you into the real avant garde of TV fanciers...you will never again miss a desired program because you forgot to turn the channel in time..."

— Budget Electronics



Eight programming pushbuttons let you sequence the GR-2001 to change channels and rotate your antenna (with optional GD-1184 Rotator) at times you preselect! Above the pushbuttons, backlit nomenclature indicates the current operating mode of the programmer.

## Full computerization gives you a magnificent 25" diagonal color picture

Now you can pre-program your color TV for an entire evening's viewing, and then just sit back, relax and watch one of the best color pictures you've ever seen. It's possible with the Heathkit GR-2001 Computer TV System — one of the finest and most advanced color television sets you can buy anywhere. This fully-computerized, programmable set means you'll never again miss another favorite show because you forgot to change channels. The optional GD-1185 Programmer automatically changes to the right channel at the right time. You can program as many as 16 separate channel changes in each of two 12/24-hour viewing periods.

For even greater automatic operation, the optional GD-1184 Antenna Rotator Control lets you rotate your outdoor antenna to get the best reception. You can select up to 8 separate antenna direction headings, with up to three stations on each heading.

In addition to all of this programming convenience, the GR-2001 is one of the best performing 25" color television sets on the market today. Dozens of circuit innovations and refinements help produce one of the most vivid, accurate, bright and sharp color pictures you have ever seen. The 25" diagonal rectangular picture tube is fully shielded to maintain better color purity, and features a black matrix screen. The phase-locked loop vertical and horizontal oscillators provide a picture so rock-steady and adjustment-free we've eliminated conventional horizontal and vertical hold controls. And the audio circuitry has been improved over that of comparable sets to provide you with true high-fidelity sound, with 50 Hz to 15 kHz frequency response (+1 dB) for added TV viewing enjoyment.

The GR-2001 is easy to build, too. Comprehensive,

fully-illustrated manuals guide you through the step-by-step kit assembly. Modular circuit boards and pre-built wiring harnesses minimize point-to-point wiring for building ease. And famous Heathkit self-service features like a built-in dot generator, centering and convergence circuits, and a test meter, will really help you save money on service during the long life of your set.

Our custom-installation option lets you build your GR-2001 into a wall, mount it in your own custom cabinet or order one of our beautifully constructed cabinets on the next page.

Your investment will be returned with year after year of trouble-free performance. Less cabinet. Includes chassis, picture tube and one speaker.

Kit GR-2001, 146 lbs., Motor Freight ..... 769.95

Second Speaker for GR-2001. Fits in space on GR-2001 cabinets where indicated. With all cables.

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

**GR-2001 SPECIFICATIONS:** Deflection: Magnetic, 90°. Focus: Electrostatic. Convergence: Magnetic. Picture IF Carrier: 45.74 MHz. Sound IF Carrier: 41.25 MHz. Color IF Subcarrier: 42.17 MHz. Sound IF Frequency: 4.5 MHz. Video IF Bandwidth: 4.08 MHz, at 6 dB down. HI-FI Output: Frequency response: +1 dB, 50 Hz to 15 kHz. Output Voltage: Greater than 1.0 V RMS. Audio Output: 4  $\Omega$  or 8  $\Omega$ . 2 Watts. Tuning Range: TV channels 2 through 83. Power Requirement: 120 VAC, 60 Hz, 200 W.

**8-Channel Tuning System Accessory** for your GR-2001. The GRA-2001-9 Tuning System Accessory adds 8 additional channels to your GR-2001's random-access tuning system to give you complete, 24-channel viewing versatility.

Kit GRA-2001-9, Shpg. wt. 1 lb. .... 14.95

**GD-1185 Programmer.** Change channels automatically at times you select, up to 16 changes in two 12/24-hr. periods. Requires GRA-601 Clock (described below) to operate. Front-panel keyboard and on-screen readout make it easy to enter time and channel.

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

**GRA-2001-6 Remote Control.** Turn set on/off, adjust volume and tint, scan channels up/down, operate optional programmer up to 20 feet from your GR-2001.

Kit GRA-2001-6, Shpg. wt. 4 lbs. .... 99.95

**On-Screen Digital Clock.** Displays time in hours, minutes and seconds in 12 or 24-hour formats on screen. 1" high digits can be adjusted with channel numbers to remain on permanently or automatically reappear at approximately selected intervals.

Kit GRA-601, Shpg. wt. 1 lb. .... 29.95

**Automatic Antenna Rotor Control.** Turns antenna to get strongest signal on each channel automatically. Accepts up to 3 channels for each of 8 directions.

Kit GD-1184, Shpg. wt. 6 lbs. .... 64.95

**Rotor Motor.** Requires 5-wire cable (not supplied).

GDA-1184-1, Shpg. wt. 11 lbs. .... 39.95

### Save more by getting an entire system

Save \$59.90 on GR-2001 System with GD-1185 Programmer and GRA-601 Clock. \$959.85 if purchased separately.

GRS-2001, 175 lbs., Motor Freight ... 899.95

Save \$64.85 on GR-2001 with Programmer, Clock and GD-1184 Rotor Control.

GRS-2002, 187 lbs., Motor Freight ... 959.95



## Save \$110 and more on the set that brought color TV into the digital age

Heath makes it easier than ever to save not just once — but twice — on state-of-the-art color TV!

First, you get a big \$110 savings on the popular GR-2000 Digital Color TV. Then, you can take 20 percent off the GRA-601 On-Screen Clock, GRA-2000-6 Remote Control or any cabinet on this page (not including shipping and handling charges) — when purchased with a GR-2000!

**SAVE  
\$70<sup>00</sup>**

A color picture you'll be proud to show off to your friends — and savings you'll be proud to take to the bank! The GR-2000 will bring more enjoyment to your family's TV viewing.

This 25" diagonal Color TV has electronic tuning which scans through preset channels; digital on-screen channel display; black matrix picture tube for extra-bright and sharp pictures; fixed IF filter which virtually eliminates adjacent channel interference and never needs alignment; automatic gain control.

Get even more savings — and enjoyment — by ordering the GRA-601 On-Screen Clock and GRA-2000-6 Remote Control (right). Save 20% when ordering with a GR-2000 (excluding shipping, handling).

The GR-2000 has famous Heathkit built-in service features — dot generator, purity and convergence circuits, vertical and horizontal centering circuits and a test meter. Kit assembly is easy, too — with factory-assembled wiring harnesses to minimize point-to-point wiring. Custom-mount in a wall or your own cabinet — or save 20% on a fine furniture cabinet when ordered with a GR-2000 (excluding shipping and handling — see below). 20.13" H x 29.13" W x 21.75" D.

Kit GR-2000, Shpg. wt. 147 lbs.

Motor Freight . . . . . Was \$669.95, NOW ONLY 599.95

Second Speaker for GR-2000 Color TV. Fits in most GR-2000 cabinets where indicated. Includes cables.

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



Simulated TV picture



### Save on On-Screen Digital Clock

Shows time in hours, minutes and seconds right below on-screen channel display.

Kit GRA-601.

Shpg. wt. 1 lb. . . . . 29.95



### Remote Control unit for your GR-2000

Turn on/off, control volume/color/tint, chg. channels from easy chair.

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

### Warranty Service for Solid-State TV Modules:

During 90-day warranty period, modules with defective components serviced at no charge for parts and labor. \$5.00 inspection/service fee charged if problem is due to construction error. After warranty expires, service fee is \$5.00 per module plus parts. Picture tubes warranted for 2 years.

**GR-2000 SPECIFICATIONS:** Picture Tube: 25" (diagonal). Viewing Area: 315 sq. in. Deflection: Magnetic, 90 deg. Antenna Input Impedance: VHF, 300 ohms balanced or 75 ohms unbalanced; UHF, 300 ohms balanced. Tuning Range: Channels 2 through 83 (Preset any 16). High-Fidelity Output: Impedance: 2000 ohms. Frequency Response: +1 dB, 50 Hz to 15 kHz. Harmonic Distortion: Less than 1% at 1 kHz. Output Voltage: Greater than 1.0 VRMS. Audio Output: Impedance: 4 or 8 ohms. Output Power: 2 watts. Power Requirement: 120 VAC, 60 Hz, 200 watts.

## Make your Heathkit TV look great when you order a cabinet with your GR-2000 Color TV



Mediterranean Cabinet. Dark oak finish, simulated wood-grain trim combine to make a cabinet as sharp as your Heathkit Color picture. Accented by antique gold hardware. Accepts 2 speakers. Fully assembled. 30.31" H x 49.94" W x 23.94" D, with cup.

GRA-604-25, 82 lbs., Motor Freight . . . . . 249.95



Compact Contemporary Cabinet is solidly constructed of quality wood solids and veneers. Beautifully finished in luxurious oiled walnut. This cabinet comes fully assembled. Equipped with cutout for one speaker. 34.38" H x 20.63" W x 24.13" D, with cup.

GRA-608-25, 65 lbs., Motor Freight . . . . . 179.95



Contemporary Cabinet makes your TV a sight to behold. Constructed of wood solids and veneers. Oiled walnut finish. Dual speaker capability. Comes assembled, finished. Dimensions, 28.38" H x 46.82" W x 23.63" D (72.09 x 18.43 x 60.02 cm), with cup.

GRA-602-25, 66 lbs., Motor Freight . . . . . 229.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

TELEVISION/33



**1** Your favorite programs will look even better on the super-sharp screen of the GR-2050 Color TV

**2** Brighter, more vivid color pictures with the GR-500's negative matrix picture tube



Simulated TV pictures

## 1 Save \$80 on quality 21" diagonal Color TV

Get years of beautiful television at a price you can't afford to pass up! This outstanding Color Television Kit brings you all of the technical excellence and quality design of our famous GR-2000A on page 33, in the popular 21-inch diagonal size. It uses the same optional on-screen clock and remote control as the GR-2000 and it has the same bright, accurate color picture — thanks to its fixed IF filter and negative matrix picture tube.

The GR-2050 is easy to build — modular circuit boards and color-coded wiring harnesses keep point-to-point wiring to a minimum. Built-in service features include dot generator, service circuit board, centering and pincushioning circuits for easier adjustment and service. Includes chassis, picture tube and one speaker. GRA-2050-1 Space-Saver Contemporary Cabinet offered separately, below.

For 120 VAC, 60 Hz. Draws 200 Watts.

Kit GR-2050, 122 lbs., Mtr. Frt. .... Was \$629.95, **NDW ONLY 549.95**

Space-Saver Contemporary Cabinet. Assembled and finished. Made of wood solids and veneers. Stained in walnut. Includes black foam grille. Overall Dimensions, 25.63" H x 30.50" W x 22.06" D (including cup).

GRA-2050-1, Shpg. wt. 74 lbs., Motor Freight ..... **169.95**

Kit GRA-2000-6, Optional Remote Control, Shpg. wt. 4 lbs. .... **99.95**

Kit GRA-601, Optional On-Screen Digital Clock, Wt. 1 lb. .... **29.95**

## 2 Build years of entertainment with this 19" Color TV

Precision 19" diagonal in-line gun color picture tube — with a negative matrix screen for more contrast and brightness. Detented UHF and VHF channel selectors, automatic fine tuning lock in on each channel. Four tuner circuits for greater selectivity, better picture — with less interference. Also has on-screen channel display, high-fidelity audio output and 75-ohm VHF antenna input. Avoid future repair bills with the trouble-shooting meter included. Less cabinet. For 120 VAC, 60 Hz. Draws 200 Watts.

Kit GR-500, Shpg. wt. 99 lbs., UPS ..... **499.95**

GRA-601, Digital Clock Accessory, Shpg. wt. 1 lb. .... **29.95**



## Zenith Video Director lets you watch your favorites — anytime!

• The programmable Zenith Video Director VCR lets you record up to four different channels over a 14-day period — up to 5 hours of your favorite TV shows on a single video cassette!

Increase your television viewing pleasure with the exciting Zenith Video Director. Use this versatile Video Cassette Recorder to record shows while

you're away. Also record a program you're watching — or record one program, while viewing another.

Remote Video Action Control lets you edit commercials while recording. Automatic indexing helps find the beginning of any program. Speed Search locates scenes at 10 times normal speed. Stop tape for "freeze action" effect. Reverse for "instant replay". Or view at 3 times normal speed. Record or play in Beta II or Beta III modes — up to 5 hours in Beta III. Audio Dub adds music and/or narration later. Accepts optional camera or monitor to make home video movies, or for closed circuit surveillance. Includes remote control, transformers, cables and auxiliary 120 VAC outlet. 120 VAC, 60 Hz, 55 W. Dimensions, 19.5" H x 6.5" W x 15.25" D.

FREE: Includes five free GDZ-9700-4 Video Cassettes — enough tape to record up to 22½ hours of entertainment in Beta III format. If purchased separately, an \$89.75 value.

GDZ-9700S, Assembled and Tested, Shpg. wt. 58 lbs. .... **1150.00**

Videotapes	Beta II	Beta III	Wt.	Price
GDZ-9700-5 (L-920)	3½ hrs.	5 hrs.	1 lb.	20.95
GDZ-9700-4 (L-759)	3 hrs.	4½ hrs.	1 lb.	17.95
GDZ-9700-3 (L-509)	2 hrs.	3 hrs.	1 lb.	14.95



## Now get famous Zenith quality in this 9-inch Black/White AC/DC/Battery Portable TV

Uses 120 VAC for home viewing; 12 VDC in car, camper or RV; optional 12 VDC battery for picnic, beach. 9" diagonal screen. 100% solid-state. Molded plastic cabinet, finished in ebony. 9.75" H x 14.63" W x 9.63" D.

GRZ-92, Assembled and Tested, Shpg. wt. 17 lbs. ... **109.95**

GRZ-92-1, Rechargeable Battery Pack, 9 lbs. .... **49.95**

SAVE \$10.00! GRZ-92-S, TV/Battery Pack, 33 lbs. ... **149.90**

## Antennas and accessories for better TV, FM entertainment

**Super-Antenna.** This 60-element VHF/UHF/FM antenna is a real signal-grabber. 171" boom, 109" turning radius. Weather-protected finish. Includes removable FM blocking elements. Less mast and cable. Select 300-ohm or 75-ohm versions below.

GD-1461, 300 ohms, 17 lbs., Mtr. Frt. .... **79.95**

GDS-1461, 75 ohms, 34 lbs., Mtr. Frt. .... **84.95**

**Deluxe Fringe Antenna.** This antenna's 28 elements pull in VHF, UHF and FM signals. 131" boom, 80" turning radius. All-weather construction stands up to winter storms, summer heat. Less mast and cable. Select 300-ohm or 75-ohm versions below.

GD-1441, 300 ohms, Shpg. wt. 10 lbs. .... **39.95**

GDS-1441, 75 ohms, Shpg. wt. 34 lbs. .... **44.95**

**Cornell-Dubilier Rotator System.** Pinpoints your outdoor antenna on each station, for greatly improved TV and FM reception. Heavy-duty 1 rpm rotator has positive automatic stop, instant reverse. ½" diameter ball thrust bearing supports antennas to 150 lbs. Lower mast clamp takes ¾" to 2" diameter masts; removable for direct mounting on tower's rotator plate. Lifetime-lubricated bearings. 360 degree rotator control. For 120 VAC, 60 Hz.

GDP-1176, Shpg. wt. 14 lbs. .... **64.95**

**75/300 Ohm Transformer/Splitter.** Matches one 75 ohm coaxial cable to separate 300 ohm VHF and UHF leads. No-strip, pre-attached leads.

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

**Matching Transformer.** Converts 300 ohms to 75 ohms for coax. For all UHF and VHF antennas.

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

**75-Ohm Coaxial Cable.** 100' of high-quality coax with 1 antenna boot and 2 connectors installed.

GD-328, Shpg. wt. 4 lbs. .... **12.95**

## Education that's right for you: Heathkit/Zenith Self-Instruction Courses



You save time and money when you choose a self-instruction course from Heathkit/Zenith Educational Systems. You save time because each subject area is presented step-by-step so you build upon the knowledge you acquire as you progress through the course. You save money because you pay far less than a comparable adult education or vocational course. But lower cost does not mean a sacrifice in quality — Heathkit/Zenith Courses use the latest multi-media techniques. And technical consultants are on duty to answer your questions by phone or letter.

Programmed learning texts make Heathkit/Zenith Self-Instruction Courses more effective. Read at your own pace in easy-to-understand, step-by-step segments. No facet of the material is omitted and nothing is assumed. Self-test reviews throughout the text let you check your progress, too, for complete understanding.

Audio-visual aids speed your learning of subject material. Large, illustrated visual materials make the text more interesting and effective. And audio aids

included with many of our courses will make your learning even easier by reinforcing the text material because you both see and hear it.

Heathkit/Zenith Educational Systems offers a full line of self-instruction courses for you, including the Electronics Fundamentals series, five complete courses that form a complete foundation in electronics; the Electronics for Hobbyists Course, described below; Digital Techniques and Microprocessors Courses on pages 39 and 42; and a series of five Advanced Electronics Courses and Math Courses ranging from metric conversion to algebra, trig and statistics.

Besides the Courses in this section, see Automotive Courses on page 51, Amateur Radio Courses on page 58, the Weather Course on page 4, and Computer-related Courses on pages 90 and 91.

You learn best by doing, so experiments in Heathkit/Zenith Courses help you get a better grasp of many concepts. Our Electronic Trainers, for use with our Electronics Courses, give you actual hands-on experience with components and circuitry. And later, the Trainers can serve as ideal experimental units so you can do your own breadboarding and circuit design work.

The Heathkit/Zenith Guarantee: If, for any reason, you are dissatisfied with our Courses, we will refund the price of the text material (less Trainer).

Earn a Certificate of Achievement plus Continuing Education Units, which certify non-credit adult education, by scoring 70 percent or better on the optional final exams. Some of our courses prepare you for professional examinations and for the College Level Examination Program (CLEP), which enables you to earn college credit for self-study, on-the-job training and work experience you have received outside the classroom.



Now you may be able to earn college credit for many Heathkit/Zenith Courses. The American Council on Education, a nationally recognized accrediting authority, recommends that member colleges

grant credit for several of our courses. If you have successfully completed any of the courses on pages 36 through 40 (EE-3101, -3102, -3103, -3104, -3105, -3201, -3401) or the EE-1100 BASIC Programming Course on page 90, check with your college or university. If your college participates in this program, order our College Credit Exam. Take notification of passing to your college for credit.

**IMPORTANT TAX NOTE:** All Heathkit/Zenith Educational Systems Courses and Trainers may qualify you for a Federal tax deduction. Treasury Regulation 162-5 permits an income tax deduction for educational expenses undertaken to: (1) maintain or improve skills required in one's employment or other trade or business, or (2) meet express requirements of an employer or a law imposed as a condition to retention of employment, job status or rate of pay.

### Approved by recognized organizations



Accredited by  
the National  
Home Study  
Council



Licensed  
School —  
State of  
Michigan

## Electronics for Hobbyists — made simple with this Heathkit/Zenith Course

\$59<sup>95</sup>

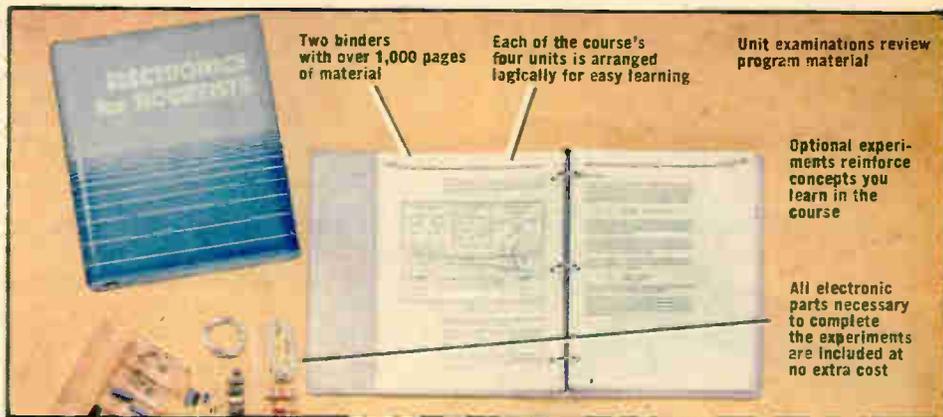
- Understand do-it-yourself electronics magazine projects
- Optional experiments offer practical hands-on experience

With the Electronics for Hobbyists Self-Instruction Course, you'll be able to understand those do-it-yourself electronic projects in popular magazines. No prerequisite is required, and the course is arranged in a logical manner, so learning is easier. The course provides an excellent introduction which can be continued with the Electronics Fundamentals Series (EE-3101 through EE-3105).

Divided into seven units, the easy-to-understand text material is backed up by examinations at the end of each unit — as well as by 26 experiments.

Upon completion, you will be able to:

1. Define voltage, current, resistance and power.
2. Find the value of voltage, current, resistance and power, when two of the above are known.
3. State the basic law of magnetism.
4. Define Direct and Alternating Current.
5. Explain the operation of a transformer.
6. Define inductance, henry, mutual inductance, inductive reactance and impedance.



Two binders with over 1,000 pages of material

Each of the course's four units is arranged logically for easy learning

Unit examinations review program material

Optional experiments reinforce concepts you learn in the course

All electronic parts necessary to complete the experiments are included at no extra cost

7. Explain diodes, transistors and ICs.
8. Use a voltmeter, ammeter and ohmmeter.
9. Explain the operation of rectifiers, filters, power supplies, amplifiers and oscillators.
10. Explain the operation of digital circuits.
11. Understand logic elements, flip-flops, counters, shift registers and clocks.
12. Explain how a digital computer operates.
13. Understand the relationships between computers, programming and software.
14. Understand experimentation and construction,

shortwave listening, amateur radio, radio control models, personal computing and audio.

Score 70% or better on the optional final exam, and earn a Certificate of Achievement and 4.0 CEUs.

Included with the Course are a complete text in two binders, and electronic components for completing the 26 experiments. To perform the experiments, you will need an ET-3100 Trainer (page 36), a multi-meter (such as the IM-5284 on page 17), and an oscilloscope (like the IO-4105 on page 29).

EE-3140, Shpg. wt. 11 lbs. . . . . 59.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

## DC Electronics Course — the interesting, efficient way to build a solid foundation

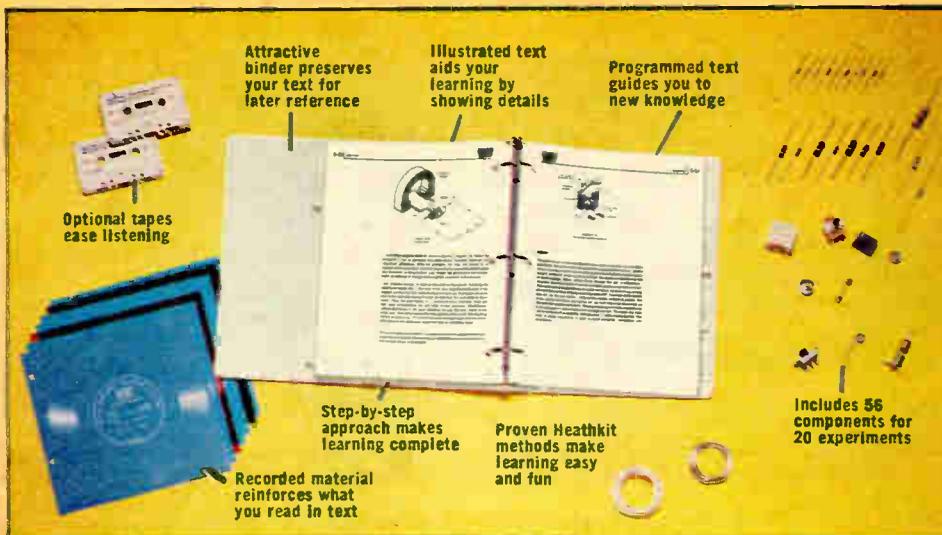
**\$49<sup>95</sup>**

- Your key to the fascinating world of electronics is this proven, complete DC Electronics Course

The Heathkit/Zenith DC Electronics Self-Instruction Course is your first step on the way to a complete understanding of electronics. You are introduced to the fundamentals of current, voltage, resistance, magnetism, Ohm's Law, electrical measurements, inductance and capacitance. This Course will take you through each new concept step by step to give you a solid foundation in electronics. Audio-visual treatment reinforces learning so you retain what you learn.

Hands-on experiments help you understand by giving you practical proof that the theory really works. You will acquire a detailed knowledge of DC electronics in a very short time. A knowledge of high school mathematics is assumed in the Course, however it even includes a review of the math you need, should you require a refresher. When you have successfully completed DC Electronics, you will be able to accomplish the following:

1. Solve problems of current, voltage, resistance and power.
2. Explain current, voltage, resistance and power.
3. Discuss the relationship between electricity and magnetism.
4. Using a schematic diagram as a guide, construct DC circuits with resistors, relays, switches, lamps, batteries and capacitors.
5. Given a wiring diagram of a circuit, draw an equivalent schematic.
6. Use a multimeter to measure current, voltage and resistance.
7. Work with powers and convert metric prefixes of ten.
8. Explain the construction, operation and purpose of resistors, potentiometers, switches, fuses, relays, capacitors and inductors.



9. Use safety procedures for both you and your test equipment.

10. Build and experiment with DC circuits of your own design.

Should you choose to take the optional final exam for DC Electronics, a passing grade of 70% or better will earn you 2.0 Continuing Education Units (a nationally-recognized way of acknowledging participation in non-credit adult education courses), and a Certificate of Achievement.

The DC Electronics Course includes a comprehensive text housed in its own attractive, sturdy vinyl binder, records containing the audio material, and the 56 electronic components necessary to perform the 20 experiments that are part of the Course. The optional ET-3100 Experimenter/Trainer is required for use in completing the experiments in order to gain full benefit from the Course. Optional cassette tapes duplicate the material on records in convenient, easy-to-use cassette form. This Course is a complete introduction to the fascinating field of electronics, and will form a solid foundation for your advancement in the world of electronic knowledge. You owe it to yourself to gain this knowledge,

and there's no better time to begin learning.

EE-3101, Shpg. wt. 7 lbs. .... 49.95

Save \$10.00! EES-3101, Includes EE-3101 and ET-3100 Kit Trainer. 13 lbs. .... 119.90

EEA-3101, Optional Cassettes, Wt. 1 lb. .... 9.95

Spanish Language DC Electronics Learning Course. (Less EB-6101-30 Parts for experiments. See pg. 46).

EE-3101-S, Shpg. wt. 7 lbs. .... 54.95



College-Level Examination, recognized by American Council on Education. Many colleges grant credit for acceptable grades earned on this exam. Check with your college first, to determine its policy. See page 35 for details.

ECC-3101, Shpg. wt. 1 lb. .... 25.00

### Money-Back Guarantee

All Heathkit/Zenith self-instruction courses carry a complete guarantee of satisfaction. If you are dissatisfied with the course, return all course materials and your receipt for a full refund.

## Gain more from Courses with the Experimenter/Trainer

**\$79<sup>95</sup>**

- Get hands-on experience building circuits, doing course experiments
- Use it later for "breadboarding"

Designed for use with the DC, AC, Semiconductor, Electronic Circuit and Test Instruments Courses. Features solderless breadboarding sockets for ease of component substitution, 2-range variable sine and square wave (200-20,000 Hz) signal source, dual-variable power supplies for positive and negative voltages (1.2 to 16 volts, 120 mA), 1 k and 100 k linear potentiometers. A center tapped transformer provides 30 volts rms, 60 Hz for line experiments. Get it with a program and save.

Kit ET-3100, Shpg. wt. 6 lbs. .... 79.95

Kit ET-3100S, Trainer with Spanish manual, Shpg. wt. 5 lbs. .... 79.95

ETW-3100, Factory assembled Trainer, Shpg. wt. 6 lbs. .... 139.95

Make it easy to perform experiments or breadboard circuits

## Learning Dictionary is a complete short course in electronics

Having the language of electronics compiled in handy dictionary form is reason enough to put this book on your reference shelf. Better yet, the Heathkit Learning Dictionary includes a compendium of 16 topic outlines that turns this Dictionary into a low-cost self-instructional course. Each topic outline lists related terms, making your Dictionary an effective learning tool. 832 pages.

EB-1010, Shpg. wt. 3 lbs. .... 14.95

## Get a thorough grounding in AC Electronics using proven methods of learning

**\$54<sup>95</sup>**

• The logical arrangement of this course will help you master AC electronics easily and enjoyably

AC Electronics covers the fundamentals and theory of alternating current in an easy-to-understand manner. Programmed instruction material teaches you a little bit at a time so you aren't overwhelmed by new concepts. Upon completion you will be able to:

1. Explain the difference between AC and DC.
2. Describe the operation of AC generators.
3. Determine average, peak, peak-to-peak, and effective values of an AC sine wave, and analyze its frequency, period and phase; then measure these values using an oscilloscope.
4. Measure current, voltage and power.
5. Analyze AC circuits which contain resistance.
6. Understand and describe capacitance and capacitive reactance.
7. Analyze AC circuits with capacitance or capacitance and resistance.
8. Understand mutual inductance, self-inductance and inductive reactance.
9. Analyze series and parallel resonant circuits.
10. Analyze AC circuits with inductance or inductance and resistance.
11. Determine the current, voltage and power relationships at the inputs and outputs of both ideal and practical transformer circuits.

## This Semiconductor Course advances your knowledge of solid-state electronics

**\$54<sup>95</sup>**

• Semiconductors have reshaped the world of electronics. This Course brings you up to date

No education in electronics would be complete without including solid-state technology. The Semiconductor Devices Course teaches you all about this comparatively-recent development. Audio aids help emphasize the comprehensive text material. And you get hands-on experience with the interesting experiments that are part of the Course.

This Course covers fundamentals, diodes, zeners, bi-polar transistor operation and characteristics, FET's, thyristors, IC's and opto-electronics. Included are texts, records and 27 electronic components for 11 different experiments. The ET-3100 is required to complete the experiments. To gain full benefit, the DC and AC Electronics Courses or equivalent knowledge is recommended. If you take the optional final exam and score 70% or better, you will receive a Certificate of Achievement and 3.0 CEUs. The optional Cassettes (listed right) duplicate the records included with the Course.

Upon completion of the Semiconductor Devices Course you will be able to:

1. Describe the electrical characteristics of semiconductors.
2. Name the primary advantages of semiconductor devices over vacuum tubes.
3. Explain how the most important semiconductor devices operate.

**Sturdy vinyl binder holds your AC Program**

**Programmed instruction helps you learn fast**

**Comprehensive text takes you step-by-step**

**Optional audio cassettes duplicates records**

**Recorded material reinforces the text material**

**Each new bit of knowledge is explained clearly**

**You learn at your own pace to suit your learning**

**Components are included for conducting the course experiments**

12. Analyze and design RC, RL and LC filters.

13. Understand construction and characteristics of capacitors, inductors and transformers.

Scoring 70% or better on the optional final exam will earn you a Certificate of Achievement and 1.5 CEU's. The DC Course or equivalent knowledge is a desirable background. Included are a text and vinyl binder, records, and 16 electronic components for completing experiments. The ET-3100 Trainer is required to complete the experiments. Optional Cassettes duplicate records.

EE-3102, Shpg. wt. 7 lbs. . . . . 54.95

Save \$10.00! EES-3102, Includes EE-3102 and ET-3100 Kit Trainer, 13 lbs. . . . . 124.90

EEA-3102, Optional Cassettes, Wt. 1 lb. . . . . 9.95

Spanish Language AC Electronics Course. (Less EB-6102-30 Parts for experiments. See page 46).

EE-3102-S, Shpg. wt. 7 lbs. . . . . 54.95

 College-Level Examination, recognized by American Council on Education. Many colleges grant credit for acceptable grades.

Check with your college first. See page 35 for details.  
ECC-3102, Shpg. wt. 1 lb. . . . . 25.00

**Optional cassettes aid comprehension**

**Protective binder houses your Semiconductor Course**

**Illustrated text explains all facets of the subject**

**Proven learning techniques speed mastery**

**Vinyl records supplement the text material**

**Programmed learning is one of the most effective techniques**

**Heathkit Self-Instruction is the fast way to learn**

**Experiments with components round out your knowledge**

4. Describe how semiconductors are constructed.

5. Use semiconductor components properly.

6. Recognize semiconductor packages and their schematic symbols.

7. Design your own circuits using semiconductors.

8. Test various semiconductor devices.

EE-3103, Shpg. wt. 6 lbs. . . . . 54.95

SAVE \$10.00! EES-3103, Includes EE-3103 and ET-3100 Kit Trainer. 11 lbs. . . . . 124.90

EEA-3103, Optional Cassettes, Wt. 1 lb. . . . . 9.95

Spanish Language Semiconductor Devices Course. Direct translation of this famous course. (Less EB-6103-30 Parts for experiments. See page 46).

EE-3103-S, Shpg. wt. 6 lbs. . . . . 54.95

 College-Level Examination, recognized by American Council on Education. Many colleges grant credit for acceptable grades.

Check with your college first. See page 35 for details.  
EEC-3103, Shpg. wt. 1 lb. . . . . 25.00



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

## Electronic Circuits Course applies your knowledge to actual circuit operation

**\$64<sup>95</sup>** • Apply the electronic knowledge you have learned to practical circuits used everyday

This Course shows you how to apply all the theory of your first courses in actual circuit operation. You should first complete DC and AC Electronics and Semiconductor Devices, or have equivalent knowledge. For experiments you must have an oscilloscope like the Heathkit IO-4105 on page 29, and the ET-3100 Trainer on page 36. Scoring 70% on the optional final exam will earn you a Certificate of Achievement and 4.0 CEUs. Upon completion you will be able to:

1. Identify basic amplifier circuits and describe their operation.
2. Discuss DC amplifiers, audio amplifiers, video amplifiers, IF and RF amplifiers.
3. Explain operational amplifiers, differential amplifiers, comparators, active filters.
4. Analyze and design simple inverting and noninverting amplifiers.
5. Explain power supply rectifiers, filters, and regulation circuits.
6. Identify commonly used LC, RC, and crystal oscillators.
7. Explain pulse shapers, multivibrators, Schmitt triggers, sawtooth generators, IC timers.
8. Understand AM, FM, heterodynes, modulation, and detection.

Optional tapes duplicate information on records

Sturdy vinyl binder protects your Program

Programmed learning aids your retention

Illustrations help increase your knowledge of the subject

Vinyl records reinforce the text material

Step-by-step method lets you learn at your speed

Proven methods assure you of successful learning

Over 100 components included for 18 different experiments

9. Construct, experiment with the above transistor and IC circuits.
10. Use a voltmeter and an oscilloscope to analyze electronic circuits.

The Electronics Circuits Course includes text, an attractive vinyl binder, records and over 100 electronic components for 18 experiments. Optional tapes duplicate the material on records in convenient, easy-to-use cassette format.

As with all Heathkit/Zenith Self-Instruction Courses, the ones on this page carry a complete money-back guarantee of satisfaction.

If, for any reason, you are not satisfied with either

Electronic Circuits or Test Equipment, simply return all course materials (less Trainer) along with your receipt for a complete refund.

EE-3104, Shpg. wt. 7 lbs. .... 64.95

Save \$10.00! EES-3104, Includes EE-3104 and ET-3100 Kit Trainer, 13 lbs. .... 134.90

EEA-3104, Optional Cassettes, Shpg. wt. 1 lb. ... 9.95

College-Level Examination, recognized by American Council on Education. Many colleges grant credit for acceptable grades.

Check with your college first. See page 35 for details.

ECC-3104, Shpg. wt. 1 lb. .... 25.00

## Learn instrument operation, applications, specification in Test Equipment Course

**\$64<sup>95</sup>** • This Course gives you a solid foundation in a wide variety of modern electronic test instruments

Understand how to use electronic test equipment. This comprehensive Course provides you with excellent background, plus the ability to operate test instruments. It covers analog and digital meters, oscilloscopes, frequency generation and measurement, and special measuring instruments. The Basic Electronics Courses (EE-3101 through EE-3104) and Digital Techniques (EE-3201) or equivalent knowledge are necessary background to benefit fully. Upon completion you will be able to:

1. Use analog and digital meters to make electrical measurements.
2. Explain the operation of integrating and nonintegrating.
3. Use an oscilloscope in electronic testing.
4. Explain operation of single and dual trace scopes, including sampling and storage types.
5. Understand operation and use of the three most popular passive frequency meters and four most popular active frequency meters.
6. Use a dip meter to calculate the value of an unknown inductor.
7. Understand the operation and use of electronic counters.

This course includes four texts in attractive binders

Self-test reviews let you check progress as you learn

Illustrations add another dimension to learning

Texts will save you time and money

Easy-to-read texts cover the subject in depth for real learning

Check your progress with unit exams

Heathkit self-instruction techniques teach better

Components are included for real hands-on learning

8. Use appropriate bridge circuits to measure resistance, capacitance, inductance, and impedance.
9. Determine beta, leakage values of transistors and transconductance and leakage values of FETs using a transistor tester.
10. Understand curve tracers, spectrum analyzers and logic probes.

The Test Instrument Course includes four texts in attractive vinyl binders and electronic components for experiments. A digital meter, analog meter, oscilloscope, frequency generator and frequency counter, as well as the ET-3100 Trainer are required

to complete the experiments. See pages 17 through 29 for Heathkit test equipment. If you take the optional final exam, a passing grade of 70% will earn you 6.0 CEUs, plus a Certificate of Achievement.

EE-3105, Shpg. wt. 18 lbs. .... 64.95

Save \$10.00! EES-3105, Includes EE-3105 and ET-3100 Kit Trainer, 24 lbs. .... 134.90

College-Level Examination, recognized by American Council on Education. Many colleges grant credit for acceptable grades.

Check with your college first. See page 35 for details.

ECC-3105, Shpg. wt. 1 lb. .... 25.00



# Digital Techniques: covers logic to ROMs — even introduces microprocessors

**\$79<sup>95</sup>**

• The Heathkit/Zenith Digital Techniques Course enables you to study tomorrow's technology today

Using tried and tested self-instruction techniques, you can learn all about the latest advances in electronics. Learn at your own pace, with the freedom to cover the material quickly, or to review those areas that need re-emphasis. And, as with all Heathkit/Zenith courses, your money will be refunded if you are not completely satisfied.

The Advanced Digital Techniques course is a comprehensive treatment of the subject, beginning with fundamentals and theory, and guiding you through digital logic circuits, Boolean algebra, flip-flops and registers, sequential logic circuits, combinational logic circuitry and digital design.

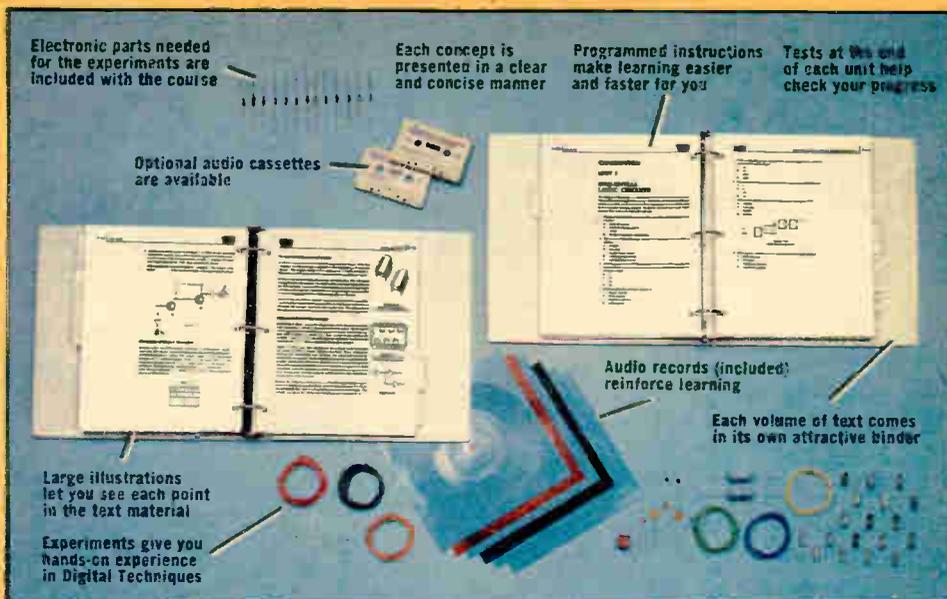
This well-organized approach to the subject of Digital Techniques combines the printed word and recorded sound for ease of learning, as well as greater comprehension and retention. It even incorporates programmed learning. As you complete each step-by-step section, hands-on experiments and tests will further aid your understanding of Digital Techniques.

You'll be getting the knowledge you need, at a fraction of the cost of a comparable college or technical school course on the subject. You'll be interested to know, in fact, that several American universities — as well as a federal agency — utilize this course.

This expertly-designed course shows you how to design digital circuitry for virtually any modern electronic application. It assumes a prior knowledge of electronics (the DC, AC, Semiconductors and Electronic Circuits courses or equivalent knowledge).

When you have successfully completed the Digital Techniques Course, you will be able to:

1. Understand the advantages and benefits of using digital techniques in electronics.
2. Name the major applications of digital techniques in electronics.
3. Convert between the binary and decimal number systems, and recognize the most commonly-used binary codes.
4. Name the major components used in implementing digital circuits, and explain how they operate.



5. Understand digital logic gates.
6. Identify the more commonly used integrated circuit families used in digital equipment and discuss their operation.
7. Use Boolean algebra to express logic operations and minimize logic circuits in design.
8. Understand the operation of flip-flops.
9. Understand the operation and application of binary and BCD counters, shift registers and other sequential logic circuits.
10. Name the most frequently used combinational logic circuits and explain their operation.
11. Design both combinational and sequential logic circuits for a given application, from definition and concept of the circuit to the selection of the integrated circuits.
12. Understand the operation and application of digital counters in the measurement of both time and frequency.
13. Understand how a digital computer is organized, and how it operates.
14. Understand microprocessors, explain their operation and applications.

The course includes a comprehensive text in two vinyl binders, records (or optional cassettes), and 44 electronic components for performing the 24 experiments. The ET-3200 Trainer is required to perform the experiments. Also recommended are a multimeter like the IM-5284 (page 17) and single-trace oscilloscope like the IO-4105 (page 29).

Upon completion — if you pass the optional final examination with a grade of 70 percent or better, you'll earn 4.0 CEUs and a Certificate of Achievement. If you are not satisfied with the course, return all materials (less trainer) for a refund.

EE-3201, Shpg. wt. 9 lbs. .... 79.95

**SAVE \$15.00!** Buy the Digital Techniques Course and the ET-3200 Trainer Kit together. \$169.90 if purchased separately.

EES-3201, Shpg. wt. 14 lbs. .... 154.90

EEA-3201, Optional Cassettes\*, Shpg. wt. 1 lb. ... 9.95

College-Level Examination, recognized by American Council on Education. Many colleges grant credit for acceptable grades. See the information on page 35, and check with your college first.

ECC-3201, Shpg. wt. 1 lb. .... 25.00

\*Optional cassettes duplicate material on records.

## Use this Electronic Trainer to get maximum benefit from the Digital Techniques course

**Learn by doing.** Use the Heathkit/Zenith ET-3200 Electronic Trainer for the Digital Techniques experiments. Also build and test prototypes, verify circuit operation and check digital integrated circuits. Solderless breadboard sockets aid experimenting and design. They take up to eight 14-pin or 16-pin dual in-line ICs; also 24, 28 and 40-pin DIPs. Has four binary data switches, two no-bounce switches to pulse logic circuits, three-frequency pulse clock generator and four LEDs for visual indication of logic states.

Regulated power supplies produce +12 VDC at 500 mA, -12 VDC at 100 mA and +5 VDC at 500 mA — all current-limited and overload-protected for greater safety. The ET-3200 Trainer is compatible with all commonly-used IC logic families, including RTL,

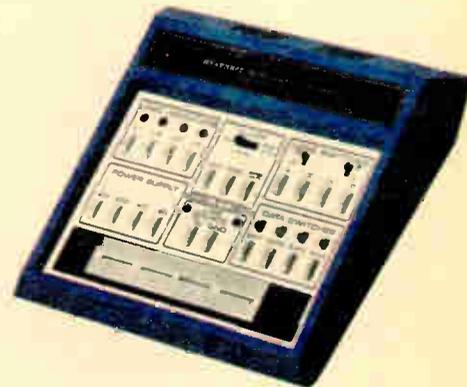
TTL, CMOS, ECL, NMOS, PMOS and Linear. The trainer can be wired for either 120 VAC or 240 VAC use.

Kit ET-3200, Shpg. wt. 6 lbs. .... 89.95

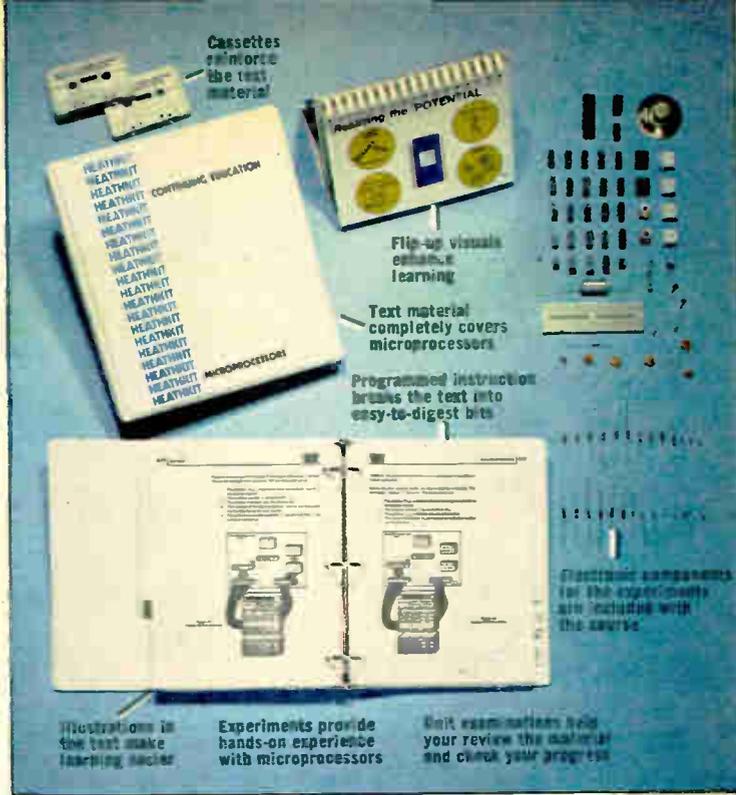
Factory Assembled and Tested ET-3200 Trainer.

ETW-3200, Shpg. wt. 6 lbs. .... 159.95

**ET-3200/ETW-3200 SPECIFICATIONS:** DATA SWITCHES: States: +5 V or 0 V. Maximum Current: 10 mA, each switch. Outputs: Four terminals, one for each switch. LOGIC SWITCHES: Type: Momentary contact, spring-loaded. Circuit: Two flip-flop latches for contact bounce buffering. Output States: Complementary, +5 V and +0.2 V. CLOCK: Output Frequency: 1 Hz, 1 kHz, 100 kHz, ±20%. Duty Cycle: 45%. Output Voltage: 5 V peak-to-peak. Overall Dimensions: 3.5" H x 12.13" W x 11.75" D (8.90 x 30.80 x 29.80 cm).



Alaska, Hawaii and Michigan Residents: Call 616-982-3411



## Learn about microprocessors, microcomputers, interfacing and programming with this course

### Microprocessor Course completely covers the subject

#### WINNER

International Award  
of Distinction —  
Society of  
Technical  
Communicators

With the Microprocessor Self-Instruction Course from Heathkit/Zenith Educational Systems, you'll learn about microprocessors, microcomputers and programming in a complete, efficient and well-organized way. You'll learn microprocessor basics, computer arithmetic, programming, interfacing, perform optional experiments and more. Our proven multimedia approach, featuring programmed learning and audio-visual aids, will help you learn quickly.

The Microprocessor Course's concise self-study texts, colorful audio-visual presentations and optional hardware experiments make microprocessor theory, design and application simpler to understand.

Start by learning or reviewing the basics about number systems and codes. Then, apply that knowledge as our course takes students step-by-step through computer arithmetic, introductions to programming, explanation and examination of the 6800 microprocessor, and a study of interfacing and I/O operations. The Microprocessor Course is organized into 10 learning units:

**UNIT 1: NUMBER SYSTEMS AND CODES.** Covers decimal, binary, octal, hexadecimal number systems; conversions and binary codes, positional notation.

**UNIT 2: MICROCOMPUTER BASICS.** Covers terms and conventions, computer words, executing a program, addressing.

**UNIT 3: COMPUTER ARITHMETIC.** Covers Binary addition, subtraction, multiplication and division; two's complement arithmetic; Boolean operations — AND, OR, Exclusive-OR, INVERT.

**UNIT 4: INTRODUCTION TO PROGRAMMING.** Covers branching, conditional branching, algorithms, additional instructions.

**UNIT 5: THE 6800 MICROPROCESSOR — PART 1.** Covers architecture, instruction set and addressing modes.

**UNIT 6: THE 6800 MICROPROCESSOR — PART 2.** Covers stack operations, sub-routines, input/output (I/O) operations and interrupts.

**UNIT 7: INTERFACING — PART 1.** Covers interfacing fundamentals; interfacing with random access memory (RAM), interfacing with displays.

**UNIT 8: INTERFACING — PART 2.** Covers interfacing with switches; the Peripheral Interface Adapter (PIA), using the PIA.

**UNIT 9: PROGRAMMING EXPERIMENTS.** Covers experiments with binary/decimal, hexadecimal/decimal, and straight line programs; arithmetic and logic instructions, branches, additional instructions, new addressing modes, arithmetic operations, stack operations and subroutines.

**UNIT 10: INTERFACING EXPERIMENTS.** Covers memory circuits, clock, address decoding, data output, data input, Peripheral Interface Adapters, key matrix and parallel-to-serial conversion, digital-to-analog and analog-to-digital conversion.

Units 1 through 6, as well as Unit 9, assume no prior knowledge of electronics. Units 7, 8 and 10 assume a knowledge of electronics equivalent to the Heathkit/Zenith Digital Techniques Course (EE-3201, page 39).

The Course comes with 62 electronic components required to complete 19 experiments. These components include two 2112 256 x 4-bit RAMs, 6820 PIA interface chip, 1406 digital-to-analog converter, 741 and 301 op-amps, and a variety of other microprocessor-oriented devices. The optional ET-3400 Trainer (page 41) is required for completing the experiments.

If you choose to take the optional final examination, a passing grade of 70 percent or better will earn you 8.0 CEUs and a Certificate of Achievement.

EE-3401, Shpg. wt. 12 lbs. .... 99.95

**SAVE \$25.00!** Order the EE-3401 Microprocessor Course and ET-3400 Microprocessor Trainer Kit together. If purchased separately, \$324.90.  
ETS-3400, Shpg. wt. 19 lbs. .... **ONLY 299.90**

**SAVE \$70.00!** Order the EE-3401 Microprocessor Course, the ET-3400 Microprocessor Trainer Kit, the ETA-3400 Trainer Accessory Kit and the ETA-3400-1 3K Chip Set together. If purchased separately, \$546.90.  
ETS-3401, Shpg. wt. 28 lbs. .... **ONLY 476.90**

Optional Slides duplicate the audio-visual flip charts.  
EE-3401-1, Shpg. wt. 2 lbs. .... 60.00



College-Level Examination, recognized by American Council on Education. Many colleges grant credit for acceptable grades. See details on page 35, and check with your college first.

