Heathkit

MAIL ORDER CATALOG NO. 860
WINTER • 1983

More technological advances for you!

See the new HW-5400 HF SSB Amateur Radio Transceiver – and the new SS-9000 Computerized Multi-Band Transceiver – on pages 8-11!

Meet HERO 1, the world's first sophisticated teaching robot, and the accompanying Heathkit/Zenith Robotics Course on pages 30-31!

The new, powerful H/Z-100 16-bit/8-bit Computer is now available in low-cost kit form! See pages 66-67.

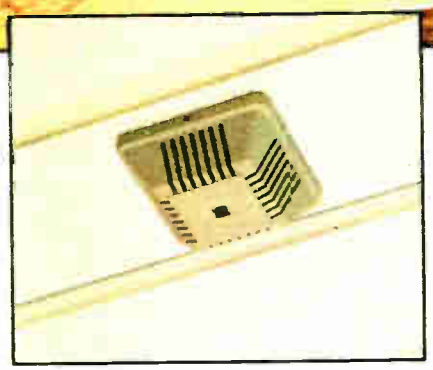
Introducing the new GR-3000 Deluxe 25" Television Computer System Kit on pages 92-93!

ORDER TOLL-FREE! CALL
800-253-0570

In Alaska, Hawaii and Michigan call 616-982-3411.

Helping you make things better

NEW Heathkit Relative Humidity Instrument monitors your environment for all-important moisture



The ID-2295 Relative Humidity Instrument has two sensory units for indoor and outdoor monitoring. They can be attached to a wall, ceiling, overhang, etc. We include 100 feet of easily-concealed transmitter cable with every kit.

$99.95

- **Extremely practical – every family can benefit from one**
- **Highly accurate – comparable units for home or business usually cost twice as much and offer less reliability**
- **Sensitivity that rivals laboratory-grade hygrometers**

Weather statistics from TV and radio are useful and detailed, but they can't report *your* specific indoor humidity. Knowledge of relative humidity can be helpful to home forecasters, critical to pilots (for dew points) and indispensable to those who want to maintain healthy indoor conditions.

Along with temperature, humidity is the single most important determining factor for personal comfort, indoors or out. Proper levels of humidification promote a healthful environment for you, your family, home furnishings, pets and houseplants. The ID-2295 Relative Humidity Instrument can help.

Increase everyone's comfort and save on fuel: During the heating season, low indoor humidity can cause skin irritation, sore throats and annoying static discharge. Woods lose lustre, crack and peel. By correcting low levels of humidity you can avoid such frequent ills, plus conserve energy, reduce heating costs and prolong the life and appearance of fine wood furniture. Without proper humidity, temperatures in the 50-70°F range feel much colder. Using the ID-2295 as a constant monitor, you can reduce a thermostat setting when humidifiers raise the relative humidity above 50% and feel warmer at 66-70°F than you would at 75° in dry air.

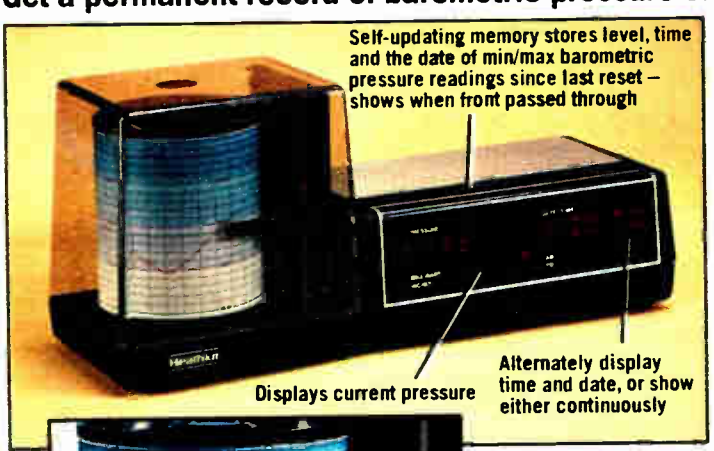
With both sensors connected, the indoor console can display their readings alternately, 1.5 or 5 seconds apart (you decide as the kit goes together), or can be switched to hold on either readout. Bright red, ½"-high digits indicate the humidity by percentage from 0 to 99 and LEDs denote the sensor.

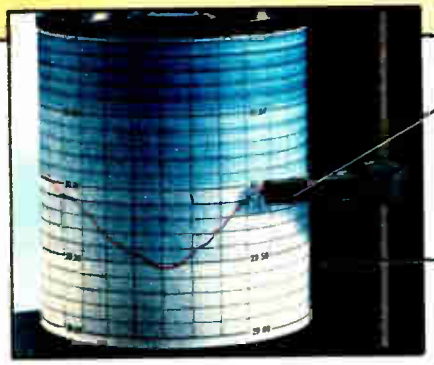
The ID-2295 is housed in a Cycolac case with teakwood vinyl trim, identical to our economical weather equipment on page 5. It operates on 120/240 VAC. With so much depending on proper humidity, order yours today!

Kit ID-2295, Shpg. wt. 6 lbs. **99.95**

ID-2295 SPECIFICATIONS: Measurement Range: 10% to 90% relative humidity. **Accuracy:** 77°F (25°C), ±10 counts. 32-135°F (0-55°C), ±20 counts. **Response Time at 77°F/25°C:** From 10% to 43% in less than 3 minutes. From 43% to 90% in less than 5 minutes. **Operating Range:** 32-131°F (0-55°C). **Dimensions of Console:** 2½" H x 7" W x 5" D. **Sensors:** 1½" H x 4" W x 4" D.

Get a permanent record of barometric pressure changes – and current readings on three scales





Barographic pen marks current pressure and continuous trend from 28.0 to 32.0 inches Hg. by the week or month.

A tinted, transparent dust cover houses and protects the recording drum, and is easily removable to add your chart notations.