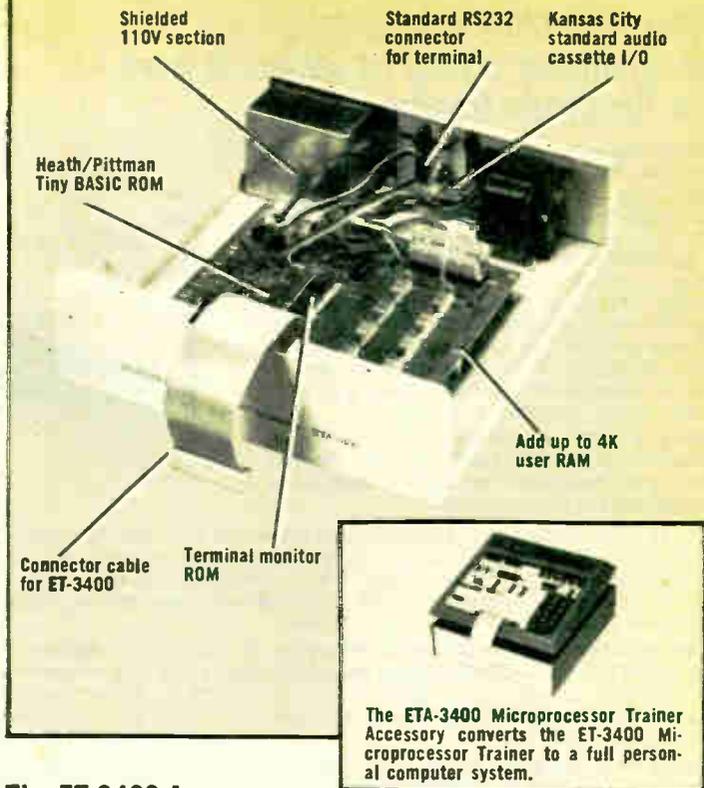
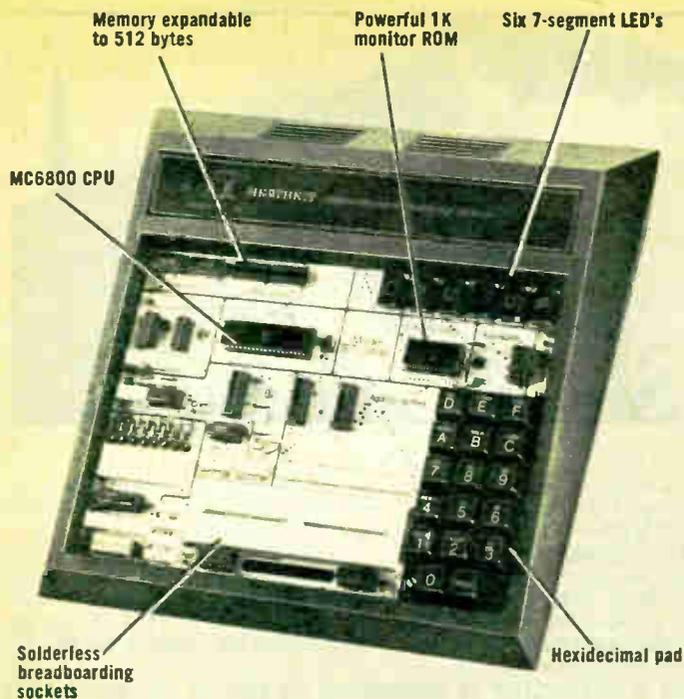
ECC-3401, Shpg. wt. 1 lb. .... 25.00

Optional 35mm Filmstrip. Same as slides above, in filmstrip form.  
EE-3401-2, Shpg. wt. 1 lb. .... 20.00

See page 46 for classroom version of the EE-3401 Microprocessor Course.



Credit Card Orders Call TOLL-FREE: 800-253-0570



## Learn computer architecture, interfacing and programming concepts with the Heathkit Computer Trainer

The ET-3400 Computer Trainer is designed for use with the EE-3401 Microprocessor Self-Instruction Program on page 40. Once you complete the EE-3401 experiments, add the ETA-3400 Trainer Accessory and a terminal such as the H-9 or H-19 for a complete system.

Functioning as a miniature digital computer, the ET-3400 Microprocessor Trainer is used with the experiments in the EE-3401 Self-Instruction Program. The ET-3400 features a built-in 1K ROM monitor program for controlling unit operation. It also has a 6-digit hexadecimal 7-segment LED display for address and data readout. The 17-key hexadecimal keyboard permits you to access memory location to examine contents, then step forward or backward from that memory location to examine more memory locations, to change a memory location, to examine and/or alter any of the MC6800 CPU's internal registers, to set break points for program debugging, or to reset the CPU. The flexible instruction set of the MC6800 permits relative addressing, and makes use of two accumulators.

The ET-3400 has 256 bytes of random access memory (RAM) built-in and is expandable to 512 bytes with the RAM's supplied in the EE-3401 Self-Instruction Program. It also features 8 buffered binary LED's for display of breadboard logic states, 8 SPST DIP switches for binary input to breadboarding circuits, and a breadboarding socket for prototyping, interfacing and memory circuits. All microprocessor address, control and data busses are buffered and terminated on the front panel for ease of connection to prototyped circuits. There's also provision for a 40-pin external connector to expand memory and I/O capacity. The Heathkit ET-3400 Microprocessor Trainer features built-in +5, +12 and -12 volt power supplies. Power requirement: 120/240 volts, 60/50 Hz, 30 watts maximum. The unit measures 3½" H x 12¼" W x 11¾" D.

All of the programming and hardware interface experiments supplied with the EE-3401 Microprocessor Self-Instruction Program are implemented on the ET-3400 Trainer. While designed primarily for use with the EE-3401 Program, the Trainer is a flexible, general purpose training unit and microprocessor breadboard. It can be used in many other applications that require a low-cost microprocessor-based software development system or as a design aid for developing special interfaces. Team it up with the ETA-3400 Trainer Accessory (description at right) for real computing power.

Kit ET-3400, Shpg. wt. 7 lbs. .... 224.95  
 ETW-3400, Factory assembled and tested, Wt. 6 lbs. .... 299.95

## The ET-3400 Accessory turns Microprocessor Trainer into a complete system

When you add the ETA-3400 Trainer Accessory, you turn your ET-3400 Microprocessor Trainer into a complete computer system. The Accessory provides you with more computing power — an additional 1K bytes of memory — so you are able to run longer and more sophisticated programs through your ET-3400 Trainer. The Accessory's memory can even be expanded to 4K bytes by adding the optional 3K Chip Set (ET-3400-1). Order the Chip Set from the listing below.

A serial I/O with EIA or 20 mA loop format in the Accessory allows you to hook up a terminal such as the H-9 (page 56) or H-19 (page 77), or a 20 mA ASCII teletype machine. It also provides an audio cassette interface enabling you to store programs on convenient audio cassettes. The ROM monitor/debugger program lets you implement the standard Trainer monitor functions through the external terminal. Memory locations can be examined or changed, break points can be initiated, and program debugging can be accomplished with a single instruction step feature.

A Tiny BASIC interpreter is provided in ROM allowing you to program using BASIC (see the EC-1100 BASIC Self-Instruction Program on page 90). Tiny BASIC features 26 variables (A-Z), integer math, 15 BASIC statements and two functions: random and user. User function allows you to run machine code routines from BASIC — the same machine code routines you learn to write in the EE-3401 Self-Instruction Program.

The ETA-3400 Accessory connects to the Trainer by means of a 40-pin ribbon cable supplied. Parts required to modify the Trainer are included. Since this modification changes the clock frequency of the Trainer, the experiments in the Microprocessor Self-Instruction Program using timing loops will be changed. It is recommended that all of the EE-3401 experiments be completed before adding this modification kit. The cabinet of the Accessory measures 3" H x 11" W x 12" D. Power requirement: 120/240 VAC, 60/50 Hz, 11 watts.

As with all Heathkit electronic kits, our step-by-step instruction manual even includes directions on soldering for the first-time builder.

Kit ETA-3400, Shpg. wt. 8 lbs. .... 175.00  
 EWA-3400, Factory assembled and tested, Wt. 8 lbs. .... 275.00  
 ETA-3400-1, Optional 3K Chip Set, Wt. 1 lb. .... 47.00

NOTE: A terminal such as the H-9 (page 56) or H-19 (page 77) is required to use the BASIC and monitor software with the Trainer Accessory.



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

EDUCATION/41

## Now microprocessor operation and programming is easy for anyone to learn — no electronics training needed

**Microprocessors.** An increasingly powerful part of our lives. Not only will you find microprocessors in computers — they can be found in many everyday products, from toys to typewriters. If you're eager to learn about microprocessors in the shortest, most effective way possible, the EC-6800 Introduction to Microprocessors Course — from Heathkit/Zenith Educational Systems — is for you. The Introduction to Microprocessors Self-Instruction Course will show you how to operate and program microprocessors. You'll learn what you need to know, without being swamped under by information you may never need or use.

Along with the optional ET-6800 Microprocessor Trainer, this Heathkit/Zenith Course is the fastest, most economical way to learn about microprocessors and microcomputers.

The EC-6800 Introduction to Microprocessors Course is a much more economical — and much faster — way to learn how to operate and program common types of microprocessors. With this new course from Heathkit/Zenith Educational Systems, you'll find the information you need, while skipping more complex, highly technical information you may not need right now.

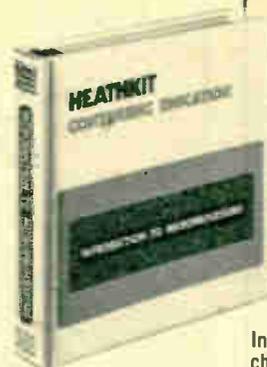
This self-instruction course is truly for the layman. No background in electronics is needed to learn about programming microprocessors. In fact, no prerequisites of any kind are required or assumed. The Introduction to Microprocessors Course uses proven teaching techniques to give you a more effective, more memorable learning experience.

As you move through the course, you will learn to operate and program a microprocessor — by learning the following concepts in 7 easy-to-follow units:

**UNIT 1: NUMBER SYSTEMS AND CODES** gives you a firm foundation in the basic language of all microprocessors — binary numbers and codes. First, you are reacquainted with the decimal number system. Then, the basic concept of numbers is expanded to include the binary, octal and hexadecimal systems. You'll get a working knowledge of numbers and codes — and you will become more proficient with them, as you proceed through the course.

Fully understanding these systems will help you understand the many digital codes used with microprocessors.

**UNIT 2: MICROCOMPUTER BASICS** teaches you how microprocessors operate. A microprocessor is a very complex electronic circuit. This circuit consists of thousands of microscopic transistors — squeezed onto a tiny chip of silicon. The thousands of transistors that make up the microprocessor are arranged to form many different circuits within the chip.



In learning how the microprocessor operates, the most important circuits on the chip are registers, counters and decoders. In Unit 2, you will learn how these circuits can work together to form simple, but useful tasks.

**UNIT 3: COMPUTER ARITHMETIC** completes your study of the binary number system. This unit will help you understand the fundamentals of binary mathematics — addition, subtraction, multiplication and division. Then you'll learn to perform two's complement arithmetic, using binary numbers. Finally, you'll find out how the microprocessor performs the four basic Boolean logic operations — AND, OR, exclusive OR and invert.

**UNIT 4: INTRODUCTION TO PROGRAMMING** will help you understand how the microprocessor handles complex tasks. You'll study programs that illustrate many important programming concepts. At the same time, you'll gain valuable programming practice, using the instruction set provided with the course.

**UNITS 5 AND 6: THE 6808 MICROPROCESSOR** shows you how to program this versatile member of the 6800 microprocessor family — the same chip used in the ET-6800 Microprocessor Trainer below. First, you'll be introduced to the architecture and instruction set of the 6808. Then, you'll learn about the 6808's stack operation, use of subroutines and interrupt capability. Unit 6 also introduces you to input/output operations. Complete specifications on the complete 6800 family are included in these units.

The programming experiments, which can be performed on the optional ET-6800 Microprocessor Trainer (described below), gives you valuable hands-on experience and helps make learning more fun.

If you choose to take the optional final examination, pass the exam with a score of 70 percent or better — and you will earn a Certificate of Achievement and 4.0 Continuing Education Units (CEUs).

EC-6800, Shpg. wt. 9 lbs. .... 29.95

## Trainer makes learning microprocessor operation and programming easier than ever

**\$129<sup>95</sup>**

• Never before has such a powerful microprocessor trainer been available at so low a price

The ET-6800 Microprocessor Trainer from Heathkit/Zenith Educational Systems helps you perform the experiments in the Heath/Zenith EC-6800 Introduction to Microprocessors Course, described above.

Functioning as a miniature digital computer, the ET-6800's built-in 1K Read-Only Memory (ROM) monitor program controls the trainer's operation. Address and data readout are provided by a six-digit hexadecimal 7-segment LED display.

A 17-key hexadecimal keyboard gives you access to memory locations to display contents, then step forward or backward to examine others, to change a location, to examine and/or alter any of the internal registers of the CPU, to set break

points for program debugging, or to reset the CPU. The keyboard includes keys from 0-F and Reset. The 1-F keys are dual-function keys and also enter commands.

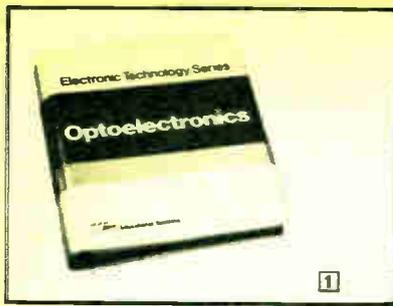
The ET-6800 employs an 8-bit parallel, NMOS, bus-oriented CPU — with 256 bytes of NMOS Random Access Memory (RAM).

A +5 volt DC power supply is built into the ET-6800, so no separate power supply is needed. And a rugged, attractive cardboard cabinet holds the price to an absolute minimum.

Everything you need to get hands-on experience in programming microprocessors is yours in the ET-6800 Microprocessor Trainer. For 120 VAC, 60 Hz. Draws only 12 watts. Overall Dimensions, 3.75" H x 8" W x 10" D (9.53 x 20.32 x 25.40 cm).

Kit ET-6800, Shpg. wt. 17 lbs. .... 129.95





1



2



3



4



5

## Gain state-of-the-art knowledge with our Advanced Electronics Series

Advanced Electronics Courses eliminate the leg-work. They come complete with components, so you can perform tried and tested experiments — based on an easy-to-understand text. Learning is faster, more fun and more economical, too.

The ET-3300 Trainer gives you actual hands-on experience with advanced electronic components. Whether you're a technician or engineer looking for self-improvement, a student seeking advanced electronics knowledge, or a hobbyist interested in new developments, these courses meet your needs.

### 1 Learn the latest in Optoelectronics

Now you can learn about the latest developments in this quickly-changing field. Our Optoelectronics Course teaches basic optical terms and concepts. It covers the types of available light sources, and provides an understanding of optoelectronic displays — including driving and multiplexing.

You'll get in-depth information on light-sensitive components such as photodiodes, photo-transistors, solar cells and optocouplers — including design and applications. You'll learn fiber optics theory and operation. And there's even an overview of lasers.

Includes parts for experiments. Experiments require ET-3300. Recommended: milliammeter and voltmeter — or a VTVM like the IM-5218 (p. 22), and a scope like the IO-4105 (p. 29). Prerequisites: DC and AC (EE-3101 and EE-3102, pgs. 36-37) or equivalent knowledge; some experience in electronics or optics. For 3 CEUs, score 70% on optional final exam.

EE-105, Shpg. wt. 5 lbs. . . . . 59.95

Kit ET-3300, Breadboard, 6 lbs. . . . . 94.95

ETW-3300, Assembled Breadboard, 6 lbs. . . . 159.95

**SAVE \$10.00! Buy Course, Breadboard Kit together.**  
EES-105, Shpg. wt. 11 lbs. . . . . 144.90

### 2 Op Amps — important ICs

A 385-page text covers measurement of common op amp parameters; basic op amp linear circuits, integrator and differential circuits; and the design and performance of op amp constant current sources, as well as current/voltage and voltage/current converters. Also covers Norton and BiFET op amps.

ET-3300 required for experiments. Components included. Recommended: an oscilloscope like the IO-4105 (p. 29), a multimeter like the IM-1104 (p. 22) and a frequency generator like the IG-1271 (p. 22). Prerequisite: Basic Electronics (EE-3101 through EE-3104, pgs. 36-38) or equivalent knowledge. For 3 CEUs, score 70% on the optional final exam.

EE-101, Shpg. wt. 5 lbs. . . . . 39.95

Kit ET-3300, Breadboard, 6 lbs. . . . . 94.95

ETW-3300, Assembled Breadboard, 6 lbs. . . . 159.95

**SAVE \$10.00! Buy Course, Breadboard Kit together.**  
EES-101, Shpg. wt. 11 lbs. . . . . 124.90

### 3 Learn how Active Filters are used

The text shows you how to design active filters with op amps, to plot and predict frequency responses, to design and breadboard first-order low-pass and high-pass filters, design second-order and high-order filters, bandpass and state variable filters.

ET-3300 Breadboard or ET-3100 (p. 36) required for experiments. (NOTE: ET-3100 cannot be used with other Advanced Electronics Courses.) An oscilloscope like the IO-4105 (p. 29) and a frequency generator like the IG-1271 (p. 22) are also helpful. Prerequisite: EE-101 Op Amps, or equivalent knowledge.

For 3 CEUs, score 70% on the optional final exam.

EE-102, Shpg. wt. 5 lbs. . . . . 34.95

Kit ET-3300, Breadboard, 6 lbs. . . . . 94.95

ETW-3300, Assembled Breadboard, 6 lbs. . . . 159.95

**SAVE \$10.00! Buy Course, Breadboard Kit together.**  
EES-102, Shpg. wt. 11 lbs. . . . . 119.90

### 4 Introduce yourself to the IC Timer

Learn about common IC timers, how each works, what they do and where to use them — for logic functions in output drive circuits, time-delay relay circuits, wide-range pulse generators, voltage/frequency converters, freewheeling power-fail oscillators, timers, alarms and in other applications.

Includes 348-page text and parts for experiments. Requires ET-3300 for experiments. Recommended: an oscilloscope like the IO-4105 (p. 29) and a multimeter like the IM-1210 (p. 23). Prerequisite: EE-3201 Digital Techniques (p. 39) or equivalent knowledge. Score 70% on the optional final exam for 3 CEUs.

EE-103, Shpg. wt. 5 lbs. . . . . 39.95

Kit ET-3300, Breadboard, 6 lbs. . . . . 94.95

ETW-3300, Assembled Breadboard, 6 lbs. . . . 159.95

**SAVE \$10.00! Buy Course, Breadboard Kit together.**  
EES-103, Shpg. wt. 11 lbs. . . . . 124.90

### 5 Learn about Phase-Locked Loops

Used in radio and TV communications, PLLs and their building blocks — the phase detector, loop filter and voltage-controlled oscillator — are covered in a 268-page self-instruction text.

Parts are included for experiments. For experiments, use the ET-3300, a DC voltmeter like the IM-5284 (p. 17) and a single-trace oscilloscope like the IO-4105 (p. 29). To get more from the Course, use a

dual-trace oscilloscope like the IO-4205 (p. 29) and an audio signal generator like the IG-5218 (p. 22). For 3 CEUs, score 70% on the optional final exam.

EE-104, Shpg. wt. 5 lbs. . . . . 49.95

Kit ET-3300, Breadboard, 6 lbs. . . . . 94.95

ETW-3300, Assembled Breadboard, 6 lbs. . . . 159.95

**SAVE \$10.00! Buy Course, Breadboard Kit together.**  
EES-104, Shpg. wt. 13 lbs. . . . . 134.90

### SAVE \$50.00 on your education!

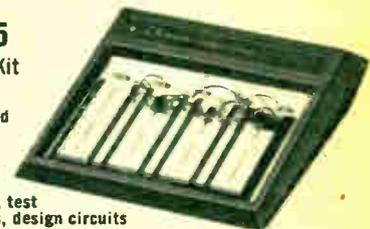
Order the Heathkit/Zenith Advanced Electronics Series (EE-101 Op Amps, EE-102 Active Filters, EE-103 IC Timers, EE-104 Phase-Locked Loops and EE-105 Optoelectronics) together with the Heathkit/Zenith ET-3300 Laboratory Circuit Breadboard Kit. If purchased separately, \$319.70.

EES-1015, Shpg. wt. 34 lbs. . . . . 269.70

### This Lab Breadboard makes learning advanced electronics easier

**\$94<sup>95</sup>**  
Kit

For Advanced  
Electronics  
Courses



Experiment, test  
components, design circuits

The ET-3300 is a great convenience tool for electronics learning or circuit design.

Solderless sockets make breadboarding easier and simpler. Sockets are designed to accommodate any size dual in-line integrated circuit package. Reliable built-in power supply provides +5 VDC ( $\pm 4\%$ ), +12 VDC (variable) or -12 VDC ( $\pm 2\%$ ) power to the Breadboard, with fixed current limiting of each supply at rated current to provide protection against shorts.

Required with the following Heathkit/Zenith Advanced Electronics Courses: EE-101, EE-103, EE-104 and EE-105. Can be used with the Heathkit/Zenith EE-102 Active Filters Self-Instruction Course. 120/240 VAC, 50/60 Hz. 3.5" H x 12" W x 12" D (8.89 x 30.48 x 30.48 cm).

Kit ET-3300, Shpg. wt. 6 lbs. . . . . 94.95

ETW-3300, Assembled and tested, 6 lbs. 159.95



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EDUCATION/43

## Our best Pro-quality Ignition Analyzer helps you perform precision auto tune-ups

**\$499<sup>95</sup>**

- Measures RPMs, dwell, voltage — performs ignition advance tests with optional timing light/advance meter

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 cylinders — 4, 6 or 8. Dwell, RPM and voltage measurements are indicated on the big eight-inch meter.

Has two voltage ranges — 0-2V for corroded connections and point measurements, and 0-20V for battery condition and general distribution checks.

Cylinder buttons can be pushed in multiple numbers, so that banks of cylinders can be shorted out for carburetor balance and for display of one or more cylinders. Both parade and superimpose displays of primary or secondary waveforms, at two different amplitudes, are available on the 12" diagonal CRT.

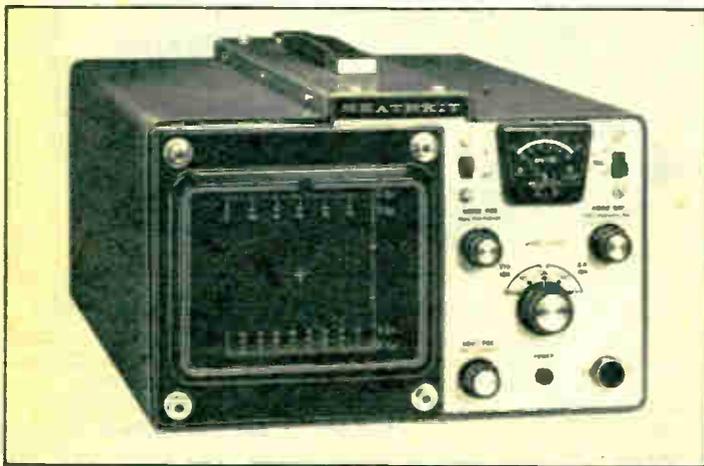
High-temperature, oil and gas-resistant neoprene cables provide easy, positive connections to engine.

Assembly, operation are simple matters. For use with 4, 6 and 8-cylinder (4-cycle), or 2-rotor Wankel engines and standard, transistorized or C-D ignitions. Includes adapter for GM HEI Systems.

Kit CO-2600, Shpg. wt. 83 lbs. .... 499.95

**Timing Light/Advance Meter.** Plugs directly into CO-2600 Analyzer, provides a bright flash that can be seen — even in daylight. Built-in advance meter measures distributor advance to 60 degrees from 1500 to 4500 rpm. All cables included.

Kit COA-2600-4, Shpg. wt. 3 lbs. .... 54.95



**Alternator Test Adaptor for CO-2600 Analyzer.**  
COA-2600-2, Shpg. wt. 1 lb. .... 14.95



### Deluxe Scope Cart

Keeps CO-2600 at ideal viewing angle for easy readings. Rolls from place to place on casters.

COA-2600-3, 25 lbs. .... 49.95

## Make tune-ups a snap with our budget-priced Ignition Analyzer

**\$199<sup>95</sup>**

- Use on three, four, six or eight-cylinder engines
- Easier to use than meter analyzers
- Built-in tachometer for convenient measurements

Detects shorted plugs, bad points, defective wiring, worn distributor parts, incorrect dwell angle, coil/condenser defects and transistor/capacitive-discharge circuit problems. Select one of four different patterns — primary or secondary, in parade or superimposed displays. For detailed analysis, the horizontal sweep can be expanded 10 to 1, vertical sweep 2 to 1.

Use with any standard, transistorized, C-D ignition on 3, 4, 6, 8-cyl. engines w/distributors. Includes adapter for use with GM HEI Systems. Handbook illustrates typical engine waveforms. 120/240 VAC. 7" H x 10.5" W x 17.5" D.

Kit CO-1015, Shpg. wt. 22 lbs. .... 199.95

**12-Volt Inverter** lets you operate CO-1015 from your car's 12 VDC lighter socket.

Kit COA-1015-1, Shpg. wt. 3 lbs. .... 39.95

**CO-1015 SPECIFICATIONS:** For Use With: 3, 4, 6 or 8-cyl. engines. Tachometer Ranges: 0-1000, 0-5000 rpm. Tachometer Accuracy: +5% of full scale. Cables: 12' pick-up cable; ground, primary, secondary leads extend additional 2'.

## 15-Amp Automatic Charger revives dead batteries fast



The Heathkit GP-1044 Automatic Battery Charger gives you a 50-amp boost that quickly charges dead batteries. Front panel meter indicates charge rate, current and full charge, or if boost charge is required. Turns off at full charge. Complete protection prevents damage to charger or battery. For use on 12 VDC, positive or negative ground batteries. Includes all cables. 120 VAC, 60 Hz. 6.13" H x 11.5" W x 7.75" D.

Kit GP-1044, Shpg. wt. 22 lbs. .... 79.95

## Save \$5.00 on Heathkit 10-Amp Automatic Battery Charger



The GP-21 Automatic Battery Charger charges 12-volt batteries at a 10-amp rate and turns off automatically when battery is fully charged. Front panel meter monitors indicate rate of charge and full charge. Easy to use — just connect battery cables (included) to your car's battery terminals, plug charger into AC outlet. Safety circuit prevents sparking until proper hookup. For 12 VDC batteries. 120 VAC, 60 Hz. 5.5" H x 9" W x 6.38" D.

Kit GP-21, Shpg. wt. 13 lbs. .... Was \$54.95, NOW ONLY 49.95



## Heath/Dana Speed Control increases driving comfort, reduces fatigue on long car trips

**\$99<sup>95</sup>**

- Maintains preset speed on uphill, downhill, and curves
- Save: Install it yourself with Heathkit instructions!

Accelerate car to desired speed, set the control, and the CS-2048 keeps car at preset speed. Tap the brake pedal, and the CS-2048 momentarily disengages for passing or slowing down. Then it returns to preset speed. For vehicles with manual and automatic transmissions. Includes our step-by-step instructions.

Kit CS-2048, Shpg. wt. 7 lbs. .... **99.95**

CSA-2048-1. For front-wheel-drive cars not listed below or replacement parts. Kit contains magnet pair, adhesive and filament tape, plus instructions for installation and parts replacement. Shpg. wt. 1 lb. .... **6.95**

CSA-2048-2. For '73-'75 Honda Civic, '75-'80 Honda CVCC or '77-'80 Honda Accord. Shpg. wt. 2 lbs. .... **15.95**

CSA-2048-3. For '75-'80 Toyota Corollas. Shpg. wt. 2 lbs. .... **15.95**

CSA-2048-4. For '73-'80 Toyota Corona, Celica, Crown, and Mark II, '75-'78 Toyota Pickup; '75-'77 Datsun 610/710, '77-'80 Datsun 810, '75-'80 Datsun 280-Z, ZX. Shpg. wt. 1 lb. .... **5.95**

CSA-2048-5. For the following fuel-injected cars: '76-'80 Volkswagen Rabbit, Dasher, Scirocco; '76-'80 Audi Fox. Shpg. wt. 2 lbs. .... **15.95**

CSA-2048-6. For '75-'80 Datsun B-210, '77-'80 Datsun F-10/310. Shpg. wt. 2 lbs. .... **15.95**



Vacuum Servo attaches to throttle



Electronic control

**IMPORTANT NOTE:** Installing the CS-2048 requires some mechanical proficiency. If you are uncertain of your abilities, you may wish to employ a qualified auto mechanic to install the CS-2048.

## Low-cost Siren/PA system for emergency vehicles

Here's a budget priced, but reliable Siren and Public Address system for your community's volunteer emergency unit or rescue squad. It features a 55 watt siren with automatic or manual wail to accommodate different traffic situations in your community. A 20 watt Public Address system amplifies your voice for emergency public announcements and your radio calls for times when you're away from your vehicle. Push button low-noise microphone ensures clear voice reproduction.

Gimbal mount makes the GD-18 easy to install. Solid-state circuitry with temperature and voltage compensated stage provides years of reliable service. The GD-18 can be used with positive or negative ground vehicles.

The GD-18 can be fitted with two kinds of horns: an exterior horn for your marked vehicles, and a concealed horn that hides behind your vehicle's grille. Concealed horn requires 4½" H x 4½" W x 13" D clearance. Note: please check standards for mobile sirens in your area.

Kit GD-18, Shpg. wt. 6 lbs. .... **79.95**

WD-5130, Siren/PA amp, assembled, Shpg. wt. 6 lbs. .... **129.95**

GDA-18-1, Exterior horn, assembled, Shpg. wt. 10 lbs. .... **99.95**

Kit GDA-18-2, Concealed horn, Shpg. wt. 10 lbs. .... **99.95**

WDA-5130-2, Concealed horn, assembled, Shpg. wt. 10 lbs. .... **109.95**



**SAVE \$35<sup>00</sup>**

On these Siren/PA systems! If purchased separately, \$179.90  
GD-18A (Kit GD-18 and Exterior horn) Shpg. wt. 21 lbs. 144.90  
GD-18B (Kit GD-18 and Concealed horn) Shpg. wt. 21 lbs. 144.90

## Exhaust Analyzer checks fuel efficiency



Now you can squeeze more power and performance out of every drop of gasoline you buy with the CI-1080 Exhaust Analyzer. By analyzing your car's exhaust, the CI-1080 measures air-to-fuel ratio and combustion efficiency. An easy-to-read meter on the CI-1080 tells you instantly whether your car's air-to-fuel ratio is unnecessarily too rich or too lean.

Besides measuring your car's air-to-fuel ratio and combustion efficiency, the meter also indicates the percentage of carbon monoxide in your exhaust. This percentage gives you

a relative figure you can use to compare your exhaust emissions with the manufacturer's specifications and the EPA clean air standards of your state.

The CI-1080 is housed in a rugged, plastic case with foldaway handle for easy storage. The kit includes all necessary cables, tubing, and complete instructions for assembly and use.

Kit CI-1080, Shpg. wt. 6 lbs. .... **99.95**



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## Capacitive Discharge Ignition gives quicker starts

Save wear and tear on your starter motor, battery, and nerves this winter with the CP-1060 Capacitive Discharge Ignition. It gives you faster starts in colder weather because your plugs get a stronger spark. Special solid-state circuits provide more voltage to heat and ignite your air-fuel mixture on cold mornings.

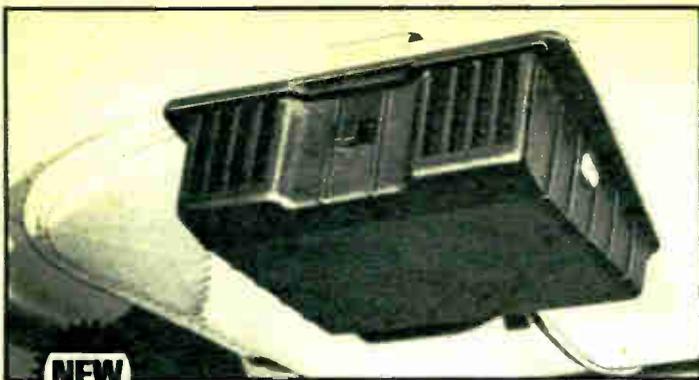
Besides giving you faster starts in cold weather, the CP-1060 helps your car's engine burn its fuel more efficiently. By increasing the voltage to the plugs, more of the air-fuel mixture explodes in the cylinder — giving you added power and better acceleration.

The CP-1060 also lets you drive more miles on a set of points. When connected to your ignition system, the CP-1060 relieves the points of heavy current demands, reducing high-current oxidation and pitting of point surfaces. Your points last longer — saving you point replacement costs, tune-up time, and money.

The CP-1060 is designed for conventional distributor ignition systems. It comes with our famous step-by-step instructions for assembly and installation.

Kit CP-1060, Shpg. wt. 3 lbs. .... **49.95**





**NEW**

## Stop thieves from stealing your valuables with this Heathkit Ultrasonic Intrusion Alarm

- Safeguards your valuables in your car, van, boat, or any other enclosed space
- Intrusion Alarm pays for itself if it goes off just once!

**\$49<sup>95</sup>**

CB's. Cassette decks. Radio navigation gear. Home stereos. They're all on a thief's shopping list. And if you own one of these devices, chances are your car, boat, or home can become a target. But with the new GD-1568 Auto Intrusion Alarm, your valuables are safer. It uses harmless ultra-sonic frequency waves to safeguard possessions. Any movement inside your car when you're away and — beep... the GD-1568 sounds an alarm using your car's horn or other sound-making accessory. It honks your horn twice a second for fifty seconds to attract maximum attention. Then it automatically resets and resumes protection. Pin switches guard your hood, trunk or other door enclosure.

Kit GD-1568, Shpg. wt. 2 lbs. .... **49.95**

GDA-1568-1, Trunk and hood pin switches, Shpg. wt. 1 lb. .... **5.95**

GOA-1568-1, Horn relay switch (for cars without horn relay), wt. 1 lb. .... **4.95**

## Wiper Delay makes driving safer on drizzly, rainy days



**\$19<sup>95</sup>** End wiper switch fumbling and keep your eyes on the road with this Windshield Wiper Delay. Its solid-state circuitry lets you time multiple wiper sweeps up to 30 seconds to keep your windshield clean and clear of drizzle and road spray. Fits most single and 2-speed

electric wiper systems on GM's, AMC's, Fords (except '72-'76 Montegos & Torinos, '74-'76 Cougars) & Chryslers (except motor reversing parking systems).

Kit CH-1068, Shpg. wt. 2 lbs. .... **19.95**



## 1 Digital Speedometer/Tach shows car speed & RPM

Unlike conventional speedometers, the CI-1265 is more accurate and easier to read. Its bright, illuminated, digital display shows your car's speed up to 199 mph or kph. It's so sensitive, it records speed changes as little as 1 mph or 1 kph. With the push of a button, the CI-1265 automatically converts from a speedometer to a tachometer for monitoring engine speed. The tachometer registers RPM in multiples of 100 for easy reading. The CI-1265 measures 1 1/4" H x



Powerful 1/2 hp motor with illuminating 75 W dome light

For added convenience, the unit comes with inside switch and handheld transmitter

## For your spouse's safety and welfare — the Heathkit Garage Door Opener

- Remote opens door from the protection of your car
- Door reopens automatically if obstructed during closing

**\$179<sup>95</sup>**

In the dark, or in a storm, just a press of the transmitter button from her car, and the Heathkit garage door opener automatically opens the door, and greets your wife with an illuminating 75 watt dome light. She drives into the safety and dry shelter of your garage. An inside switch lets her close the door and turns off automatically to insure safe entry. Features FCC-approved programmable transmitter with 256 code combinations. Opens garage doors up to 7.5'.

Transmitter, Receiver and Door-Opener Mechanism.

Kit GD-3309C, Shpg. wt. 57 lbs., Mtr. Frt. .... **179.95**

Two Transmitters, Receiver and Door-Opener Mechanism.

Kit GD-3309D, Shpg. wt. 57 lbs., Mtr. Frt. .... **194.95**

Kit GDA-3309-1, Door-Opener Mechanism Only, Shpg. wt. 44 lbs., Mtr. Frt. .... **159.95**

Kit GDA-3209-2, Adapter for jamb and pivot doors, Shpg. wt. 3 lbs. .... **10.95**

GDP-3309A, Transmitter only, Shpg. wt. 1 lb. .... **26.95**

GDP-3319A, One Transmitter, One Receiver for 3 wire systems, 1 lb. .... **54.95**

GDP-3329A, Two Transmitters, One Receiver for 3 wire systems, 2 lbs. .... **69.95**

GDA-3309-3, Power Transformer for 2-wire systems, Shpg. wt. 1 lb. .... **6.95**

GD-3309 SPECIFICATIONS: Overall Size: 12" H x 9" W x 120" L. Motor: 117 VAC 1/2 HP. Mounting Clearance: 3" above highest point of door travel. RF Frequency: 310 MHz. VHF Receiver: Powered by 24 VAC from opener mechanism. Usable on any 3-wire mechanism or 2-wire with addition of GDA-3309-3. For standard NEC wiring. Includes 20' cable.

4 1/4" W x 3 3/8" D. It installs on 4, 6, or 8 cylinder, 4-cycle engines with spark ignitions and 12 VDC neg. gnd. Includes hardware and instructions.

Kit CI-1265-1, for cars without CS-2048 Cruise Control, Shpg. wt. 3 lbs. .... **59.95**

Kit CI-1265-2, for cars with CS-2048 Cruise Control, Shpg. wt. 3 lbs. .... **49.95**

Kit CSA-2048-1, Adapter kit for front-wheel drive cars, 1 lb. .... **6.95**

## 2 Digital Clock tells time with quartz precision



FAST, EASY  
2-EVENING KIT

Install a reliable and accurate quartz clock in your car, van, camper or boat with the GC-1415 Clock/Timer. It features a quartz crystal and microprocessor-controlled circuit to give you the correct time — so you can keep appointments or listen to your favorite radio program.

The GC-1415 is a Timer, too. It keeps track of hours and minutes up to 24 hours, or minutes and seconds up to 10 minutes. For convenience, you can switch back and forth from clock to timer or hold either one without affecting the other's accuracy or time. Measures 1.8" H x 4.71" W x 3.12" D.

Kit GC-1415, Digital Clock with Timer, Shpg. wt. 2 lbs. .... **39.95**

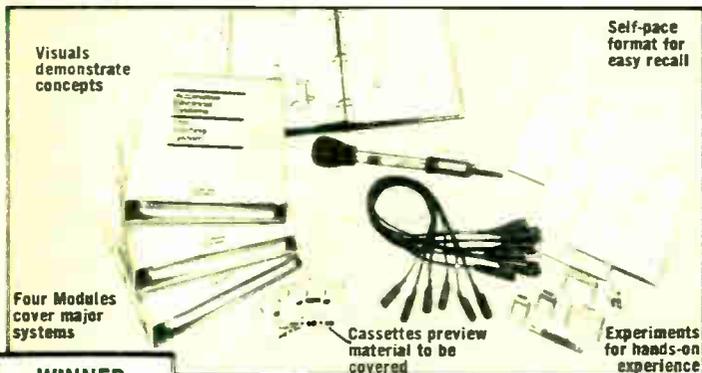
Save 16% on Digital Clock without Timer. Same as the GC-1415 above, but excludes Timer. A low-cost way to modernize your present car and give it a digital quartz clock found in the newer, more expensive automobiles.

Kit GC-1406, Shpg. wt. 1 lb. .... Was \$29.95, Now **24.95**



# Save money with our Auto Electrical Systems and Ignition/Tune-up Courses

Whether you're tired of high tune-up costs, or just want to save money preparing for the N.I.A.S.E. exams, these two courses can help you. They teach you everything you need to know to fix a car's electrical system and tune its ignition. And they do it at a big cost-savings to you. In fact, the courses generally pay for themselves with just one use. They also make it easy to study for people with little time on their hands. The courses feature a linear programmed format, a proven way to teach a subject thoroughly with maximum recall. This format allows you to schedule your study time, at your own pace, without sacrificing retention of the material. Hands-on experiments give you actual car repair experience.



Visuals demonstrate concepts

Self-paced format for easy recall

Four Modules cover major systems

Cassettes preview material to be covered

Experiments for hands-on experience



Unit tests improve your recall

Self-paced programmed instruction

Visuals illustrate concepts

Cassettes introduce each unit's subject

Shop projects give you actual repair experience

Includes ignition test components

**WINNER**

Highest award of the Society for Technical Communications

## Use Electrical Systems Course to fix your car's system step-by-step

- Covers the starter, charging, and accessory & body electrical systems
- Features hands-on experiments to show you the exact repair procedures

The Electrical Systems Course is also broken down into four modules for easier learning. Each binder covers a major section of an automobile's electrical system. The material for each module is described below. Here's what each module will teach you:

1. Automotive Electrical Principles: Covers component and circuit construction and troubleshooting.
2. The Charging System: Covers component operation and tests.
3. The Starting System: Detection and correction of problems.
4. The Accessory & Body Electrical Circuits: Problem detection and solution, plus diagram reading.

All four modules give you a comprehensive course in Auto Electrical Systems. When you complete the course and pass the optional final exam with a score of 70% or more, you earn 4.0 CEU's.

Save \$19.85! Order all four course modules.

EAC-1, wt. 23 lbs. ....	79.95
Module 1, Elect. Principles, EA-11, wt. 5 lbs. ....	24.95
Module 2, Starting System, EA-12, wt. 5 lbs. ....	24.95
Module 3, Charging System, EA-13, wt. 5 lbs. ....	24.95
Mod. 4, Access. & Body Elect. Sys., EA-14, 5 lbs. ....	24.95

## MONEY BACK GUARANTEE

We believe in these courses so much, that we guarantee you will pass your NIASE exam. If not, just return the materials along with your receipt, & we'll refund your full purchase price.

NOTE: The courses prepare you for the respective N.I.A.S.E. professional auto mechanical certification exams. For more exam information, contact NIASE, 1825 K Street NW, Washington, DC 20006.

## Heathkit/Zenith Ignition/Tune-up Course helps save you money when you tune your ignition yourself

**\$79.95**

- Features the exact procedures for easy tuning of the latest GM, Ford, and Chrysler electronic ignitions
- Helps you detect ignition problems early to prevent costly repairs and time-consuming trips to the garage

With our Ignition/Tune-up course, you can drastically cut the cost of tuning your ignition — because you do it yourself. Our course teaches you everything you need to know. You learn the exact ignition tuning procedures for your GM, Ford, or Chrysler vehicle. Here's what this course will teach you to do:

1. Understand auto ignition principles, the construction and operation of standard & electronic ignition components.
2. Learn the correct and safe way to use automotive test instruments.
3. Know the step-by-step procedures to dismantle, change, and re-assemble ignition components in GM, Ford, and Chrysler automobiles.
4. Do a complete tune-up and power balance on any American vehicle.

Scoring 70% or more on the optional final exam will earn you 4.0 CEUs. Shop projects require an engine analyzer, a timing light and ignition analyzer.

EA-2000, Shpg. wt. 12 lbs. .... 79.95

Accessory Auto Instruments. Compression tester, vacuum pressure gauge and "T" fitting.

EAC-2-1, 1 lb. .... 14.95

Save \$25.00. Order the EAC-1 left, EA-2000, & EAC-2-1 together. If purchased separately: 174.85.

EAS-2000, Shpg. wt. 32 lbs. .... 149.85

## Easy-to-use testers for checking of auto charging & ignition systems

### 1 Convenient Electronic Ignition Tester

**\$19.95**

- Takes the guesswork out of pinpointing defective components in electronic ignitions.

Features four tests that quickly tell you: if the battery is charged; if retractor and pickup coil are functioning; if ignition module is properly switching the coil primary; and the location of a faulty component in the ignition primary circuit. Put one in every car for road emergencies. 5½" L x 2½" W x ¾" H. (Note: Pick up coil test will not work on '78 and newer Omni's, Horizons, and K cars. Requires some ignition knowledge.)

Kit CI-2055, Shpg. wt. 2 lbs. .... 19.95

### 2 Hand-held Charger System Tester

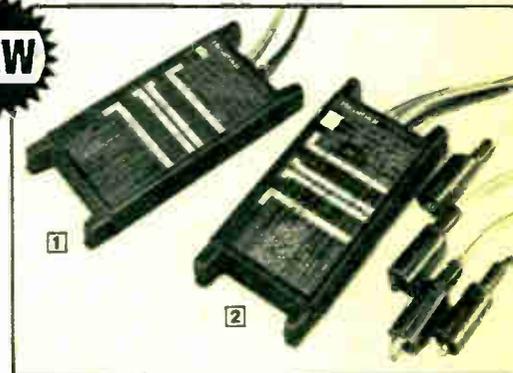
**\$19.95**

- Lets you quickly diagnose faulty components in the charging system of your automobile

Features two wire setup and three quick tests that tell you: 1) if the battery is sufficiently charged, 2) if alternator is charging battery, 3) if voltage regulator is faulty, and 4) if the alternator is functioning properly. Keep one on hand in every car to save labor costs during road emergencies. Unit enclosed in tough, 5.5" L x 2½" W x ¾" H textured case. For neg. grd. 12V. Put one in every one of your family's cars for road emergencies.

Kit CI-2065, Shpg. wt. 2 lbs. .... 19.95

**NEW**



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

## EASY ORDERING INFORMATION



**BY PHONE: NOW YOU CAN CALL  
TOLL-FREE! 800-253-0570**

NOW ORDER TOLL-FREE: 800-253-0570 using your Heathkit Revolving Charge or Visa or MasterCard credit cards. Call toll-free between 8:00 A.M. and 8:00 P.M. Eastern Time Monday through Friday. Alaska, Hawaii and Michigan orders, or after 8:00 P.M. and weekends, call 616-982-3411. For quick handling and prompt service, please fill out the order form at right before calling. Have credit card handy. For parts orders, please call Customer Service, 616-982-3571. For technical service consult the phone directory on page 53.

**BY MAIL:** Please follow these simple steps so we can handle your order quickly.

- Use the handy order form at right.
- Write your name exactly the same way, each time you order.
- Give your complete address with full details. Include your ZIP Code and daytime phone number in case we have to call you.
- For UPS deliveries to rural route or P.O. Box addresses, please give complete delivery information.
- When you fill out the form, include: 1) quantity, 2) model number, 3) description, 4) price, and 5) shipping weight. Figure out and write down the shipping and handling charges for each item from the rate chart at right.
- Please use separate sheet to order parts, manuals or for any correspondence.

## TERMS:

Here are some credit options for your order

- **Heath Revolving Charge Plan.** No money down. Up to two years to pay. Two convenient monthly payment plans available. We encourage down payments to reduce monthly payments and finance charges. Follow the instructions on reverse side of order form. Be sure to sign charge agreement.
- **MasterCard and Visa plans.** Now you can use your MasterCard or Visa credit cards to charge Heathkit products. Just fill in your credit card number in the spaces provided on the order form. Include card expiration date. Sorry, we cannot accept credit cards for replacement parts orders.
- **Commercial Accounts.** Net 30-day terms available to companies with rated credit.

- **Educational Accounts.** Net 30-day terms available to Patterson-listed educational institutions. Authorized purchase order is required.
- **Note:** All credit orders subject to Heath Credit Department approval.

## Commercial, Educational, and Industrial Sales:

- For quotations or quantity discount information on any Heath product, kit or wired, write or call Marketing Services Department, 616-982-3454. For quantities of 250 or more of any Heath product, kit or wired, write or call Contract Sales Department, 616-982-3519. Private labeling, custom packaging, or design modifications can be made to meet your specific needs.
- **Note:** Quantity discounts apply to single models only, not combination orders, special offers, or systems.

## SPECIAL SHIPPING AND HANDLING:

- **MOTOR FREIGHT ITEMS** — Items indicated Motor Freight exceed weight or size limitations of UPS or Parcel Post. Examples are TV's, organs, some speaker systems, garage door mechanisms, antennas, etc. They are shipped with freight charges collect. If one item on your order is Motor Freight, all items will be shipped Motor Freight. Consult your local motor freight carrier for charges and type of service available in your area before ordering.
- **APO/FPO Shipments** — Use the following Zones to estimate costs: West Coast — Zone 8; East Coast — Zone 5; Miami — Zone 6. PAL (Airlift Military) carries packages by air transport for a fee of \$1.00 per package plus postage. Parcel must weigh less than 30 lbs. and not exceed 60" in length and girth.
- **SAM** — Parcel must weigh less than 15 lbs. and not exceed 60" in length and girth. Be sure to check with your local postmaster for exceptions to certain APO or FPO numbers.

## HOW TO FIGURE SHIPPING AND HANDLING CHARGES

Find your zone number using Zone Chart below. Locate shipping weight of item in the first column of Rate Chart. Determine the shipping charge for the corresponding area. Enter the shipping charge on order form.

### RATE CHART

Heath Shipping and Handling Charges, mailable items only. See special shipping and handling information for Motor Freight items.

Your shipping and handling charges are indicated in the zone column across from the shipping weight.

**NOTE: Blue Label Service Area Zone A covers: AR, CT, LA, MA, ME, MS, NH, NJ, ND, OK, RI, SD, VT, PA (Philadelphia area only), NY (New York City and Long Island), CA, CO, FL, ID, MT, NV, NM, OR, TX, UT, WA, WY. Zone D covers: HI (Honolulu). Zone E covers: AK (Anchorage).**

Ship. Wt.	Zone								BLUE LABEL AIR SERVICE CHARGE				
	1 & 2	3	4	5	6	7	8	9	A	B	C	D	E
1	\$1.20	\$1.27	\$1.39	\$1.58	\$1.64	\$1.72	\$1.83	\$2.05	\$2.08	\$3.71	\$3.76	\$3.76	\$3.76
2	1.35	1.39	1.56	1.72	1.84	1.98	2.22	2.92	2.99	4.76	4.77	4.77	4.77
3	1.45	1.53	1.73	1.86	2.04	2.24	2.61	3.79	3.90	5.82	5.79	5.79	5.79
4	1.56	1.65	1.82	2.00	2.23	2.50	3.00	4.66	4.81	6.87	6.80	6.80	6.80
5	1.66	1.77	1.92	2.14	2.43	2.77	3.39	5.53	5.72	7.92	7.82	7.82	7.82
6	1.71	1.84	2.01	2.28	2.62	3.03	3.78	6.41	6.53	8.98	8.83	8.83	8.83
7	1.76	1.90	2.11	2.41	2.82	3.29	4.17	7.28	7.54	10.03	10.03	10.03	10.03
8	1.80	1.97	2.21	2.55	3.02	3.58	4.56	8.15	8.45	11.09	11.09	11.09	11.09
9	1.85	2.06	2.35	2.69	3.21	3.82	4.86	9.02	9.36	12.14	11.88	11.88	11.88
10	1.98	2.17	2.49	2.85	3.41	4.08	5.34	10.89	10.27	13.19	12.89	12.89	12.89
11	2.02	2.29	2.64	3.03	3.65	4.42	5.73	10.77	11.18	14.25	13.91	13.91	13.91
12	2.11	2.40	2.79	3.21	3.84	4.57	6.12	11.64	12.09	15.30	15.00	15.00	15.00
13	2.20	2.51	2.93	3.39	4.07	4.80	6.41	12.51	13.00	16.36	16.15	16.15	16.15
14	2.28	2.62	3.08	3.58	4.31	5.09	6.62	13.38	13.91	17.41	17.19	17.19	17.19
15	2.37	2.74	3.22	3.75	4.54	5.38	6.80	14.25	14.82	18.46	17.97	17.97	17.97
16	2.46	2.85	3.36	3.93	4.77	5.66	6.98	15.13	15.73	19.52	18.98	18.98	18.98
17	2.54	2.96	3.52	4.11	5.00	5.96	7.15	16.00	16.64	20.57	20.00	20.00	20.00
18	2.63	3.07	3.66	4.30	5.24	6.24	7.39	16.87	17.55	21.63	21.01	21.01	21.01
19	2.72	3.18	3.80	4.48	5.47	6.53	7.75	17.74	18.46	22.68	22.03	22.03	22.03
20	2.81	3.29	3.94	4.65	5.70	6.82	8.09	18.61	19.37	23.73	23.04	23.04	23.04
21	2.90	3.41	4.09	4.83	5.94	7.13	8.45	19.49	20.28	24.79	24.06	24.06	24.06
22	2.99	3.53	4.23	5.01	6.17	7.39	8.80	20.36	21.15	25.84	25.07	25.07	25.07
23	3.08	3.64	4.38	5.20	6.40	7.69	9.16	21.23	22.02	26.90	26.09	26.09	26.09
24	3.16	3.75	4.53	5.38	6.64	7.97	9.51	22.10	22.91	27.95	27.10	27.10	27.10
25	3.25	3.86	4.67	5.55	6.87	8.27	9.86	22.97	23.80	29.00	28.12	28.12	28.12
26	3.34	3.97	4.81	5.73	7.10	8.55	10.21	23.85	24.73	30.06	29.13	29.13	29.13
27	3.42	4.08	4.96	5.92	7.33	8.84	10.57	24.72	25.64	31.11	30.15	30.15	30.15
28	3.52	4.19	5.11	6.10	7.57	9.13	10.92	25.59	26.65	32.17	31.18	31.18	31.18
29	3.61	4.31	5.25	6.28	7.80	9.42	11.27	26.46	27.56	33.22	32.16	32.16	32.16
30	3.69	4.42	5.39	6.45	8.03	9.70	11.62	27.33	28.37	34.27	33.19	33.19	33.19
31	3.78	4.54	5.54	6.64	8.27	10.00	11.97	28.21	29.38	35.33	34.21	34.21	34.21
32	3.87	4.65	5.68	6.82	8.50	10.28	12.33	29.08	30.29	36.38	35.22	35.22	35.22
33	3.96	4.76	5.82	7.00	8.73	10.58	12.68	29.95	31.09	37.44	36.24	36.24	36.24
34	4.04	4.87	5.98	7.18	8.97	10.86	13.04	30.82	32.11	38.49	37.25	37.25	37.25
35	4.13	4.98	6.12	7.35	9.20	11.15	13.38	31.69	33.02	39.54	38.27	38.27	38.27
36	4.22	5.10	6.26	7.54	9.43	11.44	13.74	32.57	33.93	40.60	39.28	39.28	39.28
37	4.31	5.21	6.41	7.72	9.66	11.71	14.09	33.44	34.84	41.65	40.30	40.30	40.30
38	4.40	5.32	6.55	7.90	9.90	12.01	14.45	34.31	35.75	42.71	41.31	41.31	41.31
39	4.49	5.43	6.69	8.10	10.13	12.31	14.80	35.18	36.66	43.76	42.33	42.33	42.33
40	4.57	5.54	6.84	8.26	10.36	12.59	15.14	36.05	37.57	44.81	43.34	43.34	43.34
41	4.66	5.66	6.99	8.44	10.60	12.89	15.50	36.93	38.48	45.87	44.36	44.36	44.36
42	4.75	5.77	7.13	8.62	10.83	13.17	15.85	37.80	39.39	46.92	45.37	45.37	45.37
43	4.84	5.89	7.27	8.80	11.06	13.45	16.21	38.67	40.30	47.98	46.39	46.39	46.39
44	4.92	6.00	7.43	8.99	11.29	13.75	16.56	39.54	41.21	49.03	47.40	47.40	47.40
45	5.01	6.11	7.57	9.16	11.53	14.04	16.91	40.41	42.12	50.08	48.42	48.42	48.42
46	5.11	6.22	7.71	9.34	11.76	14.32	17.26	41.29	43.03	51.14	49.43	49.43	49.43
47	5.19	6.33	7.86	9.52	11.99	14.62	17.62	42.16	43.94	52.19	50.45	50.45	50.45
48	5.28	6.44	8.00	9.70	12.23	14.90	17.97	43.03	44.85	53.25	51.46	51.46	51.46
49	5.37	6.55	8.14	9.89	12.46	15.20	18.33	43.90	45.76	54.30	52.48	52.48	52.48
50	5.45	6.67	8.29	10.10	12.69	15.48	18.67	44.77	46.67	55.35	53.49	53.49	53.49
Add'l lbs.	.08 lb.	.12 lb.	.15 lb.	.17 lb.	.23 lb.	.28 lb.	.34 lb.	.87 lb.	.91 lb.	1.05 lb.	1.01 lb.	1.01 lb.	1.01 lb.