$199.95 Kit

- **A precision microprocessor-based instrument with many exclusive features, now at our best-ever price value**
- **See current pressure at a glance, while stylus records your permanent copy of rate and date of fluctuation**

Rate of barometric change is the single most important parameter which influences weather. If accurate documentation of daily pressure data is crucial to you, the ID-2090 Digital Barograph will provide an exacting dual readout for day-to-day forecasting and long-term trend analysis.

On the console, a four-digit display shows the current pressure at the same time it's recorded on the chart. A rear panel switch sets the method of measurement to be inches of mercury (Hg), millibars or kiloPascals, with front panel LEDs to indicate which units are in use. Top-of-cabinet buttons let you recall or clear most recent min/max pressure peaks from the ID-2090's internal memory, with the time and date each occurred.

Enclosed in a temperature-controlled oven, the pressure transducer is protected from the effects of ambient change and maintains a high (±0.03 in. Hg) level of accuracy – comparable to a mercury column barometer.

Drum rotation can be adjusted to travel and record at two different speeds, for use with the corresponding chart paper. Seven 31-day, and twenty six 31-day calibrated charts are included, enough to last for a whole year!

Kit ID-2090, Shpg. wt. 11 lbs. **199.95**

IDW-2090, Assembled and tested, Shpg. wt. 10 lbs. **249.95**

The ID/IDW-2090 Digital Barograph includes a one-year supply of chart paper. Additional chart paper and replacement pens available separately. See manual.

ID-2090 SPECIFICATIONS: Digital Clock & 4-year Calendar: 6-digit time readout in 12- or 24-hour format, with AM/PM indicators. 4-digit month and day. **Pressure Range:** 28-32 in. Hg (948-1083 MB, 94.8-108.3 KPA). **Accuracy of reading:** ±0.03 in. Hg (between 29-31 in. Hg. at 59-95°F, 15-35°C). **Overshoot:** 0.5% of full scale. **Overall error:** 0.04 in. Hg. **Chart Speed:** One revolution every 7 or 31 days. **Chart Speed Error:** 0.5% max. **Power Requirements:** 120/240 VAC, 50/60 Hz. **Dimensions:** 7" H x 15¼" W x 5½" D.

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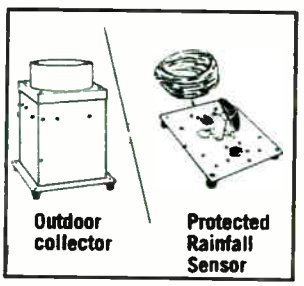
Credit Card Orders Call TOLL-FREE: 800-253-0570

The Heathkit Automatic Rain Gauge precisely measures rainfall in inches or centimeters

- **Obtain rainfall readings to within ±3%, without getting soaked**
- **Tracks both short- and long-term rainfall with separate LED digital displays, housed in an attractive walnut-trimmed cabinet**

The Heathkit ID-1790 Automatic Rain Gauge lets you 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 inches or centimeters.

You don't have to go outdoors to read the rainfall! The collector catches and measures it for you. A 100-ft. watertight cable is included for sending all readings to the indoor display. You stay warm and dry, and get instantly-updated accumulations during thunderstorm or drizzle.



The ID-1790 gives the accurate measurements you need. The weather resistant outdoor collector is housed in a 14½" H x 10" W x 10" D assembly that can be installed on a fence post, patio, or any open area for accurate readings. A screen over the plastic measuring bucket keeps out dirt, leaves and other natural debris that can cause reading errors, or clog the tip-bucket mechanism. The bucket tips automatically when full, so you don't have to go outside during or after heavy downpours to empty the collector.

The ID-1790's indoor digital display takes the guesswork out of rainfall readings. Two sets of red ½" high LED digits on a glareless flat black background constantly tell you the short- and long-term rainfall amounts. The first set of digits reads out the long-term rainfall in either centimeters or inches, whichever you choose. The second set shows short-term moisture.

The indoor unit is designed to match the other Heathkit weather instruments. It measures 5⅜" H x 12½" W x 4¾" D and comes housed in a handsome case with a walnut-grain front panel and runs on 120/240 VAC house current. A 9-volt backup battery (not included) keeps the unit's memory and measuring circuits operating during power failures. Take the "guess-or-get-wet" out of measuring rainfall – order your Heathkit Automatic Rain Gauge today.

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

IDW-1790, Assembled and tested, Shpg. wt. 12 lbs. **199.95**

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:** ±2.0 percent for ½ 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).

ID-1890 SPECIFICATIONS: Digital Clock/4-Year Calendar: 6-digit time readout. **Rear Panel Controls:** Clock Start/Stop, Hours/Month Advance, Minutes/Days Advance, 10 Minutes Advance, Time/Date Hold, 12/24-Hour Time Format. **Wind Speed Display:** 2 significant digits. Separate indicators show whether display in miles per hours, knots or kilometers per hour. **Memory:** Date, time and magnitude of maximum gust. **Accuracy:** ±5% or better. **Directional Display Accuracy:** ±11.25 deg. **Operating Temperatures:** −40° to +158° F (−40° to 70°C).

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

The Heathkit Digital Wind Instrument gives you wind speed, direction and gust information

- **Easier to read than conventional dial and needle wind speed indicators**
- **Displays the instantaneous or average wind velocity; recalls speed, day and time of peak wind gust; has accurate 12/24-hour clock with calendar**

Here's a wind speed/direction indicator with computer-age capabilities for those who demand accurate wind readings. The ID-1890 Digital Wind Computer is a precision, microprocessor-based meteorological instrument that displays instantaneous or average wind statistics, plus time and date. Lighted indicator bars show wind direction on a 16-point compass dial, also marked in radial degrees. Inside the compass face, two ½" LEDs tell you wind speed in mph, kph or knots. Built-in, 6-digit logging chronometer alternately displays time, then date or can be set to hold on one function. The included windvane and anemometer are similar to those described for the ID-4001 (next page). Requires 120/240 VAC. Includes memory retention/recall feature.

Kit ID-1890, Shpg. wt. 10 lbs. **149.95**

IDA-1290-1, 50' 8-wire cable for ID-1890, Shpg. wt. 2 lbs. **9.95**

IDA-1290-2, 100' 8-wire cable for ID-1890, Shpg. wt. 4 lbs. **16.95**

IDA-1290-3, 150' 8-wire cable for ID-1890, Shpg. wt. 6 lbs. **23.95**

Digital Barometer alerts you to storms

- **Monitors pressure, rate and direction of change, 12/24-hour time & date**
- **SAVE $75 on the kit; $65 on assembled**
- **Bright red ½" high LED readout**
- **Three unit scales: inches and millibars or kiloPascals**

The vital barometric pressure information you need to predict severe or pleasant weather is at hand with the ID-1990 Computerized Barometer. Its internal microprocessor reveals past pressure and precisely monitors the present.

You get current pressure, rate of change, direction of change, maximum and minimum pressures from memory, and the exact time and date when they occurred. In addition to being an accurate barometer, it's a clock/calendar with switchable 12/24 hour format for local and official reporting. Registers hours, minutes, seconds, month and day. All pressure data is sent by a unique, accurate electronic transducer – not an aneroid diaphragm! 120/240 VAC.

Kit ID-1990, Shpg. wt. 10 lbs. ..... **WAS $174.95, NOW ONLY 99.95**

IDW-1990. Assembled and tested. 8 lbs. ..... **WAS $194.95. NOW 129.95**

ID-1990 SPECIFICATIONS: 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 ±0.03 in. Hg (15°-35°C).

The only computerized weather station for instant, up-to-the-minute meteorological reports

- **Displays time/date, indoor and outdoor (F or C) temperatures, wind speed with direction plus barometric pressure (and if rising or falling)**
- **Microprocessor-based memory stores peak weather data so you can analyze trends**
- **Instantly recalls past weather statistics at the push of a button; Clear feature erases memory**
- **Housed in professional-looking solid walnut cabinet with brushed aluminum trim panels**
- **Remote windcup-and-weathervane transmitter assembly mounts on a 1" to 1½" mast for years of dependable, trouble-free service**
- **Styled to match any decor, it offers instant access to more comprehensive atmospheric data than was ever before available to the layman with a serious interest in weather phenomena and forecasting**

There's nothing else like it available! The Heathkit Digital Weather Computer is a personal information station that not only monitors the current weather data, but also reads significant changes and updates the data in its memory for your personal and business planning. For professional climate watchers, farmers, boaters, pilots, campers, science teachers – for anyone going outdoors – the ID-4001 can tell you what to expect.

An electronic memory almanac at the touch of a button: Received from an array of sophisticated sensors, the ID-4001 can display past and present weather data to aid in forecasting future activity. The computerized indoor console gives you the time in AM/PM or 24-hour format, and the date for exact log entries; plus and minus temperatures; wind chill factor; indoor/outdoor minimum and maximum temperatures since last memory clearance; instantaneous wind velocity with digital accuracy and 16-point compass resolution in mph, kph or knots; average wind speed with direction and peak gust since last cleared, and barometric pressure with four-digit accuracy in inches or millibars. Other memories record the high and low temperatures, min/max barometric pressures, calculation of the current rate of barometric change, and most importantly, the time and date each entry occurred. All data is stored until *you* choose to clear it, and battery backup preserves memory contents during brownouts or power interruptions.

The Heathkit Digital Weather Computer is surprisingly easy and great fun to build in about three evenings, thanks to the fully illustrated, step-by-step assembly manual. Or, you can order the IDW-4001 factory assembled and tested version, ready to install and use the very first day. The IDW-4001 comes with 100 feet of 8-wire transmission cable.

For business or personal reasons, you'll find it an investment that can pay for itself many times over. It's perfect for radio stations, cable TV companies, yacht or air-sport clubs, students, gardeners ... everyone who wants quick and reliable weather statistics at their fingertips – ALWAYS! Order an ID-4001 today, with the length of cable you desire, and start knowing for yourself what the weather ahead is really going to be!

Remote transmitter boom (shown here) attaches easily to TV antenna mast. 8-wire cable for ID-4001 must be ordered in length you require (below).

Kit ID-4001, Shpg. wt. 15 lbs. **399.95**
IDW-4001, Assembled and tested, Shpg. wt. 25 lbs. **599.95**

IDA-1290-1, 50-ft. cable, Shpg. wt. 2 lbs. **9.95**
IDA-1290-2, 100-ft. cable, Shpg. wt. 4 lbs. **16.95**
IDA-1290-3, 150-ft. cable, Shpg. wt. 6 lbs. **23.95**

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

Learn about weather science and how to predict changes with a Heathkit/Zenith Weather Course

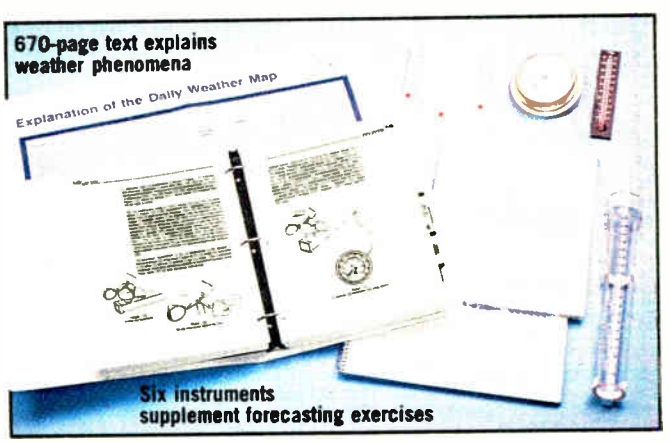
- **Teaches you how to forecast conditions by observation and instrumentation**
- **Gives you the necessary knowledge to start a small home or business weather station**

$79.95

Take the mystery out of weather with this comprehensive, award-winning Weather Course. It explains how nature's invisible forces change our atmospheric conditions and determine global climate on a day-to-day basis.