### ZONE CHART

Your zone is indicated by the first three digits of your ZIP Code

**IMPORTANT:** Shipping weights listed for model numbers shipped in more than one carton have been adjusted to provide correct postage.

Zip Code Prefixes	Zone								
006-009	8	260-261	3	363-369	5	476-477	4	598-599	7
010-069	5	262-278	4	370-386	4	478	3	600-609	2
070-089	4	279	5	387	5	479-489	2	610-619	3
090-099	5	280-283	4	388	4	490-491	4	828-832	6
		284-285	5	389-397	5	492	3	829-831	7
		286-293	4			493-495	4	834	6
100-108	5	294-295	5	400-406	3	496-499	3	835-838	7
109	4	296-297	4	407-409	4			840-847	6
110-119	5	298-299	5	410-412	3	500-516	4	850-864	7
120-123	4			413-422	4	520-524	3	865-885	5
124-126	5	300-303	4	423	3	525	4	890-897	8
127-128	4	304	5	424-426	4	526-528	3	898-900	7
129	5	305-307	4	427-432	3	530-534	2	900-921	8
130-152	4	308-329	5	433-436	2	535-539	3	922-928	7
153	3	330-334	6	437-457	3	540	4	930-934	8
154-160	4	335-338	4	458	2	541-546	4	935	5
161	3			459	2	547-548	4	936-960	8
162-163	4	339	6	460-462	3	549	3	961	7
164-165	3	340	6	463-464	2	550-566	4	962-976	8
166-199	4	350-352	4	465-466	2	567-469	5	977-979	7
		354	5	470-472	3	570-572	4	980-987	8
200-232	4	355-359	4	473	2	573-588	5	988-994	8
233-237	5	360-361	5	474-475	3	590-597	6	995-999	8
238-259	4	362	4						

**BOOK ORDERING INFORMATION** — There is a \$10 MINIMUM for a book-only purchase. No minimum if books are ordered with kits. Do not calculate shipping on books, simply add 50¢ for each book to the shipping charges column on the order blank.

# In this catalog...you'll find everything you need for 2-meter fun.

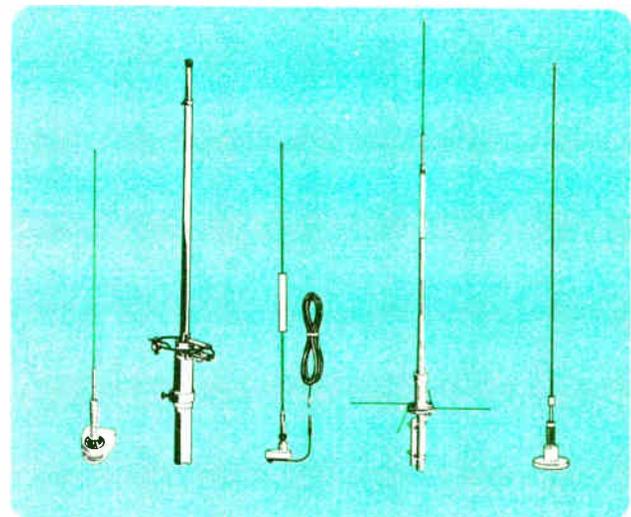


Scanning Transceiver



2-meter Amps

2-meter Hand-Held



2-meter antennas

2-meter products start on page 66.



SAVE  
UP TO  
\$100

# Heathkit®

HURRY!  
OFFER EXPIRES  
MARCH 15, 1981

SAVE  
UP TO  
\$100

# SAVE 10%

on any purchase of up to \$1,000 from this catalog

SAVE  
UP TO  
\$100

YOUR SIGNATURE \_\_\_\_\_

This coupon must accompany your order. Only one coupon per customer. Offer valid only for kit purchases from this catalog and may not be used in addition to 5% system discounts or special system/combination prices.

SAVE  
UP TO  
\$100

Clip and attach to your order

Dear Ham:

Whether you're a brand new Novice or an old hand, you'll find the attached Heathkit catalog a great "shopping list" of some of the finest (and most widely-used) equipment in ham radio.

### A 10% DISCOUNT ON ANYTHING YOU ORDER

That's right! Whether you want a new rig...or a stereo system, a color TV or a personal computer, just place an order by March 15, 1981, and we'll be happy to help you save \$10.00...\$20.00...\$30.00...as much as \$100. It's our way of saying "Glad to have you as a Heath customer!"

Whether you're looking for an action-packed QRP rig like our famous HW-8, or the new VF-7401 2-meter transceiver, you'll enjoy a rare combination of top-quality equipment, the pride of saying "I built it myself" – and you can save up to \$100.

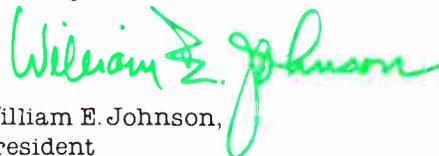
### DESIGNED TO GET YOU "ON THE AIR" FAST AND EASY

Every Heathkit product is specially designed for easy assembly. Our manuals are world-famous for their clear writing and helpful illustrations. And if you have any questions at all about your kit construction, we're as close as your telephone and ready to help you.

Go ahead. Pick the kit you want most and send in your order today. Remember though... this 10% discount is good only till March 15, 1981. So take advantage of the best possible ham gear value for your dollar!

P.S. Don't forget, your 10% discount is good on any Kit – from that new 2-Meter rig you've wanted to our new projection TV. Order several kits to save still more – your 10% discount (up to \$100) applies to your entire order!

Best regards,



William E. Johnson,  
President

Now speed your order by toll free phone

**800-253-0570**

In Michigan, Alaska & Hawaii Call (616) 982-3411

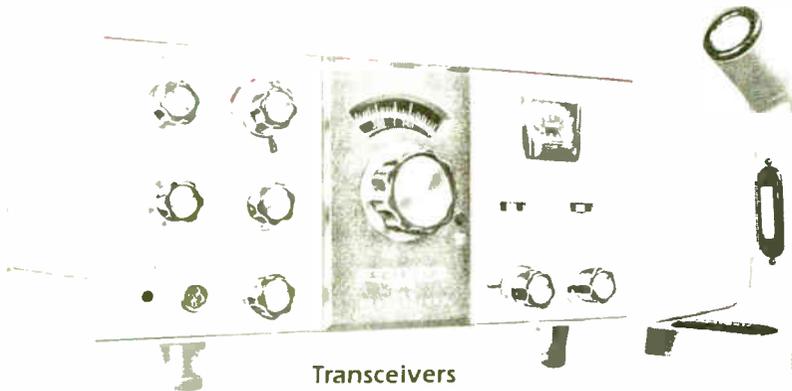


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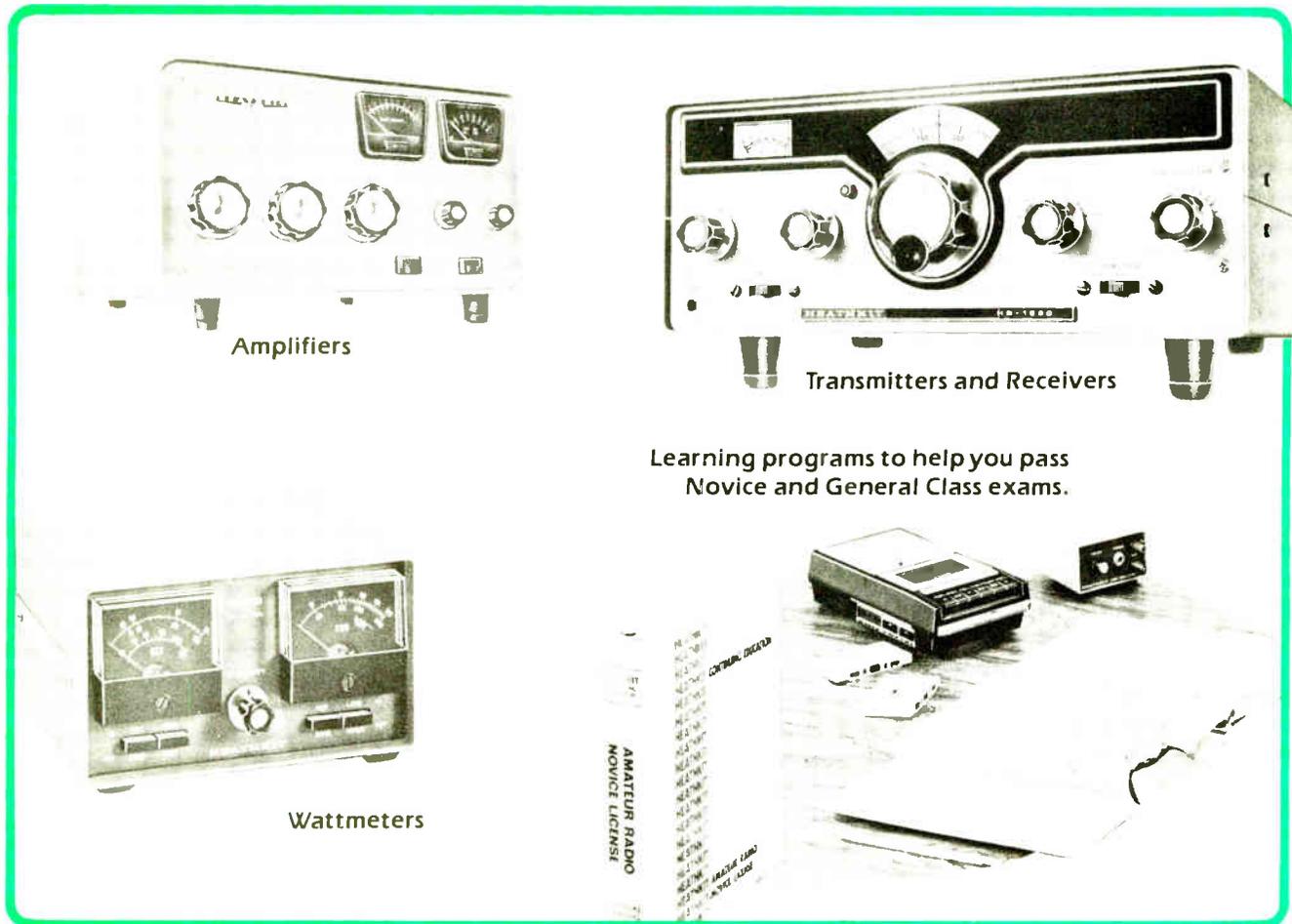
charge it!

WP-270

# In this catalog...you'll find one of the most complete selections of amateur radio gear anywhere.



Transceivers



Amplifiers

Transmitters and Receivers

Learning programs to help you pass  
Novice and General Class exams.

Wattmeters

## MONEY-BACK MANUAL PREVIEW

**MONEY-BACK MANUAL OFFER.** All kits come with manuals, but if you'd like to see how easy kitbuilding is, you can order the manual first. And we'll deduct the price of the manual when you buy the kit. Simply include a copy of your manual invoice with your order.

Send manual orders on a separate sheet of paper. Manuals are \$5 each except for the following: color TV's, organ, HX-1681, H-8-18, WH-8, WH-11A, HW-101, AR-1515, AA-1515, AJ-1600, AP-1800, AA-1640, AR-1650, SB-614, GD-1158, IG-1275, IG-5257, WH-17, SO-4105, SO-4235, JP-2711, and ET series, which are \$8 each. Assembly and operations manuals for the following are \$15 each: GR-4000, AR-1650, GR-2001, H-9, H-88/89. Manuals not available for Educational Courses. Add 10% shipping/handling for each manual. Write Heath Company, Parts Dept., Benton Harbor, MI 49022.

## HEATH PHONE DIRECTORY FOR ASSISTANCE AND INFORMATION

Product Orders (TOLL FREE except Alaska, Hawaii & Michigan) 800-253-0570	
Product Orders for Alaska, Hawaii & Michigan (sorry, toll free service not available)	616-982-3411
Replacement Parts Orders: (please have Heath part number available when you call)	616-982-3571
Order information, delayed shipments, etc.	616-982-3275
Overseas Orders: International Division	616-982-3512
Computer Sales Information	616-982-3285
General Office (non-order calls)	616-982-3200
Technical Assistance:	
• Stereo, Electronic Organs, R/C	616-982-3310
• Amateur Radio	616-982-3296
• Test Equipment, Weather Instruments, Home Clocks	616-982-3315
• Television	616-982-3307
• Home Products, Aircraft, Appliances, Marine, Automotive, Scanners, Security	616-982-3496
• Computers	616-982-3309
8:00 A.M.-Noon and 1:00-4:30 P.M., Eastern Time, Weekdays only.	

**HEATH CAREER OPPORTUNITIES:** We currently have positions available for qualified engineers, technicians and technical writers. If your expertise is in computer hardware or software, instrumentation or communications and you are interested in a career with Heath, send your resume and salary history to:

Heath Company, Personnel Department, Benton Harbor, MI 49022  
We are an Equal Opportunity Employer M/F.

**NOTE:** From time to time we make our mailing lists available to reputable businesses with offers we think would be of interest to you. If you do not wish to receive such offers, please send us the address label from your catalog with your request to: Heath Company, Dept. 597-999, Benton Harbor, MI 49022.

Copies of the Heathkit warranty or warranties for any other consumer product in this catalog costing more than \$15 may be obtained free of charge by writing the Manager of Marketing Services, Heath Company, Benton Harbor, MI 49022.

## The following notice is required by the Fair Credit Billing Act:

### IN CASE OF ERRORS OR INQUIRIES ABOUT YOUR BILL

The Federal Truth in Lending Act requires prompt correction of billing mistakes.

- If you want to preserve your rights under the Act, here's what to do if you think your bill is wrong or if you need more information about an item on your bill:
  - Do not write on the bill. On a separate sheet of paper write (you may telephone your inquiry but *doing so will not preserve your rights under this law*) the following:
    - Your name and account number (if any).
    - A description of the error and an explanation (to the extent you can explain) why you believe it is in error.
 If you only need more information, explain the item you are not sure about and, if you wish, ask for evidence of the charge such as a copy of the charge slip. Do not send in your copy of a sales slip or other document unless you have a duplicate copy for your records.
  - The dollar amount of the suspected error.
  - Any other information (such as your address) which you think will help the creditor to identify you or the reason for your complaint or inquiry.
- Send your billing error notice to the address on your bill which is listed after the words: "Send Inquiries to:"  
Mail it as soon as you can, but in any case, early enough to reach the creditor within 60 days after the bill was mailed to you. If you have authorized your bank to automatically pay from your checking or savings account any credit card bills from that bank, you can stop or reverse payment on any amount you think is wrong by mailing your notice so the creditor receives it within 16 days after the bill was sent to you. However, you do not have to meet this 16-day deadline to get the creditor to investigate your billing error claim.
- The creditor must acknowledge all letters pointing out possible errors within 30 days of receipt, unless the creditor is able to correct your billing during that 30 days. Within 90 days after receiving your letter, the creditor must either correct the error or explain why the creditor believes the bill was correct. Once the creditor has explained the bill, the creditor has no further obligation to you even though you still believe there is an error, except as provided in paragraph 5 below.
- After the creditor has been notified, neither the creditor nor an attorney nor a collection agency may send you collection letters or take other collection action with respect

## The President's Corner

Dear Friend,

A new product line is introduced in this catalog — quality wood furniture in kit form. That we expand into this area is a natural turn of events. Our parent company, Zenith Radio Corporation, designs and manufactures an excellent line of TV cabinets, so they are positioned to assist us in the program. Our ability to write clear construction manuals provides complete assurance that the finished kit will be a professional-looking product.

Also, I would like to introduce a new president to Heath. Bill Johnson has been with Heath for 20 years. His service as general manager for the past 12 months has allowed me to ease into retirement. Even so, I find it not easy to bid farewell to the hundreds of thousands of wonderful customers like yourself, and several thousand equally great fellow employees. Knowing that Bill believes in quality products and unexcelled customer service gives me a very warm feeling about the future of Heath under his able direction. Goodbye, good health and good kit building to all of you.

David W. Nurse

*D. W. Nurse*

Dear Heathkit Customer:

Dave Nurse and I have shared our business careers at Heath and we've seen your company quadruple in size as a direct result of honest and personalized customer relations...and solid value in superior kit design. I'm committed to building our future on these cornerstones of Heath's success.

We fully intend to strengthen our worldwide leadership in the design, manufacture and marketing of electronic kits. And, we'll be responding to your suggestions for new products...whenever we can assure you the quality, savings and value you've come to expect from Heath.

I'm proud, confident and delighted to take over from my good friend Dave Nurse... and look forward to the challenge of bringing you the very best that Heath can offer in the years ahead.

William B. Johnson

*William B. Johnson*

### SEE HEATHKIT PRODUCTS ON EXHIBIT AT THE FOLLOWING SHOWS:

Feb. 7-8	Tropical Ham Show	Miami, FL
Mar. 13-15	National ARRL	Orlando, FL
Apr. 3-5	West Coast Computer Show	San Francisco, CA

### Visit our Factory Store in Michigan

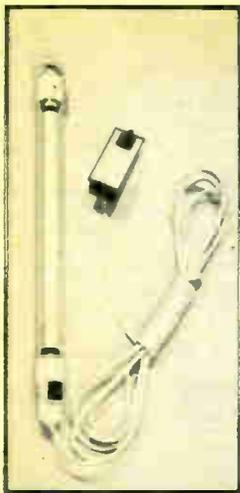
Take advantage of our MAIL ORDER PRICES, IMMEDIATE DELIVERY and expert SERVICE at our Heath Customer Center in St. Joseph, Michigan. Store hours are 9:00 AM to 5:00 PM Eastern Time Monday thru Friday and 9:00 AM to 4:00 PM on Saturdays. From Interstate 94, take Exit 23 (Business Loop 94, Red Arrow Highway) North to Hilltop Road. Take Hilltop ¼ mi. East to Heath Company.

If your address has changed or we have incorrect information on your mailing label, please send us the label with the necessary changes indicated. If your mailing label is not available, please provide us with both your old and new address. If you receive more than one mailing at the same address, please send us the mailing label you would like deleted. Thank you for your help.

to the amount in dispute; but periodic statements may be sent to you, and the disputed amount can be applied against your credit limit. You cannot be threatened with damage to your credit rating or sued for the amount in question, nor can the disputed amount be reported to a credit bureau or to other creditors as delinquent until the creditor has answered your inquiry. However, you remain obligated to pay the parts of your bill not in dispute.

- If it is determined that the creditor has made a mistake on your bill, you will not have to pay any FINANCE CHARGES on any disputed amount. If it turns out that the creditor has not made an error, you may have to pay FINANCE CHARGES on the amount in dispute, and you will have to make up any missed minimum or required payments on the disputed amount. Unless you have agreed that your bill was correct, the creditor must send you a written notification of what you owe; and if it is determined that the creditor did make a mistake in billing the disputed amount, you must be given the time to pay which you normally are given to pay undisputed amounts before any more FINANCE CHARGES or late payment charges on the disputed amount can be charged to you.
- If the creditor's explanation does not satisfy you and you notify the creditor in writing within 10 days after you receive his explanation that you still refuse to pay the disputed amount, the creditor may report you to credit bureaus and other creditors and may pursue regular collection procedures, but the creditor must also report that you think you do not owe the money, and the creditor must let you know to whom such reports were made. Once the matter has been settled between you and the creditor, the creditor must notify those to whom the creditor reported you as delinquent of the subsequent resolution.
- If the creditor does not follow these rules, the creditor is not allowed to collect the first \$50 of the disputed amount and FINANCE CHARGES, even if the bill turns out to be correct.
- If you have a problem with property or services purchased with a credit card, you may have the right not to pay the remaining amount due on them, if you first try in good faith to return them or give the merchant a chance to correct the problem. There are two limitations on this right:
  - You must have bought them in your home state or if not within your home state within 100 miles of your current mailing address; and
  - The purchase price must have been more than \$50.

However, these limitations do not apply if the merchant is owned or operated by the creditor, or if the creditor mailed you the advertisement for the property or services.



## Portable plug-in Fluorescent Light lets you see into cramped areas

Use in most any cramped area — attic, basement, car or anywhere else you can hang it.

This assembled Trouble Light will provide plenty of light — even at night — so you can see your way through most any trouble. Just plug into any 120 VAC outlet — the long 25-foot line cord lets you get to most any hard-to-reach area. Costs less to operate, too — draws just 25 watts.

There's no walking back and forth to the wall to turn this light on — the starter switch is right in the handle. And the ballast box is part of the 3-conductor grounded wall plug assembly, so you don't have to drop ballast around.

With the Heathkit GDP-206 Fluorescent Trouble Light, you'll never have to be in the dark again. For 120 VAC. 26" L x 2.5" W x 2.5" D

GDP-206, Assembled, Shpg. wt. 4 lbs. . . . 19.95

## Multi-Outlet Boxes eliminate messy extension cords



**1** This Six-Socket Multiple Outlet Box puts power where you need it. It has 6 three-hole outlets — five switched for killing power to equipment, one unswitched to leave clock running. Maximum 10 amp load. Includes fuse, fuse holder and 6-foot long cord. For 120 VAC.  
Kit HD-1360, Shpg. wt. 2 lbs. . . . . 14.95

**2** Twelve-Socket Multiple Outlet Box. Same as six-socket multiple outlet box described above, but has eleven switched outlets and one unswitched outlet to double your convenience while working in workshop or garage. With fuse, fuse holder and 12-foot long cord. For 120 VAC.

Kit HD-1274, Shpg. wt. 4 lbs. . . . . 19.95



Motor Speed Control is ideal for any universal motor, rated 15 amps or less. Saves power, blades, bits. Use large drills on metal, at slow speeds, to keep motor cool. Not for use with Dremel tools. 120 VAC. 3.5" H x 3.25" W x 6" D.

Kit GD-973A, Shpg. wt. 2 lbs. . . . . 29.95



## These 3-D Binocular Magnifiers let you see sub-miniature objects

Save yourself from eye strain when kitbuilding, or when working with sub-miniature objects. The Heathkit GDP-201 Binocular Magnifiers provide close-up magnification, while leaving your hands free. These Binocular Magnifiers make objects appear two and a half times larger than normal.

Focal distance is normally 8.5 inches (21.59 cm), but depends on user's vision. All parts American made. Ground glass lenses inserted in a durable plastic frame.

GDP-201, Assembled, Shpg. wt. 1 lb. . . . . 18.95

## Heat-Controlled Solder Station for easier soldering



This Heath-recommended, transformer-powered Weller WTCPN Soldering Station has closed-loop control of the tip temperature. Also features heat shield, indicator lamp and sponge. Tip heats up to 700 deg. F (371 deg. C). Assembled.  
GDP-1108, Shpg. wt. 5 lbs. . . . . 69.95

Set of Replacement Tips for the Weller WTCPN Soldering Station (all rated at 700 deg. F — 371 deg. C). Set includes: 1/16" screwdriver, 1/8" screwdriver, 3/16" screwdriver, 3/64" long screwdriver and 1/2" long conical tips.

GDP-1109, Shpg. wt. 1 lb. . . . . 15.95

## Three-Heat Soldering Iron Kit for kitbuilding versatility



Stand with metal case keeps the soldering iron secure. Three heat settings (high, medium and low) make the GH-17A Soldering Iron Kit ideal for most any electronic application. Soldering iron has 6-volt, 25-watt element — includes 3/16" chisel tip. Six-foot long heavy-duty power cord. Grounded wall plug adds an extra measure of safety. For 120 VAC, 50/60 Hz. Draws only 24 watts maximum. Cabinet dimensions are 5.13" H x 3.56" W x 5.5" D (13.03 x 9.04 x 13.97 cm). Soldering iron, 8" L (20.32 cm).

Kit GH-17A, Shpg. wt. 5 lbs. . . . . 39.95

## Visit your Heathkit Electronic Center (Units of Veritechnology Electronics Corporation) and see the complete Heathkit product line.

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

**ARIZONA — Phoenix, 85017**  
2727 W. Indian School Rd. 602-279-6247

**CALIFORNIA — Anaheim, 92805**  
330 E. Ball Rd. 714-776-9420

**El Cerrito, 94530**  
6000 Potrero Ave. 415-236-8870

**Los Angeles, 90007**  
2309 S. Flower St. 213-749-0261

**Pomona, 91767**  
1555 N. Orange Grove Ave. 714-623-3543

**Redwood City, 94063**  
2001 Middlefield Rd. 415-365-8155

**Sacramento, 95825**  
1860 Fulton Ave. 916-486-1575

**San Diego (La Mesa), 92041**  
8363 Center Dr. 714-461-0110

**San Jose (Campbell), 95008**  
2350 S. Bascom Ave. 408-377-8920

**Woodland Hills, 91364**  
22504 Ventura Blvd. 213-883-0531

**COLORADO — Denver, 80212**  
5940 W. 38th Ave. 303-422-3468

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

**FLORIDA — Miami (Hialeah), 33012**  
4705 W. 16th Ave. 305-823-2280

**Plantation (Lt. Lauderdale), 33317**  
7173 West Broward Blvd. 305-741-7300

**Tampa, 33614**  
4019 West Hillsborough Ave. 813-886-2541

**GEORGIA — Atlanta, 30342**  
5285 Roswell Rd. 404-252-4341

**ILLINOIS — Chicago, 60645**  
3462-66 W. Devon Ave. 312-583-3920

**Chicago (Downers Grove), 60515**  
224 Ogden Ave. 312-852-1304

**INDIANA — Indianapolis, 46220**  
2112 E. 62nd St. 317-257-4321

**KANSAS — Kansas City (Mission), 66202**  
5960 Lamar Ave. 913-362-4486

**KENTUCKY — Louisville, 40243**  
12401 Shelbyville Rd. 502-245-7811

**LOUISIANA — New Orleans (Kenner), 70062**  
1900 Veterans Memorial Hwy. 504-467-6321

**MARYLAND — Baltimore, 21234**  
1713 E. Joppa Rd. 301-661-4446

**Rockville, 20852**  
5542 Nicholson Lane 301-881-5420

**MASSACHUSETTS — Boston (Peabody), 01960**  
242 Andover St. 617-531-9330

**Boston (Wellesley), 02181**  
165 Worcester Ave.  
(Rt. 9 just west of Rt. 128) 617-237-1510

**MICHIGAN — Detroit, 48219**  
18645 W. Eight Mile Rd. 313-535-6480

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

**MINNESOTA — Minneapolis (Hopkins), 55343**  
101 Shady Oak Rd. 612-938-6371

**St. Paul, 55106**  
1645 White Bear Ave. 612-778-1211

**MISSOURI — St. Louis (Bridgeton), 63044**  
3794 McKelvey Rd. 314-291-1850

**NEBRASKA — Omaha, 68134**  
9207 Maple St. 402-391-2071

**NEW JERSEY — Fair Lawn, 07410**  
35-07 Broadway (Rte. 4) 201-791-6935

**Ocean (Asbury Park), 07712**  
1013 State Hwy. 35, 201-775-1231

**NEW YORK — Buffalo (Amherst), 14226**  
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**Jericho, Long Island, 11753**  
15 Jericho Turnpike 516-334-8181

**Rochester, 14623**  
937 Jefferson Rd. 716-424-2560

**White Plains**  
North White Plains, 10603  
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**OHIO — Cincinnati (Woodlawn), 45215**  
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**Cleveland, 44122**  
28100 Chagrin Blvd. 216-292-7553

**Columbus, 43228**  
2500 Morse Rd. 614-475-7200

**Toledo, 43615**  
48 S. Byrne Rd. 419-537-1887

**OKLAHOMA — Oklahoma City, 73112**  
2727 Northwest Expressway, 405-848-7593

**PENNSYLVANIA — Philadelphia, 19149**  
6318 Roosevelt Blvd. 215-268-0180

**Frazier (Chester Co.), 19355**  
630 Lancaster Pike (Rt. 30) 215-647-5555

**Pittsburgh, 15235**  
3482 Wm. Penn Hwy. 412-824-3564

**RHODE ISLAND — Providence (Warwick), 02886**  
558 Greenwich Ave. 401-738-5150

**TEXAS — Dallas, 75201**  
2715 Ross Ave. 214-826-4053

**Houston, 77008**  
1704 West Loop North 713-869-5263

**San Antonio, 78216**  
7111 Blanco Road 512-341-8876

**UTAH — Salt Lake City (Midvale), 84047**  
58 East 7200 South 801-566-4626

**VIRGINIA — Alexandria, 22303**  
6201 Richmond Hwy. 703-765-5515

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

**WASHINGTON — Seattle, 98109**  
505 8th Ave. N. 206-682-2172

**Tekwia, 98188**  
15439 53rd Ave. S. 206-246-5358

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



## Time-saving helpers for your work table or bench

**1** Seven-sized Nut Driver Set. Saves time securing nuts. Made from sturdy steel. Sizes:  $\frac{3}{16}$ ",  $\frac{1}{4}$ ",  $\frac{5}{16}$ ",  $\frac{1}{2}$ ",  $\frac{3}{8}$ ",  $\frac{7}{16}$ ",  $\frac{1}{2}$ ".  
GDP-204, Shpg. wt. 2 lbs. .... 14.95

**2** PanaVise Vertical Vise Head. For holding bulkier items. Padded jaws open up to 6 $\frac{1}{2}$ "; won't scratch or dig into mounted objects. Pads replaceable.  
GDP-1255, Shpg. wt. 2 lbs. .... 15.95

**3** PanaVise Circuit Board Holder. Holds boards steady for soldering circuits. Spring-loaded for quick change. Tilts 220°. Fits vacuum or standard base.  
GDP-1254, Shpg. wt. 2 lbs. .... 19.95

**4** PanaVise Vacuum Base. For temporary mounting on smooth, non-porous surfaces. For GDP-1253, -1254, -1255. GDP-1252, Shpg. wt. 2 lbs. .... 19.95

**5** PanaVise Vertical Jaw Vise Head. Nylon jaws open to 2 $\frac{1}{4}$ " to firmly grip parts without marring.  
GDP-1253, Shpg. wt. 2 lbs. .... 16.95

**6** PanaVise Standard Height Base. For GDP-1253, 1254, or GDP-1255 vise heads listed above. 3-lug mounting steadily holds steel base to bench. For GDP-1253, -1254, -1255.  
GDP-1251, Shpg. wt. 2 lbs. .... 13.95

**7** Low-cost Extension Lamp helps eliminate eye-strain. Features metal conical shade for directing light. Spring-loaded, steel extension arm swings 360° and extends 45" to accommodate any work angle. Non-mar felt-lined table clamp. 120 VAC.  
Kit GDP-202, Shpg. wt. 4 lbs. .... 26.95

**8** Weller 25-Watt Soldering Iron. Slim  $\frac{1}{8}$ " tip for close point-to-point wiring. 860° heat. Our best-selling Soldering Iron!  
GDP-207, Shpg. wt. 1 lb. .... 14.95

**9** Solder/de-solder Set. Includes Weller Soldering Iron described above, plus a de-soldering bulb for quick and easy removal of solder.  
GDP-1009, Shpg. wt. 1 lb. .... 18.95

8 oz of Solder. High quality 60/40 18 gauge, rosin core solder for your electrical connections.  
GDZ-1011, Shpg. wt. 1 lb. .... 5.95

1 pound of Solder. Same high quality 18 gauge solder described above.  
GDZ-1012, Shpg. wt. 2 lbs. .... 11.95



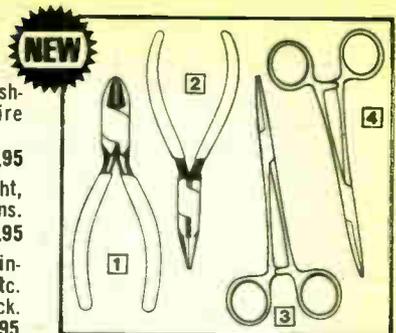
## Handy tools for the serious kitbuilder

**1** Diagonal Pliers. Feature poly-cushion grip. For general purpose wire snipping.  
GDZ-1018, Shpg. wt. 1 lb. .... 11.95

**2** 5" Needle Nose Pliers. Light-weight, balanced side cutter for fine insertions.  
GDZ-1017, Shpg. wt. 1 lb. .... 11.95

**3** Straight Forceps. Tempered stainless steel. For soldering, heat sink, etc. Serrated jaws. 3-position ratchet lock.  
GDZ-1014, Shpg. wt. 1 lb. .... 11.95

**4** Curved Forceps. Same as above, only features curved serrated jaws for those hard-to-reach places.  
GDZ-1015, Shpg. wt. 1 lb. .... 11.95



**NEW**  
Micro Cutter. Makes cutting clip leads from circuit boards easier and safer. Retainer traps clippings.  
GDZ-1013, Shpg. wt. 1 lb. .... 7.95



## Complete Tool Kit makes kit building easier

This Tool Kit has the tools you need. It contains a) a wire stripper/diagonal side cutter, b) long-nose pliers for those tight spots, c) three common head screwdrivers ( $\frac{3}{32}$ ",  $\frac{1}{8}$ ",  $\frac{3}{16}$ " ), d) a Weller WP-25 soldering iron, e) a nutdriver, f) a nut starter, g) a soldering aid, h) and generous amount of solder.

Tool Kit features a shock-resistant foam lined carrying case, with easy grip handle. Measures: 3" H x 10 $\frac{3}{4}$ " W x 10" D.

Kit GHP-1270, Shpg. wt. 3 lbs. .... 37.95

## Order this Magnifier/Lamp now and get a free tube

Order this kit from this catalog, we'll give you the tube free. That's a T-9 fluorescent circline tube—a \$10 value—FREE. What's more, you get our new version of the GDP-200 Magnifier/Lamp. It features handsome new black enamel color, a safety diffuser for tube protection; a 5" diameter, 3 diopter magnifying lens for no-strain viewing; and gimbal mount head and 45" jointed steel extension for comfortable easy positioning. 120 VAC.

Kit GDP-200, Shpg. wt. 7 lbs. .... 79.95



## Learn more about Electronics with these Heath-recommended books



Transistor Substitution Handbook. Contains 554 pages showing replacement transistors for over 19,000 American and foreign bipolar transistors.  
EDP-175 ..... 5.95

The 555 Timer Applications Source Book. 160 pp. Explains the 555 timer and 556 dual timer. Includes 17 simple experiments.  
EDP-249 ..... 6.95



The TTL Data Book. Covers design and specification data, pin outs, test data and application of transistor-transistor logic. 832 pages.  
EDP-220 ..... 7.50

Tube Substitution Handbook. 112 pp. Lists over 12,000 replacements of American and foreign receiving, picture tubes.  
EDP-174 ..... 3.95



TTL Cookbook. Defines what transistor-transistor logic is, how it works, how to use it. Covers basic to advanced designs. Includes projects. 336 pages.  
EDP-183 ..... 9.50

Building and Installing Electronic Intrusion Alarms. Written for the novice and security technician.  
EDP-135 ..... 4.50  
(See book-ordering information on page 52.)

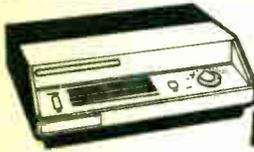


Alaska, Hawaii and Michigan Residents: Call 616-982-3411

# LIMITED QUANTITIES!

Don't delay any longer! Order the kit you want now before another kitbuilder grabs it and our warehouse stock runs dry! It's first come, first served!

# LAST CALLS



## LAST CALL

### Record-A-Call® VOX 70 takes telephone messages while you're away

Missed phone calls can ruin your day and cost you time and money. With Record-A-Call, you get all your callers' messages — on tape. It allows callers to speak as long as they wish, or with a 30-second time limit. It uses readily-available cassettes and features silent monitor, announce only, fast forward, rewind, rapid erase, and message light. 120 VAC. 9" H x 11 7/8" W x 3 3/4" D. Assembled.

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

### Here's a low-cost Video Terminal with keyboard for your computer



## \$299<sup>95</sup>

Here's a low-cost Video Terminal with keyboard for your computer

Big, bright 12" CRT displays twelve 80-character lines

The H-9 terminal has the features you'd expect on a terminal costing hundreds more: Like a big bright 12-inch CRT with an upper case 5 x 7 dot matrix for easy character reading. A long form twelve 80-character display for convenient text editing and program writing. And a short form display with forty-eight 20-characters in 12-line column that makes tabling and listing easier. The H-9 features other conveniences: An automatic line carryover for easy page-to-page tracking. A cursor mark for character and space placement, plus a built-in oscillator/speaker that generates a 4800 Hz tone and acts as an end-of-line warning.

In addition, a 67 key ASCII keyboard with a type-writer layout allows for fast adaptation. There are keys for erasing a whole page, a paragraph, a line — even a character. There are keys for two-way scrolling in the 80-character long form, and in the 20 character short form. There's a plot mode key for graphing curves and simple figures.

Above all, the H-9 can be used with any digital computer. Its serial interface provides 20 mA current loop and TTL levels. Its parallel interfacing has TTL levels, 8 bits input, 8 bits output, and 4 handshaking lines. 110-9600 baud rates. 12 1/2" H x 15 5/8" W x 20 3/4" D. 120/240 VAC, 50/60 Hz.

Kit H-9, Shpg. wt. 50 lbs. .... 299.95  
WH-9-1, Adapter Cable for H-9. EIA standard electrical and mechanical interface. 1 lb. .... 15.00



## LAST CALL

### Heathkit 6-Station Intercom saves your legs and voice

Now you don't have to huff and puff up and down stairs to talk with a person in the basement, or yell upstairs to give them a message. With the Heathkit Six Station Intercom, you can instantly get the person's attention and talk to them. The Intercom features a master unit, plus individual, add-on remotes.

The Master features talk/listen, talk only, and volume. Remote has talk/listen, talk only controls. Order each remote separately; get several for extra step-saving convenience. Remote unit: 3 3/4" H x 6" W x 5 3/4" D. The Master unit: 4 1/2" H x 8 1/2" W x 7" D. Kit GD-110, Six station Master, Shpg. wt. 5 lbs. 59.95  
Kit GD-120, Indoor Remote, Shpg. wt. 2 lbs. . . 19.95  
Kit GD-130, Outdoor Remote, Shpg. wt. 2 lbs. 15.95  
GDA-110-2, 100 ft. cable, for GD-110, 3 lbs. .... 9.95  
GDA-110-4, 100 ft. cable for GD-130, 1 lb. .... 4.95

### Save \$20.00 on this Inside/Outside Thermometer for cars, vans, & campers



## \$59<sup>95</sup>

Gives you constant readout of inside and outside temperatures for accurate climate control and driving safety. Use it to adjust your heater or air conditioner output for maximum passenger comfort. Also monitors outside temperature for warning of possible hazardous road conditions such as freezing water on pavement. Measures temperatures from -20 deg. F to +140 deg. F. (-30 C to +60 C) with ±3 deg. accuracy. Includes sensors. 3.12" H x 4.71" W x 3.12" D.

Kit CI-1525, Shpg. wt. 2 lbs. Was \$79.95, Now 59.95

### TV/FM Filter ends CB interference



Prevents CB signals from "buzzing" your TV viewing and FM listening. 300 ohms.

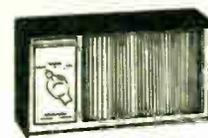
GD-1239, Assembled, wt. 1 lb. .... 6.95

### The AR-1219 AM/FM Stereo Receiver — puts stereo sound in your office or dorm room



15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN .5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

Makes an office or dorm room more pleasant to



## LAST CALL

### Heathkit Cab-to-Camper Intercom keeps you in touch with passengers

When it's time to take the highway with your camper and a load of passengers, nothing makes the trip more enjoyable than the Heathkit Cab-to-Camper Intercom. This intercom lets the driver talk to camper passengers or pipe in the cab radio to the campers.

The intercom features a master unit for the cab, and a remote for the camper. The master unit has 3-position switch for selecting "stand by", "monitor", or "talk" modes. The remote can initiate call ups to the cab, and has a position for radio listening. Both the master and remote run off your vehicle's 12 volt, negative ground source.

Kit GD-160, Master, Remote, and Cable, 5 lbs. 19.95  
GDA-160-1, Accessory Plug. Allows quick disconnect when camper and cab must be separated.

Shpg. wt. 1 lb. .... 4.95

### Take control of your model railroad setup with this Power Supply Throttle

## \$79<sup>95</sup>

Controls two engines plus accessories!



Now get total control of your HO or N gauge train. The RP-1065 features a slide throttle for complete engine speed control. Special DC compensation circuits let your train climb grades and track obstacles without stall-out. A switch bank lets you connect and control accessories. Features beige and black metal case. Measures: 4 3/4" H x 9 1/2" W x 8 1/2" D. 120 VAC, 50/60 Hz.

Kit RP-1065, Shpg. wt. 9 lbs. .... 79.95

Walk-Around Remote Control for RP-1065.

Kit RPA-1065-1, Shpg. wt. 3 lbs. .... 22.95

Save \$2.95! Order the RP-1065 and the RPA-1065-1. RPS-1065, Shpg. wt. 19 lbs. .... 99.95

work or study. Unit features a 2 μV sensitivity to pull in your favorite FM station. It also gives your music that distinct stereo presence with a 40 dB stereo separation. And you'll hear all your music with the AR-1219 amplifier's 7 to 100 kHz frequency response (±1 dB) and an S/N of 65 dB. For versatility, the AR-1219 has inputs for turntables fitted with magnetic cartridges, a cassette or reel-to-reel tape deck, and headphones. The entire unit is housed in a brushed aluminum front panel with rich walnut side panels.

Kit AR-1219, Shpg. wt. 18 lbs. .... 229.95



## Heathkit Amateur equipment puts more fun in your Ham Radio hobby

Whether you're a newcomer to Amateur Radio or a veteran of many years in the field, your best choice is Heathkit Amateur Radio Equipment. Building your own transceiver and accessories helps you learn more about the latest advancements in electronics. You build state-of-the-art transceivers like the popular SB-104A HF Transceiver and the exciting VF-7401 2-Meter FM Digital Scanning Transceiver. And does Heathkit Amateur Radio Equipment perform? Just ask any Ham

who has built and operated Heathkit Amateur Radio Equipment. Or listen to the large number of Heathkit Transceivers on the air. Now that's convincing proof that Heathkit Amateur Radio Equipment is the way to start...and continue in Ham Radio. So get more enjoyment and satisfaction from your amateur radio hobby...with the complete line of amateur radio equipment and accessories from the more than 200 Hams at Heath.

### You'll work the world with solid-state, no-tune convenience when you have the popular Heathkit SB-104A HF Transceiver

Get all the features you want in a solid-state transceiver — a clean 100 watts out on all bands, instant QSY, digital readout... even a display of your own call sign on the front panel. The moment you power up your SB-104A, six digits display your operating frequency to within  $\pm 200$  Hz. Pushbutton select CW, upper or lower sideband transmission, plug in your key, or choose PTT or VOX operation, and you're ready for broadband solid-state excitement.

The receiver front end of the 104A is factory preassembled and tested, incorporating individual preselector filters for each band. That, along with balanced first and second mixers, gives you sensitivity of less than  $0.5 \mu\text{V}$ .

The transmitter section lets you choose 100 watts out for "barefoot" operation or, with the touch of a button, one watt out to turn your 104A into Ham Radio's most sophisticated QRP transceiver. Transmitter circuitry features quad op-amp audio processing, filter sideband generation, crystal-controlled heterodyne oscillators for maximum frequency stability, and a unique ALC system to eliminate distortion-producing overdrive. Most importantly, the 104A utilizes driver and PA transistors in a broadband, no-tune push-pull configuration, diode biasing to prevent PA thermal runaway, and power regulating control circuitry to prevent damage under high SWR. For extra 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. The SB-104A operates from a charging 12 VDC auto electrical system, or the PS-1144 Power Supply described below. Move up to the digital age with the SB-104A at your Amateur station.

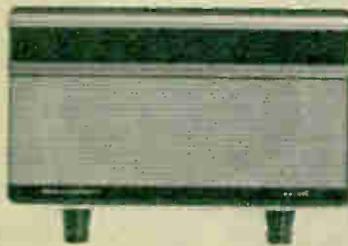
Kit SB-104A, Shpg. wt. 32 lbs. ....	689.95
Kit SBA-104-1, Noise Blanker, Shpg. wt. 1 lb. ....	29.95
Kit SBA-104-3, 400 Hz Crystal Filter, Shpg. wt. 1 lb. ....	44.95



### Look at these super SB-104A Specifications!

Frequency Coverage: 3.5 MHz through 29.7 MHz Amateur bands (80 through 10 meters); 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  $\pm 200$  Hz  $\pm 1$  count. TRANSMITTER: RF Power Output: High Power (50-ohm non-reactive load). SSB: 100 watts PEP  $\pm 1$  dB; CW: 100 watts  $\pm 1$  dB. Low Power SSB: 1 watt PEP (minimum); CW: 1 watt (min.). Output Impedance: 50 ohms, less than 2:1 SWR. Carrier Suppression and Unwanted Sideband Suppression:  $-50$  dB down from 100 watt single-tone output at 1000 Hz reference. RECEIVER: Sensitivity: 0.5 for 10 dB S+N/N for SSB. Selectivity: 2.1 kHz minimum at  $-6$  dB, 5 kHz max. at  $-60$  dB. (2:1 nominal shape factor). CW Selectivity: (with accessory CW filter) Selectable 2.1 kHz/400 Hz. IM Distortion:  $-65$  dB min.;  $-57$  dB typ. with noise blanker. Image Rejection:  $-60$  dB min. Dimensions:  $5\frac{3}{4}$ " H x  $14\frac{1}{2}$ " W x  $13\frac{7}{8}$ " D.

### Matching accessories to complete your SB-104A Station



1 Matching Speaker



2 Remote VFO



3 Station Monitor



4 Station Console

#### 1 Matching Speaker and Power Supply

SSB response-tailored 5" x 7" oval speaker. 300-3000 Hz frequency response. Connector plug and cable included. Dimensions:  $7\frac{1}{8}$ " H x  $10\frac{1}{8}$ " W x 14" D. Large enough to house the PS-1144 Power Supply. Kit SB-604, Shpg. wt. 8 lbs. ....

120/240 VAC Supply provides 13.8 VDC required by SB-104A. Full-wave bridge circuit has triple Darling-ton regulation to maintain fixed voltage. Kit PS-1144, Wt. 27 lbs. ....

#### 2 Remote VFO gives you added capability

Provides split transmit/receive capability for DX,

net operation. Multi-mode capability allows transceiver operation with either VFO or SB-104A. Two crystal positions for fixed-frequency control. VFO reference tuning scale; SB-104A displays exact frequency.  $7\frac{3}{4}$ " H x  $10\frac{3}{4}$ " W x  $15\frac{1}{4}$ " D. Easy assembly. Kit SB-644A, Shpg. wt. 10 lbs. ....

#### 3 See your signal with Station Monitor

Monitors SSB, CW & AM signals to 1 kW from 80-6 meters. Shows nonlinearity, insufficient or excessive drive, poor carrier or sideband suppression, regeneration parasites, key clicks. Manual shows 40 CRT displays (21 transmit envelope patterns, 7 trapezoid patterns, 6 RTTY cross patterns, 6 CW patterns). 120/240 VAC.  $7\frac{3}{4}$ " H x  $10\frac{3}{4}$ " W x  $15\frac{1}{4}$ " D.

Kit SB-614, Shpg. wt. 17 lbs. .... 189.95  
HDP-3622, 3-ft. Coax w/conn., Shpg. wt. 1 lb. 4.95

#### 4 Station Console adds real versatility

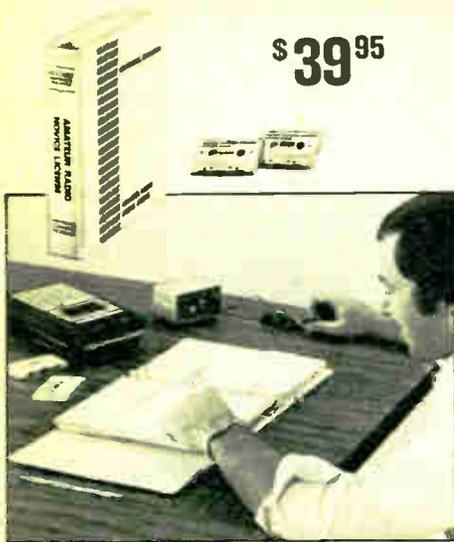
Features 24-hour, 6-digit clock; 10-minute ID timer w/automatic reset; RF wattmeter w/200/2000 watt ranges; SWR bridge w/sensitivity control; manual/VOX controlled phone patch. Phone patch provides at least 30 dB isolation. Input impedance is 600 ohm. Impedance is 50 ohm. 1.8 to 30 MHz range. 120/240 VAC. Metal cabinet measures  $7\frac{3}{4}$ " H x  $10\frac{3}{4}$ " W x  $15\frac{1}{4}$ " D.

Kit SB-634, Shpg. wt. 13 lbs. .... 189.95  
HDP-3622, 3-ft. Coax w/conn., Shpg. wt. 1 lb. 4.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

## Get your ticket and get on the air — faster and easier — with the Heathkit Novice License Course



**\$39<sup>95</sup>**

Here's a self-instruction course that's guaranteed to help you get your Novice ticket and talk to the world! This deluxe learning program prepares you for the new Amateur Radio Novice FCC exam, and provides you with helpful guidelines for setting up and operating your own station once you pass the exam. When you have completed the Novice License Course, you will be able to send and receive the Morse code accurately at the rate of five words per minute, and to pass a 20-question, multiple-choice written test from the FCC.

**Note:** This Course prepares you for the latest FCC examinations. We guarantee it.

At the end of each module, a multiple choice exam checks your understanding and retention of the material. After Module 9, two practice exams and a final exam styled after the actual FCC exam give you test-taking experience to make the actual thing a breeze. And, by successfully passing the optional final exam with a grade of 75% or better, you will earn 1.0 CEU and a Certificate of Achievement.

The Novice License Course includes two audio cassette tapes to aid you. The first contains an introduction to Amateur Radio, an explanation of RST

signal reporting, a review of circuit components, and a review of practical circuits. The second tape teaches you the Morse code in letter groups and then helps you bring your code speed up to five words per minute.

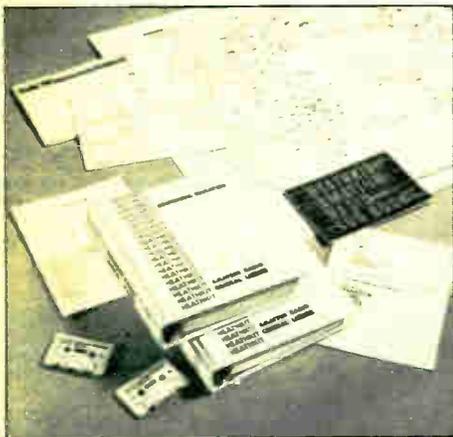
In addition, you will receive a set of Operating Aids, plus an attractive 31" x 22" Frequency Spectrum Chart and matching U.S. Call Area Map for display on the walls of your Ham "shack." All materials in this Course are packaged in an attractive vinyl binder for convenient reference.

This Course is guaranteed to help you get your license. If you fail to pass your FCC Novice exam after completing the course, we will REFUND your money. Simply return the course materials, along with your receipt and a copy of your rejection notice from the FCC.

So... if you have been putting off getting your Novice ticket because of fear of the code test or the written exam, the Heathkit Novice License Course is the answer. It contains everything you need.