You'll understand weather and learn how to predict it. A true barometer, rain gauge and 4 thermometers help instruct you to read and use weather instruments. A workbook with map and forecasting exercises, a log book for documenting daily conditions, and a step-by-step textbook that takes you from basic definitions to predicting storms are also included.

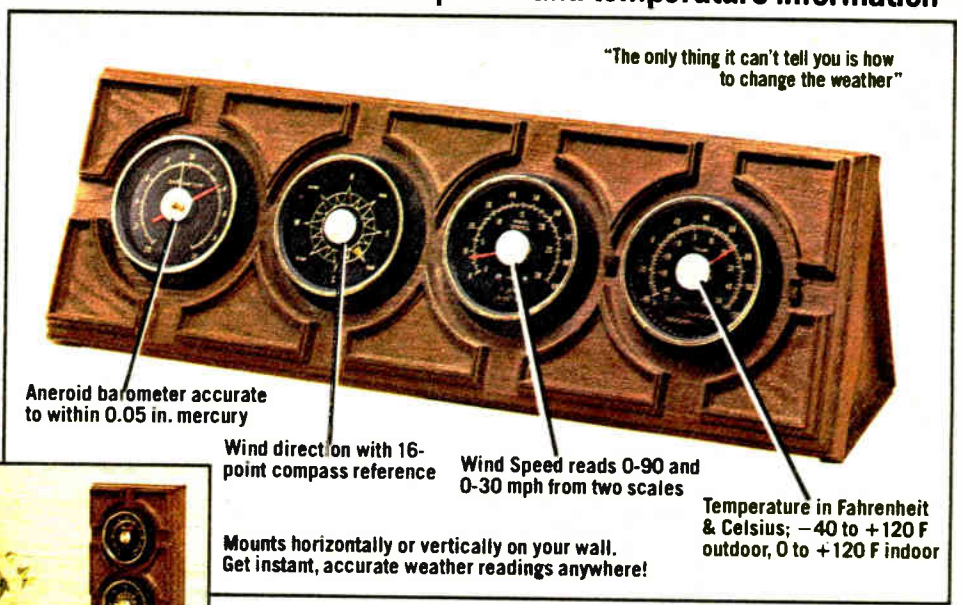
EW-4100, Shpg. wt. 10 lbs. **79.95**

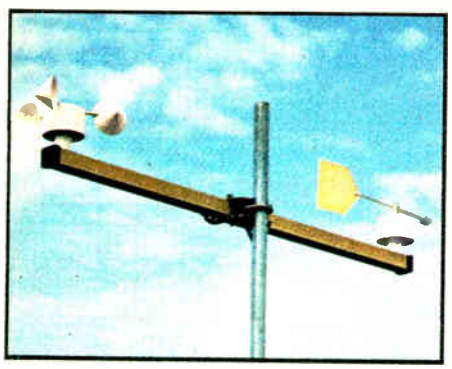


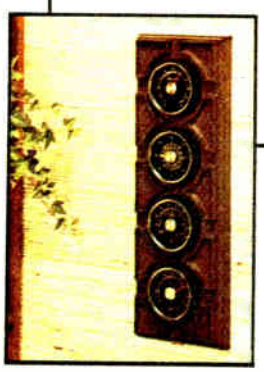
Credit Card Orders Call TOLL-FREE: 800-253-0570

The lowest cost, five-function weather station for accurate atmospheric and temperature information

- Stylish instrument plaque and long-life sensors are electronically accurate
- Monitors barometric pressure, indoor/outdoor temperatures, wind speed and direction
- Walnut grained cabinet may be displayed horizontally on table or hung on a wall at comfortable eye level
- Windtunnel-tested anemometer/weathervane transmitter assembly (below) mounts on 1" to 1½" mast for years of reliably remote service
- Black instrument dials have easy-to-read gold graphics with precision scales
- All-solid-state circuitry designed to operate from the AC line with a minimum amount of power consumption
- Temperature-compensated barometer may be used at altitudes to 10,000 feet







For the price, you can't beat the features or the accuracy of the ID-1290. It contains professional-grade instruments plus a quality, non-corroding remote transmitter assembly – all for less than $150.

Instantly accurate weather information is provided by the Heathkit ID-1290 Weather Station's five functions. You can depend on the Weather Station to give you the true indoor and outdoor temperatures, in both Fahrenheit and Celsius. The thermometer is calibrated from −40°F to +120°F (−40°C to +49°C), with a switch to select indoor or outdoor readings. A sensitive barometer helps you keep abreast of the most significant meteorological parameter – changing pressure conditions – by indicating movements as small as 0.05 inches of mercury. Wind speed can be read from 0 to 90 miles per hour in two ranges, with eight wind direction lights providing 16-point compass resolution for precision readings.

The remote transmitter assembly with temperature sensor features a ruggedly-designed anemometer and weathervane made from purely non-corrosive materials. Long-life Teflon™ bearings requiring no lubrication have been used to provide accurate readings year after year.

The ID-1290's walnut grained, sturdy indoor unit can be placed on a wall, or used as a handsome and distinctive desk set with the triangular stands included. The transmitter unit is connected to the weather station with an 8-wire cable, which can be selected below. The cables are well insulated for excellent weather resistance. Easy and enjoyable kit assembly makes the ID-1290 a great project for first-time builders, too. Includes a comprehensive book on weather. 120 VAC. Size 7" H x 20½" W x 2" D.

Kit ID-1290, Shpg. wt. 8 lbs. **149.95**

8-wire transmission cables for ID-1290 and ID-1590 Weather Instruments:

IDA-1290-1, 50 ft. cable, Shpg. wt. 2 lbs. **9.95**

IDA-1290-2, 100 ft. cable, Shpg. wt. 4 lbs. **16.95**

IDA-1290-3, 150 ft. cable, Shpg. wt. 6 lbs. **23.95**

ID-1290 SPECIFICATIONS: Wind Speed: 0-30 mph, ±2 mph; 0-90 mph, ±5 mph. **Direction:** 8-point readout over 360°. **Temperature:** 0° to +120°F, ±2°F (typ. INDOOR); −40° to +120°F, ±2°F (typ. OUTDOOR). **Barometric Pressure:** 29-31 inches of mercury within .05 inches, accurate up to altitudes of 10 000 ft. **Operating Temperature:** Receiver, −32° to 100°F; Transmitter, −40° to +120°F. **Wind Direction:** 16-point resolution by lighting two adjacent lights.

Accurate Digital Wind Speed/Direction Indicator

This ID-1590 Digital Wind Indicator may skimp on price, but certainly not on accuracy or reliability. The outdoor transmitting unit is one of the best around. It's designed to give you precise wind speed and direction year after year. The anemometer and weather vane are constructed from non-corroding, weatherproof materials for errorless readings under any conditions. Even the reed switches are hermetically sealed to prevent weathering that could cause inaccurate readings. The indoor unit features an easy-to-read seven-segment digital display and can be wired to report in two of three scales: mph, kph or knots. Switches select mode and front-panel lights show which are in use. The readout displays speeds on these scales from 0 to 99. Incandescent bulbs mark the 8 principal compass points, providing 16-point resolution by temporarily lighting two adjacent bulbs simultaneously. 120 VAC. Housed in black Cycolac™ case with teak-grain vinyl inserts. Requires 8-wire cable (order above).

Kit ID-1590, Shpg. wt. 7 lbs. **99.95**

Practical Digital Indoor/Outdoor Thermometer

When you compare the advantages this Digital Indoor/Outdoor Thermometer has over a conventional, mercury bulb sun-or-snow thermometer, you'll wonder how you did without one for so long. The big, red ½" display digits can be seen easily in broad daylight, or at night. No guesswork! The ID-1390B accurately monitors two temperatures with two sensors for indoor/outdoor readings, displayed within two degrees. Select Fahrenheit or Celsius temperatures, with continuous readings of one, or alternate readings of both. The 10' indoor and 75' outdoor cables (included) let you place the sensors anywhere (freezer, sauna, basement, pool, solar panel, etc.) Ranges from −30°F to 120°F outdoors and 20°F to 120°F in. Step-by-step instructions make it easy to assemble, and a practical kit that gives year-round value. Same size (2.5"H x 7" W x 5" D) and styling, with black Cycolac™ cabinet and teakwood trim, as ID-1590. Displayed together, a great set!

Kit ID-1390B, Shpg. wt. 4 lbs. **79.95**

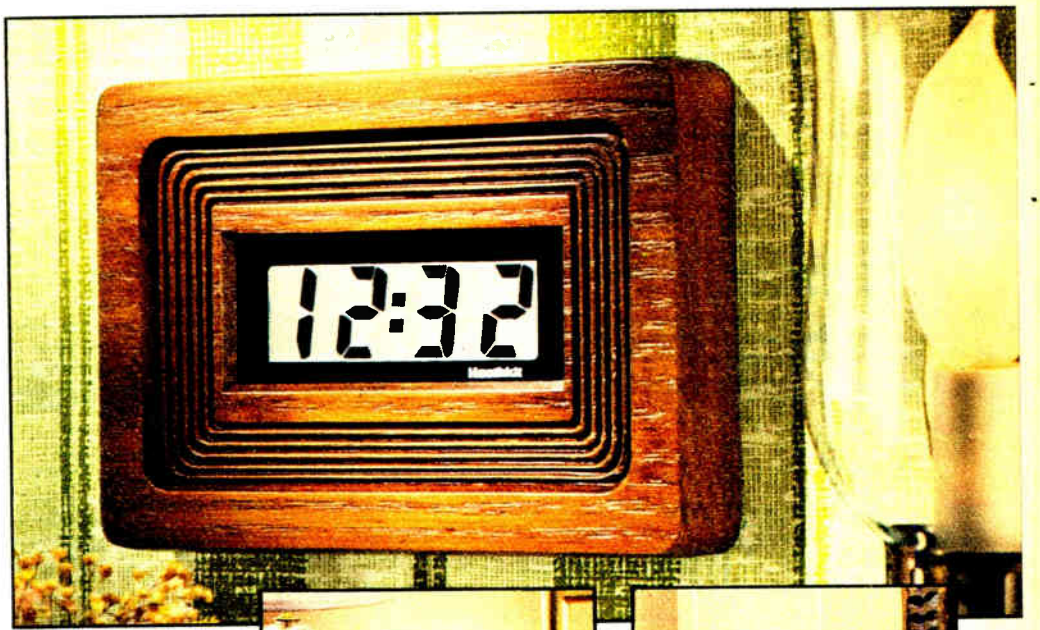
Alaska, Hawaii and Michigan Residents: Call 616-982-3411

Here's a timely project for office or den – the attractive, accurate Heathkit Digital Wall Clock

ONLY $49.95

FAST, EASY 1-EVENING KIT

- **Superb quartz accuracy to within ±1 minute per year**
- **Runs for up to two years on a single 1.5 VDC AA alkaline cell**
- **Big (one inch high) LCD digits for easy reading – even across a brightly-lit room**
- **Wire this clock to display the exact time in 12-hour or 24-hour formats**



It's fun to build the modern, decorative Heathkit GC-1720 Digital Wall Clock. This popular wall clock, which features easy kitbuilding, uses a single integrated circuit and a quartz crystal – just like a digital quartz watch – to give you on-the-dot accuracy. In fact, our GC-1720 Digital Wall Clock is so accurate – it tells time to within one minute a year. And once you set it, the GC-1720 will give you the correct time for up to two years on a single 1.5 VDC, AA size alkaline cell (not included).

Battery operation lets you put this clock in your sailboat, cabin, mobile home or any other place where wall outlets or power sources are limited. You can put it on any wall, at any height, regardless of outlet location. And it's immune to power outages caused by storms or generator failures.