ER-3701, Shpg. wt. 7 lbs. .... **39.95**  
Kit HD-1416, CW Oscillator (see below)  
Wt. 2 lbs. .... **14.95**

## The Heathkit General Class Amateur Radio Course helps you move up to the thrill of voice communications



**\$49<sup>95</sup>**

- Open new doors to the full range of Amateur Radio experiences. Leave the crowded Novice or CB bands behind. Earn your Technician or General Class License with the Heathkit ER-3702 General Class Amateur Radio Course.

**Note:** This Course prepares you for the latest FCC examinations. We guarantee it.

Move up to General Class and get all the added privileges — more frequencies to operate on, plus voice transmission, RTTY, SSTV, satellites, and more that you're missing as a Novice or CBeR.

This Course provides extra code practice to bring your code speed up to 15 words per minute. Since the FCC requires only 13 wpm to pass the General exam, the extra "two-word edge" gives you the confidence to pass the exam with flying colors.

An informative text takes you through the subjects covered on the new FCC written test. It concentrates on the information needed to pass the exam, so you don't get bogged down learning information that won't be covered by the FCC.

A simulated FCC written test gives you test-taking

experience, and allows you to review problem areas so you'll be more prepared for the actual exam. Once you pass your General exam, send us a copy of your new license or FCC notification of passing to receive 5.0 CEU's and a Certificate of Completion.

Your General License Course includes:

- Complete text
- Log Book
- T.V.I. Booklet
- Simulated exams
- Two vinyl binders
- Code workbook
- FCC Form 610
- Two code tapes
- World Call Map
- FCC exam schedule
- FCC rules and regulations

The Course is arranged in 10 units:

- |                        |                    |
|------------------------|--------------------|
| 1. Ham Radio Operation | 6. Measurements    |
| 2. Direct Current      | 7. Transmitters    |
| 3. Alternating Current | 8. Receivers       |
| 4. Active Devices      | 9. Antennas        |
| 5. Electronic Circuits | 10. Practice Exams |

The General Class License Course carries the same guarantee as the ER-3701 Novice Course above.

ER-3702, Shpg. wt. 24 lbs. .... **49.95**

## Build up your code speed with this handy CW Oscillator

**\$14<sup>95</sup>**



Get your speed up and pass your FCC exam with this handy Practice CW Oscillator. It features a telegraph key, phone jack and built-in speaker, plus volume and tone controls. And once you get your license, the HD-1416 can serve as a side tone oscillator for any transmitter using grid block keying. The cabinet measures 2 5/8" H x 4 3/4" W x 4 3/8" D. It operates on a single 9 V-transistor battery (not included). This easy-to-build, first-time kit even includes solder, as do all Heathkit electronic kits.

Kit HD-1416, Shpg. wt. 2 lbs. .... **14.95**

58/AMATEUR RADIO

## Get a money-saving start in Amateur Radio today!

**SAVE  
\$9<sup>95</sup>**

This money-saving package can help you get started in the exciting world of Amateur Radio. Why delay?

We want to help you get started in Amateur Radio by saving you money on the ER-3701 Novice License Course (above) and the HD-1416 Code Practice Oscillator (at left) when you purchase them together. And to save you even more, we include a certificate good for a 10% discount on your first purchase of up to \$100 worth of Amateur gear from the Heathkit catalog. If purchased separately, the CW Oscillator and Novice Course would cost you \$54.90.

ERS-3701, Shpg. wt. 9 lbs. .... **44.95**



Credit Card Orders Call TOLL-FREE: 800-253-0570

## For real CW fun, you can't do better than the popular Heathkit HW-8 QRP Transceiver

**\$149<sup>95</sup>**

- 80, 40, 20 and 15 meters CW
- 0.2  $\mu$ V receiver sensitivity
- Adjustable T/R delay and semi break-in
- 2-position active audio filter
- Front panel meter to show relative power

The rugged portability of this great little CW transceiver means that now you can take your Amateur Radio hobby with you wherever you go, whether it's on a camping expedition or a business trip. With dimensions of 4 $\frac{1}{4}$ " H x 9 $\frac{1}{4}$ " W x 8 $\frac{1}{2}$ " D, the Heathkit HW-8 CW Transceiver is small enough to fit in a suitcase. Its net weight of 4 lbs means it's not too bulky to back pack. A trail bike's battery will power it. Or join the growing number of Hams experimenting with solar-powered QRP (low power) operation. You can even run it off of your automobile's lighter socket. And, of course, you can also operate your HW-8 at home on 120 or 240 VAC power with the HWA-7-1 Power Supply listed below.

No matter where you operate or how you power yours, the HW-8 is a great performer — you can be sure of that. Performance begins with a quiet, super-sensitive receiver section. Hum and noise figures are minimal, and as little as 0.2  $\mu$ V in at the antenna terminal gives you a usable signal. Couple that with a tunable preselector, direct conversion with RF amplification, a balanced product detector followed by active audio processing, and you have 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 will get a minimum of 3.5 watts in on 80 meters, 3.0 watts in on 40 and 20, and 2.5 watts 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 Transceiver's 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 hasn't been forgotten, either. The HW-8 features an RF and AF gain control, solid state band switching, pushbutton band selection, and semi break-in CW operation, including adjustable T/R delay. The clean, modern front panel includes a relative power meter.

The HW-8 is an easy and enjoyable kit to build, too, with most parts mounting on a single printed circuit board. There's a minimum of point-to-point wiring. And, of course, the thorough Heathkit assembly manual guides you every step of the way. The manual for the HW-8, incidentally, even includes hints to help you make more contacts once you get your Transceiver on the air.

Just imagine all the fun you're going to have, transmitting your HW-8's signal into a dipole stretched between two towering pines out in the wilderness...

## Novice or veteran, this Heathkit Receiver/Transmitter combination adds up to enjoyment and value

1 Save \$40 on QSK CW Transmitter

**\$199<sup>95</sup>**

- 100 watts out on 80-15, 75 watts out on 10

Now you can save a big \$40 on this great Heathkit CW Transmitter for your Amateur Radio station. Whether you're a veteran brass-pounder or have just earned your Novice ticket, the HX-1681 QSK (full break-in) Transmitter is the ideal CW transmitter for you — and now, it's an unbeatable value! Full break-in capability, so you can hear other stations whenever your key is up... even between individual dits and dahs of your own transmission. A pair of rugged 6146A finals combine with solid-state design to give you a clean 100 watts minimum on 80-15, and 75 watts out on 10. The HX-1681 features built-in T/R switching, adjustable sidetone output, and receiver muting. Keying is provided for adding an external power amplifier. Harmonic radiation is 50 dB down at rated output, and spurs are down 60 dB. Covers 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5 and 28.0-28.5 MHz. You need the PS-23 Power Supply described on page 62. 6 $\frac{3}{4}$ " H x 12 $\frac{3}{4}$ " W x 12" D.



Kit HX-1681, 16 lbs. .... Was \$239.95, NOW ONLY 199.95  
AC Power Supply for HX-1681.  
Kit PS-23, Shpg. wt. 17 lbs. .... 69.95

## 2 HR-1680 Ham Bands Receiver

**\$219<sup>95</sup>**

- Dual conversion front end works 80 through 10 meters

Looking for your first receiver? The solid-state HR-1680 is the right choice. It combines high performance and low cost for serious Ham band listen-

ing. A hot dual-conversion front end and 0.5  $\mu$ V sensitivity cover 80 through 10 meters: 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5, and 28.5-29.0 MHz. Selectivity is outstanding. With a matched 4-pole crystal filter in the IF, you can count on your 1680 to be razor sharp. A tunable preselector filters out unwanted signals. Includes built-in 100 kHz calibrator. Assembly is easy, and you can align your HR-1680 without instruments. 120/140 VAC or 11.5-15 VDC. 6 $\frac{3}{4}$ " H x 12 $\frac{3}{4}$ " W x 12" D.

Kit HR-1680, Shpg. wt. 14 lbs. .... 219.95  
Kit HS-1661, Matching Speaker. 5 lbs. .... 29.95



strung from corner to corner of your hotel room, high in a metropolitan skyscraper. Reading articles on QRP (low power) operation in the national Amateur Radio magazines will give you more ideas on using your HW-8. And, by the way, these articles may surprise you when you learn the number of DX and domestic contacts HW-8 operators are making with this quality-engineered CW Transceiver.

A great performer that's going to give you hours of fun in your Amateur station... or from a mountain peak — that's the Heathkit HW-8. Order yours now and join the growing number of Radio Amateurs who are discovering the fun and fraternity of QRP operation with the HW-8. Requires headphones (below).

Kit HW-8, Shpg. wt. 6 lbs. .... 149.95

Kit HWA-7-1, AC Power Supply. Designed for the HW-8 CW Transceiver. Allows you to operate your HW-8 from standard 120/240 VAC house current.

Shpg. wt. 4 lbs. .... 19.95

GO-396, Superex Headphones, Fully assembled, 2 lbs. .... 7.95

HW-8 SPECIFICATIONS: TRANSMITTER — DC Power Input: 3.5 watts (80 meters); 3.0 watts (40 meters); 3.0 watts (20 meters); 2.5 watts (15 meters). Frequency Control: built-in VFO. Frequency Stability: Less than 150 Hz/hour drift after 60 minute warm-up. Output Impedance: 50  $\Omega$ , unbalanced. Spurious and Harmonic Levels: -35 dB or better. Offset Frequency: approximately -750 Hz, fixed on all bands. RECEIVER — Sensitivity: 0.2  $\mu$ V for readable signal; 1  $\mu$ V or less for 10 dB S+N/N. Selectivity: wide, -750 Hz @ -6 dB narrow, -375 Hz @ -6 dB. Audio Output Impedance: 1000  $\Omega$ , nominal. GENERAL — Frequency Coverage: 3.5-3.75 MHz (80 meters); 7-7.25 MHz (40 meters); 14-14.25 MHz (20 meters); 21-21.25 MHz (15 meters). Frequency Stability: less than 100 Hz/hour drift after 30 minute warmup. Power Requirement: 12-16 VDC, 90 mA, receive;  $\pm$ 30 mA, transmit. Dimensions: 4 $\frac{1}{4}$ " H x 9 $\frac{1}{4}$ " W x 8 $\frac{1}{2}$ " D (10.8 x 23.5 x 21.6 cm). Net Weight: 2 lbs.



## Start out with... or move up to the Heathkit HW-101 — With over 30,000 throughout the world, it's still the best buy in Amateur Radio today

**\$399<sup>95</sup>**

- A big 170 watts CW input, 180 watts PEP
- Full 80 through 10 meter Amateur band coverage
- USB, LSB, CW, PTT and VOX operation on all bands
- 0.35  $\mu$ V receiver sensitivity digs out weak signals

The Heathkit HW-101 is the economical, value-packed Transceiver to start with and the one to stay with. It lets you work CW with your Novice License and then, when you upgrade to General, go to phone. Select CW, or operate PTT or VOX on upper or lower sideband. When you're ready to go the legal limit, by adding the Heathkit SB-201 or SB-221 Linear Amplifiers (page 61) to your station, the HW-101 will make the perfect exciter. With the kind of performance this Transceiver has to offer, you'll find it hard to believe that you're operating on a budget. All the options you would expect to find on a top-notch transceiver are yours with this outstanding kit value.

The HW-101 gives you outstanding receiver performance; 0.35  $\mu$ V sensitivity on SSB brings in weak stations loud and clear. The high quality crystal IF filter keeps signals separate. Image and IF rejection of better than 50 dB help bring you world-wide receiving that's clean, clear and crisp. And when you add the optional 400 Hz CW filter, your copy will be arm chair all the way.

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

The HW-101's transmitter section is a top performer too. Triple action level control prevents distortion-producing overdrive to keep your signal clean. With a rugged pair of reliable 6146s for finals, the HW-101 punches 180 watts PEP in on phone, and 170 watts in on CW. Frequency stability is better than 100 Hz per hour after 45 minutes warmup, with less than 100 Hz variation for a 10% line voltage fluctuation. An FET VFO provides excellent thermal stability for heavy-duty operating without excessive heat buildup.

Look over the features and compare price and performance — it's easy to see the Heathkit HW-101 is ham radio's best buy. And easy-to-assemble circuit boards plus color coded wiring harnesses speed assembly of your HW-101. You're going to enjoy building yours. Cabinet is of rugged aluminum construction. Requires Heathkit Model PS-23 Power Supply (page 62) and HS-1661 Speaker (described

below). Also see the HDP-121A Desk Mike on page 64. Order yours today so you can get your Heathkit HW-101 Amateur station on the air soon and begin working the whole world.

Kit HW-101, Shpg. wt. 22 lbs. ....	399.95
SBA-301-2, 400 Hz CW Crystal Filter, Shpg. wt. 1 lb. ....	44.95
Fixed Station AC Power Supply. See page 62 for full description.	
Kit PS-23, 17 lbs. ....	69.95
Kit HS-1661, Matching Speaker, 5 lbs. ....	29.95

**HW-101 SPECIFICATIONS:** RECEIVER: Sensitivity: <0.35  $\mu$ V for 10 dB S+N/N for SSB operation. SSB Selectivity: (optional SBA-301-2 CW filter); 400 Hz. min. @ 6 dB down; 2.0 kHz max. @ 60 dB down. Spurious Response: Image and IF rejection >50 dB. TRANSMITTER: DC Power Input: SSB 180 W PEP (normal voice, cont. duty cycle). CW 170 W (50% duty cycle). RF Power Output: 100 W on 80 thru 15 M; 80 W on 10 M (50 $\Omega$  non-reactive load). Output Impedance: 50 to 75 $\Omega$  with <2:1 SWR. Harmonic Radiation: 40 dB below rated output. Mike Input: High impedance. Carrier Suppression: 45 dB down from single-tone output. Unwanted Sideband Suppression: 45 dB. Third Order Distortion: 30 dB from two-tone output. GENERAL: Frequency Coverage: 80-10 M amateur bands. Frequency Stability: <100 Hz per hour drift after 45 minutes warmup from normal ambient conditions. <100 Hz for  $\pm$ 10% line voltage variations. Modes of Op: USB, LSB, CW, tune. Dial Calibration: 5 kHz. Calibration: 100 kHz crystal. Power Requirements: 700 to 850 V at 250 mA with 1% maximum ripple; 300 V at 150 mA with 0.05% maximum ripple; —115 V at 10 mA with 0.5% maximum ripple; 12 V AC/DC at 5.76 amps. (See power supplies on pg. 62). Dimensions: 6 $\frac{1}{2}$ " H x 14 $\frac{1}{2}$ " W x 13 $\frac{1}{2}$ " D.

## The best performance speaker for HW-101, HR-1680

**\$29<sup>95</sup>**

- Response tailored for SSB and CW reception
- Features a big 5" x 7" oval speaker
- Rugged, lightweight aluminum cabinet
- An easy-to-build, one-evening kit

This value-packed Heathkit HS-1661 Speaker features a generous 5" x 7" oval speaker with a hefty 3.16 oz magnet that offers you frequency response of 300 to 3000 Hz for the best possible SSB and CW reception. The HS-1661 is designed to perform with your HW-101 Transceiver described above, and the HR-1680 Receiver featured on page 59 of this catalog, as well as many other model Heathkit transceivers and receivers. The green, spatter-finish cabinet is constructed of rugged, lightweight aluminum, and measures 6 $\frac{1}{2}$ " H x 9" W x 5 $\frac{1}{2}$ " D. The thorough, step-by-step Heathkit instruction manual makes this an enjoyable one-evening kit. Included are all necessary cables and, as with all Heathkit electronic kits, more than enough solder to do a job you'll be proud of.

Kit HS-1661, Shpg. wt. 5 lbs. ....	29.95
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## The Heathkit SB-221 Linear Amplifier lets you work the big DX with a solid 20 over 9 signal

**\$579<sup>95</sup>**

- Paralleled Eimac 3-500z's deliver top power
- 2 kW PEP on phone, 1 kW in on CW and RTTY
- Heavy duty power supply for reliable operation
- Easily wired for either 120 or 240 VAC

Haven't you lost enough contacts because you can't punch your signal through? The Heathkit SB-221 Linear Amplifier packs a wallop that will get you 20 over 9 reports when the others are down in the noise. And the SB-221 does it at a price that's hard to beat. Now that you're ready to move up to 2 kW power, see why this amplifier is the one for your amateur station.

A pair of rugged Eimac 3-500Z's deliver 2000 watts PEP in on phone, and can be loaded to 1 kW in on both CW and RTTY. A broad-band pre-tuned pi-input delivers maximum efficiency with extremely low distortion over the entire 80-15 meter bands. Just 100 watts of exciter drive is all that's required to drive this amplifier to full output. No alignment necessary.

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

The SB-221's power supply can be easily wired for either 120 or 240 VAC operation. Zener diode-regulated operating bias reduces idling current for cooler running and extended tube life. The amplifier incorporates built-in circuit breaker protection and a large, quiet-running fan provides maximum tube cooling. Other features include ALC to prevent distortion-producing overdrive; front-panel switch-selected monitoring of grid current, relative power, and high voltage. There's also a separate meter for measuring final amplifier plate current.

A great amplifier with a great price, and it has full FCC acceptance.

Kit SB-221, Shpg. wt. 66 lbs. .... **579.95**

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



**SB-221 SPECIFICATIONS.** Band coverage: 80, 40, 20 & 15 meters. Max. power input: SSB, 2000 W. PEP; CW, 1000 W; RTTY, 1000 W. Driving power: 100 W. Duty cycle: SSB, Continuous voice modulation; CW, Continuous (max. key-down 10 min.); RTTY, 50% (max. transmit time 10 min.). Third order distortion: -30 dB or better. Input impedance: 52 Ω unbal. Output impedance: 50 Ω unbal.; SWR 2:1 or less. Front panel controls: Tune, Load, Band, Sensitivity Meter Switch, Power, CW/Tune — SSB, Plate meter, Multi-meter (Grid mA, Rel. Power, 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 req.: 120 VAC, 50/60 Hz @ 20 amp. max. 240 VAC, 50/60 Hz @ 10 amp. maximum. Cabinet dimensions: 8¼" H x 14¾" W x 14½" D (20.96 x 37.78 x 36.83 cm).

## Punch your signal through the QRM with ease when you get the Heathkit SB-201 1 kW Linear

**\$399<sup>95</sup>**

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

Do you find yourself sitting on the sidelines during a pileup for a rare DX find because your signal doesn't measure up to the challenge? Then move up to the Heathkit SB-201 1 kW Linear Amplifier. It won't put a hole in your ham-gear budget while it's punching a hole through the QRM.

Just 100 watts is all it takes to drive the 201's heavy-duty pair of forced air-cooled 572B's to a full 1200 watts PEP in on phone, and 1000 watts in on CW. So it's ideal for use with most popular transmitters or transceivers. And you have no fear of TVI, because those finals are completely shielded to insure excellent TVI protection.

The SB-201 sports an ALC output to prevent distortion-producing overdrive. And for maximum efficiency, the 201's cathode-input tank circuits come pre-aligned and ready to go on air. No alignment necessary.

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

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

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

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

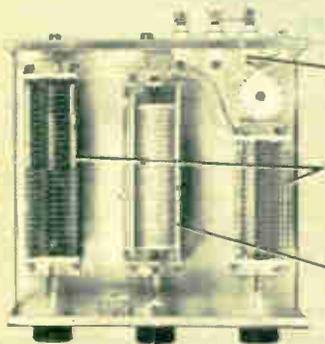
HOP-3622, 3-ft. RG8/U Jumper w/PL259 Connectors, Shpg. wt. 1 lb. .... **4.95**



**SB-201 SPECIFICATIONS:** Band coverage: 80, 40, 20 & 15 meters. Maximum power input: 1200 watts P.E.P. SSB, 1000 watts CW. Driving power required, 100 watts. Duty cycle: SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). Third order distortion: -30 dB or better at 1000 watts P.E.P. Output impedance: 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. Input impedance: 52 ohm unbalanced; broad-band pretuned input circuit requires no tuning. Meter functions: 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. Front panel controls: Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. Tube complement: Two 572B/T-160-L (in parallel). Power requirement: 120 volts AC @ 16 amperes (maximum), 240 volts AC @ 8 amperes (maximum). Cabinet dimensions: 6¾" H x 14¾" W x 13¾" D.



Alaska, Hawaii and Michigan Residents: Call 616-982-3411



Large ceramic insulators are designed to handle 2000 watts PEP

Heavy duty capacitors are easy to build and service

Continuously variable inductor means a perfect match every time

## Tied to one band? Use dipole or long wire 80 through 10 meters with the 2 kW Antenna Tuner

**\$149<sup>95</sup>**

- Accepts both balanced and unbalanced feed lines
- Continuously variable inductor gives you exact matching
- Even write in band settings on the eraseable front panel

You'll like the way the Heathkit SA-2040 2 kW Antenna Tuner helps you radiate more of your signal by maximizing power transfer from your transmitter to your antenna. It helps you reduce TVI, too. This low-priced, full-featured Tuner gives you the versatility of using a built-in 4:1 balun for balanced feedlines, or unbalanced feedlines, or long wires.

A continuously variable inductor — from 3.5 MHz to 30 MHz — gives you an infinite number of impedance settings, assuring precise antenna matching, and makes the SA-2040 ideal for MARS operation or the recently approved new band allocations. A convenient counter on the front panel indicates inductor settings. The Heathkit manual includes a chart giving you high-, mid- and low-band settings on each HF band, plus a full page logging scale for recording intermediate settings. Write your most frequently used settings on the SA-2040's eraseable front panel.

Silver-plated straps and roller contact assembly minimize RF loss at high frequencies. And large ceramic feed-through insulators withstand high voltage RF. This Tuner can handle up to 2000 watts PEP on SSB, and 1000 watts on CW. SO-239 connectors allow incorporation into your 50 Ω system.

This easy-to-build kit is a two-evening project. And when you've tightened the cover, personalize your Tuner with stick-on numerals and letters that let you add your own call sign to the front panel. The rugged black metal cabinet measures 5 $\frac{5}{8}$ " H x 14 $\frac{1}{2}$ " W x 13 $\frac{1}{8}$ " D. Compare this Tuner with the competition — match power handling capabilities, features and price. You'll see why the SA-2040 is your best buy.

Kit SA-2040, Shpg. wt. 15 lbs. .... **149.95**  
 HDP-3622, 3-ft. RG8U jumper with PL259 connectors, Wt. 1 lb. .... **4.95**

SA-2040 SPECIFICATIONS: Frequency Coverage: 3.5-30 MHz. Power Input Capability: Full legal limit. Input Impedance: 50 ohm at match. Impedance Transformation: 4:1 (balance-to-unbalanced) balun. Output Impedance: Wide Range. Cabinet Dimensions: 5 $\frac{5}{8}$ " H x 14 $\frac{1}{2}$ " W x 13 $\frac{1}{8}$ " D (36.8 x 14.6 x 35.2 cm).



## AC Power Supplies for your Heathkit or other make Amateur Radio gear

### 1 AC Supply for most 2-meter transceivers

- Power mobile transceiver plus amplifier to add VHF capability at your home QTH

The Heathkit PS-1175 supplies the necessary voltage and current to power the VF-7401 2-meter transceiver/HA-202A amplifier combination (or most other makes of VHF mobile equipment) from a standard 120 or 240 VAC outlet for base station operation. Output voltage of the PS-1175 is internally adjustable between approximately 12 and 14.5 volts DC. A Darlington circuit provides exceptionally high gain for excellent regulation. The supply is fused for overload protection, and comes with 3-wire line cord. The easy-to-assemble kit even includes a generous supply of solder. Order your PS-1175 Power Supply now and start getting double duty from your mobile transceiver.

Kit PS-1175, Shpg. wt. 15 lbs. .... **79.95**

PS-1175 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (internally adjustable from approx. 12 to 14.5 VDC). Output Current: 10 amperes intermittent, 10 minutes max. (5 amperes continuous). Load Regulation: less than 1% at 10 amperes. Ripples less than 0.5% at 10 amperes. Power Requirement: 120 VAC, 50/60 Hz at 4 amperes, 240 VAC, 50/60 Hz at 2 amperes. Dimensions: 5 $\frac{1}{4}$ " H x 6 $\frac{3}{4}$ " W x 11" D.

### 2 Here's the Supply to power HF equipment

- Here's the ideal power supply for your HW-101 or older Heathkit transceiver

The Heathkit PS-23 Power Supply will provide the operating voltages for the popular HW-101 Transceiver, as well as those necessary for the operation of many older Heathkit transceiver models and other types of Amateur Radio equipment. It has high voltage and two internally selectable low B+ taps. It also provides fixed bias and 12.6 filament voltage. The PS-23 features excellent bias supply filtering, plus extremely low ripple content. A circuit breaker in the primary circuit provides overload and short circuit protection. Instructions are included for either 120 or 240 VAC wiring. This easy-to-assemble kit will have you on the air in no time. And will give you many years of service.

Kit PS-23, Shpg. wt. 17 lbs. .... **69.95**

PS-23 SPECIFICATIONS: High voltage output: 820 VDC no load; 700 VDC @ 250 mA  $\pm 10\%$ . AC ripple: Less than 1% @ 250 mA. 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. Power requirement: 120/240 VAC, 60/50 Hz, 350 watts maximum. Dimensions: 6 $\frac{3}{4}$ " H x 4 $\frac{3}{4}$ " W x 9" L.



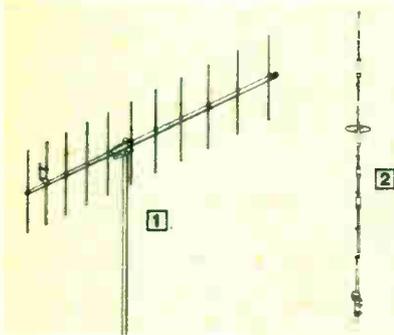
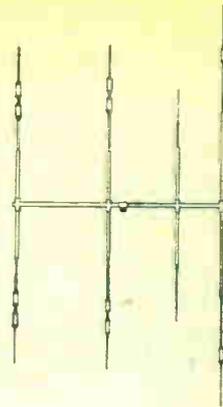
## Tri-Bander's easy-to-follow manual gets you on the air quickly

- Gives you 8.3 dB actual gain over a dipole on 10, 15 and 20 meters
- Famous Heathkit step-by-step instructions make it ideal for Field Day/club uses

If you've ever built a beam, you'll really appreciate the step-by-step Heathkit assembly manual that comes with the SA-7040 4-Element Tri-Band Yagi. The manual even shows you how to optimize performance for CW, HiPhone or LoPhone portions of each band. And once you've assembled this compact beam, you'll love its performance. Three active elements and separate, matched Hy-Q traps on each

band give you an excellent 8.3 actual gain over a dipole on 10, 15 and 20 meters. Front-to-back ratio is 25 dB for minimum interference. A separate 10-meter reflector assures correct monoband spacing. Energy transfer is more efficient thanks to a VSWR of less than 1.5:1 at resonance on each band. Beta Match for tapered impedance, DC ground. The 7010 accepts full legal power, and feeds with 52-ohm coax. Boom length is 15'10", with a 31-foot longest element. Turning radius is 17'5". Wind load area is 5.8 sq. ft. Move up to the SA-7010.

Kit SA-7010, Shpg. wt. 45 lbs. .... 229.95



### 1 Beam gets you out on Two

Cushcraft 11-element 2-Meter Yagi features 11.3 dB forward gain, a 20 dB front-to-back ratio. Gamma match tuning for minimum SWR. Feeds directly with 52-ohm coax. 1000 watts. Designed for vertical polarization and cut for 146-148 MHz Amateur FM. Boom length, 144"; longest element, 40"; turning radius, 72". Assembly required.

HDP-1470, Wt. 6 lbs. .... Our price, 39.95

### 2 Cushcraft ATV-5 gets the DX

A vertically-polarized, omni-directional antenna designed to provide complete CW and SSB coverage of the 80 through 10 meter Amateur bands. It features specially designed high Q traps optimized for wide operating bandwidth. SWR is 1.5:1 or less at resonance on each band. The ATV-5 may be used with any transmitter or transceiver employing nominal 50-ohm input. Accepts full legal power. Built-in coax connector takes the PL-259 on your feedline. Height is 28'4" on CW, 24'9" on phone. For maximum performance in limited space. Assembly required.

HDP-1473, Shpg. wt. 10 lbs. .... 99.95

### 3 HD73 Heavy Duty, Dual-speed Rotator completes your beam

Couple the Alliance HD73 with the Heathkit SA-7010 Tri-Band Yagi (above) to achieve real DX success. For antennas with up to 10.7 sq. ft. wind load area. For masts 1 3/8" to 2 1/2" OD. For 120 VAC, 60 Hz. Uses 6-cond. cable or 8-cond. cable listed below.

HDP-1295, Shpg. wt. 19 lbs. .... 129.95

IDA-1290-1, 50-ft. 8-cond. cable, 2 lbs. .... 9.95

IDA-1290-2, 100-ft. 8-cond. cable, 4 lbs. .... 16.95

IDA-1290-3, 150-ft. 8-cond. cable, 6 lbs. .... 23.95

### Superflex RG-8/U 52-Ohm Coax

(Not shown). 11-gauge center foam polyethylene dielectric, 92% copper braided shield. PL-259 connectors installed each end.

HDP-3620, 100-ft., Shpg. wt. 11 lbs. .... 29.95

HDP-3621, 50-ft., Shpg. wt. 6 lbs. .... 19.95

HDP-3622, 3-ft., Shpg. wt. 1 lb. .... 4.95

### 4 "W2AU" Balun matches better

Reduces TVI, balances antenna current distribution for maximum gain. Guards your antenna's feed point from the weather. Protects your equipment from lightning. For use with dipoles, vees, quads, yagis. Rated for full legal power. Comes assembled. Includes instructions. Impedance ratio of 1:1.

HDP-3615, Shpg. wt. 1 lb. .... 15.95

### 5 Coax Switch takes four antennas

Choose from up to four antennas or interconnecting equipment. Handles 2 kW PEP to 250 MHz. 50 ohms. Grounds all outputs not in use.

Kit HD-1234, Shpg. wt. 1 lb. .... 12.95

### 6 B & W Low-pass Filter reduces TV!

70 dB attenuation reduces TVI. Insertion loss less than 0.3 dB. 160-10 meters. 50 Ω. Full power.

HDP-3700, Shpg. wt. 2 lbs. .... 29.95

HDP-3622, 3-ft. Coax w/connectors, 1 lb. .... 4.95

### 7 Change antennas in seconds, save coax with the Remote Coax Switch

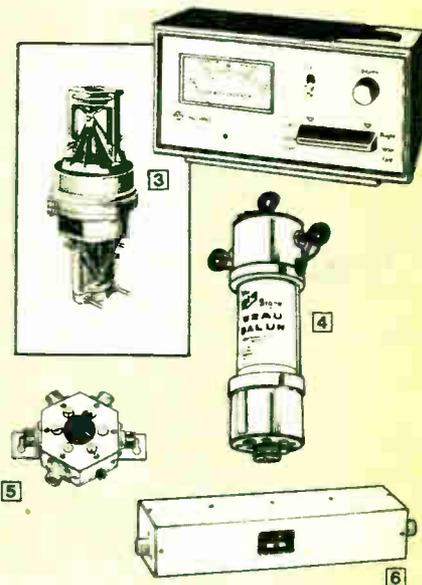
Turn the knob on the SA-1480 Remote Coax Switch. Whirr! A bright LED shows which of up to five antennas you have selected. Saves money, too, replacing five expensive coax feedlines from station to antennas with just one. Accepts signals to 150 MHz. Rated for full power. 50-70 ohm input impedance. Almost no insertion loss — less than 2 dB at 100 MHz. Silver-plated switch contacts reduce insertion loss. Special shielded, weatherproof switch housing protects switch. Grounding position for lightning protection. Includes U-bolt mounting assembly. Control Box is 3 3/8" H x 5 3/8" W x 5 1/4" D. Remote Unit: 8 1/4" H x 4 3/8" W x 7 1/2" D. Use the eight-wire cable listed below.

Kit SA-1480, Shpg. wt. 8 lbs. .... 89.95

IDA-1290-3, 150-ft. 8-cond. cable, 6 lbs. .... 23.95

IDA-1290-2, 100-ft. 8-cond. cable, 4 lbs. .... 16.95

IDA-1290-1, 50-ft. 8-cond. cable, 2 lbs. .... 9.95



Control unit (above) goes in your station; switch (right) goes on mast.



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

# Reliable, money-saving Amateur Radio accessories for your Ham station



**1** Cantenna™ Dummy Load



**4** 6-Socket Multi-Outlet Box



**3** 12-Socket Multi-Outlet Box



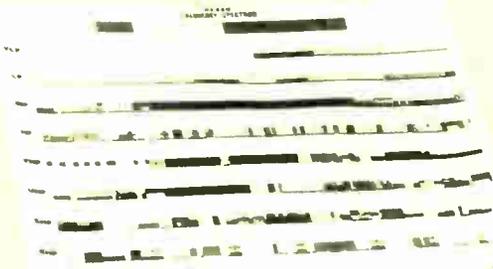
**7** HF Wattmeter/SWR Bridge



**6** Phone Patch



**2** Micoder



**5** Frequency Chart



**8** Relative Field Strength Meter



**9** PTT Mike



**10** Desk Mike

## **1** Dummy Load kills the QRM

Helps you avoid unnecessary interference during tune ups. Ideal for transmitter maintenance and alignment. Handles up to 1 kW of RF with VSWRs of less than 1.5:1 up to 300 MHz, and less than 2:1 to 400 MHz. 50 Ω. Oil filled (oil not included).

Kit HN-31, Shpg. wt. 3 lbs. .... 19.95  
HDP-3622, 3' coax w/PL259 conns., 1 lb. .... 4.95

## **2** Micoder™ II dials up repeaters

Replace your old mike with the Heathkit Micoder II Microphone/Auto Patch Encoder. Its 300-3000 Hz response is tailored for clean voice transmission. Up to 30 mV rms maximum output for full modulation. Push-to-talk bar for convenient one-hand use. Accurate and stable tones for phone calls through repeaters equipped for autopatch. Operates on one 9V battery (not supplied) or power from transceiver. Use with most transceivers having a high-impedance input. Includes 6' coiled cord, hanger clip. 3 3/4" H x 2 5/8" W x 1 3/4" D.

Kit HD-1984, Shpg. wt. 1 lb. .... 44.95

## **3** Instant power at your fingertips

The Twelve-Socket Multiple Outlet Box provides additional electrical outlets for your equipment in Amateur station, workshop, basement or garage. Features 11 3-hole outlets for killing power to equipment, and 1 unswitched for clock or memory-save. Includes fuse holder, fuse and 12' cord. Handles 10A maximum load. 120 VAC.

Kit HD-1274, Shpg. wt. 4 lbs. .... 19.95

## **4** Get the 6-Socket Multi-Outlet Box

As above, but 6 3-hole outlets — 5 switched and 1 unswitched. 10A max. 6-foot cord. 120 VAC.

Kit HD-1360, Shpg. wt. 2 lbs. .... 14.95

## **5** Frequency Chart for your wall

This colorful addition to the wall of your Amateur station measures a big 31" W x 22 3/4" H. It's a full-color, graphic breakdown of the radio frequency spectrum. Comes to you rolled in a mailing tube.

HDP-1495, Shpg. wt. 1 lb. .... 4.95

## **6** Add Phone Patch to your station

The Heathkit HD-15 Phone Patch adds versatility to your station. Individual receiver/transmitter line gain controls simplify adjustment. The HD-15's VU meter continuously monitors the unit's output and lets you adjust for maximum null depth to produce maximum isolation between the telephone line and your station. Matches 3-16 Ω speakers, hi-Z or 600 Ω inputs. PTT operation. 2 5/8" H x 9 3/4" W x 3 3/8" D.

Kit HD-15, Shpg. wt. 3 lbs. .... 44.95

## **7** Build HF Wattmeter/SWR Bridge

Features dual power/SWR scales, easy calibration. 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. .... 49.95

**HM-102 SPECIFICATIONS:** Frequency Range: 1.8 to 30 MHz. Wattmeter Accuracy: ±10% of full-scale reading. Power Capability: 10 to 2000 watts. SWR Sensitivity: Less than 10 watts. Impedance: 50 ohm nominal. Con-

nectors: UHF type SO-239. Dimensions: 5 1/4" H x 2 1/4" W x 6 1/2" D.

Kit HM-2102 (not shown), same as above, except 50-160 MHz and 25 to 250 watts. 4 lbs. .... 49.95  
HDP-3622, 3' coax w/PL259 conns., 1 lb. .... 4.95

## **8** Meter for faster adjustments

Relative Field Strength Meter makes transmitter adjustments quicker and more precise. Provides visual indication that transmitter is radiating a signal, helps tune transmitter for maximum output. Covers 1.8 to 250 MHz. 2 5/8" H x 4 1/8" W x 4 3/8" D.

Kit HD-1426, Shpg. wt. 2 lbs. .... 12.95

## **9** Need a new Mobile PTT Mike?

Fully assembled Mobile PTT Mike features a high impedance piezo-ceramic element. 200-5000 Hz response, and peak response frequency of 2300 Hz. Sensitivity: -55 +3 dB below 1 volt per microbar at 1000 Hz. Includes cable, mounting clip. Connector not included.

HDP-1340, Shpg. wt. 1 lb. .... 14.95

## **10** Desk Mike upgrades your station

Fully assembled Heathkit Desk Mike with VOX and PTT. This Hi-Z Dynamic Microphone features 70-10,000 Hz response, VOX and grip-to-talk operation. Has rugged die-cast case, grey and satin chrome finish. The PTT switch can be mounted on the base or handle of the mike. Cables included. Looks good and works great!

HDP-121A, Shpg. wt. 4 lbs. .... 59.95





## Get accurate VHF power readings with the Heathkit HM-2141 Dual Meter VHF Wattmeter

**\$89<sup>95</sup>**

- Measures average forward power with  $\pm 7.5\%$  accuracy up to 300 watts
- Direct reading SWR

Measures forward and reflected average power and PEP from 50 MHz to 175 MHz. Simultaneous readings of transmitted output up to 30/300 watts forward and 10/100 watts reflected power make antenna tuning a snap. Reads SWR directly from 1:1 to 3:1. Factory-assembled, calibrated sensor. Uses 9V cell (not included) or 120 VAC with optional Adapter below. Sturdy aluminum cabinet.

Kit HM-2141, Shpg. wt. 5 lbs. .... **89.95**

PS-2350, AC Adapter for HM-2141, 1 lb. .... **4.95**

HDP-3622, 3-ft. Coax w/connectors, 1 lb. .... **4.95**

**HM-2141 SPECIFICATIONS:** Frequency Range: 50 to 175 MHz. Insertion SWR: less than 1.05:1. Accuracy (full scale): 30 W and 300 W (FWD), 100 W (REF),  $\pm 7.5\%$  (AVG). 10 W (REF),  $\pm 10\%$  (AVG). Dimensions:  $4\frac{1}{8}"$  H x  $7\frac{1}{2}"$  W x  $5\frac{3}{8}"$  D.

## Get more low band operating efficiency when you build the HM-2140 Dual HF Wattmeter for your Amateur station

**\$89<sup>95</sup>**

- $\pm 5\%$  Forward power accuracy
- Reads PEP or Average power for any frequency between 1.8 and 30 MHz
- Features a factory-assembled and calibrated sensor

- Measures transmissions up to 200 and 2000 watts PEP forward and up to 500 watts reflected

Building the HM-2140 Dual HF Wattmeter is going to give your Amateur station greater operating efficiency. Installed in your transmission line, this high-accuracy Meter monitors both forward and reflected power for any frequency between 1.8 and 30 MHz. While designed primarily for the Amateur Radio bands within the high-frequency ranges on the 160, 80, 40, 20, 15 and 10 meter bands, the HM-2140 also can be used for other services which may lie in between the Amateur bands.

The more than 200 Hams at Heath have designed this Wattmeter to measure transmitter output up to 200/2000 watts PEP in the forward direction, and up to 50/500 watts reflected. It features dual meters for forward and reflected power and SWR, and boasts a  $\pm 5\%$  forward power accuracy to give you precision measurements. High and low power ranges and a factory-assembled and calibrated sensor insure accurate readings. This Dual HF Wattmeter also reads SWR directly from 1:1 to 3:1, as well as reading PEP or Average power.

For complete portability in the field, the HM-2140 Dual HF Wattmeter can be operated on a 9-volt battery (not included). A special switching circuit permits you to observe the battery condition at any moment. Where AC power is available, you can use the AC Adapter listed below. The Wattmeter is housed in a rugged aluminum cabinet styled to complement your other Amateur Radio equipment. For



added convenience of operation, the remote sensor can be mounted into the cabinet, or up to four feet away from the metering cabinet and nearer to the transmitter's output cables. Spend an enjoyable evening or two building the handy HM-2140 HF Dual Wattmeter for your station. The easy-to-follow Heathkit assembly manual will guide you step-by-step from unpacking to final adjustment and operation. The manual even includes a section on operation and installation of your HM-2140 Dual HF Wattmeter, a circuit description, and a detailed schematic. And Heathkit quality plus your care will assure you of a Wattmeter providing many years of service and value. And as with all Heathkit electronic kits, this one contains all necessary parts, and a generous supply of solder.

Kit HM-2140, Shpg. wt. 3 lbs. .... **89.95**

PS-2350, AC Adapter for HM-2140, 1 lb. .... **4.95**

HDP-3622, 3-ft. Coax w/connectors, 1 lb. .... **4.95**

**HM 2140 SPECIFICATIONS:** Frequency Range: 1.8 to 30 MHz. Insertion SWR: less than 1.05:1. Accuracy: (full scale): 200 Watts and 2000 Watts (FWD), 500 Watts (REF),  $\pm 5\%$ . 50 Watts (REF),  $\pm 7.5\%$ . Power requirement: 9 volts DC (Battery NEDA Type  $\approx 1604$ ) or optional PS-2350 AC Adapter. Dimensions:  $4\frac{1}{8}"$  H x  $7\frac{1}{2}"$  W x  $6\frac{3}{8}"$  D (10.48 x 19.05 x 16.19 cm).

## Electronic Keyer gives you selectable word speed



Your CW transmissions will be 100% copy when you have the Heathkit HD-1410 Solid-state Electronic Code Keyer in your Amateur station. It makes sending code easy, whether you're operating base or portable. While you're building your Keyer, you select the speed range you want — 10 to 35 words per minute, or 10 to 60 words per minute. For ease of operation, the dot and dash paddles' travel and tension are adjustable. When the two pad-

dles are treated as one, the HD-1410 operates as a single-paddle keyer with dot and dash memory. Lambic operation forms most characters with reduced wrist movement. Dots and dashes are self-completing and always in the proper proportion. The HD-1410 operates on either 120 VAC or 12 VDC. It features adjustable side-tone frequency, a built-in speaker, and headphone jack. A special weighted cabinet helps keep the HD-1410 stable to prevent annoying sliding during operation. The aluminum cabinet's low-profile styling and compact size won't block your access to other operating controls, either. It measures just  $3"$  H x  $5"$  W x  $7\frac{3}{8}"$  D. And this easy-to-build kit will have you on the air quickly.

Kit HD-1410, Shpg. wt. 4 lbs. .... **54.95**

## Value-packed Dip Meter covers 1.6 to 250 MHz



Here's a real Heathkit Amateur Radio value — a better Dip Meter at a lower cost. The HD-1250 can be used to determine the approximate resonant or operating frequency of either energized or de-energized circuits. The Colpitts oscillator covers 1.6 to 250 MHz in fundamentals with a MOSFET paraphase amplifier and hot-carrier diodes for more sensitivity and a better dip. It uses a Q-multiplier for greater detector sensitivity and a responsive  $150 \mu\text{A}$  meter movement for positive resonance indications. Your HD-1250 Dip Meter includes a phone jack for modulation monitoring. It's smaller and lighter than other Dip Meters, too. Whether you're checking resonant frequencies, adjusting traps, looking for parasitics, or using it as a signal generator, the HD-1250 is designed to go anywhere you do. It fits your-hand, and thanks to its solid-state design and 9-volt battery operation (battery not included), it's always ready to use. It's easy to build, too — usually just a single evening. Once completed, the rugged aluminum-construction Meter stores handily in a custom molded gray carrying case.  $2"$  H x  $2\frac{3}{8}"$  W x  $5\frac{3}{8}"$  L. The assembly manual includes a section on operation.

Kit HD-1250, Shpg. wt. 4 lbs. .... **64.95**



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

AMATEUR RADIO/65

Squelch control also functions as scanning sensitivity control to skip weak signals, scan only to "full-quieting" ones.

LED indicates 5 kHz position.

The 0 kHz/5 kHz button gives you 800 channels in 5 kHz steps.

Dim/Bright button — bright for daytime meter and frequency readout, subdued for safe nighttime mobilling.

Manual/Scan button lets you find a frequency, or lets the 7401 find one for you.

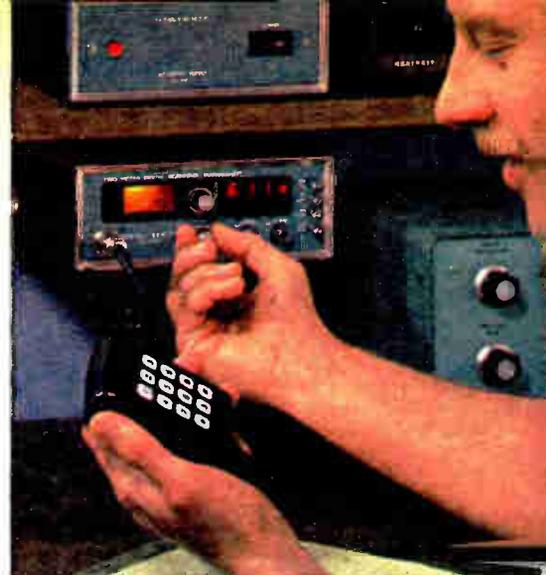
Lock/Latch button. In Scan/Lock, receiver scans to a signal and remains until reset. In Scan/Latch, resumes scanning 4-8 seconds after received transmission ends.

10 kHz button advances readout in 10 kHz steps. In Scan, as it recycles from "9" to "0," it also causes 100 kHz readout to advance one digit.

Sturdy 4-pin DIN connector allows you to detach the microphone from the 7401.

1 MHz button allows you to select any 1 MHz segment of the 2-meter band.

100 kHz button controls tuning in 100 kHz increments, to let you change frequencies when 7401 is in manual mode.



## The exciting Heathkit VF-7401 FM Digital Scanning Transceiver finds all the 2-Meter action for you

**\$339<sup>95</sup>**  
with PTT  
microphone

- Continuously adjustable, 15-watt output
- Band scan capability 1 MHz at a time — front panel selectable
- 800-Channel synthesized capability
- Preprogrammed power-up on your favorite channel
- Microphone is detachable

If you have one or more repeaters in your reception area, you need the Heathkit VF-7401 2-Meter FM Digital Scanning Transceiver. You can't effectively monitor one or more repeaters, plus simplex frequencies, without a scanning transceiver like the VF-7401. And never again will you have to search through a repeater guide on the highway. The VF-7401 will find all of the local activity for you, because this exciting Transceiver scans the entire 2-meter band in 1 MHz segments. When it finds an active channel, it stops! It stays on the active channel, when you select the Scan/Lock Mode, until you reset it. Or, set your VF-7401 in the Scan/Latch mode, and it will resume scanning when the received transmission ends.

You can adjust the receiver to stop scanning for "full-quieting" signals only. Or, open up the squelch when there are 2-meter band openings. Your VF-7401 will find that "2-meter DX" for you without the tedious task of flipping through channels one by one. Naturally, your VF-7401 lets you change frequencies manually, too. Three small front panel switches allow you to select manually any desired frequency at the scan rate. Once you have the frequency you want, you may also offset it by a separate 5 kHz switch.

Your VF-7401 will "power-up" on the frequency of your choice. While building your transceiver, you program in any simplex or repeater frequency. Then, every time you turn it on, before it begins to scan, that frequency is monitored first. Besides simplex, your VF-7401 has +600 kHz, -600 kHz and 1 MHz offsets. It can accommodate any 2-meter amateur band offset combination, even MARS and CAP.

The VF-7401 is a continuously adjustable, 15-watt (nominal), solid-state, narrow-band FM transceiver. Featuring a hot receiver, it incorporates a double-tuned front end with MOSFET RF amplification, dual-conversion, 8-pole crystal IF filter-

ing for perfect bandpass shaping and outstanding adjacent channel selectivity, IC limiting, Quad detection and excellent audio quality. An improved synthesizer eliminates the need for a panel-mounted syn lock light. Power amp tuning and output power level adjustment are both accessible from the rear panel without removing the case. Also added — a sturdy SO-239 antenna connector, plus chassis-mounted power and external speaker jacks.

Your VF-7401 has a detachable microphone with rugged 4-pin DIN connector. And if you choose the optional Micoder™ II Microphone/Auto Patch Encoder (described on page 64), stop worrying about when your mike battery is going to run down. The Micoder II draws its power directly from the VF-7401. Also included is a handy gimbal-mount bracket for mobile installation. The Transceiver requires a 13.8 V, 3 amp continuous, 4 amp intermittent, power source such as a charging automobile electrical system, or the optional VFA-7401 AC Power Supply described on the next page.

Kit VFS-7401-1, Transceiver and Micoder II, Shpg. wt. 12 lbs. .... **359.95**  
Kit VFS-7401-2, Transceiver and PTT Microphone, Shpg. wt. 12 lbs. .... **339.95**

**VF-7401 SPECIFICATIONS:** Receiver: Sensitivity: 0.5  $\mu$ V for 12 dB SINAD (or 15 dB of quieting). Squelch Threshold: 0.3  $\mu$ V or less. Audio Output: 1.5 watts at less than 10% THD; 2 watts maximum output (typical). Image Rejection: -50 dB or greater. Spurious Rejection: -50 dB or greater. IF Rejection: -80 dB or greater. Internally Generated Spurious Signals: Below 1  $\mu$ V equivalent. Bandwidth: 6 dB at 15 kHz minimum and 60 dB at 15 kHz minimum and 60 dB at 30 kHz maximum. Modulation Acceptance: 6.5 kHz minimum. Transmitter: Power Output: 15 watts nominal to a 50  $\Omega$  <0° (resistive) load at 25° C and 13.8 VDC. Harmonic and Spurious Output: -60 dB. Modulation: FM, 0-7 kHz, adjustable. Duty Cycle: 100% with VSWR of less than 10:1. Tone Encoder: 3 tones 70 to 200 Hz, approx. 700 Hz deviation. Transmitter Offset: -600 kHz, +600 kHz, +1 MHz (AUX). General: Frequency Coverage: Any 4 MHz segment from 143.5 to 148.5 MHz. Frequency Increments: 5 kHz. Frequency Stability: +.0015%. Operating Temperature Range: +15° F to +125° F (-10° C to +50° C). Operating Voltage Range: 12.6 to 16 VDC (13.8 VDC, nominal). Current Consumption: Receive Mode: 550 mA max., squelched; 750 mA max., full rated audio. Transmit Mode: 4A max. at 13.8 VDC. Dimensions: 2-3/4" H x 7-1/4" W x 10-1/4" D (7.0 x 18.4 x 26.0 cm).

## Code Courses and Reference Books to help you get more from Amateur Radio

**Ameco Senior Code Course.** Here's the way to learn the code and make sure you'll pass your FCC CW exam. Two 33 RPM long-playing records contain 22 lessons that take you from an introduction to the Morse code through to 18 words per minute.

HDP-332, Shpg. wt. 2 lbs. .... **7.50**

**"By the Word" Code Course.** Two audio cassette tapes teach you the code using the world-famous, success-proven "by the word" method. It begins by presenting simple material at 13 words-per-minute, and then increases in complexity, not speed. The cassette tapes make it easy and convenient to rewind and listen a second time.

HDP-132, Shpg. wt. 1 lb. .... **9.95**

**Amateur Radio License Study Guides.** These guides make getting your higher class license easier, and also serve as convenient reference guides as you advance in your Amateur Radio hobby.

GENERAL, EDP-123 ..... **7.95**

ADVANCED, EDP-124 ..... **6.95**

EXTRA, EDP-125 ..... **5.95**

**US Callbook.** Your "telephone directory" of names and addresses — a complete listing of the Radio Amateurs in all US call areas and territories. Also contains a listing of SSVT, AMSAT, OSCAR users, Great Circle bearings, and more. A big 1070 pages.

EDP-126 ..... **17.95**

**DX Callbook.** Complete listing of foreign Amateurs, addresses, postal rate charts, call zone maps, world time conversion chart, world QSL bureaus, more. 900 pages.

EDP-127 ..... **16.95**

**1981 Edition. ARRL Radio Amateur's Handbook.** Up to date electronics theory and application. 538 pages.

HDP-293 ..... **10.00**

**73 Dipole Antennas.** Description, construction of 73 different dipole and long-wire antennas. 160 pages.

EDP-180 ..... **4.95**

**ARRL Antenna Handbook.** Antennas, transmission lines, propagation, antenna design. 336 pages.

EDP-182 ..... **5.00**

(See page 52 for book ordering information)



## This AC Supply is perfect for your 7401

**\$42<sup>95</sup>**

- Operate your Heathkit VF-7401 from your home QTH, in addition to mobile operation
- Provides 13.8V, 3A continuous, 4A intermittent
- Rugged, reliable construction for years of service
- Matches the VF-7401's "military" styling and color

Don't leave 2-meter fun in the car — take your VF-7401 2-Meter FM Digital Scanning Transceiver into the house with you when you have the Heathkit VFA-7401-1 AC Power Supply at your home QTH. The VFA-7401-1 is the perfect match-up for your 7401 Transceiver (see previous page). It provides well-regulated, low voltage, DC power from an AC power outlet so you can put your 7401 on the air from your home amateur station, as well as on the highway.

The VFA-7401-1 is an easy-to-build kit, so you can get it up and running quickly. And you can wire it to operate from either a 120-volt or 240-volt 50/60 Hz AC power line. It will maintain output regulation within 1.5%.

Designed primarily to provide the 13.8 VDC required by the VF-7401, this supply may also be used with most other equipment requiring +13.8 VDC at a maximum of 3A continuous, 4A intermittent.

Rugged and reliable, this Power Supply is designed to match the VF-7401 in the popular, attractive "military" styling and color. It will be a great addition to your station . . . and will give you many years of dependable service.



Kit VFA-7401-1, Shpg. wt. 7 lbs. . . . . 42.95

VFA-7401-1 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (Adjustable from approximately 12 to 15 VDC). Output Current: 4.0 amperes for 20 minutes (40% duty cycle). 3.0 amperes continuous. Output Regulation: Better than 1.5% from no load to full load (3.0 amperes). Output Ripple: Less than 2 mV peak-to-peak. Power Requirement: 120 VAC or 240 VAC, 50/60 Hz, at 85 watts (full load). Overall Dimensions: 3 3/8" H x 7 1/4" W x 9 7/8" D (7.8 x 18.4 x 25.1 cm).

## Heathkit 40-Watt Amplifier increases your range



**\$54<sup>95</sup>**

- Work those repeaters you've been hearing but can't access; put extra punch in your 2-meter signal. You can do it with this rugged 40-Watt Amplifier. The more than 200 Hams at Heath have designed it to meet and surpass FCC specs for harmonic and spurious radiation, too.

Tied to your repeater? Missing the fun of "2-meter DX" because of a weak signal? The Heathkit HA-202A 40-Watt Amplifier delivers a solid 40 watts minimum for just 10 watts in. And it draws only 7 amperes maximum from your car's charging system. Features an antenna changeover relay and sensing circuitry for completely automatic T/R switching. Tuned input/output circuits keep spurious radiation low. Special emitter ballasted configuration withstands VSWR's of up to 3:1. Internally adjustable to cover any 1.5 MHz portion of the 143-149 MHz band. Final alignment requires VTVM, wattmeter or SWR bridge. Mount it almost anywhere in your car, or team it with the PS-1175 Power Supply on page 62 for a better signal from your home QTH. Includes SO-239 connectors for easy hookup.

Kit HA-202A, Shpg. wt. 4 lbs. . . . . 54.95  
HDP-3622, 3-ft. RG8U jumper with PL259 connectors, 1 lb. . . . . 4.95

HA-202A SPECIFICATIONS: Power Output: 20W @ 5W in. 40W @ 10W in. 50W @ 15W in. Impedance: 50 Ω nominal. Input VSWR: 1.5:1 maximum. Maximum Stable VSWR: 3:1. Harmonic and Spurious Radiation: -60 dB or better. Standby current: 1 mA. Power Requirement: 12-16 VDC, 7A maximum. Dimensions: 3" H x 4 1/4" W x 5 1/2" D.

## Heathkit 10-Watt Amp gives you hand-held clout

**\$39<sup>95</sup>**

- Your 2-meter hand-held will be able to compete with "the big boys" once you add this compact 10-Watt Amplifier. It's designed to meet or surpass the latest FCC specifications for harmonic and spurious radiation, too.



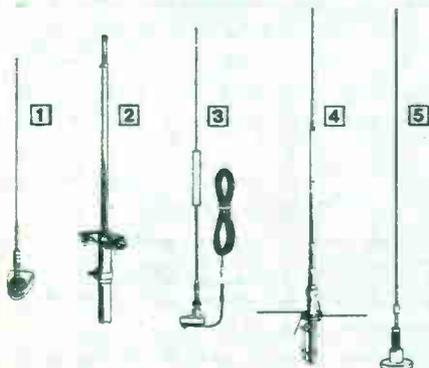
Don't take a back seat when it comes to increasing the range of your 2-meter hand-held. The Heathkit HA-201A 2-Meter Amplifier will get your hand-held into your favorite repeater full-quieting every time, because it delivers up to a full-bodied 10 watts for a mere 1 1/2-watt input. Or get 8 watts for just 1 watt in. It's ideal for use with the Heathkit VF-2031 on page 68.

The HA-201A features fully automatic operation with solid-state transmit/receive switching. It incorporates tuned input and output for maximum efficiency and reduced spurious emissions, and meets or surpasses FCC requirements for spurs and harmonics. It has been designed, also, to withstand infinite VSWR load without failure. Your HA-201A kit includes a dummy load and RF detector, as well as SO-239 connectors for easy hookup. A VTVM is necessary for tune-up. And the Amplifier requires a 12-16 VDC power source for operation. Features a rugged metal cabinet.

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

HA-201A SPECIFICATIONS: Power Output (at 13.6 VDC input): 8W @ 1W in; 10W @ 1.5W in. Input/Output Impedance: 50 Ω. Power Requirement: 12-16 VDC, 2.2 A maximum. Dimensions: 2 3/4" H x 5 5/8" W x 5 3/8" D.

## Assembled 2-meter antennas to radiate more of your signal



1 Hustler Standard Gain 2M Mobile Antenna. 3/4 wavelength rear deck whip. 3.4 dB gain, 1.1:1 SWR. Handles 100 watts. 47" radiator. 17" coax, connectors included. Antenna removable from mount.  
HWA-202-3, Shpg. wt. 2 lbs. . . . . 23.95

2 Cushcraft AR-2 Ringo Standard Gain Fixed Antenna. 135-175 MHz. Omnidirectional. 3.75 dB gain, 1.1:1 SWR. 100 watts. Ω feed with PL259. Less coax. Mir's suggested list price, \$24.95.  
HWA-202-11, Shpg. wt. 2 lbs. . . . . Our price, 19.95

3 Hustler CGT-144 Super Gain 2M Collinear Mobile Antenna. Phased 1/4 and 5/8 wavelength radiators.

5.2 dB gain. 1.1:1 SWR; to 200 watts; Height 85". 17' RG58/U coax, connectors included.

HWA-202-9, Shpg. wt. 3 lbs. . . . . 39.95

4 Hustler GG-144 Super Gain Fixed Antenna. Covers 140-150 MHz. 6 dB gain. 6 MHz bandwidth. 1.2:1 SWR. 1 kW. SO-239 connector. 117" tall. 4 radials of 21" aluminum rod. For 1 3/4" mast. Less coax.  
HWA-202-10, Shpg. wt. 7 lbs. . . . . 89.95

5 Cushcraft 2-Meter Mobile Magnetic-Mount Antenna. 3/8 wave. 3 dB gain. Covers 145-148 MHz. Includes PL259 connector, cable. Preassembled.

HDP-1472, Shpg. wt. 3 lbs. . . . . 29.95



## \$199.95 buys it all in a 2-meter Hand-Held

**\$199.95**

- Includes everything you need — even 146.94 MHz crystal
- Rechargeable nickel-cadmium Battery Pack & AC Charger
- "Rubber duckie" antenna, phone jack and earphone
- Single crystal duplex or simplex capability

Carry 2-meter action with you wherever you go with the great Heathkit VF-2031. You get a minimum of 2 watts out, more than enough to put you into your local repeater full quieting every time. The signal is clean, too. Careful design and plenty of internal shielding insure stability and put spurs a full 60 dB down. Single crystal transmit and receive circuitry covers 8 of your favorite channels. You can choose simplex, or duplex with a  $\pm 600$  kHz split at the flip of a switch. With separate built-in microphone and speaker, adjustable deviation, and performance-designed FM engineering, what your VF-2031 says and hears is always crisp and clean. Sensitivity? Less than  $0.5 \mu\text{V}$  quiets the VF-2031's hot receiver section a full 20 dB. Volume and squelch are fully adjustable, too. The VF-2031 covers 143.5 to 148.5 MHz. The VF-2031 comes complete with a "rubber duckie" antenna and a crystal for 146.94 MHz operation. A built-in phone jack with earphone is included. A universal BNC output connector gives you a wide choice in antenna selection. To give your VF-2031 even more flexibility, add the optional VFA-2031-3 Encoder and enjoy the versatility of instant auto-patch accessing. Includes a long-life rechargeable nickel-cadmium battery pack. When the charge runs low, slip the VF-2031 into the Drop-in Charger, also included. Transceiver measures  $9\frac{1}{8}''$  H x  $3\frac{3}{8}''$  W x  $1\frac{7}{8}''$  D.

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

Fitted Holster-style Carrying Case. VFA-2031-2, Shpg. wt. 1 lb. .... 17.95

Crystal Certificates. Specify frequency, send to mfr. Crystal returned postpaid. Order one for each crystal needed. VFA-2031-4, Postpaid ..... 6.95

SAVE \$10.00 on this Auto Patch Encoder. Make phone calls through repeaters with auto-patch inputs.

VFA-2031-3, 1 lb. .... Was \$34.95, NOW 24.95

SAVE \$10.00 on this Continuous Tone Encoder. Access most repeaters using your 2031.

VFA-2031-5, Wt. 1 lb. .... Was \$34.95, NOW 24.95

External Microphone. PTT MIC with coiled cord plugs into VF-2031 so you can transmit without removing unit from holster. Kit VFA-2031-6, 1 lb. .... 39.95

10-Watt Amplifier. Description on page 67. Kit HA-201A, Wt. 2 lbs. .... 39.95

68/AMATEUR RADIO



## 4-Band Shortwave Receiver — the beginning kit builder's introduction to the world of shortwave listening and build-it-yourself fun

**\$99.95**

- Covers 550 kHz to 30 MHz in four bands
- Built-in AM antenna, connection for external antenna
- Built-in speaker plus headphone/external speaker jack
- The perfect, practical introduction to kit-building

If you're looking for a great first-time electronic kit — or simply a great low-priced shortwave receiver — search no more. The Heathkit SW-717 is the best buy for your money. It's an ideal introduction to the fun and fascination of electronic kit construction. And from the moment the final screw is tightened and the receiver turned on, it will begin bringing you many exciting years of shortwave listening enjoyment.

The SW-717 offers complete coverage all the way from 550 kHz through 30 MHz in four bands. With it the shortwave listener can tune in foreign broadcasts from all over the globe, amateur and CB radio bands, local and marine weather reports, ships at sea, plus the standard AM broadcast band.

This 4-Band Receiver features a wide slide-rule tuning dial with logging scale; bandspread tuning for easy separation of crowded stations; a variable BFO for code reception; built-in speaker, and a front panel jack for external speaker or headphone like the GD-396 Superex phones described below. Other features include switchable automatic noise limiting; a signal-strength tuning meter, and a built-in AM rod antenna plus a connection for an SWL (shortwave listening) antenna such as the GRA-72 listed below.

Solid-state circuitry is used throughout the SW-717. Most of the components are mounted on a single printed circuit board, both for ease of assembly and for reliability of performance. The built-in power supply is transformer-operated from either 120 VAC or 240 VAC, and uses four silicon diodes in a full-wave bridge circuit. Once construction is completed, the receiver can be aligned without the need for instruments.

The SW-717 manual also includes instructions for operation, and a reception guide listing bands, frequencies, zones and times of best shortwave reception. Easy-to-follow instructions and careful engineering make this a gift the recipient will be proud of building.

Kit SW-717, Shpg. wt. 10 lbs. .... 99.95

Long-wire SWL Antenna. Really helps pull in distant stations. 75-foot copper long wire with 30-foot lead-in, all insulators and hardware for easy setup.

GRA-72, Shpg. wt. 2 lbs. .... 7.95

Superex Headphones. Ideal for use with the SW-717 and other shortwave receivers, as well as the HW-8 Transceiver on page 59. Shown in the photo above, the Superex Headphones feature dual coils for excellent sensitivity, wide headband for comfortable listening. 600 ohms impedance.

GD-396, Fully assembled, Shpg. wt. 2 lbs. .... 7.95

SW-717 SPECIFICATIONS: Frequency Coverage: Band A — 550 kHz-1500 kHz, Band B — 1.5-4 MHz, Band C — 4-10 MHz, Band D — 10-30 MHz. Meter: Indicates relative signal strength. Headphone Jack: Accepts low impedance headphones or external speaker. Loudspeaker: Built-in. Controls: Volume with on/off switch; Mode (AM, Standby & CW); BFO; Main Tuning; Bandsread Tuning; ANL on/off. Power Supply: Transformer operated; full-wave bridge rectifier. Power Requirement: 120/240 VAC, 60/50 Hz, 8 watts. Dimensions:  $5\frac{1}{2}''$  H x  $14\frac{1}{2}''$  W x  $8''$  D.



Credit Card Orders Call TOLL-FREE: 800-253-0570

## When it comes to computers, Heath won't leave you out in the cold

More than a slogan: It's Heath's total commitment to give you extra value for your computer dollar. Now with more software, more peripherals, more accessories — Heath offers one of the most complete and innovative computer lines anywhere. You get more versatility and flexibility — at affordable prices.

**On selecting a computer:** Do you want built-in peripherals for convenience, or the flexibility to design your own system? Can you expand memory power as your skills grow? How good is the software? Is it compatible with existing software? Will the manufacturer stand behind the computer? You can be sure of the answers when you select Heath.

**Choose from three very different computers for different people:**

**For convenience — the All-In-One H-89.** If you're more interested in running software than in hardware and software development, the H-89 gives you a complete, balanced computer system in one package. It's powerful and very cost-competitive, with a personality that a first-time computer user will find comfortable. 100K of floppy disk capability is built-in. And you can now expand to 64K RAM and more than 2 megabytes of on-line storage. More on page 70.

**For flexibility — the H-8.** If you're interested in developing hardware or write physical I/O routines in Assembly language, the H-8 is for you. Its versatile bus-oriented architecture, new 64K RAM capacity, expandability and hardware front panel position it as the right choice. See page 72.

**For DEC® compatibility — the 16-bit H-11A.** If you need a computer for scientific uses, real-time systems or similar applications, and DEC PDP-11V03 hardware and software capability is significant, the H-11A is your choice. We offer a large selection of compatible hardware and software. See page 74 to learn more.

**Heath introduces new software to meet your growing needs:**

New operating systems let you use Heath's greatly-expanded on-line storage capabilities. Standard CP/M® revolutionizes the world of Heath Computer Systems! One of the world's most popular operating systems, you can now take advantage of the hundreds of programs written with the ORG-O version of CP/M. We offer BASIC™, FORTRAN™ and COBOL™ Languages, all specially designed for CP/M. A BASIC Compiler is also available. See pages 84-87.

We've updated HDOS (Heath Disk Operating System) for H-47 and 3-drive systems. Microsoft™ BASIC and FORTRAN are available under HDOS. And the new P-System with UCSD Pascal™ features excellent responsiveness to changing needs, clear readability and a large program library.

**More languages — 3 versions of BASIC, Assembly, FORTRAN and COBOL.** Run thousands of existing programs. See pages 84-87. SOFTSTUFF offers software tools at affordable prices. See page 88. Utility and applications programs include word processing, office aids and others. See pages 83, 87 and 88.

**HUG (Heath Users' Group)** shares an extensive program library and informs you of the latest Heath Computer developments. Owners of Heath Computers can join HUG. See page 89 for details.

**Expand to over 2 megabytes of on-line storage with the new H-47 Floppy Disk System.** Heath's first dual-sided, double-density 8-inch disk system offers more than eight times the on-line storage capacity of its predecessors. See page 77.

**Heath Accessories —** including new wire wrapping products, memory, interfacing and others — make your computer more useful. See pages 71, 81 and 82.

**You get complete, accurate documentation.** Assembly, operating and instruction manuals are fully detailed.

**Possible tax credit:** ask your tax adviser about possible credits and deductions for business and investment uses of Heath Computers.

**You get the convenience of one-stop shopping.** Our complete computer line is available here in the Heathkit Catalog.

**And we won't leave you out in the cold.** Expert technical advice is always available by phone, letter or in person. And our service specialists help keep your Heath Computer System working right.

**5% Discount on complete Heath Computer Systems:** Buy any Heath Computer, one major peripheral and any amount of accessories on the same order form. Then, deduct 5% from the total price (excluding shipping and handling; one discount per customer; not combinable with other discounts).



# The Heathkit All-In-One Computer: extra convenience in a compact unit — new 64K RAM capacity, built-in video terminal, built-in floppy, greatly expanded software selection — all at an affordable price

Only  
**\$1695<sup>00</sup>**  
for H-89

- 16K RAM standard, expandable to 64K
- Two Z-80 microprocessors for high-speed operation
- Up to over 2 megabytes on-line

- Professional-style keyboard, 12-key numeric keypad
- Easy-to-read, 12-inch CRT displays up to 2000 characters
- Runs all Heath H-8 disk software

Are you looking for all the computing power and built-in peripherals you need — but your budget doesn't allow for extravagance? The Heathkit All-In-One Computer has the power, peripherals and convenience you need, for little more than "bare-bones" models.

This easy-to-operate 8-bit computer features separate Z-80 microprocessors for the computer and video terminal. Computer never has to share processing power with terminal, so the All-In-One can perform a variety of high-speed tasks.

Use the All-In-One as a professional video terminal. With all functions of our popular H-19 Terminal (page 77), up to twenty-four 80-character lines can be displayed — as well as a software-controlled 25th line.

The typewriter-format professional keyboard controls all terminal functions. The keyboard prints the entire ASCII set, upper and lower cases — along with 33 special graphics symbols for extra flexibility.

Select baud rates up to 9600 through the keyboard. Direct cursor addressing lets you insert or delete characters anywhere on the screen. Control all 32 terminal functions from keyboard or computer. Reverse video lets you emphasize any portion of the screen by reversing white on black.

Designed in calculator format, the 12-key numeric keypad makes entering arithmetic programs faster and easier than before. Shifted functions give you control to make insertions or deletions.

You get more memory power. 16K of random access memory (RAM) is supplied. Built-in diagnostics make memory checks faster and easier. And we've expanded memory capacity — up to 64K RAM (using CP/M — 56K using HDOS) with accessories, so you can expand to meet your advanced computing needs.

The built-in floppy disk system gives you up to 100K bytes of on-line data storage capacity. You get fast, accurate access to data. You'll be able to load programs in seconds, update data fast. And the disk drive is factory assembled for easier kitbuilding.

If you need even more on-line storage, buy the H-77 5.25" Floppy Disk System. Designed for the All-In-One, the H-77 can give you up to 300K bytes on-line. (3-drive systems require Heath Disk Operating System, Ver. 1.6 or 2.0 (page 84), CP/M® or P-System with Pascal™ (page 85).

For maximum data storage — over 2 megabytes on-line — select the new H-47 8" Floppy Disk System. This dual-sided, double-density, dual-drive floppy disk system makes your All-In-One more versatile than ever before. (Requires WH-88-47 Interface, H-88-7 ROM Kit — sold on page 71: HDOS Ver. 2.0 or CP/M Operating Systems, sold on pages 84 and 85.)

You get H-8 compatibility. All Heath H-8 disk software runs on All-In-Ones with floppy disk storage.

Choose from our widest software selection ever! New HDOS (Ver. 2.0) and Standard CP/M Operating Systems — new SOFTSTUFF™ tools — new word processing software — new applications programs — and the Heath User's Group, with over 500 applications and utility programs (pages 82-89).

You get more flexibility. An EIA Standard RS-232C Serial Interface (page 71) lets you use peripherals (with software). Cassette interfacing is standard on kit versions.

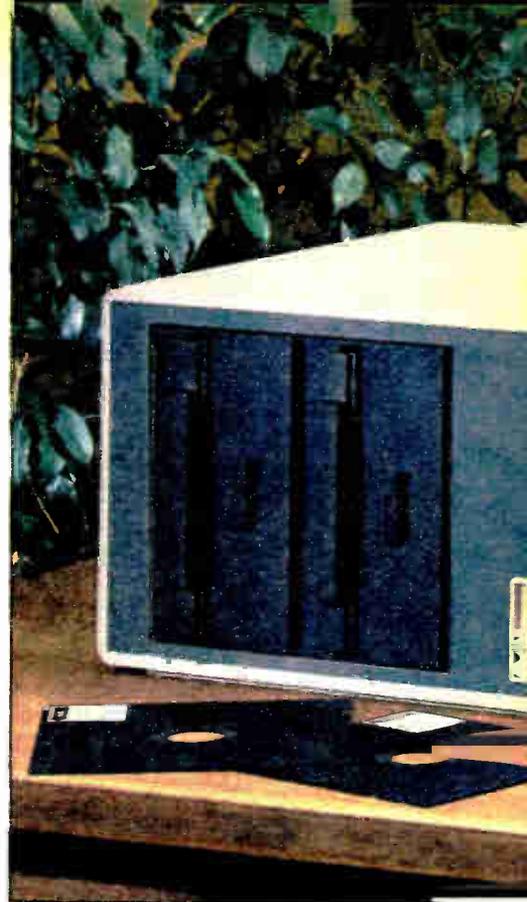
Save when you buy — and ask your tax adviser about possible tax credits. Requires HDOS, CP/M or similar operating software for normal operation.

Kit H-89, Shpg. wt. 78 lbs. .... 1695.00

Assembled All-In-One Computer, H-47, CP/M capable. Includes 5.25" floppy, 48K RAM, RS-232C Interface. WH-89-FA, 54 lbs., Mtr. Frt. .... 2895.00

H-88 All-In-One Computer, without floppy. Kit H-88, Shpg. wt. 61 lbs. .... 1295.00

**H-89/WH-89-FA/H-88 SPECIFICATIONS:** Clock: 2.048 MHz. Video Terminal: High-resolution CRT with P4 phosphor. Keyboard: 80 keys. Cursor: Blinking, non-destructive underline or block. Cursor Controls: Up, down, left, right, home, CR, LF, back space and tab. Cursor Addressing: Relative and direct. Tab: Standard eight-column tab. Refresh Rate: Same as AC line frequency. Edit Functions: Insert and delete character or line. Erase Functions: Erase from beginning of line, erase to end of line, erase from beginning of page, erase to end of page, erase line, erase page. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 13" H x 17" W x 20" D.



## The H-89 All-In-One — more computer than the competition

BRAND	TWO MICRO-PROCESSORS?	PROFESSIONAL SCREEN SIZE?	COMPLETE KEYBOARD?	BUILT-IN VIDEO DISPLAY?	ALL-IN-ONE CONSTRUCTION?	BUILT-IN FLOPPY?	STANDARD CP/M AVAILABLE?	64K MEMORY CAPACITY?	PRICE*
Heath H-89	YES (Two Z-80s)	YES (25 lines x 80 char.)	YES (80 keys, upper and lower cases; includes numeric keypad)	YES (High-resolution CRT)	YES	YES	YES	YES	\$1995 Kit
Apple II	NO (Single 6502)	NO (25 lines x 40 char.)	NO (48 keys, N-key rollover)	NO (External TV or monitor)	NO (5 pieces)	NO (Extra)	NO	YES	\$2200
TRS-80 Model I Level II	NO (Single Z 80)	NO (16 lines x 64 char.)	NO (No control key)	NO (Non-integral medium-resolution CRT)	NO (6 pieces)	NO (Extra)	NO	NO (48K)	\$1966

For systems with B/W video display, one 5.25" floppy disk drive, 48K RAM, standard DOS BASIC — as of 1C 16/80.

## Design an All-In-One Computer System for your needs

Memory:	Mass Storage:	Interfacing:	Peripherals: (require H-88-3 interface)	
We've opened up whole new worlds of capability, performance and software selection for All-In-One Computer owners. With the All-In-One's uncommon flexibility, you can configure your own custom computer system. Use this handy chart to select the memory, peripherals and accessories you need.	<p><b>64K (CP/M), 56K (HDOS) Expansion Set H-88-16</b> (requires 48K RAM, H-88-7 ROM Kit)</p> <p><b>16K Chip Set H-88-2</b> (can expand memory to 48K RAM — standard with WH-89 modems)</p>	<p><b>Cassette ECP-3801A</b> (not for systems using CP/M)</p> <p><b>Floppy H-47 (8" — requires WH-88-47 Interface, H-88-7 ROM Kit)</b></p> <p><b>H-77 (5.25" — requires H-88-3 (exc. WH-88-3), H-88-6 (models without external brightness control)]</b></p>	<p><b>ROM Set for H-47, CP/M, H-88-16 H-88-7</b> (standard with WH-89-FA)</p> <p><b>H-47 Interface WH-88-47</b> (standard with WH-89-FA)</p> <p><b>Serial 2-port H-88-3</b> (standard with WH-89-FA)</p> <p><b>Serial Cassette for WH-89, WH-89-CA H-88-5</b> (not for WH-89-FA)</p>	<p><b>Printers H-14, WH-24, WH-34, WH-44K, WH-54</b></p> <p><b>Modems WH-23, WH-33</b></p>





## Add even more versatility to your All-In-One Computer

**\$625<sup>00</sup>** Kit  
with one drive

- Additional data storage capacity, easier copying of programs
- Each drive installs vertically to take up less space
- Build in 2 evenings

Designed especially for the All-In-One Computer, the H-77 Floppy Disk System gives you all the storage and programming capacity you need for most applications. When you use the H-77 with your All-In-One, you have room for up to three disk drives. You can mount operating system and program disks at the same time, for rapid access to programs and data. And because the H-77 Floppy Disk System is designed to work with the Heath All-In-One Computer, you'll have a harmonious computer system.

The storage media for the H-77 is the standard, hard-sectored 40-track diskette. Measuring just 5.25 inches in diameter, each floppy disk offers access to 100K bytes of program and data storage.

Disk drives install vertically, so the H-77 takes up less space. And each drive is factory assembled and tested, for easier kitbuilding.

You get the flexibility to add as much data storage capability as you need. You can add the H-77 to your H-89, or to your H-88 (with the optional H-88-4 Disk Drive) for two-drive capability and 200K bytes of on-line data storage. The H-77 comes with a diskette storage box which fits into the second drive housing, so your system looks neat and efficient.

Or, for 3-drive capability and 300K bytes of on-line

storage, add the H-17-1 Second Drive to your H-77. For instant three-drive capability, the factory assembled and tested WH-87 — which includes two disk drives — can be used in place of the H-77/H-17-1. (NOTE: 3-drive systems require HDOS, Ver. 1.6, HDOS, Ver. 2.0 (HOS-817-1) or CP/M® Operating Systems (HOS-817-2) — see pages 84 and 85.)

Expand your All-In-One's capabilities today. No modification required for All-In-Ones with external brightness control. H-88-6 Modification Kit required for All-In-Ones without external brightness control.

Kit H-77, with one drive, 25 lbs. . . . . 625.00

Dual-Drive Floppy Disk System Kit.

Kit H-87, with two drives, 30 lbs. . . . . 895.00

Assembled Dual-Drive Floppy Disk System. No modification required for All-In-Ones with external brightness control. H-88-6 Modification Kit required for All-In-Ones without external brightness control.

WH-87, with two drives, 28 lbs. . . . . 1195.00

Backplate Modification Kit. Required to use H/WH-47, H-77, H/WH-87 Floppy Disk Systems with All-In-Ones which do not have an external brightness control.

H-88-6, Shpg. wt. 2 lbs. . . . . 50.00

**H-77/WH-87 SPECIFICATIONS:** Diskette Size: 5.25 inches. Diskette Type: Single-sided, single-density. Number of Tracks per Diskette: 40. Number of Sectors per Track: 10. Formatted Bytes per Sector: 256. (Diskettes not included.) Spindle Motor Speed: 300 revolutions per minute (rpm), +1 percent. Data Transfer Rate: 128 kilohertz. Motor Start Time: 1 second. Operating Temperature Range: 32 to 104 degrees F (0 to 40 degrees C). Power Requirement: 120/240 VAC, 50/60 Hz. Overall Dimensions: 8.625" H x 8.875" W x 15" D (21.9 x 22.5 x 38.1 cm). Net Weight: 22.5 lbs. (10.2 kg).

## All-In-One Accessories

**16K RAM Expansion Chip Set.** Expand your H-88 or H-89 to as much as 48K RAM with one or two of these memory expansion sets.

H-88-2, Shpg. wt. 1 lb. . . . . 75.00

**NEW! 64K Wired Memory Expansion Set.** Expands All-In-One RAM capacity to 64K. Requires 48K of memory, H-88-7 ROM Kit (sold below).

WH-88-16, Shpg. wt. 1 lb. . . . . 150.00

**NEW! ROM Kit** to use with H-47 Floppy, CP/M Operating System and H-88-16 Memory Expansion.

H-88-7, Shpg. wt. 1 lb. . . . . 55.00

**NEW! Three-Port RS-232C Serial Interface** lets All-In-One communicate with printers, time-share systems and other peripherals.

HA-88-3, Shpg. wt. 3 lbs. . . . . 120.00

**Floppy Disk Drive and Controller for H-88.**

H-88-4, Shpg. wt. 17 lbs. . . . . 450.00

**Cassette Interface for WH-89-CA Computer.**

H-88-5, Shpg. wt. 2 lbs. . . . . 100.00

**Wire Wrapping Board** with bus connectors. Design custom circuits. Accepts forty-eight 16-pin sockets (also 54 14-pin, other combinations). Uses HCA-6, HCA-7 (p. 81).

H-88-10, Shpg. wt. 1 lb. . . . . 30.00

**Second Drive for the H-77 Floppy Disk System.**

H-17-1, Shpg. wt. 5 lbs. . . . . 325.00

**Plastic Anti-Glare Filter. Clear.**

HCA-3, Shpg. wt. 1 lb. . . . . 12.95

**Fabric Anti-Glare CRT Filter. Black.**

HCA-4, Shpg. wt. 1 lb. . . . . 19.95

**NEW! Dust Cover for All-In-One and H-19.**

HCA-5-89, Shpg. wt. 1 lb. . . . . 14.00

**NEW! Dust Cover for the H-77 Floppy Disk.**

HCA-5-77, Shpg. wt. 1 lb. . . . . 14.00



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

## Get immediate programming versatility and plug-in flexibility — with the popular, budget-pleasing Heath H-8 Computer

Only  
**\$350<sup>00</sup>**  
Kit

- Fully-buffered bus has 7 plug-in positions for memory and I/O
- Heavy-duty power supply handles full complement of memory, I/O devices
- Expanding software library
- Over 2 megabytes of on-line data storage now available
- Built-in ROM monitor to control front panel program
- Newly enhanced capabilities

The Heath H-8 — the computer that grows as you grow. With its 7 positions for plug-in modules, you can put together any combination of memory, interfacing and accessories. And our expanding selection of peripherals, accessories, operating software and applications software gives your H-8 Computer unmatched versatility.

Novices can use the H-8 as a computer trainer. The 16-key front panel keyboard provides octal data entry, direct access to registers and memory, one-button program load and dump, and input/output keys to communicate directly with any port. And you can directly monitor program activity with the nine-digit front panel octal readout, which provides much more information than conventional computers.

The features we pack into the H-8 Computer mean extra value to you. A special heavy-duty power supply lets the H-8 handle up to 64K of memory (including interfacing). And our engineers have designed efficient convection cooling into the H-8.

The CPU board, including the 8080A chip, clock, systems controller and ROM monitor, is fully assembled, wired and tested for easier kit assembly and faster system setup. An exclusive Heath 50-pin fully-buffered bus gives you more room for memory and interfacing. The built-in speaker gives you audible feedback and special effects. Front panel lights keep you up to date on status. With all these features and more, the H-8 is an excellent choice to be the heart of your computer system.

Heath floppy disk systems, sold separately, provide greater flexibility. The H-17 (page 73) provides up to 100K bytes of on-line data capacity. Add a second drive to expand capacity to 200K bytes. And now, with the new H-17-3 Modification Kit, you can

add a third floppy disk drive to your present H-17, expanding on-line data capacity to 300K bytes.

Expand to over 2 megabytes on-line! The new H-47 Floppy Disk System, our 8-inch, dual-sided, double-density system, brings the H-8 Computer into the megabyte age of data storage. See page 77.

You get total freedom to design a system that meets your specific needs. Start with an H-8 System Package — kit or assembled (below, left). Or design your own H-8 system from an expanding selection of peripherals and accessories — including additional memory and data storage, video terminals, color graphics, printers, a music synthesizer system and two new modems.

Choose from an expanding software library. We continue to support the H-8 with new, more versatile operating systems — a new version of the Heath Disk Operating System (HDOS) and Standard CP/M®. More languages, too — Microsoft's BASIC™, FORTRAN™, COBOL™ and BASIC Compiler.

Many new applications programs are being introduced — including problem-solvers for home, hobby and business. And the Heath Users' Group maintains over 500 programs — from business accounting and personal budgeting to computer-aided instruction, exciting games — even weather forecasting! Turn to pages 82-89 for the full story.

Get the flexibility you need — at a budget-pleasing price. Requires at least 4K memory (p. 81).

Kit H-8, Shpg. wt. 30 lbs. .... 350.00

WH-8, Assembled Computer, 30 lbs. .... 450.00

PAMGO ROM. Boot up with 1 or 3 keystrokes — not 11.

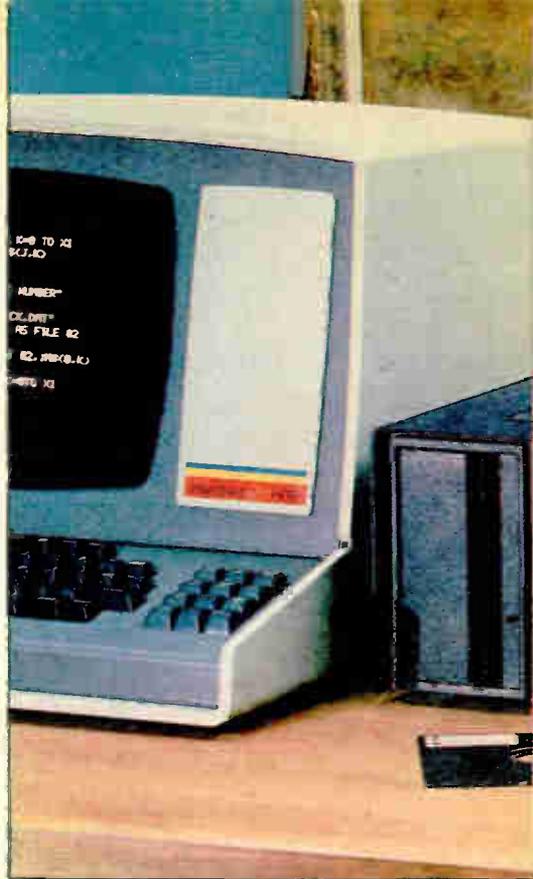
H-8-9, Shpg. wt. 1 lb. .... 20.00

Extended Configuration Option. Required to run H-47 Floppy Disk System or CP/M Operating System with H-8 Computer. Includes replacement front panel read-only memory (ROM).

HA-8-8, Shpg. wt. 1 lb. .... 65.00

Dust Cover for H-8. HCA-5-8, 1 lb. .... 14.00

Look at the Manuals — with no risk. Manuals for H-8, H-8-4 Interface, H-14 Printer, WH-8-16 Memory Board, H-19 Terminal. When you order the H-8 Computer, deduct \$30.00 from the purchase price (ex-



cluding shipping and handling charges).

HM-800, Shpg. wt. 11 lbs. .... 30.00

NOTE: Product manual also included with each kit.

**H-8/WH-8 SPECIFICATIONS:** Microprocessor: 8080A. Monitor: In on-board 1K x 8 ROM. Octal addresses, data input and display from the front panel. Monitor Functions: Memory display and alter, register display and alter, memory load and dump, single instruction execution, program execution, port input and output. Clock: 2.048 MHz. Interrupts: Seven, priority vectored. Power Supplies: +8 VDC at 10 amperes maximum, regulated to +5 VDC on each circuit board; +18 VDC at 500 milliamps, regulated to +12 VDC and -5 VDC on the CPU circuit board. Chassis Capacity: Seven locations on the mother circuit board for memory or interfacing cards. Four memory cards maximum. One bus expansion maximum. Operating Temperature: 32 degrees F to 104 degrees F. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 6.5" H x 16.25" W x 17" D (16.51 x 41.28 x 43.18 cm).

**Assembled 16K H-8 System.** 16K RAM, 100K bytes on-line storage. Just add terminal, plug in, connect cables, boot up. Includes WH-8 Assembled Computer, WH-17 Assembled 5.25" Floppy Disk, WH-8-4 4-Port Serial Interface, WH-8-16 Assembled 16K Memory Board, HOS-817-1 Heath Disk Operating System, Ver. 2.0. \$1844.00 separately. **BUY THE SYSTEM AND SAVE \$169.00.**

WHS-83, Shpg. wt. 81 lbs. .... 1675.00

**Complete 16K H-8 System Kit.** 16K, 100K bytes of on-line storage, video terminal. Includes H-8 Computer, H-8-4 Four-Port Serial Interface, WH-8-16 16K Wired Memory Board, H-17 5.25" Floppy Disk, H-19 CRT Terminal and HOS-817-1 Heath Disk Operating System, Version 2.0. \$2314.00 separately. **SAVE \$219.00 WHEN YOU PURCHASE THE SYSTEM.**

HKS-82, Shpg. wt. 143 lbs. .... 2095.00

### How to configure a Heath H-8 Computer System

With 7 plug-in positions for memory and I/O, your H-8 Computer System can grow as your needs grow. You can expand to 64K of memory, and up to over 2 megabytes of on-line data storage. You'll find that the tremendous benefits provided by our many new products is well worth your hard-earned computer dollar.

Memory:  
(4 cards, up to 64K)

Wired 16K  
WH-8-16

Mass Storage:

Cassette  
ECP-3801A  
(requires H-8-5  
Interface)

Floppy  
H-17 (5.25" — requires  
minor modifications, HA-8-8  
Ext. Configuration to run CP/M)  
H-47 (8" — requires  
HA-8-8, WH-8-47)

Interfacing:

Wired  
H-47 Interface with  
2 Serial Ports  
WH-8-47

Serial/  
Cassette  
1-port  
H-8-5

Serial  
4-port  
H-8-4

Parallel  
3-port  
H-8-2

Peripherals:

Terminal  
H-9, H-19  
(requires H-8-4, H-8-5 or  
WH-8-47)

Color Display  
GDZ-1320  
(requires HA-8-3  
Board)

Printers  
H-WH-14, WH-24,  
WH-44K, WH-54  
(requires H-8-4 or WH-8-47)

Modem  
WH-23, WH-33  
(requires H-8-4, H-8-5 or  
WH-8-47)



## Instant access and increased data storage capacity — yours with the H-17 Floppy Disk System

**\$625<sup>00</sup>**  
Kit

- Up to 300K bytes of on-line data storage (using accessories)
- Build in just 2 evenings

- Take advantage of all the new disk-based H-8 software programs
- Assembled and tested drive system

Make your H-8 Computer System a total versatility system — with the H-17 Floppy Disk System. With the H-17, you get the data storage capacity you need to load programs quickly. Store hundreds of programs on a single disk and have rapid access to any one of them, anytime you need it.

The H-17 provides up to 100K bytes of on-line data storage (up to 300K bytes with additional drives — order at right). Data is stored on standard, hard-sectored 40-track diskettes — just 5.25 inches in diameter. Disks are easier to handle — and load — than paper tape or cassettes.

The H-17 includes a single disk drive, a disk interface/controller circuit board which plugs directly into the H-8's mainframe, and a built-in power supply. Because the H-17 Floppy Disk System is especially designed for the H-8 Computer, you get a harmonious computer system that interfaces properly and runs smoothly.

See the expanding line of systems and applications software for the Heath H-8 Computer—including the complete new line of SDFSTUFF™ software tools, new utility programs and the Heath Users' Group software library, with more than 500 useful programs. Turn to pages 82-89.

The H-17 uses the famous Siemens 82 single-drive system, a performance-proven 5.25-inch floppy disk drive which provides accurate high-speed access to data. The assembled Siemens drive performs much better than most equivalent drive systems.

For more data storage area, add the optional H-17-1 Second Drive and make your H-17 a more versatile dual-drive floppy disk system. With two drives, you'll have up to 200K bytes of program-and data storage area. You'll be able to run operating system and program disks at the same time.

If you need even more on-line data storage capacity, buy the new H-17-3 Three-Drive Modification Kit and another H-17-1 Drive. Add this kit to your H-17 to get up to 300K bytes of on-line storage — 50% more than on previous versions. With the H-17-3, your H-17 can provide even more versatility.

To use the H-17 Floppy Disk System effectively, you need an H-8 Computer with at least 16K of Random Access Memory (RAM), as well as a Heathkit disk-based operating system, sold on pages 84 and 85.

Your choice of operating systems include: HOS-817-1 Heath Disk Operating System (HDOS), a new issue (Ver. 2.0) which now supports 8-inch drives and 3-drive systems; and HOS-817-2 Standard CP/M®, one of the most popular operating systems for microcomputers — with hundreds of existing utility and applications programs available worldwide.

Kit includes one blank 5.25-inch floppy diskette.  
Kit H-17, with one drive, 28 lbs. ....625.00

Factory Assembled and Tested H-17 Floppy Disk System. Comes with the same extra-value features found on the kit version above. With one drive.

WH-17, Shpg. wt. 28 lbs. ....695.00



**Three-Drive Modification Kit.** Increases H-17 capacity to three drives, instead of two. Enjoy even more programming flexibility and versatility. Includes new sheet

metal, fan and power supply components, 3-drive cable. Easy kit assembly. Requires H-17 or WH-17 Floppy Disk System. Drive not included. Order H-17-1 Drive separately, below.

Kit H-17-3, Shpg. wt. 8 lbs. ....79.95

**Optional Second or Third Drive** adds versatility to your H-17. Run operating system and program disks simultaneously. 100K on-line bytes per drive.

H-17-1, Assembled, Shpg. wt. 5 lbs. ....325.00

**Dust Cover for H-17 Floppy Disk System.**

HCA-5-17, 1 lb. ....14.00

**H-17/WH-17 SPECIFICATIONS:** Storage Media: 5.25-inch, hard-sectored diskette. Number of Tracks per Diskette: 40. Number of Sectors per Track: 10. Formatted Bytes per Sector: 256. Drive Type: Siemens Model 82. Track Seek Time: 30-milliseconds. Random Sector Access Time: Less than 250 milliseconds. Power Requirement: 120/240 VAC, 50/60 Hz, 75 watts. Dimensions: 6.25" H x 13.5" W x 13.5" D (15.89 x 34.29 x 34.29 cm).



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

# DEC®-compatible educational/science computer for laboratory and scientific applications — available at a price you can afford

Only  
**\$1395<sup>00</sup>**  
Kit

- DEC half-size KD11-HA (LSI-11/2) CPU
- Full compatibility with DEC PDP-11/03 — at a fraction of the cost
- Choose from a wide variety of DEC-compatible software programs
- 8" floppy disk storage available
- Room for up to 56K bytes (28K words) of memory
- Plug-in flexibility — with seven plug-in positions for memory and interfacing
- Rugged, long-life construction
- 16-bit computing power

Designed with full DEC LSI-11 compatibility, the Heath H-11A Computer offers the versatility and flexibility you need to perform DEC programs and real-time laboratory applications.

The H-11A uses the same microprocessor, memory I/O and operating system as the DEC LSI-11, and runs all software designed for the DEC PDP-11/03. You can choose from a vast selection of practical programs to run your home more efficiently, to reduce the clerical costs of your business and to process all types of data more efficiently than before.

**The 16-bit vs. 8-bit issue:** Your choice of a 16-bit or 8-bit computer depends upon your needs. If you're a professional who needs full DEC compatibility, the 16-bit H-11A is your choice. The H-11A has adequate computing power, even for the more complex and sophisticated jobs that you will be tackling later.

The H-11A features the physically smaller KD11-HA Microcomputer Module (a half-size LSI-11/2 microprocessor). That makes the Heath H-11A identical to the DEC PDP-11/03, but at a fraction of the cost. There's no on-board memory, so the KD11-HA Microcomputer Module gives you more flexibility to match your ROM, RAM and interfacing requirements to your particular needs.

This smaller configuration allows you to put more computing versatility into the H-11A by providing an extra plug-in slot for additional memory or I/O interfacing. The H-11A's total of seven plug-in slots lets you add any combination of ROM, RAM and interfacing, up to a maximum memory capacity of 56K bytes. And full compatibility with the LSI-11 family means you can combine components from both the LSI-11 and LSI-11/2 families.

Features of the KD11-HA Microcomputer Module include a PDP-11/34 instruction set, a raw computer speed of 380 nS microcycle time, resident firmware debugging (ODT) and ASCII console routines, as well as single and double operand instructions. With the KD11-HA Microcomputer Module, you set the capabilities you need for effective system configurations.

The extra-value features built into the H-11A Computer ensure longer life and greater return on your computer investment. A switching power supply uses less electricity than other power supplies, which saves money. And it generates less heat than other supplies, which prolongs the life of the H-11A. The H-11A Computer features a rugged steel chassis and an extra-thick backplane to help ensure long, reliable performance.

Available in economical, easy-to-build kit form — or in factory assembled and tested form, the basic Heath H-11A Computer includes a handsome cabinet, a heavy-duty power supply, and a backplane that includes the bus and a fully-assembled CPU board. You can add your selection of optional memory and I/O accessories to the mainframe.

Learn by building it yourself. What better way is there to get to know your computer than by building it yourself? The Heath H-11A Computer lets you understand it better. You can build it yourself

and benefit from the knowledge — and the savings. Like all Heath computers, the H-11A comes with an easy-to-follow assembly and operation manual. When you build it yourself, you can also perform more of the service steps yourself, to keep your computer in top operating form. A nationwide network of service centers are ready to help you with technical advice and expert service.

Whether you buy a full Heath H-11A Computer System or the computer itself, compare the price of the Heath H-11A with comparable 16-bit computers. Buy this DEC-compatible Heath computer and find out why the combination of advanced design and quality components make the Heath H-11A Computer one of the best 16-bit computer values anywhere. For 120/240 VAC, 50/60 Hertz, 200 watts maximum power consumption. Dimensions, 6.5" H x 19" W x 17" D (16.5 x 48.3 x 43.2 cm).

Kit H-11A, Shpg. wt. 43 lbs. .... **1395.00**

Factory Assembled, UL Listed H-11A Computer.

WH-11-UL, Shpg. wt. 37 lbs. .... **1995.00**

**Modification Kit for H-11/H-11A Computers.** This special modification kit places the line time clock switch on the front panel for easier access. It's easy to assemble, and includes an entirely new front panel.

Kit 830-35, Shipping charges prepaid ..... **53.50**

Look over the Manuals before you buy. Complete assembly and operation manuals for the Heath H-11A Computer, the H-11-2 Parallel Interface, the H-11-5 Serial Interface and the H-9 Video Terminal.

Get a first-hand look at the accurate, easy-to-follow Heath assembly manuals that take you, step-by-step, from unpacking to final plug-in. Know your H-11A Computer System inside out — before buying. And when you do buy the H-11A Computer, we'll deduct the price of this manual set.

HM-1100 Manual Set, Shpg. wt. 12 lbs. .... **30.00**

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**H-11A/WH-11A SPECIFICATIONS:** Central Processing Unit: Uses DEC KD11-HA CPU. Word Length: 16 bits. Instruction Set: PDP-11/03. Memory: Directly addresses 32K. I/O Addressed: 28K to 32K. RAM/ROM: 0 to 28K. Backplane: Eight 2-wide module slots. Power Supply: Overcurrent and overvoltage protected, switching regulator. Internal fan for cooling. Power Requirement: 120/240 VAC, 50/60 Hz, 200 watts maximum. Power Outputs: +5 VDC at 15 amperes max., and +12 VDC at 3 amperes maximum. Dimensions: 6.5" H x 19" W x 17" D (16.5 x 48.3 x 43.2 cm).

## Configure your own H-11A Computer System

With seven plug-in positions for memory and I/O, you can design a Heath H-11A Computer System to meet your exact needs. Choose from a full selection of memory, interfacing

and peripherals to complement your H-11A Computer. And with full DEC compatibility, you can be sure to get full use from all H-11A hardware and software.

**Memory:**  
(Max. 30K words)

Wired 4K  
WH-11-1

Wired 16K  
WHA-11-16

**Mass Storage:**

Floppy  
H/WH-27

**Interfacing:**

Serial  
H-11-2

Parallel  
H-11-5

**Peripherals:**

Video Terminals  
H-9, H/WH-19

Printers  
H/WH-14, WH-24,  
WH-34 (DEC)

Modem  
WH-23, WH-33





Shown with optional  
830-35 LTC Switch

## H-27 Floppy Disk gives much faster access to data and information

**\$2195<sup>00</sup>**

- Full compatibility with DEC® RX01 (PDP-11V03) system
- Z-80 microprocessor-based controller
- Uses larger 8" floppy disks
- Dual-drive system for more on-line storage — up to ½ million bytes
- 250 mS access to data
- Fast 6 mS head step time

The Heath H-27 Floppy Disk System gives you dual-drive versatility, with a total of ½ Meg bytes of on-line program and data storage area — enough room for most of your general-purpose application needs. The H-27 stores data and information on 8-inch floppy disks, which are compatible with equipment using the IBM 3740 format.

The Z-80 microprocessor-based disk controller in the Heath H-27 Floppy Disk System provides an average data access time of 250 milliseconds. This means you will have very fast access to data.

You get full compatibility with DEC RX01 and RXV11 (PDP-11/03 and PDP-11V03) hardware and software when you use the H-27. This gives you the capability of using the hundreds of application programs written by users of the DEC PDP-11, one of the most popular microcomputers. Performance-proven hardware and software bases including the H-11A, provide outstanding computer power.

See the full line of software for the Heath H-11A Computer, including the FORTRAN language, on pages 84 and 85.

While compatible with the DEC systems, the H-27 Floppy Disk System gives you even more. A built-in self test diagnostic, which operates during power-up, protects existing programs on your disks. A mechanical interlock prevents accidental damage to data and information — if the floppy disk is not seated properly, the door will not close and the H-27 Floppy Disk System will not operate. A write-protect function protects important files and programs from being inadvertently written over. And a reformatting procedure gives you the capability of initializing a diskette with the standard IBM 3740 format.

A single-board bootstrap/interface circuit uses just one backplane slot on the Heath H-11A Computer, leaving more space for memory and I/O additions to your Heath H-11A Computer System. The H-27 Floppy Disk System measures 7.75" H x 18" W x 20" D. It operates on 120 or 240 VAC, 60 Hz power, and draws a maximum of 240 watts. To use the full capabilities of the HT-11 Operating Systems Software (page 84), which is designed for use with the Heath H-27 Floppy Disk System, you need a Heath H-11A Computer with at least 32K bytes of memory.

Kit H-27, Shpg. wt. 93 lbs., Motor Freight . . . 2195.00

Assembled WH-27 Dual-Drive Floppy Disk System.

WH-27, Shpg. wt. 69 lbs., Motor Freight . . . 2595.00

Five Single-Density, Single-Sided 8-Inch Floppy Disks for the Heath H-27 Floppy Disk System, supplied in standard IBM 3740 format.

HCS-62, Shpg. wt. 2 lbs. . . . . 25.00

**H-27/WH-27 SPECIFICATIONS:** Diskette: 8-inch. Capacity (8-bit bytes, IBM 3740 format): 256,256 bytes per diskette; 3,328 bytes per track; 128 bytes per sector. Recording Surfaces Per Diskette: One. Tracks Per Diskette: 77 (0-76 or 0-114[8]). Sectors Per Track: 26 (1-26 or 1-32[8]). Bit Density: 3200 bpi at inner track. Track Density: 48 tracks per inch. Recording Technique: Double frequency. Data Transfer Rate: Diskette to Controller Buffer: 4 μS/data bit (250K bps). Track-To-Track Move: 6 mS/track maximum. Head Settle Time: 15 mS maximum. Rotational Speed: 360 rpm, ±2.5%; 166 mS/revolution nominal. Average Access: 250 mS, calculated as follows: Seek (77 tracks/8.3) x Settle (3 mS + 15 mS) + Rotate (166 mS/2) = Total (250 mS). Temperature: Operating: 59 deg. F to 90 deg. F (15 deg. C to 32 deg. C) ambient. Maximum Temperature Gradient: 20 deg. F/hr (11.1 deg. C/hr). Non-Operating: -30 deg. F to +140 deg. F (-35 deg. C to +60 deg. C). Diskette Non-Operating: -30 deg. F to +125 deg. F (-35 deg. C to +52 deg. C). Humidity: Operating: 77 deg. F (25 deg. C) maximum wet bulb; 36 deg. F (2 deg. C) minimum dew point, 20 to 80% relative humidity. Non-Operating: 5 to 98% relative humidity (no condensation). Diskette Non-Operating: 10 to 80% relative humidity. Power Requirement: 120/240 VAC, 60 Hz, 240 watts maximum. Interface Module Power Requirement: 5 VDC, 1 amp typical, 1.5 amps maximum. Dimensions: 7.75" H x 18" W x 20.75" D (20.32 x 45.72 x 52.71 cm). Net Weight: 61 lbs. (27.67 kilograms).