Big one-inch-high digits make the Digital Wall Clock easy to see from 30 feet away. It's the ideal timepiece for kitchen, recreation room, or any other large area where you need to know the exact time, and don't want to see a power cord dangling in view.

And you can wire your Digital Wall Clock for either 12- or 24-hour time formats. That's a valuable feature for amateur radio operators, sailors, pilots or anyone who wants a 24-hour format for logging sign-on times, navigation, or filing flight plans. Features reliable, "set it and forget it" convenience.

An attractive, lightweight polyurethane case gives the Digital Wall Clock the look and feel of real wood. The simulated oak grain matches the decor of almost any room. And since the case measures just 5¼" H x 7⅛" W x 1½" D, it fits in places where some wall clocks can't – between kitchen cupboards or in a sailboat's tight quarters.

The Digital Wall Clock is an easy, enjoyable one-evening kit, with all parts mounted on a single circuit board. Since this is an ideal start kit, be sure to see our line of selected kitbuilding tools on page 50.

Kit GC-1720, Shpg. wt. 2 lbs. **49.95**

Perfect in den, living room

Or use in kitchen

GC-1720 SPECIFICATIONS: Display: Four-digit Liquid Crystal Display (LCD) with colon. **Display Height:** 1" **Time Format Options:** 12-hour format or 24-hour format. **Accuracy:** ± 1 minute per year at normal room temperatures, after adjustment according to instructions. **Power Requirement:** One 1.5 VDC, AA-size cell (not included). **Battery Life:** Approximately 1 year with carbon-zinc cell; approximately 2 years with alkaline cell. **Dimensions:** 5.25" H x 7.13" W x 1.50" D (13.33 x 18.11 x 3.81 cm).

Digital Floor Clock is a lustrous, modern-looking timepiece

- **Digital readout adjusts to room light for a pleasant, easy-to-read display**
- **Smoked glass shelves provide ideal display for flowers, knick-knacks**

Add elegance to any room in your home with the Heathkit Super-Clock. This space-age product is housed in a handsome simulated walnut veneer cabinet 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 you and your friends will admire.

An excellent first-time project, the Super-Clock displays hours and minutes – with the center colon pulsing once each second. Indicator alerts you to power outages. Add Westminster Electronic Chimes (below) for Old World charm. 120/240 VAC, 50/60 Hz. 60½" H x 14" W x 9½" D.

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

Shelf version of Digital Clock

In walnut veneer cabinet. Add chimes below. 120/240 VAC. 6½" H x 12½" W x 6¼" D.

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

Add these Westminster Chimes

Sounds 4 notes on ¼-hour, 8 notes on ½-hour, 16-note passage and hour on hour. Volume, pitch and sound delay controls; built-in tick-tock and speaker. Builds into GC-1195 or GC-1197.

Kit GCA-1195-1, Shpg. wt. 3 lbs. **99.95**

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

The Heathkit® Pledge

Our instruction manuals are written with you, the builder, in mind. They begin with a soldering guide for the first-time builder, and step-by-step instructions guide you through every detail of construction. In case of difficulty, there's a troubleshooting guide. You can even call or write the Heath Technical Consultants for prompt answers to any special questions. All this because our ever-growing popularity is based on one simple pledge: *"We won't let you fail."*

Easy one-evening kits

The kits on this page are practical, fun introductions to the growing world of kitbuilding. Average building time is just one evening. Perfect for birthdays, holidays or family indoor get-togethers.

Build the Heathkit Digital Alarm Clock in an evening — it's an ideal starter kit to try yourself or give as a timely gift

FAST, EASY 1-EVENING KIT

- **Displays time in either 12- or 24-hour formats**
- **Flashing display alerts you to power failures**
- **With handsome simulated wood-grain cabinet**

Our budget-priced Digital Alarm Clock has a 24-hour alarm with delay button, plus other space-age conveniences hard to find at this low price. It's a perfect beginner's kit, and ever-reliable timepiece. A four-digit blue-green fluorescent readout displays the correct time. Automatic dimming adjusts the display brightness to light conditions, and alerts you by flashing if the clock has been shut off during a power interruption.

It sounds a pleasant electronic tone to start your day out right. If you aren't quite ready to take on the world, press the Alarm Delay for 9 more minutes of pleasant dreams, up to 1 hour total.

What makes it tick? You'll know when you finish this one-evening-to-build, years-to-enjoy alarm clock. Attractive modern styling, small-size and solid-state dependability make it ideally suited for use in home, office or cottage – anywhere you need accurate time or a reliable, pleasing wake-up. 120/240 VAC. Dimensions 2¼" H x 7" W x 4¾" D. Get started in kitbuilding today!

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

Rechargeable Portable Light travels with you anywhere to illuminate

- **Disperses much more light than narrow-beam flashlights**
- **Rechargeable — just plug into AC outlet; no batteries to buy**

Indoors or outdoors, the GD-1246A gives you more light where you need it. Charge it from 120 VAC outlet (charger included) or car cigarette lighter with optional 12-volt adapter. Safer to use than kerosene lamps or candles. Metal case with handle is 10⅝" H x 3⅛" W x 5" D. **EXTRA VALUE** – Optional 12-volt charger now included FREE – was $5.95! *You get extra savings and full portability.*

Kit GD-1246A, Shpg. wt. 6 lbs. **39.95**

Stop break-ins with Photo Switch

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, 2 lbs. **9.95**

You can take your music along too, with this AM Portable Radio

FAST, EASY 1-EVENING KIT

- **We've made this popular Heathkit product even easier to build!**
- **Improved circuitry for increased battery life — up to 60 hours**
- **Earphone for private listening**
- **High-gain ferrite rod antenna for excellent AM band reception**

Especially designed for the first-time kit builder, your Heathkit GR-1009 Portable AM Radio will give you pleasure in many different ways, from the fun of kitbuilding to the pride of accomplishment, and the enjoyment of a fine product for years to come.

Excellent AM sensitivity gives you great audio reproduction of music and voice with clear, even tone. An 8-transistor, 7-diode superheterodyne circuit gives the quality performance you expect from a Heathkit product. Power is supplied by an inexpensive 9-volt battery (not included), or PS-2350 120 VAC Battery Eliminator (page 61).

Trim, high-impact cabinet looks sharp, cleans easily. Measures 3¼" H x 6⅜" W x 1¼" D.

A fun, practical way to begin kitbuilding, the GR-1009 requires only a soldering iron, screwdriver, pliers and wire cutters. And remember: "We won't let you fail!" Troubleshooting instructions are found in all our manuals for convenience.

Kit GR-1009, Shpg. wt. 2 lbs. **18.95**

Adjust lights with Tabletop Dimmer

Control brightness of table lamps and floor lamps for reading, dining, watching TV or personal moments. It eliminates unnecessary brightness in 3-way bulbs whose low-watt filaments are burned out, and helps bulbs last longer. Insulated plastic case with knob and non-marring feet is a 3¼" cube.

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

Freezer Alarm prevents food loss

Insure your meats and other frozen foods from spoilage by installing an alarm that warns of a failure in your freezer's cooling system or door left ajar. Alarm beeps and flashes a red light if inside freezer temperature rises above +20 F. Requires 2 "C" batteries. Includes 20-ft cable.

Kit GD-1183, Shpg. wt. 2 lbs. **19.95**

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

NEW Heath's latest generation of amateur radio equipment brings the accuracy and convenience

The Heathkit HW-5400 Synthesized HF SSB Transceiver builds on advanced concepts

IT'S ONLY
$699.95
without options

- **Without a doubt – higher performance features at a lower price than any comparable transceiver**
- **Fully synthesized with crystal stability and accuracy**
- **Unique dual-speed tuning knob with 50 Hz resolution**
- **Digital display with direct keypad frequency entry, two memories per band, and status symbols**

We've just designed the dream Transceiver: You're looking at a bold new venture into the world of high value, high-tech ham gear. A system of powerful flexibility and far-reaching capability. Precisely what you've asked from us; half a century of combined technological expertise in amateur radio kit creation went into its development. We proudly present the HW-5400 Series SSB Transceiver and everything *new* it has to offer.

Improved technology, at a never-before-seen low price: Our first goal was to halt the price spiral created by rigs overloaded with front panel gimmickry that did very little to increase their measureable performance value. Following that, the most important considerations were high quality in a low-profile unit, maximum enjoyment from the kitbuilding experience, cost cutting self-serviceability, quick operating convenience, a synthesized high-resolution frequency display, and time-tested controls that had a record of achieving great results in unison. Thus far a herculean task of ideals, but the list also included several extremely useful 'improvements' which no other manufacturer had yet been able to offer license-holders. *Heath succeeded.*

Three modes, eight bands and plenty of power for HF excitement: The HW-5400 operates in USB, LSB and CW on the 80 through 10 meter bands, including 10, 18 and 24 MHz. Completely solid-state and totally broadbanded. Beyond the essentials, this perfection-packed kit is a long overdue example of American value engineering, with uncommon additions like automatic sideband selection. Full break-in (QSK) for avid CW operators. Power supply activation at the Transceiver. Defeatable amplifier relay. Over- and reverse voltage protection. Heavy shielding on the internal power amplifier. High VSWR cutback protection with forward power limiting. The first microprocessor-controlled masterpiece of PLL frequency synthesis designed to match the level of professional caliber in every radio amateur.

One control, twice the convenience: The HW-5400's high-resolution tuning system employs a dual-speed technique so uniquely practical and efficient, Heath has applied for patent rights. Depending on which hole your finger selects for rotation you can fly through any band, or extract new QSOs by screening a narrow frequency range. Utilizing an infrared optical shaft encoder, the standard dial-hole affords an incremental tuning rate of 50 Hz per step, displayed directly with unerring PLL accuracy. The high-speed hole uses a metallic insert and capacitive-touch circuit to blank out the 10 and 100 Hz display digits and lets you rapidly scan a band in 1 kHz increments, or leap ahead at 25 kHz per revolution.

Total Transceiver status at a glance: Special-function symbols to the left of the frequency display will instantly inform you of current mode, transmit/receive status, split operation, split-access memory handling and whether the tuned frequency is outside the band edge. These status characters can be set at full brightness, made dimmer than the frequency display for better contrast, or darkened completely by pivoting a small jumper wire.

Beats the QRM every time: A tremendously versatile *Split-Memory* Access function lets you bring the transmitter frequency from memory and into the display for review or alteration while in receive, without missing a single word or fragment of code from the station in contact. The status display clearly indicates this mode with a letter M (see inset, next page).

At this price, second best can't compare with second-to-none: The HW-5400 benefits from some miraculous new microprocessor ingenuity, made possible only by Heath. Three phase-locked loops (HFO, BFO and VFO) are used to ultimately produce a single injection frequency, maintaining unexcelled stability and repeatability under even the most severe operating conditions. An 'intelligent' controller circuit manages all logically-encoded functions such as the synthesizer IC programming, PLL monitoring and unlock detection, band-frequency storage, coordination of the display, and it performs a self-diagnostic sequence upon power-up. The microprocessor's programming

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# of high technology to kit-form transceivers in this price class

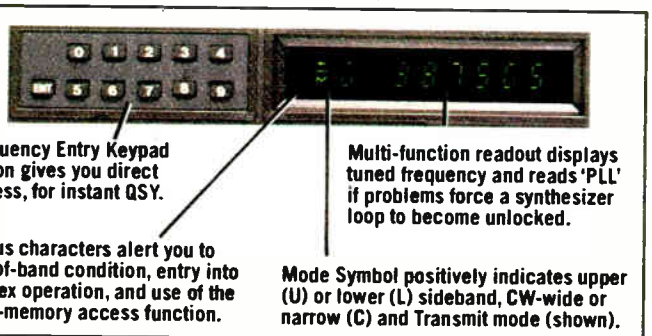
includes routines which protect the Transceiver from damage, such as forcing a return to receive mode should one of the synthesizer loops become unlocked or if the band switch is inadvertently turned while transmitting.