Alaska, Hawaii and Michigan Residents: Call 616-982-3411



## Give your computer system a burst of color with the Heath/Zenith® Color Video Display

**\$399<sup>95</sup>**

- This quality-built color video display is the right product, at the right time, at the right price
- Fully assembled and tested Heath/Zenith unit features 13-inch (diagonal) color picture
- Accepts composite NTSC color video signal from computer systems, video cassette recorders and color cameras

Add a colorful new dimension to your computer system. The Heath/Zenith GDZ-1320 Color Video Display is the ideal complement for the Heath HA-8-3 Color Graphics Board below — as well as many other computers, video cassette recorders (VCRs) or color video camera with NTSC composite video output.

Now is the time to add a color video display to your computer system. You can take advantage of the HA-8-3 and the new color software to be offered soon by SOFTSTUFF™ for the H-8 and All-In-One Computer Systems.

**NEW**

## The HA-8-3 Color Graphics Board lets you create color displays with your H-8

**\$395<sup>00</sup>**

- Includes advanced color video generator, programmable sound generator for maximum enjoyment
- Capable of accepting up to four X-Y joystick consoles and an arithmetic processing chip (both not included)
- Board is fully assembled and tested, for fast and easy installation in your Heath H-8 Computer

The Heath HA-8-3 Color Graphics Board will add colorful capabilities to your H-8. It connects to the Heath/Zenith GDZ-1320 Color Video Display above (preferred), or to other video devices which accept the NTSC composite video signal. This Color Graphics Board includes the TI-9918 Color Video Display Generator from Texas Instruments — the most advanced color video generator available. The TI-9918 produces vivid color pictures for color video displays — as well as monochrome levels for black-and-white monitors.

Maximum resolution of the TI-9918 Video Display Generator is 256 x 192 pixels. The video display screen consists of 35 display planes: the External Video, Backdrop and Pattern Planes — as well as Sprite Planes 0 to 31. The planes are stacked, with the external video the innermost or lowest plane. The sprite 0 plane is the outside or highest plane.

The Color Video Display Generator can produce three color display modes:

The **Pattern Mode** causes the pattern plane to be broken up into groups of 8 x 8 pixels, called pattern positions. Since the full image is 256 x 192 pixels, there are 32 x 24 pattern positions on the screen in Pattern Mode. Within each pattern position, two unique colors are allowed.

In **Text Mode**, the pattern plane is broken into groups of 6 x 8 pixels, called text

The Heath/Zenith Color Video Display represents outstanding value. You get a higher-quality color picture, because this 13-inch (diagonal) color display accepts the composite NTSC color video signal directly from the HA-8-3 Color Graphics Board — as well as other devices. You get a better picture than produced by an RF Modulator, because direct reception eliminates the two steps of modulating and demodulating the signal.

The GDZ-1320 also accepts a Hi-Z audio input. An RCA-type phono jack, with an impedance of 75 ohms, is provided for NTSC video input — while a miniature phono jack is built-in to the unit for audio input.

Fast warm-up capability lets you use the Heath/Zenith Color Video Display right away. Fully automatic color processing, built into the Display, assure consistent color levels and vivid hues, for a better all-around color picture. The GDZ-1320's picture stays so rock-steady that the vertical hold and horizontal hold controls have been eliminated! And a built-in audio amplifier and speaker faithfully reproduce each sound.

When you want top-notch color video reproduction from your computer, video cassette recorder or camera, you can count on Heath/Zenith. The Zenith name has meant quality in the color television field, year after year. And the same quality has been built into the GDZ-1320 Color Video Display. Service is available from Zenith service centers nationwide.

The GDZ-1320's high-impact black styrene cabinet protects the Heath/Zenith Color Video Display's electronic components, under normal operating conditions. This fully assembled and tested product runs on 120 VAC, 60 Hz. Draws 82 watts of power. UL and CSA listed. Overall Dimensions, 14" H x 20.25" W x 14.75" D (35.56 x 51.44 x 37.47 cm).

GDZ-1320, Assembled and tested, Shpg. wt. 44 lbs. . . . . **399.95**

**GDZ-1320 SPECIFICATIONS:** Screen Size: 13 inches (diagonal measurement). Video Input: Composite NTSC-system video (1 Volt P-P, negative sync), via RCA-type phono jack. Input Impedance: 75 ohms. CRT: 13VBAP22 (100 degree deflection angle); vertical-stripe screen with black surround negative guardband, EFL (R) in-line tri-potential electron gun, automatic degaussing. Video Resolution: 240 lines (at 3.125 mHz). Light Output: 90 Foot-lamberts (average) at maximum beam current. Chroma Bandwidth: 0.7 mHz, +3 dB. Color Level and Processing: Fully automatic. Vertical, Horizontal Hold: No adjustments required. Warm-Up Time: 15 seconds maximum. Audio Input: Hi-Z/high-impedance audio (2 Volts P-P), via miniature phono jack. System includes built-in speaker and front panel volume control. Cabinet Material: High-Impact Styrene, UL Rated V-O. Cabinet Finish: Black, with hot stamp chrome trim. Power Requirement: 120 VAC, 60 Hz, 82 Watts. UL and CSA listed. Conforms to technical requirements of 21 CFR, Subchapter J, for X-radiation. Overall Dimensions: 14" H x 20.25" W x 14.75" D (35.56 x 51.44 x 37.47 cm).

positions. There are 40 x 24 text positions on the screen in this mode. Sprites do not display in the screen, and two colors are defined for the entire screen.

In **Multicolor Mode**, the screen is broken into groups of 4 x 4 pixels. This provides a grid of 64 x 48 positions on the screen. With each of the 3072 positions, one unique color is allowed.

The TI-9918 Video Display Generator can also display eight different levels of gray, for black-and-white displays.

The **AY-3-8910 Programmable Sound Generator**, built into the Color Graphics Board, is a Large-Scale Integrated (LSI) circuit which is capable of making nearly any sound desired for your game or other application, under software control. The analog sound outputs can each provide 4 bits of digital-to-analog conversion, greatly enhancing the dynamic range of the sounds produced.

To perform sound effects while allowing the processor to continue its other tasks, the PSG can continue to produce sound after the initial commands have been given by the control processor. Realistic sound production with more than one effect is accomplished by the 3 independently controllable channels.

**Eight channels of analog-to-digital conversion are provided**, for up to four X-Y joystick consoles (not included). Each channel has 4 bits of parallel input/output for switches and LEDs. A built-in socket will accommodate the AMD-9511 Arithmetic Processor Chip (not supplied), which permits extremely rapid floating point, trigonometric and transcendental computations — as well as hardware multiplication and division of both integer and floating point numbers.

**Demonstration software for our Color Graphics Board is supplied on a 5.25-inch floppy diskette.** Additional software will be offered by SOFTSTUFF™ in the near future. Due to the use of wait states and an 18 VDC power requirement, proper operation of the HA-8-3 Color Graphics Board is guaranteed only when it is used with Heath memory boards — or with other boards which use fully static single-supply RAMs.

HA-8-3, Assembled and tested, Shpg. wt. 3 lbs. . . . . **395.00**



## Versatile H-19 Video Terminal with full ASCII set, professional keyboard and super-sharp CRT display

**\$695<sup>00</sup>**  
Kit

- Z-80 microprocessor-based for efficient data handling
- Typewriter-style keyboard, 12-key numeric pad
- DEC VT-52™ software-compatible
- Now expandable to an H-88 All-In-One Computer

**Exceptional capabilities:** The H-19 is designed for the H-8 and H-11A, or any device using RS-232C interfacing. A Z-80 microprocessor makes it ideal for high-speed data handling. Typewriter-format keyboard lets you begin entering data right away. The H-19's 32 functions can be controlled from the keyboard, or a computer. A 12-key numeric keypad, in calculator format, makes the entry of mathematical programs faster and easier. Keyboard-selectable 110-9,600 baud rates make changes easy. Eight user-function keys give extra flexibility.

The H-19 displays the entire ASCII set, upper and lower case. Thirty-three graphics characters can be arranged for a variety of effects. Prints twenty-four 80-character lines (with software-controlled 25th line). Using direct or relative addressing, a blinking, non-destructive underlining or block cursor lets you make corrections or edit, anywhere on the video screen.

Now, you can change your H-19 into an H-88 All-In-One Computer, with the new H-19-2 Conversion Kit (below). And the H-19's ROM listing is available (p. 83) to help you understand how this powerful, versatile video terminal operates — or to allow you to alter its personality and cursor control protocols to match those of other terminals. 120/240 VAC, 50/60 Hz. 13" H x 17" W x 20" D.

Kit H-19, Shpg. wt. 54 lbs. .... 695.00

WH-19, Assembled Video Terminal, Shpg. wt. 43 lbs. .... 995.00

**NEW! Convert the H-19 to an H-88 All-In-One Computer!** Easy assembly — includes detailed assembly manual, all necessary parts. When finished, you'll have an H-88 with 16K RAM — and a powerful video terminal. Add an H-88-4 Disk Drive/Controller (p. 71), and you can expand to a full-fledged H-89!

Kit H-19-2, Shpg. wt. 19 lbs. .... 695.00

H-19-1, Source Listings for ROM of H-19 Video Terminal, 1 lb. .... 25.00

HCA-4, Black Fabric Anti-Glare CRT Filter, 1 lb. .... 19.95

HCA-3, Clear Plastic Anti-Glare CRT Filter, 1 lb. .... 12.95

**NEW!** HCA-5-89, Dust Cover for H-19 Terminal, Shpg. wt. 1 lb. .... 14.00



**H-19/WH-19 SPECIFICATIONS:** Character Set: 128 (95 ASCII, 33 graphic). Character Type: 5 x 7 (upper, lower case), 5 x 9 (lower case with descenders). Keyboard: 80 keys (60 alphanumeric, 12 function), 12-key numeric pad. Cursor Controls: Up, down, left, right, home, CR, LF, tab. Tab: 8 columns. Erase: Page, to end of line, to end of page. Scroll: Auto, line/page freeze. Bell: On receipt of control G. Video: Normal and reverse (using escape sequence). Interfacing: RS-232. Mode: Full or half-duplex. Parity: Even, odd, stick, none. Handshaking: Software, ctrl S — ctrl Q; all RS-232 lines tied high internally. Buffered terminal capable of keeping up with most operations and normal scrolling text output, at 9600 baud or less. Power Requirement: 120/240 VAC, 50/60 Hz. Overall Dimensions: 13" H x 17" W x 20" D (33.02 x 43.18 x 50.80 cm).

**NEW**

## Move up to over 2 megabytes on-line with the Heath H-47 Floppy Disk System!

**\$2595<sup>00</sup>**  
Kit

- Supplied with two disk drives for over 2 million bytes of on-line data and program storage area
- Stores over a million bytes on each 8" floppy disk — more than 6 times the capacity of a 5.25" disk
- Fully compatible with Heath 5.25" disk systems
- Supported by HDOS and CP/M® Operating Systems

**Over 2 megabytes of on-line storage:** Each 8-inch disk can hold over 1 million bytes of data. Because the H-47 is supplied with two pre-assembled drives, this means you can have over 2,000,000 bytes of data on-line at any one time — more than 10 times the capability of a 5.25" dual-drive system.

**Compatible with Heath 5.25" systems:** Use up to three 5.25" drives with the two 8" drives in the H-47, for maximum storage — over 2.3 million on-line bytes! Less than half the access time: 191 mS — compared to the 490 mS time of currently available disk systems for the H-8 and All-In-One.

**Move up to new software capabilities:** With the H-47, you can run both HDOS and CP/M. These systems open the door to thousands of useful programs. And you can transfer data between 8" and 5.25" disks at any time.

**Includes 40-conductor flat cable for connection to H-8, All-In-One.** Requires WH-8-47 and HA-8-8 for H-8; WH-88-47 and H-88-7 for All-In-Ones (except WH-89-FA). Also requires H-88-6 (listed at right).

Kit H-47, Shpg. wt. 87 lbs. .... 2595.00

WH-47, Assembled 8-Inch Floppy Disk System, Shpg. wt. 66 lbs. .... 3500.00

Wired H-47 Interface with two RS-232C Serial Ports, for use with H-8 Computer. WH-8-47, Shpg. wt. 2 lbs. .... 235.00

HA-8-8, Extended Configuration Option for H-8, Shpg. wt. 1 lb. .... 65.00

WH-88-47, Wired H-47 Interface for All-In-One Computers, 2 lbs. .... 195.00



**Backplate Modification Kit.** Required to use H-47 with H-88, H-89, WH-89 and WH-89-CA Computers which do not have an external brightness control.

H-88-6, Shpg. wt. 2 lbs. .... 50.00

H-88-7, Replacement ROM for All-In-One Computers, 1 lb. .... 55.00

**H-47 SPECIFICATIONS:** Number of Tracks per Surface: 77. Recording Density: Outer Track, 1836 BPI single — 3672 BPI double; Inner Track, 6536 BPI. Track Density: 48 tracks per inch. Data Transfer Rate: Rotational Speed: 360 rpm, ±2.5%. Average Rotational Latency: 83.3 mS. Average Seek Time: 78 mS. Head Settle Time: 15 mS. Average Access Time: 191 mS, including settle. Power Requirement: 120/240 VAC, 50/60 Hz, 204 Watts. Overall Dimensions: 10.2" H x 18.9" W x 18" D (25.91 x 48.00 x 45.72 cm).



Alaska, Hawaii and Michigan Residents: Call 616-982-341



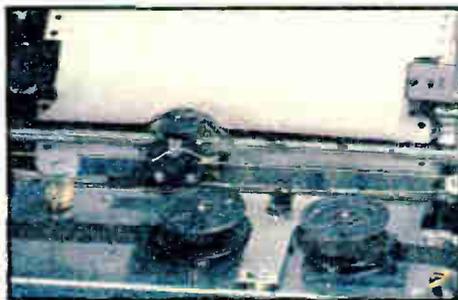
## Low-cost, microprocessor-based H-14 Line Printer provides convenient hard copy output

**NOW SAVE**  
**\$100<sup>00</sup>**  
 on assembled  
 version

- Packed with extra features you won't find on comparably priced line printers
- Use with most any computer — communicates via RS-232C or 20 mA loop interfacing

The Heath H-14 Line Printer brings hard-copy value and performance at an affordable price — in easy-to-build kit form, or assembled. Hard copy provides added convenience in reading, editing, debugging and modifying your computer programs. The H-14 Line Printer can also provide handy printed copies of address lists or other data you need for any of your personal or business applications.

The H-14 prints the standard 96-character ASCII set (upper and lower case) on a 5 x 7 dot matrix print head. Uses readily available 0.5-inch nylon inked ribbon on 2-inch spools. Maximum throughput rate is 75 characters per second, with selectable 80, 96 or 132 character line length. Standard spacing is 6 lines per inch; 8 lines per inch spacing is software selectable. Baud rates are user-selectable, from 110 to 4800. Adjustable width sprocket



Sharp printout, low payout: The Heath H-14 is one of the lowest-cost microprocessor-based line printers available today.

feed handles edge-punched fan-fold paper from 2.5" to 9.5" wide, with a maximum thickness of 0.006 inch.

The H-14 Line Printer provides extra value and performance — at a price that won't break your budget. Connects to most computers with std. RS-232C serial interface or 20 mA current loop. Handshaking provided by busy control signal.

Standard equipment for the H-14 Line Printer includes a 25-pin male EIA connector and a matching paper catch. For 120/240 VAC, 50/60 Hz. Dimensions, 4.80"H x 18.33"W x 14.33"D (12.19 x 46.56 x 36.40 cm). Requires HDOS or CP/M Operating System Software for H-89 All-in-One Computer; H-88-18 Software for H-88; HDOS, CP/M or H-8-18 for H-8 Computer; HT-11 for H-11A (all sold on pages 84 and 85).

Kit H-14, Shpg. wt. 30 lbs. . . . . **595.00**

**SAVE \$100 on Assembled and Tested H-14 Line Printer.**  
 WH-14, 27 lbs. . . . . **Was \$895.00, NOW ONLY 795.00**

**NEW! Dust Cover for Heath H-14 Line Printer.**  
 HCA-5-14, Shpg. wt. 1 lb. . . . . **14.00**

**H-14/WH-14 SPECIFICATIONS:** Printing Speed: Initial time per full line is approximately 1.75 seconds on 60 Hz power line. 2.1 seconds on 50 Hz power line. Avg. throughput approx. 40 cps with 96 char. line. Print head temp. controlled by varying print speed. Characters: Impact prints 0.11" high characters. Format: 80, 96 or 132 cpi (96 cpi software selectable only). Forms Handling: Sprocket feed with adj. widths, 2.5" sec slewing rate. Form depth selectable from 0.0210" to 0.1365". Ribbon System: Standard typewriter ribbon with automatic reversing mechanism. Panel LED Indicators: Power on/off, print head temp. Operator Controls: Power on/off, on/off line, fwd/reverse feed, top of form, wide characters.





## WH-24-1/TI-810 — our fastest printer

**\$1735<sup>00</sup>**

- Optimized 150 cps bi-directional printing system
- Handles forms to 15" wide, prints up to 5 copies
- Assembled unit includes BOTH upper and lower case

Make a big impact on both your printing and your printer costs. Optimized bi-directional printing, at a fast 150 characters per second/64 lines per minute, minimizes printhead travel time, maximizes efficiency. Vertical and horizontal tabbing help produce maximized data, regardless of format.

The built-in 256-character FIFO (First In, First Out) buffer receives data at speeds from 110 to 9600 baud. Programmable forms length and a wide carriage handle multiple-part forms from 3 to 15 inches wide. The WH-24-1's 9 x 7 dot matrix font prints clearer, more legible characters of an original, and can produce up to five high-quality copies.

The WH-24-1 prints the full 96-character ASCII set, with both upper and lower case letters. Line width is adjustable up to 132 characters per line, while 6 or 8 lines per inch printing density can be selected by operator or software.

Once a form has been engaged by the tractor drives, alignment can be made at the main control panel. Adjustments for forms thickness can be made by use of the printhead-to-platen adjustment while printing.

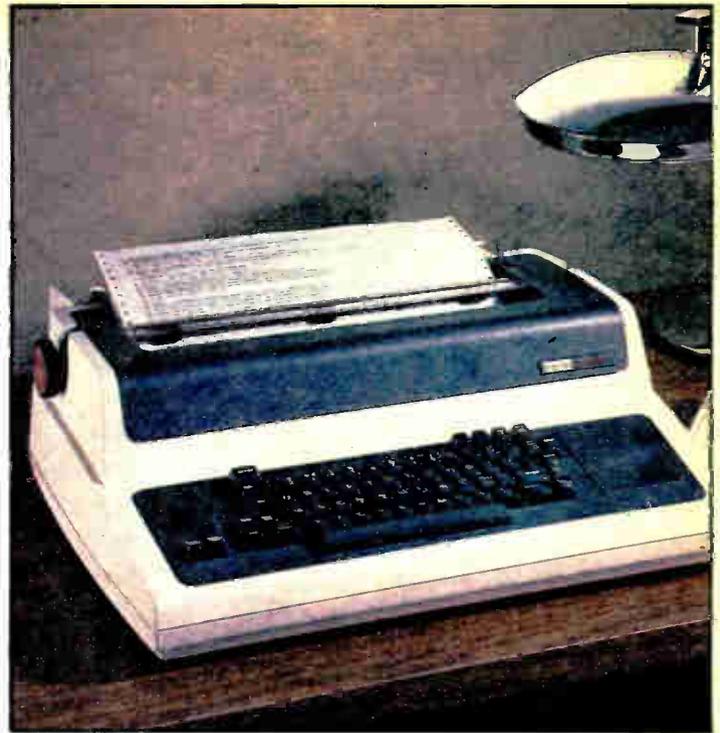
Self-testing capabilities verify the WH-24-1's electronic and electromechanical capabilities. Includes upper and lower cases. For 120/240 VAC, 50/60 Hz. Overall Dimensions, 8"H x 25.75"W x 20"D (20.32 x 65.41 x 50.80 cm). Needs WHA-11-5 Serial I/O Card (below) for use with Heath H-11 and H-11A Computers only; not required for other Heath Computer Systems.

WH-24-1, Assembled, Shpg. wt. 66 lbs., Motor Freight ..... 1735.00

Serial I/O Card for Heath H-11 and H-11A Computers.

WHA-11-5, Shpg. wt. 1 lb. .... 150.00

**WH-24-1 SPECIFICATIONS:** Printing: Technique: Seven-wire matrix, impact. Speed: 150 characters per sec., 64 lines per min. (at 132 chars./line), up to 450 lines per min. (at 10 chars./line). Character Set: 96-character ASCII. Characters Per Inch: 10. Format: Up to 132 chars. line max., 6 or 8 lines/inch (operator or software selectable). Forms Handling: Tractor feed with adjustable widths. 5 in. second (127 mm/second) slewing rate. Panel Indicators: power on/off, on line off line, error, paper out LEDs. Operator Controls: Power on/off, on line off line, forward and reverse feed, fwd line and form feed, tab reset. Communications: Interfacing: EIA Standard RS-232C Serial Interface. Baud Rates: 110, 150, 300, 1200, 2400, 4800, or 9600 baud. Parity: Odd, even, ignore. Operating Temp. Range: 37 to 104 degrees F (5 to 40 degrees C). Operating Humidity Range: 5 to 90% (no condensation). Power Requirement: 120/240 VAC, 50/60 Hz. Overall Dimensions: 8"H x 25.75"W x 20"D.



## Compact, versatile DEC<sup>®</sup> writer Desktop Teleprinter

**\$1195<sup>00</sup>**

- WH-34 Terminal/Printer has many convenience features
- Clearly prints the full 128-character ASCII set
- Assembled unit prints at a true speed of 30 cps

The WH-34/LA-34 DECwriter IV Teleprinter sets new standards for convenience in computer and data communications terminals. Small and lightweight, it's a natural for the office environment. Its keyboard is arranged like a typewriter keyboard, complete with sculptured keys. And snap-in cartridge ribbons mean easier ribbon changes with no mess.

This 300 baud, 30 cps desk-top terminal can print at burst speeds of up to 45 cps. An alternate 110 baud/10 cps speed is keyboard-selectable. The terminal operates full duplex, with optional local echo. A 9 x 7 dot matrix impact printhead clearly prints the full 96-character ASCII set, upper and lower case. Character density is adjustable from 10 to 16.5 characters per inch; line spacing is adjustable from 6 to 12 lines per inch.

Designed for operator simplicity, the WH-34's VIEW mode can be used for last character visibility. The off-line setup mode lets the computer select performance parameters from the keyboard or a computer, making the terminal useful in almost any kind of office function.

Also included is an EIA Standard RS-232C Serial Interface to communicate with computers, acoustic couplers and Bell 103J or equivalent modems. A start-up supply of ribbon and paper lets you begin using the DECwriter Desktop Teleprinter right away.

WH-34, Assembled, Shpg. wt. 40 lbs. .... 1195.00

WHA-34-2, Tractor Feed, Shpg. wt. 3 lbs. .... 150.00

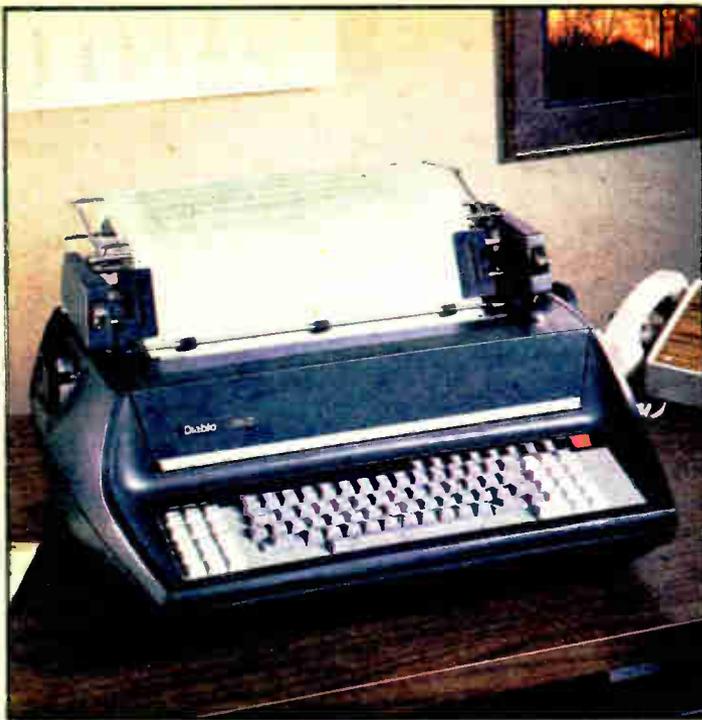
**WH-34 SPECIFICATIONS:** Format: 10, 12, 13.2 or 16.5 characters per inch horizontal spacing, keyboard selectable — up to a maximum of 132 characters per line; 2, 3, 4, 6, 8 or 12 lines per inch vertical spacing, keyboard selectable. Forms Handling: Standard typewriter platen (WHA-34-2 Tractor Feed available). Slewing rate, 5 inches per second. Communications: Code: ANSI Standard. Bit Structure: Bit Serial: 1 start, 7 data, 1 parity, 1 stop bit at 110 and 300 baud. Parity: Odd, even, mark or space — switch-selectable. Power Requirement: 120 VAC, 60 Hz. Dimensions: 7"H x 22"W x 15.5"D

Universal Floor Stand fits H-14, WH-24-1, WH-34 and WH-44K Printers. Raises printer to desk level for easier operation. With paper rack.

HCA-2, Shpg. wt. 28 lbs. .... 99.00



Alaska, Hawaii and Michigan Residents: Call 616-982-3411



## Letter-quality printer/terminal for word processing

**\$2995<sup>00</sup>**

- Diablo 1640 KSR Printer/Terminal is fully assembled
- Features famous letter-quality daisy wheel printing
- Includes full ASCII keyboard for added versatility

The Diablo 1640 KSR Printer/Terminal is designed for applications that require a serial printer and terminal, such as data communications or word processing systems. The 1640 KSR combines the latest in microelectronic technology with its field-proven daisy wheel printing mechanism.

Terminal features professional typewriter-style Hall-effect keyboard, with full upper/lower case ASCII set. Bi-directional printing for 45 cps maximum print speed. Set horizontal, vertical tabs in any position. Top of form control, forward/reverse paper motion. Two-color/graphics capabilities with 1/120" horizontal, 1/48" vertical motion. An EIA Standard RS-232C Serial Interface and a 256-byte print buffer accept data at 110-1200 baud rates; interface is compatible with Bell 102, 113, 212 or equivalent modems.

Other extra-value standard features of the WH-44K include ETX/ACK protocol, ribbon out, paper out and cover open sensors, self-testing capability and host program control through escape sequences.

Assembled unit includes friction platen, power supply, operator control panel, HCS-22 Print Wheel (Elite 12 with unslashed zero), HCS-51 Film Ribbon. For 120/240 VAC, 50/60 Hz. Dimensions, 9.25" H x 23.5" W x 15.75" D.

WH-44K, Assembled, Shpg. wt. 72 lbs., Motor Freight ..... 2995.00

Bi-Directional Tractor Feed Accessory for WH-44K and WH-54 Printers. Dual tractors allow moving paper backward through printer for much better registration in word processing, forms preparation, graphics applications.

HCA-1, Shpg. wt. 7 lbs. .... 259.00

**WH-44 SPECIFICATIONS:** Print Wheel: Interchangeable 96-character plastic daisy wheel. Format: Line length adjustable to 13.1" maximum (132 characters per line at 10 pitch, 158 characters per line at 12 pitch). Forms Handling: Adjustable forms width to 15.5 inches (39.3 cm) maximum; form thickness selectable to 27/1000 inch (0.0686 cm) maximum. Dimensions: 9.25" H x 23.5" W x 15.75" D (23.50 x 59.69 x 40.0 cm).

## Choose Diablo™ printing quality at a lower price!

**\$2495<sup>00</sup>**

- Diablo 630 RO is factory assembled and tested
- Daisy wheel printing quality, less keyboard
- Fewer parts, adjustments for greater reliability

Another value-packed breakthrough in letter-quality printers! Now, Heath offers a choice of daisy wheel printers — with or without keyboard. The Diablo 630 RO provides daisy wheel printing quality, less keyboard.

Designed to provide and maintain superior printing quality, the WH-54/Diablo 630 RO Printer has been re-designed, with 50% fewer moving parts. Most field adjustments have been eliminated. Carriage rail to platen accuracy is ensured by fixed positioning in the precision-stamped side plates of the frame assembly. The carriage assembly is factory pre-aligned using lasers, allowing complete replacement interchangeability.

The 630 RO prints the standard 96-character ASCII set, both upper and lower case — at speeds up to a maximum of 35-40 characters per second.

Software-compatible with Diablo 1640/1650 series, the WH-54 uses the same ribbons, printwheels and tractor feed accessories as its siblings. And it uses both metal and plastic printwheels — so you can take advantage of the added durability of metal in high-production word processing systems.

This state-of-the art product uses efficient bi-directional printing for maximum output. RS-232C Serial Interface with 256-byte print buffer runs at 110-1200 baud rates, compatible with many Bell modems.

Includes friction platen, power supply, operator control panel, HCS-22 Print Wheel (Elite 12 with unslashed zero) and HCS-51 Film Ribbon. For 120/240 VAC, 50/60 Hz. Overall Dimensions, 9.25" H x 23.5" W x 15.75" D.

WH-54, Assembled, Shpg. wt. 65 lbs., Motor Freight ..... 2495.00

**WH-54 SPECIFICATIONS:** Printing Speed: 35-40 characters per second (cps) maximum. Print Wheel: Accepts both metal and plastic 96-character daisy wheels; also metal 88 and 92-character daisy wheels. Print wheels are fully interchangeable. Format: Line width adjustable to 13.1" max (132 characters at 10 pitch, 158 characters at 12 pitch). Forms Handling: Adjustable forms width to 15.5" (39.3 cm) maximum; form thickness selectable to 27/1000 inch (0.0686 cm) maximum. Communications: Interfacing: EIA Standard RS-232C Serial Interface; compatible with Bell 102, 113, 212 and equivalent modems. Baud Rate Selection: 110, 300, 600 or 1200 baud. Power Requirement: 120/240 VAC, 50/60 Hz. Overall Dimensions: 9.25" H x 23.5" W x 15.75" D (23.50 x 59.69 x 40.0 cm). Diablo is a trademark of Xerox Corporation.

See our complete selection of print wheels and ribbons for the Diablo 1640 KSR and 630 RO Daisy Wheel Printers on the opposite page.



## Accessories and interfacing for the H-11A give your computer added flexibility

**Assembled 4K Memory Expansion Module.** Plugs into backplane, adds 4K x 16-bit word capacity to memory. Uses reliable 1K x 4 static MOS RAM chips. Access time, less than 500 nS. Decode circuitry to operate on 4K address boundaries. Handle for easier installation/removal. Assembled, tested.

WH-11-1, Assembled, Shpg. wt. 2 lbs. .... 95.00

**Assembled 16K Memory Expansion Module.** 16K dynamic MOS Random Access Memory (RAM) on a 5" x 8.5" board. On-board refresh, 570 nS cycle time, 250 nS access time. Fully expand memory with only two of these expansion modules. Maximum memory capacity of the H-11A Computer is 28K words.

WHA-11-16, Shpg. wt. 2 lbs. .... 495.00

**Extended Arithmetic Chip** adds powerful mathematical instructions to any LSI-11 Computer. Instructions include fixed point multiplication, division and extended shifts. Also includes full floating point addition, subtraction, multiplication and division operations. This extended arithmetic chip minimizes the need for sub-routines and saves memory space in your computer.

H-11-6, Shpg. wt. 1 lb. .... 190.00

**Serial Interface.** Use this interface between the bus of any LSI-11 Computer and serial peripherals (like video terminals and line printers). EIA or optically isolated 20 mA current loop interfaces are available. Baud rates between 50 and 9600 are selectable. This serial interface is fully compatible with PDP-11V03 Computers, as well as other LSI-11 machines. It plugs directly into the LSI-11 backplane. Includes mating connectors. To interface the WH-24-1/TI-810 Teletypewriter to the H-11A, order WHA-11-5 Interface (page 79).

Kit H-11-5, Shpg. wt. 2 lbs. .... 135.00

WH-11-5, Assembled, Shpg. wt. 1 lb. .... 150.00

**Adapter Cable for H-11-5 Serial Interface.** This fully assembled cable provides EIA interfacing between the H-11-5 Serial Interface and other peripherals.

WH-11-51, Assembled and Tested, Shpg. wt. 1 lb. .... 15.00

**Parallel Interface.** Provides 32 latched input/output lines, 16-bit word transfers and an LSI-11 interface, as well as control logic for interrupt processing and vectored addressing. Control status registers are compatible with PDP-11 software routines. Includes four control lines, data ready and accepted operations. Maximum data transfer rate is 90K words per second. Drives cable up to 25 feet long. Compatible with TTL and DTL devices.

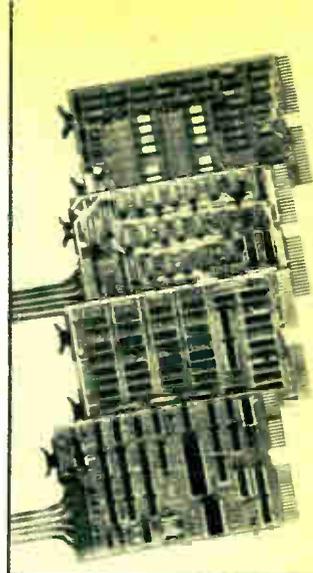
Kit H-11-2, Shpg. wt. 2 lbs. .... 125.00

Factory Assembled and Tested Parallel Interface for H-11A.

WH-11-2, Assembled, 1 lb. .... 150.00

**NEW! Wire Wrapping Board for H-11A.** Design custom circuits. High capacity for sophisticated circuits. Punched, etched double-sided board with room for 32 16-pin IC sockets (also 38 14-pin, or other combinations). With card extractor, hardware. See H-8-10 (below) for full description. Uses HCA-6, HCA-7 below.

H-11-10, Shpg. wt. 1 lb. .... 35.00



## Accessories, interfacing give your Heath H-8 Computer System more capability

**NEW**

### Accessories expand the world of your H-8

**Boot up faster with PAMGO ROM.** Only 1 keystroke on power-up/3 on reboot, instead of the usual 11. 2708-compatible masked, programmed ROM is exactly like the H-8 front panel ROM — except that on power-up or reset, it sets the program counter to a

030 000 split octal default address. PAMGO ROM makes booting up a breeze.

H-8-9, Shpg. wt. 1 lb. .... 20.00

**Extender Board** lets you operate your H-8 with accessory boards outside card cage. Allows easy access for servicing, prototyping or debugging.

HA-8-1, Shpg. wt. 1 lb. .... 40.00

**Music Synthesizer System.** Board connects to stereo system with two shielded cables (included). True D/A converter provides excellent 27.5-3300 Hz frequency response, up to 9 harmonics. 4-part harmony (voices) in stereo. Enter any song, right from conventional sheet music — even if you've never read music before. Documentation shows how to get maximum enjoyment. Software on 5.25" disk. Requires min. 24K memory, H-17 Floppy, terminal.

HA-8-2, Assembled, Shpg. wt. 3 lbs. .... 159.00

**Color Graphics Board.** Includes TI-9918 Color Video Display Generator from Texas Instruments — the most advanced available. Connects to GDZ-1320 (preferred-p. 76), VTR video input or UHF TV RF Modulator. Contains AY-3-8910 Programmable Sound Generator, capable of making nearly any sound desired for your game or other application.

Eight channels of A/D conversion are provided, for up to 4 X-Y joystick consoles (not included). Each console has 4 bits of parallel I/O for switches, LEDs. Socket provided for AMD-9511 Arithmetic Processor Chip (not supplied). Permits extremely rapid floating point, trigonometric and transcendental computations — as well as hardware multiplication/division of both integer and floating point numbers.

Demonstration software for our Color Graphics Board is supplied on 5.25" disk; additional software to be offered by SOFTSTUFF™ in near future. Due to use of wait states and 18 VDC power requirement, proper operation guaranteed only when used with Heath memory boards — or other boards using fully static single supply RAMs.

HA-8-3, Assembled, Shpg. wt. 3 lbs. .... 395.00

**Wired H-47 Disk Interface with 2 RS-232C Serial Ports** interfaces H-8 with H-47, as well as line printers, video terminals and other serial devices.

WH-8-47, Assembled, Shpg. wt. 2 lbs. .... 235.00

**Extended Configuration Option** allows H-8 to run with H-47 and/or CP/M.

HA-8-8, Shpg. wt. 1 lb. .... 65.00

**16K Wired Memory Board** expands memory power. Assembled, tested, factory burned-in to eliminate memory problems.

WH-8-16, Assembled, 2 lbs. .... 299.00

**4-Port RS-232C Serial Interface w/modem controls.** One port switch-programmable for 20 mA loop. Software programmable baud rate. Solderless addressing, vector interrupt jumpers. Connector for DCE, DTE modes. W/ WH-8-41 Cable.

Kit H-8-4, Shpg. wt. 2 lbs. .... 195.00

WH-8-4, Assembled, 3 lbs. .... 250.00

WH-8-41, Adapter Cable, 1 lb. .... 15.00

**Serial/Cassette Interface.** 1200 baud, with 1 serial port for ctrl. terminal. NOTE: Not to connect H-8 to H-14.

Kit H-8-5, Shpg. wt. 3 lbs. .... 125.00

WH-8-5, Assembled, 2 lbs. .... 145.00

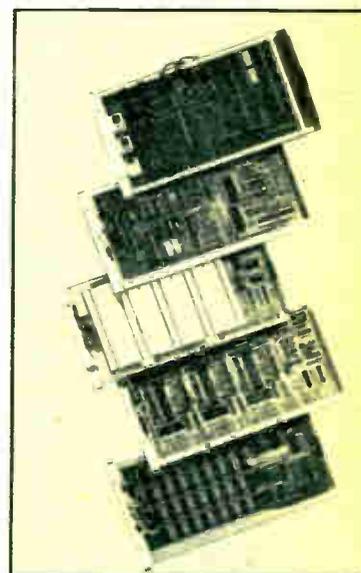
WH-8-51, Adapter Cable, 1 lb. .... 15.00

**Parallel Interface.** 3 ports, each w/8 bits I/O, universal handshaking.

Kit H-8-2, 3 lbs. .... 150.00

**Circuit Design Breadboard Card.** Custom design analog, digital circuits. Includes 5 VDC power supply. Reusable.

Kit H-8-7, 2 lbs. .... 90.00



### Design, build custom circuits for your H-8 Computer

**H-8 Wire Wrapping Board.** Greater capacity than H-8-7 Breadboard Card. Punched, etched board accepts 80 16-pin, 96 14-pin sockets (also 14, 16, 24, 40-pin types). Accepts 3 50-pin flat cable connectors. W/bus connectors, heat sink, 5V regulator, misc. hdwe. Uses HCA-6, HCA-7 below.

Kit H-8-10, Shpg. wt. 1 lb. .... 29.95

**Wire Wrapping Kit.** With wire wrapping tool, 50 ft. roll of wire, pre-cut wire in 1"-4" lengths (50 wires per package), pre-stripped 1" on both ends.

Kit HCA-6, Shpg. wt. 2 lbs. .... 12.95

**Wire Wrapping Socket Kit.** Total of 36 three-level wire wrapping sockets (12≠ 14-pin, 10≠ 16-pin, 8≠ 18-pin, 3≠ 20-pin, 2≠ 24-pin, 1≠ 40-pin).

Kit HCA-7, Shpg. wt. 1 lb. .... 29.95



## Space-saving Computer Work Station organizes your computer system

- Gain attractive, rugged operating efficiency. The PD-11 Computer Work Station organizes your computer system components in less space

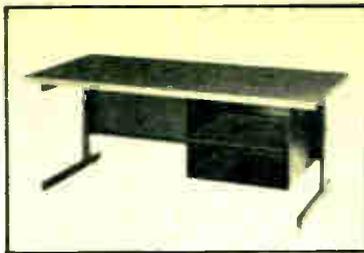
**\$295<sup>00</sup>**

Organizes your system in less space — yet all components are easily accessible. Designed to Heath specifications, the 60" x 30" easy-to-clean Formica™ desk top places terminals at a comfortable height for seated operators. Lower shelves hold the computer and disk systems (except H-47, H-77). Upper shelf measures 8.5" H x 20" W x 19.75" D (21.59 x 50.80 x 50.17 cm), while the lower shelf measures 7" H x 20" W x 19.75" D (17.18 x 50.80 x 50.17 cm).

Rugged steel legs and sheet metal shelving last under constant use. Locking casters make it easy to roll the work station from place to place — and to keep your computer system components securely in place.

Keep your operator comfortable and efficient — and welcome an attractive office centerpiece. Partially assembled. Computer system not included.

PD-11, Shpg. wt. 95 lbs., Mtr. Frt., FOB El Segundo, CA ..... 295.00



## Versatile Acoustic Modem is ideal for any phone



- We now offer the assembled Lexicon Lex-11 Acoustic Modem at a far lower price than the WH-13 CAT™

The Lexicon Lex-11 Modem lets your computer talk to other computers over standard telephone lines. Also communicates with any Bell 103 compatible modem. Selectable answer/originate modes. Many practical and useful applications. RS-232 interfacing. For 120 VAC.

WH-23, Assembled and tested, Shpg. wt. 3 lbs. .... 159.00



## Direct-Connect Modem offers improved quality



- Reliable communications — the UDS Direct-Connect Modem offers better quality than acoustic modems

RS-232C interface. Two modular phone jacks — plug phone into one, use second jack to connect to standard phone line. Full or half-duplex communication, originate/answer modes. FCC Certified. Powered by phone line. Requires std. single-line phone with modular connectors. Phone-modem cable included.

WH-33, Assembled and tested, Shpg. wt. 2 lbs. .... 195.00



## Multi-Function TI Calculator for computer hobbyists



**\$59<sup>95</sup>**

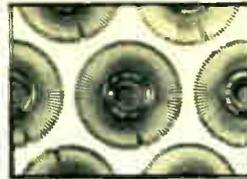
- Compact, goes anywhere
- Special memory, logic operations
- Factory assembled and tested

Designed especially for the computer hobbyist, this fully assembled Texas Instruments® Pocket Programmer/Calculator features fast conversions between octal, decimal and hexadecimal number systems; special logic operations for computer applications; three-key independent memory and fifteen levels of parentheses to handle complicated calculations; constant mode to simplify repetitive calculations; and an easy-to-read 8-digit LED display. Lightweight and compact enough to fit in your shirt pocket, this Texas Instruments product is ideal for any computer-related

application. Rechargeable battery and 120 VAC adapter/charger are included with this fully assembled and tested multi-function calculator. Overall Dimensions, 5.5" H x 3" W x 1.25" D (13.97 x 7.62 x 3.18 cm).

PC-11, Assembled and tested, Shpg. wt. 2 lbs. .... 59.95

## Choose from a full line of computer system supplies for highest-quality system performance



### Choose from these Diablo printwheels

Courier 10 (Diablo 38100), Pica w/slashed zero. HCS-20, Shpg. wt. 1 lb. .... 8.00  
 Courier 72 (D. 38107), Pica w/unslashed zero. HCS-21, Shpg. wt. 1 lb. .... 8.00  
 Elite 12 (D. 38102), Elite w/unslashed zero. HCS-22, Shpg. wt. 1 lb. .... 8.00

General Scientific (Diablo 38141). Greek letters, superscripts, math symbols. HCS-23, Shpg. wt. 1 lb. .... 8.00  
 APL-10 (Diablo 38150). Special set for APL language. HCS-24, 1 lb. .... 8.00  
 OCR-A (Diablo 38144). ANSI Std. OCR Type A font. HCS-25, 1 lb. .... 8.00  
 Prestige Elite Legal 12A (Diablo 38105). Elite w/legal symbols, incl. ©, ® and ™. HCS-26, Shpg. wt. 1 lb. .... 8.00  
 Courier Legal 10 (D. 38104). Pica w/legal symbols. HCS-27, 1 lb. .... 8.00



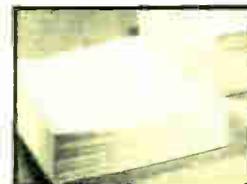
### Ribbons for dark, clear printouts

Ribbon for H-14 Line Printer. Also fits ARS-33 printers. HCS-52, 1 lb. .... Pkg. of 3, 8.00  
 Cloth Ribbons for the WH-44 Diablo Printer. HCS-50, Shpg. wt. 1 lb. .... Pkg. of 3, 18.00  
 Film Ribbons for the WH-44 Diablo Printer. HCS-51, Shpg. wt. 1 lb. .... Pkg. of 3, 18.00

Ribbon for the WH-24/TI-810 Bi-Directional Line Printer and the H-36/LA-36 DEC®writer II. Long-lasting, top-quality ribbon makes dark, crisp impressions. HCS-53, Shpg. wt. 1 lb. .... Pkg. of 3, 15.00

Ribbon Cartridges for the WH-34 DECwriter IV Computer Teleprinter. Eliminates messy ribbon changes. When old ribbon wears out, simply remove old cartridge and insert new ribbon cartridge.

HCS-54, Shpg. wt. 1 lb. .... Pkg. of 3, 25.00



### Top-quality paper for printers

Premium 8.5" x 11" Printer Paper. For all printers sold by Heath. 2800 sheets of premium, one-part fan-fold paper, approximately 20 lb. high-quality bond. In box.

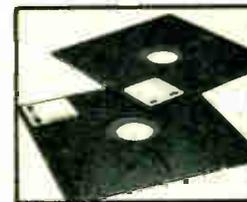
HCS-1, Shpg. wt. 28 lbs. .... 30.00

Standard 8.5" x 11" Paper. 3200 sheets of standard, one-part fan-fold 8.5" x 11" printer paper. Approximately 15 lb. bond.

HCS-2, Shpg. wt. 31 lbs. .... 30.00

14.875" x 11" Paper for WH-24, WH-34, H-36 and WH-44 Printers. Box contains 3200 fan-fold sheets of white/green lined paper.

HCS-3, Shpg. wt. 47 lbs. .... 35.00



### Floppy disks for mass storage

5.25" Diskettes. For all Heath 5" systems, North Star, some others. Hard sectored. 40/35 tracks. HCS-61, Pkg. of 5, 1 lb. .... 20.00

8" Single-Density, Single-Sided Diskettes. For H-27, virtually all systems using 8" soft sector disks. IBM 3740 std. format. Pkg. of 5. HCS-62, Shpg. wt. 2 lbs. .... 25.00

NEW! 8" Double-Density, Single-Sided Diskettes for H-47 Floppy Disk System. HCS-64, Pkg. of 10, Shpg. wt. 2 lbs. .... 60.00

NEW! 8" Double-Density, Double-Sided Diskettes for H-47 Floppy Disk System. HCS-65, Pkg. of 10, Shpg. wt. 2 lbs. .... 70.00

### Paper tape storage supplies for your computer system

Three 900-foot rolls of Blank Paper Tape. Each roll is eight inches (20.32 cm) in diameter. Paper tape is 1" (2.54 cm) wide. Just load the roll of tape onto your paper tape punch/reader — and you're ready to begin programming.

HCS-10, Shpg. wt. 5 lbs. .... 10.00



# Cut paperwork down to size, reduce costs with improved Zenith® Electronic Typing

## \$395<sup>00</sup>

- Our system is quick to learn, easy to use
- New revision includes improved capabilities, supports 3-drive floppy disk systems

Zenith Electronic Typing makes word processing practical for both single-secretary offices and departmentalized secretarial staffs. Anyone who can turn on a TV and type can increase their output by 50 percent or more, usually even on the first day. All you need are standard secretarial skills. A special self-instruction course shows you how — in as little as two hours.

We've improved Zenith Electronic Typing, with new features that make it even easier to produce near-perfect documents in a fraction of the time required by conventional typing — with no white-outs, strike-overs or erasures:

The new Document Index Format shows document number, title, size in characters and creation date. Page numbering is now automatic. You can now scroll (move) back to the beginning of a document. And entire blocks of copy can now be moved, copied elsewhere in the document or indented.

Two Search Modes quickly locate areas which need editing. Insert or delete any word, sentence or paragraph. Automatically replace any word, name or phrase to speed up production of customized form letters. Automatic Realignment saves hours of retyping. Automatic Centering and Justification, on command, means no counting or guessing.

Once the document is letter-perfect, the touch of another key automatically prints a clear copy of the document — on a separate printer (not included) — at an error-free rate of up to 450 words per minute.

Zenith Electronic Typing Word Processing Software requires H-89 (or equivalent Heath system) with 48K RAM and printer. Any Heath-offered printer will work; we recommend the WH-54 or WH-44K Letter-Quality Printers, as well as 2 or 3-drive floppy capability.

H-8-40, on 5.25" disk, Shpg. wt. 6 lbs. .... 395.00

### Save with complete Word Processing packages

Discounts on word processing packages make even better values:

**SAVE \$200!** Just purchase Zenith Electronic Typing, any Heath computer and any printer in this catalog. Then, subtract \$200.00 from the total (not including shipping and handling charges).

**SAVE \$100!** Buy the Zenith Electronic Typing Word Processing Software, along with any printer offered in this catalog. Then, subtract \$100.00 from the total of your purchase (not including shipping and handling).

## Source Listings for selected Heath computer software give you a better understanding of system operation

Source Listing for Heath Disk Operating System (HDOS), Version 1.6. Includes all utilities, device drivers.

HOS-1-SL, Shpg. wt. 11 lbs. .... 195.00

Source Listing for the Read-Only Memory (ROM) of the H-17 Floppy.  
H-8-51, Shpg. wt. 1 lb. .... 25.00

Source Listing for the ROM of the H-19 Video Terminal.  
H-19-1, Shpg. wt. 1 lb. .... 25.00

Source Listing for Cassette version of Extended Benton Harbor BASIC Language, included in H-88-18 Cassette Software.  
H-8-60, Shpg. wt. 2 lbs. .... 25.00

Source Listing for Cassette version of Assembly Language, included in H-88-18 Cassette Operating Software Package.  
H-8-54, Shpg. wt. 2 lbs. .... 25.00

Listing for Cassette version of Text Editor.  
H-8-53, Shpg. wt. 2 lbs. .... 25.00

Listing for Cassette version of Console Debugger.  
H-8-52, Shpg. wt. 1 lb. .... 25.00

(NOTE: All source listings are copyrighted. Reproduction of these source listings is expressly prohibited. HDOS updates available at nominal charge.)



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(Check all boxes which apply; sign and return to HEATH COMPANY. Another Sublicense Grant form should be used with future orders for additional SOFTWARE products.)

- Digital Research CP/M®  Microsoft BASIC™ Interpreter  
 Microsoft FORTRAN™  Microsoft COBOL™  Microsoft BASIC Compiler  
 Digital Research SID™/ZSID  Digital Research MAC™  
 Digital Research DESPOOL™

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FOR SID/ZSID, MAC AND DESPOOL PURCHASERS ONLY: The serial number of your Digital Research CP/M System must be supplied in advance. HEATH or VEC will supply the information if S.D. MAC and/or DESPOOL are purchased on the same order with a DIGITAL RESEARCH Operating System.

CP/M SERIAL NUMBER \_\_\_\_\_

HEATH COMPANY \_\_\_\_\_

By \_\_\_\_\_

ACCEPTED AND AGREED:  
CUSTOMER'S SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_

### CUSTOMER SOFTWARE SUBLICENSE GRANT FOR DIGITAL EQUIPMENT CORPORATION® (DEC®) SOFTWARE PURCHASERS

(Check all boxes which apply; sign and return to HEATH COMPANY. Another Sublicense Grant form should be returned with future orders for additional SOFTWARE products.)

- HT-11 Operating System  HT-11-1 FORTRAN

Write in the blank below your CPU make, model and serial number. (If CPU is purchased with this order, HEATH will fill in the blank.)

CPU \_\_\_\_\_

(Fill in blank)

HEATH of Benton Harbor, MI, for itself and on behalf of the LICENSOR listed above grant to CUSTOMER a non-transferrable and non-exclusive Sublicense to use the software programs checked by CUSTOMER above (referred to individually or together as SOFTWARE), under the terms and conditions stated in this Sublicense Grant.

SOFTWARE is furnished to CUSTOMER for use only on the single CPU listed above, and may be modified or copied (with the inclusion of LICENSOR's copyright notice) only for use on such CPU. CUSTOMER shall not provide or otherwise make SOFTWARE, or any portion thereof, available in any form to any third party without the prior approval of LICENSOR. LICENSOR retains title to the ownership of SOFTWARE at all times. LICENSOR and HEATH JOINTLY AND SEVERALLY DISCLAIM ALL IMPLIED WARRANTIES WITH REGARD TO THE SOFTWARE LICENSED HEREUNDER, INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS; and any stated express warranties are in lieu of all obligations or liability on the part of either LICENSOR or HEATH for damages, including but not limited to special, indirect or consequential damages arising out of or in connection with the use or performance of SOFTWARE licensed hereunder. This Sublicense Grant, the licenses granted hereunder and the SOFTWARE may not be assigned by the CUSTOMER without prior written consent from LICENSOR. No right to reprint or copy SOFTWARE, in whole or in part, is granted hereby, except as otherwise provided herein.

HEATH COMPANY \_\_\_\_\_

By \_\_\_\_\_

ACCEPTED AND AGREED:  
CUSTOMER'S SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_



## More languages — so your computer system can do more for you!

Each language offers more flexibility — and more versatility. Write your own programs with surprising ease — and execute programs just as easily, too. We'll even keep your

language current, by supplying updates free of charge, for one full year — when you sign and return the registration card enclosed with each software package.

## Popular Microsoft™ BASIC™ Language Interpreter

As low as  
**\$150<sup>00</sup>**

- Extra features make programming easy
- Many math, algebra and trigonometry functions
- Now available for both HDOS and CP/M systems

Microsoft BASIC is one of the most versatile languages available for the personal computer. Scores of practical utilities and applications programs are written in this BASIC. This version is especially written for use with Heath 8-bit computer systems, including the H-8, H-88 and H-89 Computers.

Capabilities include: Direct access to CPU ports and memory locations; an IF-THEN-ELSE control structure, which allows more highly-structured programming — including editing during programming and random or sequential filing capabilities; mathematical and logical operators; and a DEF statement, which allows user-defined functions which are not listed as intrinsic functions.

You also get many extended features: program edit facilities, including insertion, deletion, character change and search capabilities; file management facilities, which include random files, sequential files and file manipulation;

Powerful string processing functions, including LEFT, RIGHT, MID, ASC, CHR and concatenation; extended statements, operators, functions and commands which are not available in most other BASICs — ERASE to eliminate arrays from a program, LINE INPUT to add lines to string variables without delimiters, SWAP to exchange the values of two variables, the TRON and TROFF debugging aids which help trace the execution of program instructions, and WIDTH to set the width of the terminal printing line;

Automatic line numbering and renumbering; branching, loops and subroutines to change the order of program line execution in various ways; PRINT USING for control of output formats; ON ERROR command for error trapping routines.

Microsoft BASIC includes double precision floating point number and double precision mathematics, as well as algebraic and trigonometric capabilities.

This software package requires a Heath computer system with a minimum of 32K RAM — as well as either HDOS or CP/M®, as indicated below.

Microsoft BASIC, Ver. 4.7, supplied on 5.25-inch diskette. For HDOS systems. H-8-21, Shpg. wt. 3 lbs. ....	150.00
Microsoft BASIC, Ver. 5.1, supplied on 5.25-inch diskette. For Heath CP/M systems only. Requires Sublicense Grant (p. 83). HMS-817-1, Shpg. wt. 5 lbs. ....	175.00
Microsoft BASIC, Ver. 5.1, supplied on 8-inch diskette. For Heath CP/M systems only. Requires Sublicense Grant (p. 83). HMS-847-1, Shpg. wt. 5 lbs. ....	175.00

## Speed up programming with this BASIC Compiler

**\$250<sup>00</sup>**

- Compiled programs run much faster, use less space
- Includes many useful utility programs

The Microsoft BASIC Compiler eliminates time-consuming interpretation when you run a program. First, compile your program through this BASIC compiler. It converts each line of the program into machine code — the language your computer understands. You'll find that it runs much faster.

Another advantage: compiled programs occupy less space in memory.

Includes many utility programs to make compiling easier: The MACRO-80 Relocating Assembler converts Assembly Language programs into source code for the LINK-80 Editor, the LINK-80 Linkage Editor converts relocatable libraries and modules into runnable load modules, the useful LIB-80 Library Manager allows you to build your own libraries of relocatable modules.

Requires a minimum of 40K bytes RAM, two floppy disk drives, Heath Standard CP/M Operating System (page 85) and Customer Software Sublicense Grant (p. 83). For Heath computer systems only.

BASIC Compiler, on 5.25" disk. HMS-817-4, 5 lbs. ....	250.00
BASIC Compiler, on 8" disk. HMS-847-4, 5 lbs. ....	250.00

## Powerful Microsoft FORTRAN™ System

**\$195<sup>00</sup>**

- Powerful ANSI-66 FORTRAN IV Language Compiler
- Macro-Assembler, Linkage Editor, Cross-Reference Generator
- Linkable library of math, I/O, utility routines

With more power to help your computer system do more, the Microsoft FORTRAN Programming System features these versatile components:

1. The unique FORTRAN-80 Compiler, which uses the powerful ANSI-66 FORTRAN IV Computer Language;
2. A Cross-Reference Generator (CREF);
3. The MACRO-80 Relocating Assembler;
4. The LINK-80 Linkage Editor;
5. The Microsoft FORTRAN Library, filled with floating point mathematical routines — plus I/O and utility routines;
6. Sample FORTRAN-80 and MACRO-80 Assembler source programs.

Each of the components in the Microsoft FORTRAN Programming System help you create more powerful, more versatile programs:

The Microsoft FORTRAN-80 Compiler is a true native-code compiler which supports the full ANSI-66 FORTRAN IV Language, except for complex numbers. This allows you to take advantage of the large base of applications programs already written in the FORTRAN Language.

A microprocessor-based FORTRAN development package, which generates relocatable object modules, is included with the compiler. You can link these modules, using the LINK-80 loader, and generate an absolute file.

This compiler also includes many extensions to increase system utility and efficiency — and it performs some object code optimization. An option to list generated object code in 8080 Assembly Language is available.

The Microsoft MACRO-80 Relocating Assembler is an 8080/Z-80 assembler, with complete facilities for macro development. It generates relocatable object modules for use with the Microsoft LINK-80 Linkage Editor. It accepts Intel 8080 and Zilog Z-80 mnemonics, features macros and conditional assembly, and will generate a sorted cross-reference listing — when used with the CREF Cross-Reference Generator (included).

The LINK-80 Linkage Editor, included with this programming system, converts relocatable libraries or modules (such as those produced by Microsoft FORTRAN, BASIC, COBOL and Pascal languages — as well as by the Microsoft MACRO-80 Relocating Assembler and Digital Research's PL/I Compiler) into runnable load modules for direct execution or disk storage.

Capabilities of this linkage editor include options to specify prommable code, and ability to separately specify origin address for code, data segments. Absolute symbol table listing of generated load module may be obtained.

Microsoft's FORTRAN Library includes all FORTRAN mathematical, I/O and utility functions. Using the FORTRAN Library, you can perform a multitude of functions — absolute values, truncation, remainders, maximum values, minimum values, conversion, transfer of signs, positive differences, exponentials, logarithms, sines, cosines, hyperbolic tangents, arctangents and square roots.

The library contains arithmetic routines, conversion subroutines and subprogram linkages. Special functions are provided (INP, CALL OUT, PEEK, CALL POKE and subprogram linkages), which allow for more sophisticated programming.

Routines in the Microsoft FORTRAN Library may be called by — and linked with — mathematical programs created by the MACRO-80 Assembler.

The versatile Microsoft LIB-80 Library Manager, included with CP/M versions of the Microsoft FORTRAN Programming System, allows the building of your own libraries of relocatable modules.

Microsoft FORTRAN is one of the most powerful, sophisticated and impressive programming systems available to microcomputer users. Put it to work today.

This programming system requires a minimum of 40K bytes of Random Access Memory (RAM), dual-drive floppy disk capability, and either the HDOS or CP/M Operating Systems (as listed below).

Microsoft FORTRAN Programming System, supplied on 5.25-inch floppy diskette. For use with HDOS systems.

H-8-20, Shpg. wt. 4 lbs. ....	175.00
Microsoft FORTRAN Programming System, supplied on 5.25-inch floppy diskette. For Heath CP/M systems only. Requires Sublicense Grant (p. 83). HMS-817-2, Shpg. wt. 5 lbs. ....	195.00
Microsoft FORTRAN Programming System, supplied on 8-inch floppy diskette. For Heath CP/M systems only. Requires Sublicense Grant (p. 83). HMS-847-2, Shpg. wt. 5 lbs. ....	195.00



## Microsoft™ COBOL™ Programming System — popular, powerful, business-oriented

**\$395<sup>00</sup>**

- The most popular business-oriented language
- Most Level-I features, many Level-II extras
- Multitude of extra-value utilities

COBOL has always been the number one language for large business data processing systems. Microsoft's COBOL-80 Language System, Version 4.0, makes this powerful and versatile language practical for use on your Heath H-8, H-88 or H-89 Computer System.

Microsoft COBOL-80 far exceeds the minimum specifications of ANSI-74 COBOL, and has so many Level-II features and optional modules that you can easily use COBOL programs written for large computer systems (Minimum required by ANSI Standard) is Nucleus, Table Handling and Sequential I/O, at full Level-I implementation):

MODULE	IMPLEMENTATION LEVEL
Nucleus	Level-I plus these Level-II features:
<p>CONDITIONS — Level 88 conditions with value series or range; use of logical AND/OR/NOT in conditions; use of algebraic relational symbols (&gt;, =); implied subject, or both subject and relation, in relational conditions; sign test; nested IF statements; parentheses in conditions.</p> <p>VERBS — Extensions to ACCEPT and DISPLAY for formatted screen handling; ACCEPTance of data from DATE/DAY/TIME; STRING and UNSTRING statements; COMPUTE with multiple receiving fields; PERFORM VARYING.</p> <p>IDENTIFIERS — Mnemonic names for ACCEPT or DISPLAY devices; procedure names consisting of digits only; qualification of names (in procedure division statements only).</p>	
Table Handling	Level-I some Level-II features
Sequential I/O	Level-I, most Level-II features
Relative I/O	Level-I, some Level-II features
Indexed I/O	Level-I, some Level-II features
Interprogram Communication	Level-I
Library	Level-I
Communication	None
Debugging	Special extensions to ANS-74 Standard providing convenient trace-style debugging
Report Writer	None
Segmentation	Level-I
Sort/Merge	None now; Level-II implementation will be available by late 1981, as an extra-cost option

In addition, Microsoft COBOL has important extensions which make COBOL easier to use in a microcomputer environment:

**Extended debugging facilities**, featuring special extensions to the ANSI-74 Standard which make debugging more convenient;

**And advanced screen handling facilities**, which permit easy forms handling on CRT terminals with cursor control (like the H-19 on page 77).

**COBOL is the ideal language for business data processing** and many other tasks which consist primarily of processing disk files and data bases.

Microsoft COBOL can typically handle a 600-1000 line program, in a computer system with 48K of Random Access Memory (RAM).

**This programming system includes** MACRO-80 Assembler, LINK-80 Linkage Editor, LIB-80 Library Manager, Microsoft COBOL Library and Run-Time Software.

Requires at least 48K RAM, two floppy disk drives (H-47, page 77, recommended for applications involving large disk files), the Heath Standard CP/M Operating System (see page 85) and Customer Software Sublicense Agreement (page 83). For Heath computer systems only.

Microsoft COBOL, supplied on 5.25-inch floppy diskette.

HMS-817-3, Shpg. wt. 5 lbs. .... 395.00

Microsoft COBOL, supplied on 8-inch floppy diskette.

HMS-847-3, Shpg. wt. 5 lbs. .... 395.00



## CP/M® software expands capabilities

With the introduction of the Heath-compatible Standard CP/M Operating System (page 85), we're proud to offer these three compatible utility programs. Each includes full documentation and free updates for one year after purchase, when the registration card enclosed with each software package is signed and returned.

### MAC™ makes it easier to assemble programs

**\$85<sup>00</sup>**

- Uses full Intel-compatible macro definitions
- Full documentation, diskette with macro libraries
- Fully compatible with CP/M's ASM Assembly Language

MAC is Digital Research's optional Macro Assembler, for use with Heath CP/M. Fully compatible with CP/M's ASM Assembly Language, MAC has macros which makes writing Assembly Language programs easier.

Many features are specifically designed for the sophisticated Assembly Language programmer, such as: Additional conditional assembly operators; title and page pseudo-operators; full Intel-compatible macro definitions, including recursive macro calls and disk macro libraries. And MAC also has the ability to generate a SID-compatible symbol table file for use in debugging.

The 168-page manual is practically a textbook on macro assemblers. And the MAC diskette contains a variety of useful macro libraries for performing disk I/O, assembling Z-80 op codes and performing other useful tasks.

Requires H-8 or H-89 with floppy capability, as well as Heath CP/M. For Heath computers only. Both versions identical, except for media.

HDR-817-1, with 5.25" diskette, Shpg. wt. 2 lbs. .... 85.00

HDR-847-1, with 8" diskette, Shpg. wt. 2 lbs. .... 85.00

### DESPOOL™ provides multi-tasking printer operation

**\$50<sup>00</sup>**

- Perform 2 tasks at the same time with your computer
- Print one file, while working on another
- Quick set-up, easy to use

Have you ever had a mountain of work to finish — but you have to wait, because your computer is printing a file through your line printer? Wait no more! DESPOOL gives your system maximum efficiency — by allowing it to do both tasks at the same time! Print one program through your line printer, while continuing to use the assembler, editor, BASIC or an applications program.

When you want the multi-tasking option, just load DESPOOL into memory. DESPOOL takes up very little memory space. When you're ready to use DESPOOL, just type CONTROL-F, wait for the spooler prompt and type the file name — DESPOOL will instantly return your terminal to the previous program, while printing the specified file through your line printer.

DESPOOL requires a Heath H-8 or All-In-One Computer System with floppy disk capability, and the Heath Standard CP/M Operating System.

HDR-817-3, with 5.25" diskette, Shpg. wt. 2 lbs. .... 50.00

HDR-847-3, with 8" diskette, Shpg. wt. 2 lbs. .... 50.00

### Advanced SID™/ZSID Debugging Utility for CP/M

**\$125<sup>00</sup>**

- Get both SID (8080-compatible) and ZSID (Z-80-compatible) — at substantial savings!
- Use with MAC Macro Assembler, other Digital Research/Microsoft products

The SID/ZSID Debugging Utility is an advanced version of CP/M's DDT Debugging Utility. While maintaining all DDT features, SID/ZSID allows the use of the names used at the source level, instead of addresses, in dumping and modifying memory, setting breakpoints and making patches to your program using Assembly (symbolic) Language instead of numeric values.

SID/ZSID also contains advanced features — the ability to draw histograms, showing the execution frequency of a group of subroutines, maintaining pass counts and providing a trace-back of the execution path to selected breakpoints.

SID/ZSID requires the MAC Macro Assembler above, Digital Research's Linkage Editor, or the LINK-80 Linkage Editor, to create the table file used for symbolic references. It functions in a DDT-type mode without symbol file (histogram, traceback and other advanced features will still function. Requires Heath CP/M. Both versions identical, except for media.

HDR-817-2, with 5.25" diskette, Shpg. wt. 2 lbs. .... 125.00

HDR-847-2, with 8" diskette, Shpg. wt. 2 lbs. .... 125.00



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**SOFTSTUFF**—quality software tools at affordable prices. All programs have been checked and confirmed on the hardware indicated. Documentation has been fully reviewed. SOFTSTUFF products are supplied on 5.25-inch floppy disks (unless otherwise indicated), and are shipped postpaid. Specify operating system (HDOS or CP/M) when ordering.

## Keep your books up to date with General Ledger II

This software package includes powerful programs for entry, maintenance, reporting and analysis of accounting data. Features include Custom Chart of Accounts to determine account names and numbers. Use any numbering system, with or without decimal notation; Comprehensive Printouts upon request, in 96-column format;

Double Entry and Automatic Entry Checking to check debits and credits with each entry; One-Keystroke Data Entry; Account Verification to prevent entries to non-existent accounts, reject active account numbers; New Account Facility to open new accounts during data entry, with no disruption to the transaction being entered; Balance Reporting to call up any balance during data entry and update balances with new transactions; Audit Trail, to provide a source number and free-form description.

Includes listings, sample printouts. Requires Microsoft™ BASIC™ (p. 86).  
 SF-9004, for HDOS systems, Postpaid ..... 124.95  
 SF-9104, for CP/M systems, Postpaid ..... 124.95  
 Manual. Purchase price refunded when complete package is purchased.  
 595-2500, Postpaid ..... 15.00

## Know what's in stock with Small Business Inventory

Provides complete business inventory analysis. Alpha-numeric part numbers to 12 characters, 18-character part descriptions. Twelve items of information, including reorder level, usage history by month and year-to-date. Printouts include all information, part number/description/price, reorder list. Requires MICROSOFT BASIC (p. 86) and H-19 (p. 77).

SF-9005, for HDOS systems, Postpaid ..... 89.95

## Pong Set — three fast-paced games to play

Handball — you play against the walls. Full X-Y paddle movement. No scoring; designed to prepare you for Pong. Pong — popular 2-player game. Score automatically tallied by computer. First player to reach 21 wins. Special features include sound effects and various angle deflections off sections of paddle. QPong — same as Pong, but play against the computer — and you'd better be good. Requires H-8 with 32K RAM, HA-8-3 Color Graphics Board (p. 76) and joystick.

SF-8009, for HDOS systems, Postpaid ..... 29.95

## Game Combo: UFO and Blackjack

UFO — shoot down UFOs as they fly. Random speed, direction changes. Automatic scoring. Colorful explosions and exciting sound effects. Blackjack — for 1 player. Start with \$500. Hit, stand, double your bet. Computer deals, keeps score. Dealer must hit on 16 or less. Requires H-8 with 32K RAM, HA-8-3 Board and a color monitor like the GDZ-1320 (page 76).  
 SF-8010 (both games), for HDOS systems, Postpaid ..... 29.95

## C BASIC Language for more programming flexibility

C BASIC is a disk-extended BASIC — a non-interactive BASIC language with pseudo-code compiler and run-time interpreter. Supports full file control, chaining, integer and extended precision variables.

SF-8107, on 5.25" disk, for CP/M systems, Postpaid ..... 110.00

SF-8108, on 8" disk, for CP/M systems, Postpaid ..... 110.00

## Translate to machine code with BDS C Compiler

Supports most C Language features — structures, arrays, pointers, recursive function evaluation and overlays. Linking loader, library manager, library with general purpose, file I/O and floating point functions and reference book. Initializers, statics, floats and longs not included.

SF-8006, for HDOS systems, Postpaid ..... 119.95

SF-8106, for CP/M systems, Postpaid ..... 119.95

## Write programs faster with Microsoft MACRO-80 Package

MACRO-80 Assembler generates relocatable object modules for LINK-80 Editor. Accepts Intel 8080, Zilog Z-80 mnemonics. Generates sorted cross-reference listing when used with CREF (included). LINK-80 converts relocatable libraries or modules — from MACRO-80, other languages/compiler — into runnable load modules for execution, disk storage. Specify programmable code, origin address for code and data segments. Absolute symbol table listing of generated load module available. For H-8, H-89.

SF-8002, for HDOS systems, Postpaid ..... 69.95

## Full Screen Editor for more efficient programming

Uses H-19 or H-89 screen as a window into a file. Type changes anywhere on screen. Function keys perform character and line insertion/deletion functions. String search, move and copy single and multiple lines, scrolling of text in the window. For Heath H-89 or H-8/H-19 systems.

SF-9000, for HDOS systems, Postpaid ..... 49.95

SF-9100, for CP/M systems, Postpaid ..... 49.95

## Text Formatter for use with your Text Editor

Performs full and justification (straight right margin) functions. Page numbering, headers and footers, indents, hanging indents, centering and underlining. INCLUSION allows automatic insertion of up to 26 user-defined strings, merging of documents. For H-89 or H-8/H-19 systems.

SF-9001, for HDOS systems, Postpaid ..... 54.95

SF-9101, for CP/M systems, Postpaid ..... 54.95

## Keep records in order with SORT

Very fast Assembly routine sorts records, to 255 chars. User-defined sort fields. Called by MICROSOFT BASIC or stand-alone. Includes source code.

SF-8004, for HDOS systems, Postpaid ..... 29.95

## CPS gives you access to more information

Permits file transfer between Heath computer and MicroNET™ Information Services. User-defined keys for auto log-in, mail check. Full error checking, elapsed time clock on screen. Ideal for time-sharing systems.

SF-9003, for HDOS systems, Postpaid ..... 39.95

SF-9103, for CP/M systems, Postpaid ..... 39.95

## RTTY Communications Processor — more fun for Hams

Split-screen feature lets you copy incoming messages, while editing outgoing messages. On-screen graphics present complete system status: time, CW ID, ASCII or Baudot operation. Disk-based autostart.

SF-9006, for HDOS systems, Postpaid ..... 99.95

## Exciting H-8 Computer Games

In 1200 baud cassette form, requires H-8 Computer and H-8-5 Interface to load. Not for H-89, H-8-4.

Biorhythm tells you when to face the world, when

to stay in bed. Requires Extended BASIC, 16K RAM.

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

Space War lets you command the starship-Enterprise on a galactic journey, fighting Klingons and solving problems. Requires 24K or more RAM.

PA-83, Shpg. wt. 1 lb. .... 10.00

Game Set #1 w/Craps, Orbit, Tic-Tac-Toe, Nim, Hexapawn, Hangman, Hamrabi and Derby. Requires 8K RAM.

PA-84, Shpg. wt. 1 lb. .... 10.00



## Heath Computer owners and buyers: join HUG



Heath  
User's  
Group

Join the Heath User's Group (HUG) and keep up-to-date on the latest computer hardware/software developments, while you expand your utility and applications software capabilities!

### Here's what a HUG Membership gives you:

- 1) A one year's subscription to REMark Magazine (10 issues) — an exclusive periodical for HUG members only. It provides you with two important services: a) Sneak previews on the newest Heathkit computer products and b) A written medium where you and other members of HUG can share new hardware modifications, software enhancements, application programs, and other ideas.
  - 2) Special access to The HUG Software Library — where you can order over 500 low-cost programs for your H-8, H-88, or H-89 computer. The programs are stored on cassettes and disks, and written by HUG members (see list below).
  - 3) The HUG Software Library Catalog — listing each program in the library by program name, program description, program language, version, equipment required to run the program, and HUG author.
  - 4) A chance to win valuable prizes by competing in HUG Software Contests — a great way to further your program-writing expertise and have fun at the same time. Besides valuable gifts, winners have their names printed in REMark.
  - 5) A vinyl-covered, three-ring binder — with inside pocket containing the HUG handbook. It explains more about the group: why it was started, how members participate (some members have even formed local groups to increase the benefits of belonging to HUG), plus hints on making the most of your membership.
- Here's a quick peek at just some of the different program titles available from the HUG Software Library to its members:

- HUG Editor
- PAGE EDITOR
- Time for HDOS
- File Cruncher
- Floating Point Package
- Fixed Point Package
- Graphic Hanoi Game
- Cross-Reference Utility
- Disk Dump Utility
- Disk DUP Utility
- Disk Relabeler
- Programs for Printers
- HDOS Device Drivers
- Basic Renumbering Program
- Modem Packages
- Text Processors
- Sort Utilities
- Disk Recover Utilities
- Small Business Packages
- Loan Amortization
- Real Estate Programs
- Home Budget Maintenance
- Checkbook Programs
- Credit Card Management
- Adventure Game
- Memory Test Programs
- Mailing List
- Disassemblers
- Master Catalog System
- Solar Domes
- Tax Programs
- Morse Code
- Music
- Antenna Design Programs
- Power Supply Design
- Stock Programs
- Weather Forecasting
- Pilot (Language)



- Payroll
- Inventory Package
- Finance
- Games and Graphic Games
- 11 disks of CP/M® Programs
- OSCAR Locator

With every Heath Computer you purchase, you'll find a HUG membership application enclosed. But if you missed out on that opportunity to join the Heath Users Group, why not fill out the application below — or write to HUG Membership, Hilltop Road, St. Joseph, MI 49085.

	HUG Membership Rates (per year, U.S. Funds)		
	U.S.	Canada & Mexico	International
New Members:	\$18	\$20	\$28
Renewal	\$15	\$17	\$22

Send to: HUG Membership, Hilltop Rd., St. Joseph, MI 49085

Yes, I want to become a member of HUG and take advantage of keeping up-to-date on the latest Heath computer developments, while I increase my utility and applications software library.

I've enclosed \$ \_\_\_\_\_ (U.S. Funds only) to cover my membership.

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City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

(Check one)  U.S.  Canada or Mexico Country \_\_\_\_\_

Signature: \_\_\_\_\_

## Get more out of your computer system with these helpful books



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**Getting Acquainted With Microcomputers.** A 228-page guide explaining what microcomputers can do. EDP-275 ..... 8.95

**8080 Machine Language Programming For Beginners.** A guide to 8080 machine language for new computerites. EDP-272 ..... 7.95

**PDP-11 Programming Fundamentals.** How to program your PDP-11 computer with assembly language and get the most out of it. EDP-239 ..... 10.00



**Fortran IV Self-Teaching Guide.** Teaches you High-level computer programming in FORTRAN. EDP-279 ... 8.95

**101 Basic Computer Games.** 250-page book describes new computer games that the entire family can play. It's the only collection containing a complete listing, sample run, and description of each game. EDP-237 ..... 7.50

**The Software Gourmet Guide and Cookbook.** This 218-page publication offers you new ideas for your 8080A computer. Ideas include: general purpose routines, programming time delays, random number generators, and six appendices. EDP-228 ..... 12.95



**Basic Software Library, Volume II.** This volume of the Basic Software Library includes basic computer programs in the fields of engineering and statistics. EDP-241 ..... 24.95

**Basic Software Library, Volume III.** Advanced business programs in this book help cut clerical costs. EDP-242 ..... 39.95

**Basic Software Library, Volume IV.** Includes general purpose computer programs for many applications. EDP-243 ..... 9.95

(Book ordering information on page 52.)



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## Effective Pascal Programming Course helps you learn this powerful computer language

**NEW**  
**\$99<sup>95</sup>**

- Pascal is an ideal language for beginning programmers, as well as more experienced computer users
- Heathkit/Zenith brings you a self-instruction course on Pascal — the newest and most powerful programming language available for microcomputer systems
- Uses field-proven Heathkit/Zenith self-instruction methods
- Audio-tutorial format — a 500-page self-instruction text and five audio cassette tapes let you see AND hear each concept of the Pascal language as it is presented

Pascal — modular, sophisticated, powerful. And now, easy to learn: If you've been around programming languages or even if you're new to computers, you have probably heard about Pascal. Pascal is the new, structured and very adaptable programming language that has quickly swept into popularity.

**Why Pascal?** This modern programming language implements the best ideas that have been developed by computer programmers over the past twenty years. It is designed to be readable, reliable and simple. The Pascal language has gained these characteristics because of the language's strict adherence to the best ideas of structured programming.

Pascal incorporates these structured programming features: Top-Down Detail, where overall structure can be established before adding details; and Modular Organization, which makes fixing programming errors easier than with other programming languages. Segments of a Pascal program can be isolated and tested independently from the rest of the program.

**Learn Pascal from this Heathkit/Zenith course:** Now, Heathkit/Zenith Educational Systems has placed the Pascal language into a structured learning course. Our Pascal Course is the result of the combined talents of highly qualified programming instructors, with assistance from specialists in instructional design.

**Proven audio-tutorial methods make learning easier:** Whether you're new to computer programming, or already accomplished in one or more languages, Heathkit/Zenith makes the Pascal language easier to learn. A 500-page self-instruction text is reinforced by five audio cassettes.

**Ten modules guide you through the process of learning Pascal:**

The **Introduction** shows how to identify and write simple Pascal programs. It also covers constants and variables, expressions, input and output. In **Modular Programming**, students learn to identify and write



correct self-contained procedures. Functions and scoping rules are also covered. Students find out how to make decisions in Pascal while studying. **Module 3, Making Decisions.** This module teaches students how and when to incorporate IF...THEN...ELSE and CASE statements in Pascal programs, as well as how to use Boolean variables. **Module 4** covers REPEAT...UNTIL, WHILE...DO and FOR loops. **Module 5** discusses Pascal data types and teaches you how to declare your own data types.

**Module 6, Arrays and Character Strings,** shows how to use arrays in solving problems. Students write and trace programs involving arrays. **More About Procedures, Module 7,** covers the writing of complete and correct Pascal procedures, to perform the desired tasks. It also discusses the application of scoping rules to determine how and what objects are handled inside and outside of a procedure. Students learn about Records and Sets in **Module 8.**

**Module 9, Pointers,** covers the difference between pointers, linked lists, stacks, queues, binary trees and other statements. The last module covers sequential files and standard Pascal files, so that you can store files or data on disks.

To earn 4.0 Continuing Education Units (CEUs) and a Certificate of Achievement, pass the optional final examination with a 70 percent or better score after completing this Heathkit/Zenith Course.

EC-1111, Shpg. wt. 7 lbs. ....99.95

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## Assembly Language Course speeds program runs

**\$49<sup>95</sup>**



- Self-instruction format for effective learning
- Hands-on experiments reinforce self-study
- Use your computer's entire memory capacity
- Store more information in less memory space
- Execute computer programs much faster

In Assembly, no time is wasted interpreting, so programs run much faster. And, using Assembly, changes can be accomplished easily.

Our Assembly Language Course teaches you at your own pace, using a special 400-page self-instruction text. A workbook provides hands-on training with programming experiments — you perform experiments on your own computer. Computer required for experiments. This program is designed for 8080, 8085 and Z-80 microcomputers — including the Heath H-8, H-88 and H-89 Computers.

Includes text, workbook and instruction placard with ASCII code chart and all 244 Assembly Language instructions. Score 70% on the optional final exam to earn 6 CEUs. Classroom version of this Course on page 46.

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

## BASIC™ Course lets you talk to your computer

**\$44<sup>95</sup>**



- BASIC is one of the easiest computer languages to write
- BASIC is easy to learn with this field-proven self-instruction course
- Use with any BASIC-programmable computer
- College credit now possible with new exam

Fourteen programmed-instruction segments help you get a grasp on BASIC — including numbers, statements, syntax, functions, loops, lists, arrays and strings.

Learn to define and plan a program, format and write it, how to adapt programs.

Includes text, workbook with experiments and handy reference cards. Earn 3.0 CEUs — score 70% on the optional final exam. Classroom version on page 46.

EC-1100, Shpg. wt. 7 lbs. ....44.95



**College-Level Examination,** recognized by American Council on Education. Many colleges grant credit for acceptable grades. Check with your college first, to determine its policy. See page 35.

ECC-1100, Shpg. wt. 1 lb. ....25.00



Credit Card Orders Call TOLL-FREE: 800-253-0570

## COBOL™ Self-Instruction Course introduces you to this popular business computer language

**\$149<sup>95</sup>**

- COBOL — used in most commercial data processing systems
- This Course is priced lower than most COBOL courses
- Field-proven self-instruction techniques make learning the COBOL Language easier than before
- Learn how to write COBOL Language programs — encoding arithmetic logic and control statements

Almost all commercial data processing systems, as well as computer mainframes used by the Federal Government, use the COBOL Language. COBOL is especially useful in any application which involves manipulation of large, highly structural data files. It's more efficient in these applications than BASIC, and gives the programmer far greater productivity than Assembly Language. COBOL is used in accounting functions, inventory control and other business applications. It's more self-documenting; you see each step of each operation.

Now, there's a COBOL Course designed for beginning programmers — at the right price. The Heathkit/Zenith COBOL Course is priced far below the competition. It covers the basics of encoding, input characteristics, program hierarchy, identification, environment, data and procedure divisions. Both the ANS 74 and ANS 68 versions of COBOL are used in the course.

COBOL Programming uses the effective audio-tutorial learning method. You get a clearly written self-instruction textbook full of diagrams, tables, illustrative programs and unit tests.

A set of nine audio cassettes complements the student textbook, allowing you to hear AND see each concept as it's presented.

The student textbook covers these aspects of the COBOL Language: a sample COBOL Language program; program variations; the structure and syntax of COBOL; simple arithmetic statements, comments and diagnostics; advanced arithmetic and control statements; additional data concepts; magnetic tape and disk concepts; and an applied COBOL program.

A set of six practice COBOL programs is located at the end of the workbook. You



can work on them at specified points in the course — or you may prefer to wait until the end of the text. A master COBOL coding sheet is also included. Use it as an aid in writing your COBOL programs.

If you pass the optional final examination with a score of 70 percent or better, you'll earn 3.0 CEUs and a Certificate of Achievement.

Learn the programming language that thousands of businesses use world-wide. Order the Heathkit/Zenith COBOL Programming Course today. To get the most out of COBOL Programming, we recommend that you use a Heath H-89 (page 70) or H-8 (see page 72) Computer System with floppy disk storage capability, the Heath CP/M Operating System (offered on page 85) and the Microsoft™ CP/M COBOL Programming System (sold on page 87).

EC-1105, Shpg. wt. 7 lbs. .... 149.95

## Computer Concepts for Small Business helps in Computer decision



**\$49<sup>95</sup>**

- Learn how to determine data processing requirements for your small business concern
- Uses field-proven self-instruction
- Audio cassettes let you see and hear each important concept

When you consider making a computer investment that can run into thousands of dollars, you need to know as much about computers as possible — before making the investment. The Heathkit/Zenith Computer Concepts for Small Business Course is designed to give you the information and understanding you need to evaluate the usefulness of a computer in your business.

Proven self-instruction methods are used in the text. Three audio cassettes, as well as three appendices to the text, reinforce the text material.

Four concise, easy-to-understand units give you everything needed to intelligently evaluate how a computer can benefit your business. The Computer and How it Works covers types of memory, input/output devices, capabilities of different types of storage media and applications software. It explains the typical tasks a computer can perform in a small business.

The Data Processing Department and Personnel teaches you how to organize a data processing (DP) department. It explains the roles of the DP manager, data processing engineer, systems analyst, operator and other personnel. Alternatives in Computer Services compares the advantages of owning your own computer, versus time-sharing or a service bureau.

How to Select a Computer shows you how to define and fulfill your data processing requirements.

A 70% or better score on the optional final exam earns 1 CEU and a Certificate of Achievement.

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

### MONEY-BACK GUARANTEE

If not satisfied, return materials and proof of purchase for refund of purchase price.

## Personal Computing teaches you microcomputers, BASIC™ programming



**\$39<sup>95</sup>**

- Learn how a computer can help you
- This course explains computers in everyday terms, so little technical knowledge is required
- Self-instruction text and cassettes make learning more effective

Are you interested in computers? The Heathkit/Zenith Personal Computing Course shows you how to determine if your particular problem can be solved by a computer. You'll also be able to cut through the technical fog, and understand what a computer can do — in easier, simpler terms.

No extensive math, electronics or computer background needed: The self-instruction textbook, supported and reinforced by two audio cassettes, lets you see and hear each concept in our Personal Computing Course. Five easy-to-understand units explain different parts of the computer system:

In Computers and Data, you'll find out how to apply the capabilities of a computer to your specific problems. You will see how computers "understand" electronic data — and how to convert written words into electronic data.

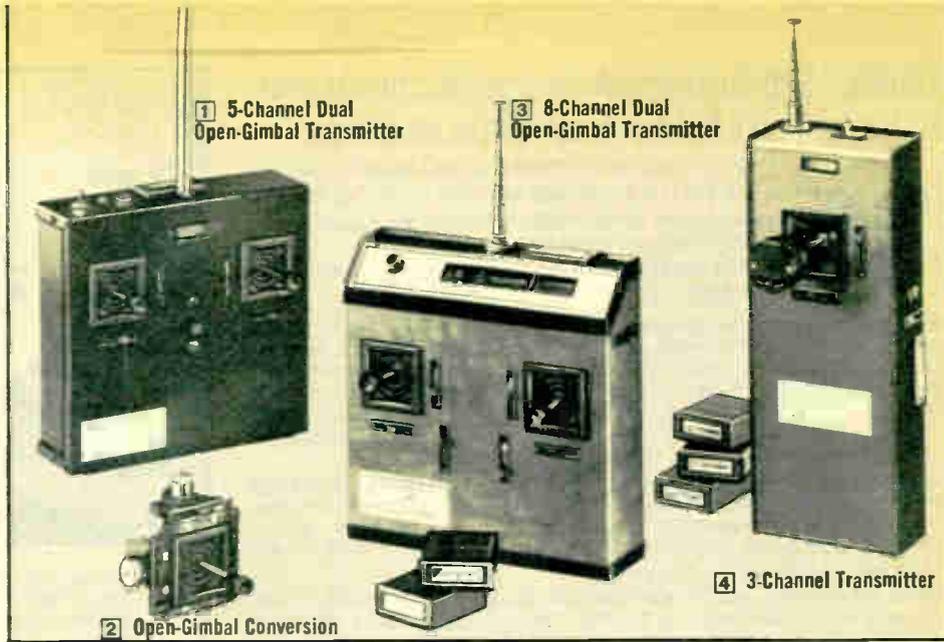
The Hardware unit shows you how to compare computers, by understanding how each computer performs. Systems and Interfacing teaches you how to evaluate small computer systems, by understanding how different system components perform. You will find out how the computer communicates with other components, and how to distinguish between analog and digital data. Software shows you how to choose software programs that help solve problems.

In the last unit of this Heathkit/Zenith Course, you'll actually learn to write short programs using BASIC. Pass the optional final exam with a 70% or better score, to earn 1 CEU.

EC-1000, Shpg. wt. 5 lbs. .... 39.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411



## Choose our patented Heathkit Pack-17™ R/C system for years of family enjoyment and value

Heathkit Pack-17 R/C is a radio control system you can grow with as your interest and ability in R/C modeling increase. So unique that we hold a patent on it, Heathkit Pack-17 R/C gives you a choice of 17 different transmit and receive modules. With this capability of instant frequency change, you don't have to wait when someone else is on your channel. Rechargeable nickel-cadmium batteries save you money. And Heathkit Pack-17 R/C gear can be used with every kind of R/C model. So start right by starting with the one you can grow with — Heathkit Pack-17 R/C.

### 1 For real value and real control, choose the Heathkit 5-Channel Dual Open-Gimbal Stick R/C Transmitter

This exciting Heathkit 5-Channel Dual Open-Gimbal R/C Transmitter gives you dual-stick control of four R/C channels (with ratchet or spring return, as you prefer) plus a switch-activated auxiliary channel for retracts or other switched functions. Since you build it yourself, you can tailor stick to channel to suit your needs by interchanging throttle and elevator controls between right and left sticks. The latest design open-gimbal sticks provide you with smoothness and control you'll really appreciate as you run your models through their paces. Performance-proven circuitry will provide you with years of reliable, trouble-free operation. Famous Heathkit plug-in module capability means you can change frequencies in an instant. The value-packed Heathkit GDA-1919-1 Transmitter includes your choice of one plug-in frequency module — specify the frequency you want from the list at the top of column one on the next page (no model number needed). Nickel-cadmium batteries and charger are included to save you money. The comprehensive Heathkit step-by-step instruction manual assures easy kitbuilding and do-it-yourself service, to save you more. For even greater savings, order your GDA-1919-1 Transmitter as part of a complete Heathkit R/C system from the next page.

Kit GDA-1919-1, Shpg. wt. 4 lbs. .... 129.95

### 2 Up-date your older model Heathkit R/C Transmitter with this Open-Gimbal Conversion Kit

Here's good news for owners of Heathkit GD-1205-D and GD-505-D R/C Transmitters. You can now get the convenience and control of open-gimbal stick R/C with this easy-to-install conversion kit. The GD-1419 Kit includes two sticks.

Kit GD-1419, Shpg. wt. 1 lb. .... 37.95

### 3 Top-of-the-line 8-Channel Dual Open-Gimbal Transmitter

This Heathkit top-of-the-line 8-Channel R/C Transmitter gives you open-gimbal stick convenience, too! Two control sticks and a retractable landing gear switch

provide control of five servos. Three auxiliary controls allow control of three more servos. Four trim tabs allow you to make fine adjustments to the first four channels, without changing stick position. It includes your choice of one plug-in frequency module from the 17 frequencies listed on the opposite page (specify frequency wanted when ordering — no model number needed). This kit includes a money-saving rechargeable 9.6 volt nickel-cadmium battery pack and recharger. To save even more, order your 8-Channel R/C Transmitter as part of a complete system from the next page. This easy-to-build kit comes with complete step-by-step instructions, and all the solder you need.

Kit GDA-1205-0G, Shpg. wt. 5 lbs. .... 149.95

**GDA-1205 AND GDA-1919-1 SERIES SPECIFICATIONS: TRANS. —** RF Frequency: crystal controlled, all bands. Frequency stability: within  $\pm 0.005\%$  on 27 MHz; within  $\pm 0.002\%$  on 53 MHz; 72 MHz. Temp. Range: 0 to 160°F. RF Output Circuit: pi network. Power Supply: 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-1919-1, 5 channels (4 with trim), on/off switch. 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  $\mu$ V or better. Selectivity: 6 dB down at  $\pm 4$  kHz; 30 dB down at  $\pm 9$  kHz. Current Drain: 10 mA. Intermediate Frequency: 453 kHz. Power Supply: 4.8 V battery pack (GDA-1205-3). Controls: On/off switch. Dimensions: 5/8" H x 1 1/4" W x 1 3/4" D. Net Weight: 2 ozs.

### 4 Now get a 3-Channel Transmitter with rechargeable batteries

The convenience and versatility of plug-in frequency change, and it's the only 3-Channel Transmitter we know of that includes rechargeable nickel-cadmium batteries and an external charger. So you can fly with full power and uncompromised performance. This 3-Channel Pack-17 outfit features a 2-axis stick assembly, and easy-to-handle Transmitter with a convenient strap for one-hand operation. An optional conversion pack lets you go 4-channel by adding another channel to the stick. All three stick channels have trim control, the 4th channel is controlled by a thumb tab. Compatible with all Heathkit servos. Includes one frequency module of your choice (when ordering specify frequency from list on next page — no model number needed).

Kit GDA-1405-1, Shpg. wt. 5 lbs. .... 99.95

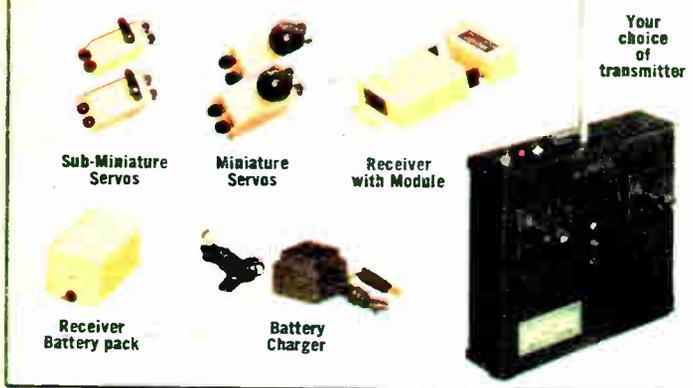
Kit GDA-1405-3, 4-Ch. Conversion, Shpg. wt. 1 lb. .... 14.95

**GDA-1405-1 SPECIFICATIONS: TRANSMITTER —** RF Carrier Frequency: one frequency, crystal-controlled on 27 MHz, 53 MHz or 72 MHz bands. Operating Temperature: 0°-160°F. Controls: 3 channels (two with trim); ON-OFF switch. Optional fourth channel. Power Supply: Internal 9.6V, 500 mA hours, nickel-cadmium battery. Rechargeable simultaneously with receiver battery at 35-40 mA from external charger. Dimensions: 9½" H x 3 1/8" W x 2¼" D (24 cm H x 9.5 cm W x 5.7 cm D).



## Heathkit Pack-17™ saves where it counts —

in the pocketbook, not in performance. Heathkit Pack-17 R/C outperforms top-of-the-line assembled systems. When you select a Heathkit Pack-17 R/C System, you save twice: first when you buy, and again when you build.



## Pack-17 lets you change frequencies in seconds without buying a new transmitter or receiver

**NOTE:** Amateur Radio License required for operation on 53 MHz band. Class C License required for operation on 27 MHz and 72 MHz bands. When ordering specify exact frequency desired (see list below).

Transmit Module, 1 lb. . . . . 24.95      Receive Module, 1 lb. . . . . 19.95

**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, 72.16, 72.24, 72.32, 72.40, 72.96, 75.640 MHz. (When ordering specify transmit or receive. No model number needed).

### SPECIAL 5-MODULE OFFER — SAVE 94.55!

5 Transmit and 5 Receive Modules of your choice. 2 lbs. . . Only \$129.95

## High-quality Heathkit Servos, Receivers and Batteries

SERVO COMPARISON CHART	Miniature GDA-1205-4	Sub-Miniature GDA-1205-5	Hi-Torque GDA-1205-8
Idle Current (max.)	20 mA	12 mA	20 mA
No Load Current	80 mA	80 mA	150 mA
Stall Current (nom.)	600 mA	450 mA	1000 mA
Thrust	3 lb.	3 lb.	38 in. oz.
Travel Time	0.6 sec.	0.6 sec.	0.4 sec.
Rotary Travel	90°	90°	90° or 180°
Dimensions (HxWxL*)	1 5/8 x 1 1/4 x 2 3/32"	1 1/4 x 3/4 x 2 3/32"	1 5/8 x 1 1/4 x 2 3/32"
Net Weight	1.75 oz.	1.25 oz.	1.75 oz.

All servos: Power Requirement: 4.8 VDC. Position Accuracy: 1%. Output: 1 rotary arm, 1 rotary wheel. Input Signal: Pulse, 1-2 msec, 4V P-P. Temperature Range: 0° to 160° F. Backlash: <0.002". \*H includes outputs, L includes mtg. ears.

Kit GDA-1205-5, Sub-Min. Servo. Shpg. wt. 1 lb. . . . .	29.95
Kit GDA-1205-4, Miniature Servo. Shpg. wt. 1 lb. . . . .	29.95
Kit GDA-1205-8, Hi-Torque Servo. Shpg. wt. 1 lb. . . . .	34.95
Kit GDA-1205-2, Receiver with 1 Frequency Module. 1 lb. . . . .	59.95
Kit GDA-1205-3, Receiver Battery Pack. 1 lb. . . . .	14.95
Trainer Link Accessory. Takes the danger of crashing out of learning. Lets you hook up two 1205 transmitters for flight instruction so your instructor can take control and save your model should you get in trouble while learning to fly.	
GDA-1205-6, Shpg. wt. 1 lb. . . . .	10.95

## Complete your R/C system with the Cessna 172

This beautiful, maneuverable Cessna 172 model airplane is constructed of rugged plastic and foam. It features a big, big 48" wingspan, and even includes engine. Assembly required. Order with an R/C system below and save \$10.00.

RP-1172, Airplane & engine (without system), Wt. 8 lbs. . . . . 79.95



Includes Fox .25 engine, fuel tank and line, glass-filled nylon mount, wheels, prop and hardware. All you need to add is fuel and R/C equipment for the flying thrill of a lifetime.

## Save big when you purchase a complete R/C System

**Save nearly \$100 on this 5-Channel Open-Gimbal Stick System:** Includes the GDA-1919-1 Open Gimbal Stick Transmitter described on the opposite page, plus one plug-in frequency module, receiver and one plug-in frequency module, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, this system would cost you up to \$324.65. Save nearly \$100 by getting the complete 5-Channel Open Gimbal Stick System! (Specify frequency modules from left — no model number needed).

GDS-1919, Shpg. wt. 9 lbs. . . . . 229.95

**Save \$74.70 on this 8-Channel Dual Open Gimbal Stick System:** Includes the GDA-1919-0G Open Gimbal Stick Transmitter described on the opposite page, plus one plug-in frequency module, receiver and one plug-in frequency module, receiver battery pack, and four servos (choice of miniature, subminiature or both). If purchased separately, this system would cost you up to \$344.65. Specify frequency modules from left — no model number needed.

GDS-1205-0G, Shpg. wt. 11 lbs. . . . . 269.95

**Save \$10.00 — get the Cessna 172 as part of a system**

Buy the RP-1172 Cessna 172 plus either system above and deduct \$10.00.

**BONUS:** Receive the Radio Control Handbook free with the purchase of either system above. Specify GDA-1205-7 on your order.

## Get higher performance with Thumb Tach®

The Thumb Tach measure rpm without physical connection to your engine. 0-5000 and 0-25,000 ranges. Ideal for needle valve adjustment, selection of glow plugs, performance tuning of engines. One-evening kit.

Kit GD-69, Wt. 1 lb. . . . . 29.95

## R/C Battery Monitor for sure power

Expanded scale voltmeter checks capacity (under load) of batteries. Includes meter, connector for all Heathkit battery packs, clips and case. One-evening kit.

Kit GD-1188, Shpg. wt. 1 lb. . . . . 14.95

## R/C Handbook teaches from ground up

This book is a must for the R/Cer's library. It explains the basics of radio control, covering most conventional control systems. (See page 52 for book-ordering information). EOP-159 . . . . . 11.95



FAST, EASY  
1-EVENING KIT



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

## Pro-Series High Fidelity Components — designed and engineered for audio enthusiasts who demand the finest in high fidelity equipment

### 1 Get lower distortion with this Digital FM/AM Tuner

This Tuner has these features for cleaner reception: A digital display for exact station frequency tuning. A selectable wide/narrow IF bandwidth for low distortion reception normal station density areas, and more listenable stations in congested band areas. An Antenna input attenuator to reduce cross modulation. A switchable signal-strength/multipath meter and scope output for precise antenna orientation and maximum signal reception. And a Dolby option for increased dynamic range and reduced noise. All encased in an EIA rack compatible chassis measuring: 5¼" H x 19" W x 14" D.

In addition, the Tuner has these FM specifications for better listening: Sensitivity: 1.8  $\mu$ V (10.3 dB $\mu$ /3.5  $\mu$ V (16.1 dB $\mu$ ), usable; 2.5  $\mu$ V (13.2 dB $\mu$ /35  $\mu$ V (36.1), @ 50 dB SN, mono/stereo for receiving distant stations. S/N: 83/75 dB mono/stereo for dynamic range that surpasses most station transmissions. Hum and Noise: 75 dB. Freq. Resp.: 20-15,000 Hz  $\pm$ 0.5 dB. THD: <0.1% for authentic reproduction. IM Dist: <0.5%. Capture Ratio: 1.2 dB. Selectivity: 40/80 dB. AM Sensitivity: Ext. Antenna: 30  $\mu$ V; Radiated, 250  $\mu$ V/meter. Power Req. 120 VAC. Kit AJ-1600, Shpg. wt. 25 lbs. .... 399.95  
AJA-1600-2, Dolby FM Noise Reduction Module, 1 lb. .... 49.95  
AEA-1800-2, Oak-Finished Cabinet, 6 lbs. .... 29.95

### 2 The Versatile Preamp with the great review

In Stereo Review, Julian Hirsch stated: "In sum, the Heath AP-1800 does practically everything one could want, and does it with perfection."

Yes, everything one could want: One moving coil head amp, plus 2 moving magnet cartridge inputs with 3 cartridge sensitivities and capacitance selections to match any turntable cartridge. Tape monitoring for 2 decks, plus deck-to-deck dubbing with the ability to listen to any source. Separate bass and treble tone controls for each channel, with 2 turnover points (bass 250 or 500 Hz, treble 2.5 k or 5 kHz) for precise tone control. Plus, tone bypass for pure listening. Continuous loudness compensation for good response at any volume level (designed with the latest psychoacoustical data). A 32 step precision attenuator for exact volume control. A unique L-R mode for system balancing, as well as L,R, L+R, stereo and stereo reversed channels. Plus adapter loops for equalizers, noise processors, and other accessories. All enclosed in a EIA rack compatible chassis measuring 5.22" H x 19" W x 11.25" D.

And with perfection: Frequency response: 20-20,000 Hz,  $\pm$ 0.2 dB, phono; 20-20,000, +0, -2 dB, high level. THD: <0.02% hi-level, 0.03% phono; A-weighted S/N: 85 dB hi-level, 75 dB M.C. phono. IHF IM: <0.01%. TIM: <0.02%. Kit AP-1800, Shpg. wt. 27 lbs. .... 349.95  
AEA-1800-2, Oak-Finish Cabinet, 6 lbs. .... 29.95

### 3 Introducing the Ten Band Octave Equalizer

Improve the sound of your music without the expense of purchasing a whole new system. Find out how — turn the page for the complete story.

### 4 Active Audio Processor — for wider dynamic range

You're probably not hearing all your music. Learn why by turning the page.

### 5 Add more bass with this Electronic Crossover

Discover the richer bass this component can help add to your present system. To learn more about this amazing component, turn the page.

**SAVE  
5%**

**When you buy regularly-priced Heathkit Stereo High Fidelity Systems**

Order a receiver & a pair of speakers; or an amplifier, pair of speakers, & program source. Add up cost, then deduct 5% (exclud. shpg. & hndg.).

Discount doesn't apply to system specials on pp. 95, 98, 89.

### 6 For precise monitoring — The AD-1701A

Safeguard your components and tapes with the AD-1701A Graphic Output Indicator. With its 30 LEDs (15 for each channel), it gives you a visual readout of your amplifier or preamplifier output. It can warn you of dangerous peak loads that can overheat your system or blow your tweeters. What's more, the AD-1701A accurately monitors your system's output with a 50 dB dynamic range. A peak/hold button allows you to supplement your tape deck's restricted meters, thus making more precise, low distortion recordings. Fits standard 19" racks. Measures: 2" H x 19" W x 13" D. For 120/240 VAC, 50/60 Hz power sources.

Kit AD-1701A, Shpg. wt. 15 lbs. .... 159.95  
AEA-1800-3, Solid-Oak Panels, Shpg. wt. 2 lbs. .... 14.95

### 7 Our most powerful amplifier — the AA-1800

Has all the power you need to drive wide dynamic range speakers, and operate your system at live performance levels. Turn the page for details.

### 8 A proven performer — The AA-1600 Stereo Amplifier 125 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN .05% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

Here's an amplifier with 125 Watts per channel and a 2.0 dB dynamic headroom to reduce clipping and operate your speakers at their maximum dynamic range. No matter what the source — tapes, records, or broadcast — the AA-1600 amplifies your music with clarity. The transient intermodulation distortion is less than .05%, and hum and noise are a full 100 dB below 125 W (90 dB below 1 watt). And with the AA-1600, your speakers are safely interfaced. It features rugged output devices and does away with dissipation limiters to eliminate tweeter-damaging pops and clicks. It also has a special 8-second turn-on delay to safeguard your speakers from thumps and pops.

Like all our Pro-Series High Fidelity Components, the AA-1600 is easy to assemble with our step-by-step instructions. Minimum point-to-point wiring, and a clean, open chassis layout make assembling the AA-1600 a breeze. Looks handsome in our optional Oak-Finish Cabinet. Measures 7¾" H x 19" W x 13" D.

Kit AA-1600, Shpg. wt. 51 lbs. .... 329.95  
AEA-1800-1, Oak-Finish Cabinet, 5 lbs. .... 29.95

AA-1600 SPECIFICATIONS: Dynamic Headroom: 2.0 dB. Frequency Response:  $\pm$ 1 dB, 7 Hz to 50 kHz, -3 dB, 5 Hz to 100 Hz (1 watt). Input Sensitivity: 135 mV. Damping Factor: >50. IM Dist. (SMPT): <.05% from 125 mW to 125 Watts. Stereo Separation: 70 dB min. Input Impedance: 30K ohms. Power Req.: 120/240 VAC, 50/60 Hz.

### 9 T-4M Metal Compatible Cassette Deck — 71 dB S/N

B-I-C's T-4M two speed cassette deck records & plays metal tapes. Three head design offers off the tape monitoring. Separate tach-feedback capstan motor insures steady tape speed for studio quality recordings (more info on page 99).

ATP-1484, 22 lbs. .... 699.95  
ATA-1484-1, Rack Mount for ATP-1484, wt. 1 lb. .... 24.95

### 10 Pro-Series Rack combines beauty, convenience

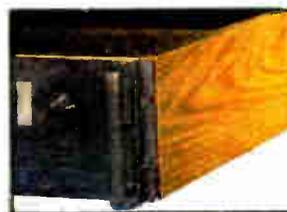
Keeps your stereo components in one, portable, space-saving package. It's compatible with Standard EIA panels in any height, and comes with record dividers and top shelf for a turntable. Features walnut veneer side panels and locking swivel casters. Measures: 43½" H x 21½" W x 18" D.

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

### New Audio-Technica AT-30E Moving Coil Cartridge

Has replaceable stylus assembly & elliptical diamond stylus (0.3 mm x 0.7 mm). Stereo sep: 25 dB at 1 kHz. Freq. Resp: 15-20,000 Hz. Requires AP-1800.

ADP-1294, Shpg. wt. 1 lb. .... Mfr's price, \$125.00, our price: 79.95



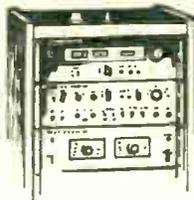
Heathkit Pro-Series Audio Components are also available with optional oak-finish wood cabinets (except the AA-1800). These fine cabinets are listed and sold separately for each Heathkit Pro-Series Component.



Credit Card Orders Call TOLL-FREE: 800-253-0570



ASX-1383s



AS-1373s

### Save big with our New Year Pro-Series System specials

Choose one of these systems: Each one features our AJ-1600 Digital Tuner, our versatile AP-1800 Preamp, our high-power AA-1600 Amp, and a choice of speakers: a pair of ASX-1383 Floor Speakers, or a pair of AS-1373 Bookshelf Speakers.

#### Save \$180<sup>00</sup> Pro-Series System with ASX-1383 Floor Speakers

System includes a pair of ASX-1383 Speakers. (see p. 100) System regularly: 1479.75.

AAS-1600-1, 179 lbs. . . Just: 1299.75

#### Save \$160<sup>00</sup> Pro-Series System with AS-1373 Bookshelf Speakers

System includes pair of AS-1373 Speakers. (p. 100). System regularly: 1459.75.

AAS-1600, wt. 238 lbs. Just: 1299.75

#### Save another \$150<sup>00</sup>!

on this Dual 714Q quartz Turntable

When you order either AAS-1600-1 or AAS-1600 at left (order cartridge, p. 99).

ACP-1466, wt. 22 lbs. . . . . 299.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411



## The Pro-Series Ten Band Octave Equalizer — a low-cost way to upgrade your system

**\$259<sup>95</sup>**

- Matches the response of your system to room acoustics
- Lets you make custom recordings with special effects
- Improves the performance of every component

Features ten ISO centered controls for octave-by-octave adjustment through the entire 20-20,000 frequency spectrum. These controls let you eliminate room "dead" spots and "live" spots for a smooth, flat frequency response. The controls also let you engineer records, tapes, and FM music to your creative tastes. The controls also improve components by enriching cartridge response, cutting harmful subsonics, and enhancing woofer, midrange, and tweeter performance. Unlike some equalizers, the AD-1703 has a mode selector for equalizing before or after recording without rearranging wires. And it fits any 19" EIA rack.

Kit AD-1703, Shpg. wt. 17 lbs. **259.95**  
 AEA-1800-2, Oak-Finished Cabinet, Shpg. wt. 6 lbs. **29.95**



## The AD-1702 Variable Electronic Crossover — It improves your system's sound

**\$179<sup>95</sup>**

- Lets you add a subwoofer system for more bass response
- Allows you to multiamp your system for lower distortion and smoother frequency response at crossover points

With the AD-1702, you can dramatically expand your system's bass response and lower its distortion. For more bass response, the AD-1702 allows you to add a subwoofer system. Six selectable crossover points, plus outputs for monaural, stereo, and bridged hookups, let you connect another amplifier and subwoofer to your present system. And to insure good summed response at the six crossover points, the AD-1702 has switchable 6 db/octave and 18 dB/octave slopes.

The AD-1702 also enables you to multiamp your system for lower distortion. The six selectable crossover points can be frequency scaled up to 6 kHz.

Kit AD-1702, Shpg. wt. 15 lbs. **179.95**  
 AEA-1800-3, Solid-Oak End-Panels, Shpg. wt. 2 lbs. **14.95**

## The Pro-Series AA-1800 Amplifier — it has the power to prevent clipping on wide dynamic range sources

**\$599<sup>95</sup>**

- Better dynamic range with 2.5 dB of Dynamic headroom
- Features patent-pending speaker protection
- Styled to match other fine Pro-Series Components

**250 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN .025% TOTAL HARMONIC DISTORTION FROM 20 HZ TO 20,000 HZ**

If you like to listen to digital mastered or direct disks, or enjoy music with a wide dynamic range, then you need the full 250 Watts per channel power and the 2.5 dB Dynamic headroom of the AA-1800. This power and extra headroom allow the AA-1800 to scrupulously reproduce your music—even in a system equipped with the most inefficient speakers. In addition, the AA-1800 features a patent-pending speaker protection system. It safeguards your speakers from damaging input signals. And massive heat sinks and wire-frame chassis keep the AA-1800's electrical circuits cool without the use of noisy fans. Dim.: 7" H x 19" W x 17.75" D.

Kit AA-1800, Shpg. wt. 75 lbs. **599.95**

## Pro-Series Active Audio Processor boosts dynamic range, reduces noise and tape hiss

**\$249<sup>95</sup>**

- Increases your system's total dynamic range up to 17 dB
- Single ended design eliminates the need for preprocessing

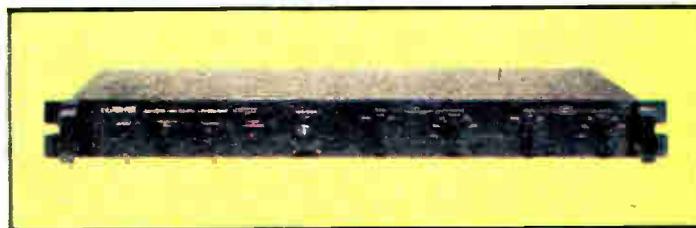
Dynamic range is to music as perspective is to a painting or picture. It gives music depth and feeling. The trouble is that some of the dynamic range in most music is lost in the recording or broadcasting. The AD-1706 features an expander circuit that restores this loss — up to 7 dB.

The AD-1706 also contains a noise reduction circuit that sifts out up to 10 dB of noise from records and hiss from tapes. The result: your music gains depth — with that first note of a song jumping out of a deep, silent background.

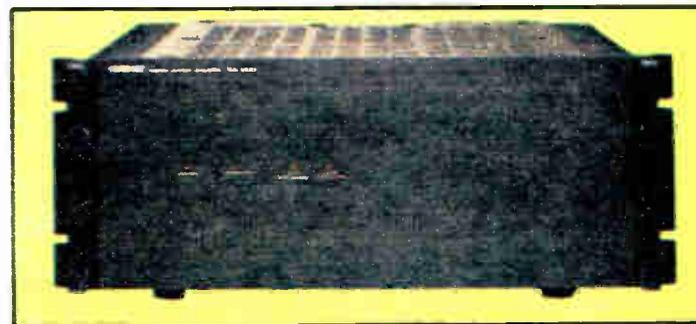
Kit AD-1706, Shpg. wt. 18 lbs. **249.95**  
 AEA-1800-2, Oak-Finish Cabinet, Shpg. wt. 6 lbs. **29.95**  
**96/STEREO HIGH FIDELITY**



**AD-1703 SPECIFICATIONS:** Center Frequencies: 32, 64, 125, 250, 500, 1 k, 4 k, 8 k, and 16 kHz. Max. Boost: +11 dB. Max. Cut: -11 dB. S/N: 90 dB A weighted below 1.5 V. Total Harmonic Distortion: Less than .001% from 20-20,000 Hz @ rated output. Freq. Response: 20-20,000 Hz. Overload: 8 V rms. TIM: Less than .03%. Rated Output: 1.5 V rms. Filter Q: 1.2 ±5%. Clipping Indicator: Approx. 7 volts rms. Power Req.: 120/240 VAC, 50/60 Hz. Dimensions: 5.75" H x 19" W x 14" D.



**AD-1702 SPECIFICATIONS:** Crossover (-3 dB): 40, 60, 80, 100, 125, or 150 Hz with 6 dB/octave or 18 dB/octave slopes. ±5%. Bass Level Control: ±15 dB. S/N A-weighted: 80 dB. Freq. Response: 20 Hz to 20 kHz, +0 to -0.2 dB. Upper Freq. Gain: 0 dB to ±25 dB. Infrasonic Filter: (-3 dB): 15 Hz Butterworth High Pass (switched) 12 dB/octave. Separation: 60 dB. Input impedance (1 kHz): 50 k ohms. Max. Output: 8 V rms. TIM: Less than 0.03%. THD: Less than 0.01%. Power Req.: 120/240 VAC, 50/60 Hz. 12 Watts. DIM.: 1.75" H x 19.25" W x 13" D.



**AA-1800 SPECIFICATIONS:** Hum & Noise: 85 dB. THD: < 0.025%. TIM (DIM 100): < 0.03%. IM Dist. (SMPTE): < 0.02% from 250 mW to 250 Watts. Channel Separation: 60 dB. Low Freq. Damping Factor: > 100. Input Sensitivity: 110 mV (for 1 watt at 8 ohms). Input Impedance: 20 kilohms, shunted by < 50 pF. Power Req.: 120 VAC, 60 Hz.



**SPECS:** Expansion: -4 dB to +4 dB. Freq. Resp.: 20 Hz to 20 kHz. THD: < .01%. Hum & Noise: -70 dB. High Filter: -3 dB, 7 kHz, 12 dB/octave. Input Overload: 5 VRMs min. at 1 kHz. Power Req.: 120/240 VAC, 50/60 Hz. Dim.: 5.75" H x 19" W x 14" D.



Credit Card Orders Call TOLL-FREE: 800-253-0570



## The AR-1650 gives you control of your music

**\$759<sup>95</sup>**

Silver Panel

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

- 1.8  $\mu$ V sensitivity for clear FM reception
- 80 dB FM signal/noise ratio for wide dynamic range

**Clean FM reception:** The AR-1650's 1.8  $\mu$ V sensitivity pulls in your favorite station loud and clear. Its five-gang FM tuning capacitor rejects unwanted signals, giving you cleaner FM reception and minimal interference. A special narrow band switch blocks unwanted neighboring station signals for cleaner station reception in cities with many radio stations.

**Precise, on-the-nose tuning:** There's no guessing or fidgeting when you tune in your favorite FM or AM station on the AR-1650. A blue vacuum fluorescent four-digit display lets you tune in to the exact frequency of your station. And you can change from one station to the next quickly and effortlessly with the fly-wheel tuning knob. A center-tune meter and signal strength meter allow you to home in on your FM station's signal for the best possible reception with the greatest stereo separation and lowest distortion and noise.

**Complete control of your music:** The AR-1650 lets you hear your music just the way you like. You can adjust the frequency response across the full 20-20,000 HZ frequency range, with the bass, midrange, and treble controls. Or if you want to listen to a tape or record with the lowest frequency distortion, just flip the tone flat switch to bypass the tone control circuits.

**A receiver you can build on:** The AR-1650's 125-watt power amplifier, with a -90 dB hum and noise rating, gives you more music and less noise from audio sources. You can plug in two turntables, two auxiliary sources, and two tape-decks. The tape monitor control enables you to record from deck one to deck two, while monitoring deck two.

**Built-in speaker protection:** Fused B+ and B- power supply buses for each channel eliminate the need for dissipating limiters that can cause tweeter-damaging pops and clicks. Turn-on delay and thermal-circuit breakers further protect your speakers from damage and expensive repairs.

**Choice of styles:** You can choose between natural aluminum or black anodized aluminum front panel. Either one will match a listening room's decor with their walnut veneer cabinets and straight-line design.

**Easy to assemble:** Like all Heathkit projects, the AR-1650 comes with our famous easy-to-read, step-by-step instruction manual. To speed assembly and ensure performance to specifications, the amplifier, tuner, and IF multiplex circuit boards are factory assembled and tested. Takes about ten evenings to assemble.

- Kit AR-1650S, Silver Front Panel, Shpg. wt. 66 lbs. .... 759.95  
 Kit AR-1650B, Black Front Panel, Shpg. wt. 66 lbs. .... 779.95  
 Kit AJA-1600-2, Optional Dolby NR Module, Shpg. wt. 1 lb. .... 49.95

Built-in speaker protection      Quick, easy-touch tuning      Stepped volume control

Walnut veneer cabinet

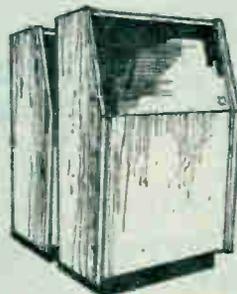
For headphone listening      Adjust response to your taste      For better station reception

Make custom tapes      Six source selection      For speaker balancing & phasing

The AR-1650 is the finest Heathkit stereo receiver ever! We've designed new versatility into this receiver — including capabilities to accept more sources, drive two separate sets of speaker systems — and a unique tape monitoring system!

**AR-1650 SPECIFICATIONS:** FM Section: Mono/Stereo; Usable Sensitivity, 1.8 (10.3)/3.5 (16.1)  $\mu$ V (dBf). 50 dB Sensitivity: 2.5 (13.2)/36 (36.1)  $\mu$ V (dBf). S/N: 80/73. THD @ 60 dBf and 1 kHz: .1/.1%. Freq. Resp: 20 Hz to 15 kHz,  $\pm$ 0.5 dB. Selectivity: Wide, 40 dB Narrow, 80 dB. AM Section: Ext. Ant./Radiated Sensitivity: 30  $\mu$ V/250  $\mu$ V/M, S/N: 50/40 dB. Amp. Section: Input Sensitivity: 0.67 mV phono, 67 mV Aux. Maximum Input Signal: 150 mV phono, 10 V Aux. Freq. Resp: 20 Hz to 20 kHz +0 to -0.2 dB. IM Distortion: 0.05% TIM: 0.05%. Power Req: 120/240 VAC, 50/60 Hz. Dim: 7" H x 21 $\frac{3}{4}$ " W x 16 $\frac{1}{2}$ " D.

## Save \$139.95 on this AR-1650 Receiver/Speaker special!



Order the AR-1650B or AR-1650S with a pair of AS-1348 wide dynamic range Speakers (see page 100), add up the cost (excluding shipping and handling), then deduct \$100. You save even more because the AS-1348-2 Speaker pair is marked \$39.95 off the regular speaker price. Your total savings is \$139.95!



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

STEREO HIGH-FIDELITY/97

Receiver has an easy-to-tune digital display

**\$399<sup>95</sup>**

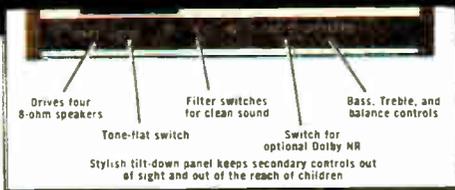
With the AR-1515 Receiver, you get an unusual blend of power, convenience, and style. On the power end, the AR-1515 delivers a clip-resistant 70 watts per channel, a hum and noise of -80 dB on high input sources (-65 dB on phono). For convenience, the AR-1515 gives you fast digital display tuning. Input and output jacks for two turntables, a tape deck, and an auxiliary. For style, the AR-1515 comes with a handsome aluminum brushed front panel, and a tilt-down panel to hide the tone controls, filter switches, and other secondary controls. Solid walnut panels enhance the receiver's looks, making it blend with any listening room decor. Measures 6½" H x 17½" W x 14¼" D. See p. 100 for speaker savings!

Kit AR-1515, Shpg. wt. 47 lbs. .... **399.95**

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

AA-1515 Amplifier only. Same specs. as AR-1515 amplifier section (see below).

Kit AA-1515, Shpg. wt. 40 lbs. .... **199.95**



**70 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 Ω WITH < 0.08% THD FROM 20-20,000 HZ**

Get big receiver features in this medium power receiver

**\$299<sup>95</sup>**

**35 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN .1% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ**

Here's an intermediate power receiver like demand big receiver features in a small size package. The AR-1429 has many of the same features that give the higher power receivers their rich sound. For example, the AR-1429's FM section features a sensitivity of 1.8 μV, a stereo separation of 40 dB, and two 8 pole ceramic FM filters. It's even equipped with a phased lock loop (PLL) stereo demodulation circuit for clean stereo reception with minimum distortion.

You'll also find the AR-1429 has the versatility of a big receiver, too. It has two low-level inputs for magnetic cartridge turntables, plus three high-level for auxiliary, tape, and tape monitor. There are also back panel jacks for a tape deck; plus speaker outputs capable of handling four low power speakers.

In addition, the AR-1429 gives you all the big receiver controls to adjust your music to your tastes. It features bass and treble controls to adjust the high and low frequencies to your room's acoustics. A tone flat switch lets you listen to your favorite source without the tone colorations. You can also add the optional Dolby NR module for further noise reduction.

The AR-1429 fits in places where bulky receivers can't—Like on a bookcase's shelf. It has a low, yet stylish sleek design that measures 4¾" H x 20" W x 13½" D. Those measurements include the AR-1429's walnut side panels that blend with just about any room's decor.

Like all Heathkit high fidelity components, the AR-1429 is made to outlast other receivers. Because you build it yourself with our easy-to-follow, step-by-step instruction manual. See page 100 for speaker savings with this receiver!

Kit AR-1429, Shpg. wt. 32 lbs. .... **299.95**

Optional Dolby FM Noise Reduction Module.

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: Aux., Tape and Tape Mon., -80 dB; Phono, -65 dB (-79 dB for 10 mV); Phono RIAA Equalization: ±1 dB (30 to 20 kHz). FM Section: Sensitivity: 1.8 μV (10.3 dbf) usable, 4.0 μV (17 dbf @ 50 dB signal to noise). Selectivity: 65 dB. Capture Ratio: 1.8 dB. AM Suppression: 48 dB. Image Rejection: 90 dB. FM Stereo Separation: 40 dB, typ. at 1 kHz. Frequency Response: ±1 dB from 20-15,000 Hz. AM Section: Sensitivity: 10 μV. Selectivity: 20 dB at 10 kHz. Power Requirement: 120/240 VAC, 50/60 Hz.

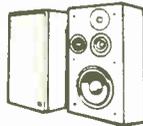
**SAVE**

**\$109<sup>95</sup>**

On this receiver-speaker special!

Get our AA-1515 Amplifier and a pair of AS-1373-2 speakers.

AAS-1515, 170 lbs.  
Usually: 659.85  
Now: 549.90



**SAVE**

**\$150<sup>00</sup>**



On the Dual 1264 Changer when you buy the AAS-1515.  
ACP-1466, 22 lbs.  
With system: 299.95

**AR-1515 SPECIFICATIONS:** Amplifier: Frequency Response: +0, -1 dB, 8 Hz to 45 kHz; +0, -3 dB, 4 Hz to 80 kHz. IM: Less than 0.08%. .25 to 70 watts. Damping Factor: Greater than 60. Input sensitivity: Phono 1 & 2, 2 mV; Aux., Tape & Dub, 200 mV. Hum and Noise: Phono (2 mV ref.), -65 dB; Aux., Tape, Dub (200 mV), -80 dB. FM Sensitivity: 1.8 μV IHF. Selectivity: 100 dB IHF. Image Rejection: 90 dB IHF. Stereo Separation: 40 dB or greater at mid frequencies. AM Sensitivity: 5 μV with 50 ohm direct input. Selectivity: 20 dB at 10 Hz. Power Req. 120/240 VAC.



1



2

**1 Low cost AA-1219 Stereo Amplifier**

**\$149<sup>95</sup>** 15 WATTS MIN. RMS, INTO 8 OHMS WITH LESS THAN .5% THD FROM 20-20,000 HZ

Features: freq. resp. of 8 Hz to 80 Hz, -1 dB, 1 watt for good reproduction. Has ganged tone & volume controls, plus balance control, phono, tape monitor jacks. 3¾" H x 12¾" W x 12" D. 120/240 VAC.

Kit AA-1219, wt. 15 lbs. .... **149.95**

**2 Budget priced AJ-1219 AM/FM Tuner**

**\$149<sup>95</sup>** Features pre-assembled and aligned FM front end for 2 μV sensitivity. Has 40 dB typical, 35 dB minimum separation for true stereo sound. Also features lighted dial, stereo indicator, inputs for FM antenna, built-in AM antenna. Metal case with walnut veneer panels. 3½" H x 13" W x 11" D. 120/240 VAC.

Kit AJ-1219, Shpg. wt. 12 lbs. .... **149.95**

**SAVE \$70<sup>00</sup>**

On this tuner, amplifier and speaker combination

Includes AJ-1219, AA-1219, and AS-1342-2. Kit AAS-1219, 115 lbs. .... **399.85**



**SAVE \$20<sup>00</sup>**

On this B-1-C Micro 350

When you purchase the AAS-1219 system above.  
ACP-1467, wt. 14 lbs. .... with system, 99.95



## Low-Cost Solid-state Amplifier puts life into mono tuners & phonographs



**3.25 WATTS, MIN. RMS, INTO 8 OHMS WITH 1.5% THD FROM 40-20,000 HZ**

The AA-18 takes the signal (at least 250 mV) from a record player with ceramic cartridge, a tape player, mono AM or FM tuner, or any other signal source, and cleanly amplifies it. Features walnut-colored metal case. Measures 2 3/4" H x 7 1/4" W x 5 3/4" D. 120/240 VAC, 50/60 Hz.

Kit AA-18, Shpg. wt. 4 lbs. .... **32.95**

## New T-2M Tape Deck takes metal tapes



- Features 66 S/N
- **30,000-21,000 Hz** frequency response

**B-I-C's 2-Speed Cassette Deck with Dolby N.R.** gives you the maximum response out of metal tapes. Also gives you unsurpassed response on non-metal tapes, too. Two speed selection: 3 1/2 ips. (specs. above) and 1 7/8 ips. (30-18,000 Hz freq. resp., S/N:62 dB, Dolby NR on). Has 6 position bias and equalizer controls. 120/240 VAC, 60/50 Hz. Dim: 6" H x 16 3/4" W x 9 3/4" D. ATP-1482, Assembled, wt. 15 lbs. .... **329.95**

## T-4 Metal Compatible Cassette Deck



- High 71 dB S/N reduces hiss
- Save \$100

**B-I-C's T-4M Two-Speed Cassette Deck records/ plays metal tapes.** Features fluorescan meters, LED digital counter, feather-touch microprocessor controls, and two-motor drive for easy operation and longer life. Has pitch, bias, and equalization controls (more details on p. 97).

ATP-1484, 22 lbs. ... Was \$799.95, Now **699.95**

ATA-1484-1, Rack Mount, 1 lb. .... **24.95**

## Save 20% on DiscKit™



Keeps records free of static and removes stylus-damaging debris, for "pop-free" sound and longer life. Kit includes walnut-handle record brush, stylus brush, anti-static pistol, test light, and 1 ounce of cleaner fluid. Save \$10.00 by ordering your DiscKit now.

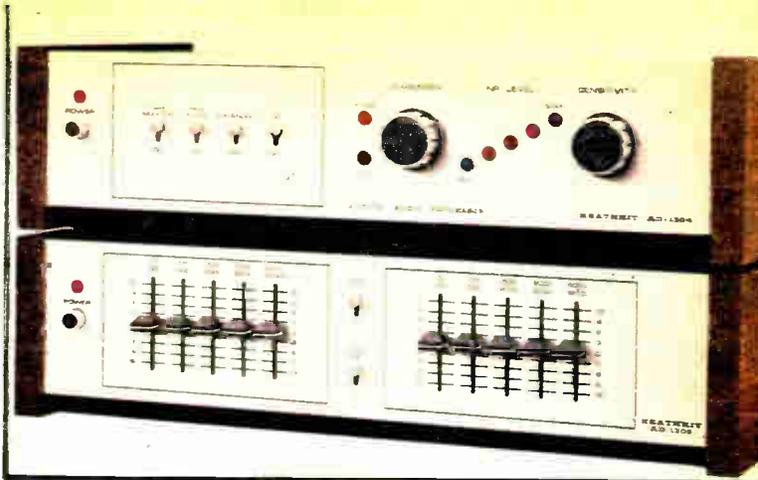
ADP-1286, Shpg. wt. 4 lbs., Was \$49.95, Now **39.95**



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

1 Plug in this low-cost Active Audio Processor to restore the dynamic range lost in the recording and broadcasting processes

2 Use this 5 Band, 2 Channel Equalizer to enhance highs, adjust midranges, and boost bass responses in any speaker system



## 1 Audio Processor for clean sound

**\$199<sup>95</sup>**

- Sifts-out background noise and hiss from records and tapes
- Replaces up to 7 dB of dynamic range

Features three dynamic filters to remove noise and hiss, without injuring your music. Also features a separate expander to restore dynamic range strangled during broadcasting and taping. Front panel controls and LED indicator lights let you control the amount of filtering and expansion. Metal case with solid walnut side panels. 4 1/2" H x 17 1/2" W x 8 3/8" D.

Kit AD-1304, Shpg. wt. 12 lbs. .... **199.95**

**AD-1304 SPECIFICATIONS:** Noise Reduction: 3 dB typical at 2 kHz, 10 dB typical between 4 kHz and 15 kHz. Expansion: -3 dB to +4 dB. Freq. Resp: 20-20,000 Hz. THD: 0.1% at rated input (20-20,000 Hz). Hum & Noise: -70 dB, 20-20,000 Hz at 200 mV ref. High Filter: 7 kHz, 12 dB/octave rolloff, linear phase. Power Req: 120/240 VAC, 50/60 Hz.

## 2 Audio Equalizer enhances response

**\$134<sup>95</sup>**

- Gives you maximum performance out of budget-priced systems
- Tailors your treble, midrange, and bass to fit your musical tastes

Made for the budget minded audiophile, this 5 Band, 2 Channel Equalizer lets you boost or cut frequency response by 12 dB, from 30 Hz to 32 kHz. Comes with solid walnut side panels and a brushed aluminum front panel with five finger slide controls for each channel. Measures: 4 1/2" H x 17 1/2" W x 8" D.

Kit AD-1305, Shpg. wt. 11 lbs. .... **134.95**

**AD-1305 SPECIFICATIONS:** Frequency Control Range: (for each channel), 30-125 Hz, 125-500 Hz, 500-2000 Hz, 2000 Hz to 8 kHz, 8 kHz-32 kHz. S/N: 90 dB below 1.5 V. THD: Less than .05% from 20-20,000 Hz. Overload: 5 volts rms. IMD: Less than .05%. Rated Output: 1.5 volts rms. Overall Gain (flat): Zero dB (unity gain). AC Outlets: one switched, one unswitched. Power Req: 120/240 VAC, 60/50 Hz.

## 1 Dual 714Q features ULM tonearm

New Ultra Low Mass tonearm permits stylus to overcome built-in record flaws. See chart below.

ACP-1466, Shpg. wt. 22 lbs. .... **449.95**

## 2 B-I-C Micro 350 with repeat play

Repeats from 1-6 plays, then automatically shuts off. Has Micro-mass tonearm. See chart below.

Heath recommended turntables & changers — they treat your records with care



MODEL	FUNCTION	DRIVE	RUMBLE, DIN-B (dB)	WOW AND FLUTTER, WRMS (%)	MFR.'S SUGG. PRICE	HEATH PRICE
Dual 714Q ACP-1466, 22 lbs.	Auto-stop only. DC quartz PLL control	DC Gapless	-78	0.015	\$479.95	<b>449.95</b>
Dual 622 ACP-1465, 19 lbs.	Single play, auto start/stop, continuous repeat	DC Direct	-75	0.03	\$319.95	<b>299.95</b>
Dual 1264 Chgr. ACP-1464, 17 lbs.	1 to 6 records, cont. repeat, anti-resonance filter	Belt	-70	0.04	\$275.00	<b>199.95</b>
B-I-C Micro 350 ACP-1467, 14 lbs.	MicroMass Tonearm, 1-6 records, repeat	Belt with pitch/control	-64	0.08%	\$219.95	<b>119.95</b>

MODEL	RESPONSE (Hz)	OUTPUT	SEPARATION	STYLUS	TRACKING FORCE	MFR.'S PRICE	HEATH PRICE	WITH TURNTABLE
Shure V-15 Type IV ADP-1259, 1 lb.	10-25,000	4.0 mV	25 dB	Elliptical 0.2 x 0.7	3/4 to 1 1/4 gm.	\$165.00	<b>124.95</b>	<b>99.95</b>
Audio-Tech. AT-14SA ADP-1139, 1 lb.	5-45,000	2.7 mV	25 dB	Shibata	3/4 to 1 3/4 gm.	\$150.00	<b>89.95</b>	<b>69.95</b>
Audio-Tech. AT-30E ADP-1294, 1 lb. Needs preamp like AP-1800 (page 26)	15-25,000	0.28 mV	25 dB	Elliptical 0.3 x 0.7	1.4 to 2.0 gm.	\$135.00	<b>79.95</b>	<b>59.95</b>
Shure M95HE ADP-1298, 1 lb.	20-20,000	4.7 mV	25 dB	Hyperelliptical Nude Diamond	3/4 to 1 1/2 gm.	\$ 97.50	<b>65.95</b>	<b>39.95</b>
Empire 2000E/III ADP-1147, 1 lb.	20-20,000	4.5 mV	28 dB	Elliptical 0.2 x 0.7	1/2 to 1 1/2 gm.	\$ 85.00	<b>59.95</b>	<b>19.95</b>



Feel your music as well as hear it — with this high efficiency Floor Speaker

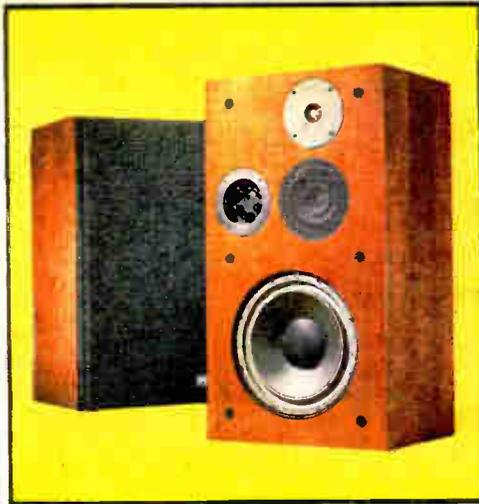
**\$349<sup>95</sup>** • Extra wide dynamic range  
 each • Massive 15" woofer  
 • Handles up to 250 watts  
 • Features 6 drivers

Feel the music of your favorite artist — and hear it — with our AS-1348, 8 ohm Floor Speakers. They feature an arsenal of drivers that energize your music and turn your listening room into a concert hall. Three 1" dome tweeters direct your music's high frequencies (up to 20 kHz) around the room for wide dispersion. Two 4½" midrange drivers radiate frequencies from 500 to 3000 Hz for clear presence and realism. And a 15" slot-loaded woofer delivers those bone-vibrating bass frequencies down to 28 Hz.

The AS-1348 features 14 combinations of attenuation and response controls to shape each driver's frequency response and walnut and oak veneer cabinet. Kit AS-1348, 110 lbs., Mtr. Frt. . . . . 349.95

Save \$39.95 when you buy two AS-1348 speakers  
 Kit AS-1348-2, 220 lbs., Mtr. Frt. . . . . pair 659.95

AS-1348 SPECIFICATIONS: Frequency Response:  $\pm 3$  dB, 28 Hz to 20 kHz. Recommended Amplifier Power: 10 to 250 watts. Crossover Frequencies: 500 Hz (12 dB/octave) and 3000 Hz (6 and 12 dB/octave). Dimensions: 38" H x 24" W x 15" D.



Enjoy classical, rock, and jazz, with our best-selling 3-Way Speaker

**\$199<sup>95</sup>** • Designed for upright or  
 each • horizontal placement  
 • Two controls allow you to modify tweeter response

No matter what kind of music you listen to, you'll enjoy it more with the  $\pm 3$  dB, 40 to 20,000 Hz frequency response of our popular AS-1373. This Three-Way, 8-ohm Speaker features a 10" woofer for a solid, well-defined bass, a 4.5" enclosed midrange driver for crisp, clear midranges, and a 1" dome tweeter for a full 120° dispersion of frequencies above 3 kHz for a flat response — even at 20,000 Hz. Other features include flush mounted drivers for reduced diffraction, two-hole tweeter mounting for good imaging, tweeter response controls, and a walnut-veneer that's sharp-looking.

Add all these features up and you'll understand why the AS-1373 is so popular with our customers.

Kit AS-1373, Shpg. wt. 68 lbs. . . . . 199.95

Save \$20.00 when you buy a pair of AS-1373s  
 Kit AS-1373-2, Shpg. wt. 141 lbs. . . . . 379.90

AS-1373 SPECIFICATIONS: Recommended Amplifier Power: 10 watts min. to 250 watts. Crossover Freq.: 500 and 3000 Hz. (12 dB/octave). Switches: 3 kHz shelf/flat, 10 kHz rolloff/flat. Dimensions: 26" H x 14.5" W x 12.125" D.



With ASX Speakers, the difference you see is the difference you hear

**\$199<sup>95</sup>** • Phased-aligned drivers for  
 each • minimum transient distortion  
 • Curved foam structure for minimum diffraction

Because our ASX-1383 Speakers have a staggered driver design, your music's bass, midrange, and treble will arrive at your ear at the same time — in the exact way your artist recorded them.

And with the ASX-1383's special structural foam construction, the 1" tweeter, 5" midrange, and 10" woofer get maximum dispersion, with minimal diffraction. So, when you sit in front of these fused-protected speakers, you enjoy the full response of your music's highs, midrange, and low frequencies.

Of course, there are other ASX design differences you'll appreciate. Like the  $\pm 3$  dB, 40-25,000 Hz frequency response, the constant voltage crossover network, and the beautiful rosewood veneer cabinet. Order a pair of ASX-1383s and discover the difference in sound. Sold in pairs only.

Kit ASX-1383, Shpg. wt. 114 lbs., Mtr. Frt. . . 399.90

ASX-1383 SPECIFICATIONS: Impedance: 8 ohms. Recommended Amplifier Power: 10 to 250 watts. Crossover Frequencies: 750 Hz and 4000 Hz (6 dB/octave). Dimensions: 36" H x 24" W x 15" D.

**SAVE \$100!**

Order one of these receivers with a pair of AS-1348's, then deduct \$100 from system price

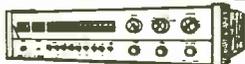
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 See p. 98



Compact LS-ONE Two-way Mini Speakers

- For car or home
- Wide 100-20,000 Hz frequency response
- LC-type crossover at 2500 Hz

**\$59<sup>95</sup>**  
 each



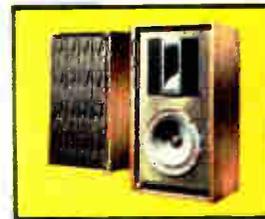
These 8 ohm speakers have a 4" long throw woofer, a 1" soft dome tweeter, all enclosed in a cast aluminum housing measuring 7.13" H x 4.5" W x 4.56" D. Handle up to 40 watts peak. Sold in pairs only.

ASP-1442, Assembled, 12 lbs. . . . . pair 119.90  
 ASA-1442-1, Pair of mounting brackets, 3 lbs. . . 16.90

High efficiency Two-Way Speakers

- 5 Watt minimum driving power
- Feature 60-1400 Hz frequency response

**\$89<sup>95</sup>**



Each 8 ohm speaker has a horn-type tweeter, and a 8" woofer in a vented enclosure. Features walnut vinyl cabinet measuring 22.25" H x 12" W x 10.5" D.

Kit AS-1342, Shpg. wt. 32 lbs., UPS . . . . . each 89.95

Kit AS-1342-2.

Buy two — save 9.95, wt. 78 lbs., UPS . . pair 169.95



**NEW**

## Fight the energy crisis with your own low-cost Heathkit Hydraulic Log Splitter for the fast, safe, easy way to split wood!

- Saves time — splits logs up to 21" long — splits logs faster than by hand and cuts worktime by hours!
- Powerful 10-ton force-driven ram and triple angle steel wedge do the wood splitting for you
- Convenient work height — log cradle securely holds your logs at a comfortable 15" above ground
- Rugged Log Splitter features heavy-duty steel frame and tubular log cradle for years of rough use
- Portable — weight-balanced, wheels right down to any work site
- Reliable 5 hp, 4 cycle Tecumseh engine runs on regular or unleaded gas
- Takes one evening to assemble with our step-by-step instructions



Only  
**\$539<sup>95</sup>**



**FAST, EASY  
1-EVENING KIT**

The new Heathkit GU-1810 Log Splitter splits and shears logs up to 21" in length, quickly and easily. High-torque, 4 cycle, 5 hp Tecumseh gas engine operates 4.5 gpm hydraulic pump. Engine and pump build up 1550 psi to drive cylinder ram with up to 10 tons of splitting force! Six-inch, triple-angle steel wedge splits most woods with ease. Twenty-four second, full-cycle, automatic return and easy-to-use, 3-position lever cut your work time by hours! No more time-consuming, strenuous, or unsafe log splitting by hand.

Three-position, one hand lever features non-locking forward, neutral, and detented reverse with automatic return to ready ram for your next log. No more standing around and waiting to position the next log for splitting. Common-size 21" tubular log cradle firmly holds and positions logs for splitting at a

comfortable (15" above ground) work level. No more wobbling logs. No more strenuous stooping. Cradle and frame made from sturdy, industrial-grade steel to take years of punishing use. Flexible, high psi-rated, reinforced hose ensures years of long, reliable operation. Pump and cylinder use 7 quarts of readily-available automatic transmission fluid (not supplied).

Weight-balanced design, with puncture-proof, hollow hard rubber tires, allows the Heathkit Log Splitter to be wheeled right to the worksite. Steel-base threaded stand unscrews for easy transportation from storage to worksite (not road towable). Compact design, 31" H x 31½" W x 53¾" D, fits in car's trunk, station wagon or pickup truck. Large one-gallon gasoline tank holds enough fuel to run the Heathkit Log Splitter for hours in remote areas — such as cottages and winter hunting cabins. Engine runs on regular or unleaded gasoline.

Easy to build: Assembles in one evening with our simple-to-follow, step-by-step instructions. Kit includes complete hardware. Wedge, frame, and tubular cradle are pre-welded to ease assembly. Engine,

pump, and cylinder are pre-assembled to speed kit building. All components mount on frame with high-strength steel bolts. The entire hydraulic system is protected by pressure relief valve. Just three reinforced, high psi-rated hoses to connect between pump and cylinder. Five-eighth inch steel axle for wheels features nut and washer seating for fast mounting. Painted in OSHA safety orange.

Priced to fight the energy crisis: Just \$539.95 — much less than other comparable units. Purchase your low-cost Heathkit Log Splitter today and start splitting wood the easy, time-saving way.

Kit GU-1810, Shpg. wt. 206 lbs., Mtr. Frt. . . . 539.95

**GU-1810 SPECIFICATIONS:** Splitting Force: 10 tons. Log Length Capacity: 21". Log Cradle Length: 21". Splitting Wedge: 6" triple-angle wedge. Cylinder Type: 4" diameter, 18" stroke. Valve: 3 position, 4-way, 1550 psi relief valve, with non-locking forward, neutral, and detented reverse with automatic return and shut-off. Cylinder Fluid: 7 quarts of Automatic transmission fluid (not supplied). Power Plant: 4-cycle, 5 hp Tecumseh gas engine. Fuel Tank: 1-gallon. Fuel: Regular or unleaded gasoline. Dimensions: 31" H x 31½" W x 52¾" D. Net Weight: 196 lbs.



Alaska, Hawaii and Michigan Residents: Call 616-982-3411



1



Thru-hull transducer



Transom mount transducer



2



3

## Get ready for the upcoming fishing season with these fine accessories for your boat

### 1 Dual Range Depth Sounder finds fish, tells water depth

\$99<sup>95</sup>

- Lets you navigate in unknown waters
- Tells water depth or depth of submerged objects down to 240'

This Dual Range Depth Sounder lets you safely explore unknown waters for fishing, scuba diving, or pleasure cruising. A high pitched beep alerts you to shoals or objects projecting above any preselected depth from 5' to 240'. Two selectable ranges, 0'-60' and 0'-240', insure accurate readings. Noise rejection circuit gives clear, precise readouts by blocking motor ignition interference. Unit has a corrosive-resistant Cylolac® case, and features bright neon lamp with sun shield to make depth reading easy day or night.

Kit MI-1031-1, with thru-hull transducer, 15' coax, Shpg. wt. 8 lbs. .... 99.95

Kit MI-1031-2, with transom-mount transducer, 25' coax, Shpg. wt. 8 lbs. . 99.95

LAST CALL on Single Range Depth Sounder—same as MI-1031, one range: 0'-240', no alarm

Kit MI-1030-1, w/thru-hull transducer and 25' coax, Shpg. wt. 8 lbs. .... 69.95

Kit MI-1030-2, w/transom-mount transducer and 25' coax, Shpg. wt. 8 lbs. . 69.95

### 2 Heathkit Seeker™ shows where the fish are

Chart Recording Depth Sounder features an extra-wide transducer for greater coverage, giving you a wider picture of what's below, so it marks more fish. Three ranges: 5-200', 200-400', 400-600'. Two lamps light chart for night trips. Easy to install gimbal mount. Operates on boat's 12-V system. One chart roll lasts 13 hours. 8" H x 11" W x 7" D. Includes 1 roll chart paper.

Kit MI-2910-1, with thru-hull transducer, 30' cable. 17 lbs. .... 289.95

Kit MI-2910-2, with transom-mount transducer, 30' cable. 17 lbs. .... 289.95

MIA-2910-1, two rolls of chart paper. Shpg. wt. 2 lbs. .... 10.95

MIS-2910-1, Save \$15.75! 12 rolls Chart Paper. If pur. sep., \$65.70. 12 lbs. 49.95

### 3 Catch more fish with portable Fish Spotter™ Sounder

Take this light-weight, portable Fish Spotter™ Sounder on your next fishing trip. Detects fish swimming between the surface and any preset depth you choose up to 240'. Features two switch-selected ranges, 0'-60' and 0'-240', for better sensitivity. Noise rejection circuit eliminates engine ignition interference. Bright neon flasher with sun shade makes day or night reading effortless. Aluminum case holds sounder and water-tight transducer with suction-cup bracket. Runs on two 6-volt lantern batteries (not included). Measures: 7" H x 6" W x 11" D.

Kit MI-2901, Shpg. wt. 8 lbs. .... 119.95

Kit MIA-2900-1, Scanning Transducer Bracket for MI-2901 & MI-2900. 4 lbs. .... 34.95

## Don't get lost! Navigate with this Heathkit Radio Direction Finder

In William F. Buckley, Jr.'s book, "Airborne," the author reminisced that, "The most satisfactory radio direction finder I ever had was out of Heathkit."

Now you can safely venture out of sight of land or go for a night cruise with the Heathkit Radio Direction Finder. It gives you a fix on your position by tuning-in and finding the signal directions of long-wave beacon band (190 kHz to 410 mHz) or AM broadcast band (535 kHz to 1605 kHz) stations. Radio frequencies are shown on a bright, easy-to-read digital display that automatically adjusts to changing light conditions for easy day or night reading.

You can quickly locate the direction of station signals with the unit's lighted null meter, rotating rod and telescoping antenna. A big Azimuth ring marked in 2° increments (±3° accuracy) helps you make directional readings and compass headings quickly and easily.

The MR-1010 runs off your boat's 12-15 VDC electrical



system or becomes quickly portable with six "D" cell flashlight batteries. To prolong battery life, digital display automatically fades off after 20 seconds, but can be instantly recalled with a touch of a button.

The unit is compact—measuring 1/4" H x 11 1/2" W x 12" D. It is housed in a rugged, white plastic cabinet with a blue and plastic front panel. Our famous step-by-step, no nonsense manual instructions makes this unit easy to build. The circuits are designed so you can align them without instruments or technical knowledge.

Kit MR-1010, Shpg. wt. 14 lbs. .... 279.95

## Find those fish with Thermo Spotter®



Here's a handy device for your next fishing trip. It shows water temperature down to 100', so you can find the exact swimming level of your favorite aquatic fish. Simply lower the submersible sensor, press the meter button for the temperature readout, and check depth on cable. Fish temperature charts (included). Take-up reel case. Runs on 1.5 V AA battery (not included). Measures 10 1/4" H x 5 3/4" W x 3 1/4" D.

Kit MI-104, wt. 3 lbs. ... 49.95

## Power Inverter gives boat AC current



Take a blender or TV (up to 175 W) on your next cruise. Unit changes DC (12 or 6 V) current to 60 cycle AC. Not for high starting current or sine wave AC equipment.

Kit MP-10, 8 lbs. . 54.95

Credit Card Orders Call TOLL-FREE: 800-253-0570



## Heathkit Digital Depth Sounder protects your boat and passengers

**\$169<sup>95</sup>**  
transom-mount  
transducer

- Detects depth, from 2' to 499'
- Alerts you to unexpected changes in depth both audibly and visually
- Five alarm settings

Prevent costly boat repairs and personal injury with the Heathkit Digital Depth Sounder. Automatic range selection constantly monitors water depths from 2' to 499'. Crystal oscillator in unit sends depth changes to display every .9 second. Display tells you depth in .1' increments from 2' to 9.9', and reads in 1' intervals from depths 10' to 499'. Automatic gain control self-adjusts the signal sensitivity for precise, accurate depth readings.

Five alarm settings warn you visually and audibly of unexpected depth changes at the following levels: 2', 4', 10', 20', and 40'. Built-in keel offset automatically subtracts (up to 7') the keel depth or other displacement hull depth, giving you the exact distance between the lowest point of your hull and the lake bottom. Three LCD display with backlighting informs you of water's depth day or night.

Made from non-corrosive, weather-resistant materials — stainless steel, plastic, and aluminum — for years of outdoor service. Back connector for adding MI-2917 or MI-2918 kits. Dim: 2½" H x 7.0" W x 5½" D.

Digital Depth Sounder with Thru-Hull Transducer.  
Kit MI-2916-1, Shpg. wt. 8 lbs. .... 169.95

Digital Depth Sounder with Transom-Mount Transducer. Kit MI-2916-2, Shpg. wt. 7 lbs., 159.95

Digital Depth Sounder with Flush-Mount Transducer. Kit MI-2916-3, Shpg. wt. 8 lbs. .... 179.95



**MI-2916 SPECIFICATIONS:** Depth Ranges: 2.0' to 9.9' and 10' to 499'. Autoranging. Display: LCO with auto night light. Frequency: 200 kHz. Accuracy: ± 5% +1 count. External Control: Off-On switch. Alarm Settings: 2', 4', 10', 20', 40'. Internal Controls: Keel offset, 0' to 7'. Operating Temperature Range: 32°F to 122°F (0° to 50°C). Power Requirement: 10 to 17.7 VDC. Average Current: 25 mA. (110 mA with night light). Alarm: Audible and Visual.



## Order one of these Heathkit Digital Remotes for your MI-2916 for added safety



### \$119<sup>95</sup> Heathkit Digital Remote Readout Station

- Independent alarms and depth settings
- Same type of display and accurate calibrations as the MI-2916

Place the Digital Readout Remote unit in your boat's cabin, flying bridge, or any other location on board. It provides an additional depth reading station that audibly and visually warns you of unexpected changes in depth. A 25' cable carries power and depth sounder signals from the MI-2916 above to the remote for accurate depth readings and easy placement.

This remote has the depth display characteristics, alarm settings, keel offset control, and all weather construction as the MI-2916 described above. However, the alarm and depth settings on this remote can be set independently from the depth warning and keel settings on MI-2916. Measures 2½" H x 7.0" W x 5½" D.

Kit MI-2917, Shpg. wt. 4 lbs. .... 119.95



### Flush-mount Digital Remote for Sailboats

- Works off the MI-2916
- Adjustable keel offset for safe sailing in shallows

Slip this rugged, water-tight, flush mount remote into your bulkhead, and it will warn you of unexpected changes in depth through all kinds of sailing weather. It works off the MI-2916 and features a red warning light that flashes when the depth gets below the preset MI-2916 warning levels. Like the MI-2917 remote at left, this unit has a backlighted LCD digital display for easy reading day or night, and has an independent, adjustable keel offset (up to 7'). The remote features a diecast zinc 5" bezel to match standard bulkhead instrument panels. Slips into 4½" hole. Dimensions: 5" diameter x 4½" D.

Kit MI-2918, Remote with visual warning only, Shpg. wt. 4 lbs. .... 149.95

Kit MIA-2918-1, Audible warning alarm for MI-2918, Shpg. wt. 1 lb. .... 19.95



Alaska, Hawaii and Michigan Residents: Call 616-982-3411

Make this season's boating safer and more enjoyable with these Heathkit Digital Marine Instruments



**NEW**

### Bulkhead Mounting Digital Remote for Sailboats

Keeps you up-to-date on the water's depth. This remote works off the MI-2916 (see right). Features independent and adjustable keel offset, back-lighted LCD display, and optional audible alarm. See p. 103 for more information.



### The new MI-2916 Digital Depth Sounder

Safeguards your boat and passengers from costly injuries. Features three different kinds of transducers for all types of hulls. See p. 103 for full details.



### The versatile MI-2917 Digital Remote

Works off the MI-2916 above. Gives you an extra depth warning station. Features same display and housing as MI-2916. For the complete story, turn to page 103.

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All prices quoted are Mail Order, Net F.O.B. Benton Harbor, Michigan and apply in the United States and Possessions only. Prices and Special Offers herein are effective January 3, 1981 through April 3, 1981. Prices and specifications are subject to change without notice. Heath Company cannot be responsible for typographical or pictorial errors. Printed in U.S.A.

## Keep track of any weather condition with these Heathkit computerized digital weather instruments

If you're interested in weather, you'll appreciate the convenience and accuracy of these micro-processor-controlled instruments. See pp. 4 & 5.



Computerized Barometer — for full barometric pressure information  
**\$239<sup>95</sup>**



Automatic Rain Gauge — measures long-term and short-term rainfall  
**\$149<sup>95</sup>**



Digital Wind Computer — tells wind velocity, recalls peak gusts.  
**\$199<sup>95</sup>**

**ORDER TOLL-FREE!**

Dial 800-253-0570 to order your new Heathkit product. For part ordering, please see page 53.