Able to leap large differences in a single bound: What's even faster than scanning at kHz-per-second rates through the bands to reach a desired frequency? That's right...*instantly synthesized direct entry by pushbutton touch control,* with 50 Hz resolution! It allows for no mistakes, no overtuning and no time lost in capturing new QSOs. With the inexpensive HWA-5400-3 Keypad option installed, your operating convenience increases tenfold. Press ENTER. The first digit disappears and a cursor appears at the bottom of the segment. Pressing a digit button causes that number to enter the display at the cursor location, which then jumps one position to the right. Continue typing one number after another. When the last digit is entered into display, this new frequency is selected for immediate use. Want to change just a digit or two? Pressing the ENTER Button will advance the cursor past those digits you wish to leave unchanged. Sound incredible? It is!

Half the size of some transceivers, double the performance of many: The HW-5400 front panel is clean and uncluttered, with all functions marked for easy operation. Two dual-concentric Gain knobs provide separate MIC/CW and AF/RF control. A third dual-concentric, center-detented knob provides ±350 Hz of receiver incremental tuning and ±600 Hz shift of the IF passband to achieve peerless rejection of adjacent signal interference. An automatically switched meter indicates signal strength in receive mode and ALC in transmit. Six pushbuttons commit a newly-tuned frequency to memory, exchange the memory with display, enable split T/R operation between memory and display, and switch between RECeive/TUNE, PTT/VOX and FAST/SLOW AGC modes. Vox Gain, Anti-Vox, Vox Delay and Sidetone Level controls are located out of sight, behind the front panel nameplate, which flips up at your touch. Easy to set when needed, out of mind the rest of the time.

Companion to this Transceiver, the HWA-5400-1 Power Supply/Speaker/Digital Clock provides a well-regulated, 13.8 volt source of double-fused DC power. Two main cables supply the HW-5400 with power, speaker input, memory preservation, an essential sensor line for proper regulation and remote on-off switching at the radio. The Supply can be wired for 120 or 240 VAC, 50/60 Hz operation, and the Clock for 12 or 24-hour format.

Valuable free education: The HW-5400 is the first and ONLY microprocessor-controlled Transceiver available in kit form. By this virtue alone, it offers every builder the experience of 'interfacing' with the newest technologies that are being applied to amateur radio. You'll learn its internal engineering details with hands-on understanding. The fully-illustrated, step-by-step Heathkit manual guides you through assembly and alignment.



The HW-5400 Series kits will yield an everlasting feeling of do-it-yourself satisfaction and admiration from fellow amateurs. Only a VTVM and frequency counter are required for the alignment procedure. We supply everything else, including an RF probe and as always, more than enough solder.

Heath's years of experience and constant innovation in the amateur radio field are exemplified in the HW-5400 Transceiver. In every respect the very finest of its kind, it may forever change the way you look at rigs of lesser imagination. When performance is a priority, and price is at a premium, Heath offers you the most – *and the best* – at the same time!

Kit HW-5400, Shpg. wt. 24 lbs. **699.95**

Kit HWA-5400-1, Shpg. wt. 39 lbs. **199.95**

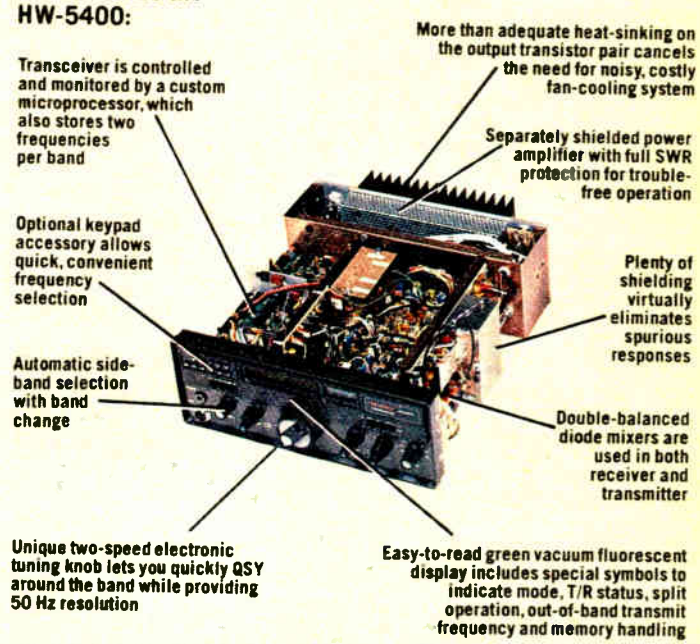
HWA-5400-3, Frequency Entry Keypad, Shpg. wt. 1 lb. **59.95**

HWA-5400-2, Deluxe 2.1 kHz 4-Pole SSB Crystal Filter provides sharper skirt selectivity in the IF bandpass for ten total poles of filtering and optimum receiver performance. Shpg. wt. 1 lb. **59.95**

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

Ideal for fixed, mobile and portable operation

A look inside the HW-5400:



HWA-5400-1 SPECIFICATIONS: Line Voltage: 120/240 VAC, 50/60 Hz. **Output Voltage:** 13.8 VDC at rated load. **Protection:** 20-ampere DC output fuse. 7- and 4-ampere slow blow fuses for 120 and 240 VAC primaries, respectively. **Output Current:** As required by Transceiver, up to 18 (20 peak) amperes during transmit. **DC Output Regulation:** 7% from receiver load to transmit load at 120 VAC primary; 4% additional with AC primary at 110-130 or 220-260 VAC. **Ripple:** 50 mV or less at rated load. **Duty Cycle:** 9 amperes DC continuous, 18 amperes at 50% (10 min. on, 10 off). **Speaker:** 4 ohms impedence, 300-3000 Hz response, 2 watts peak power. **Clock:** 4-digit blue fluorescent display in 12 or 24 hour format, synchronized to line frequency. **Cabinet Dimensions:** 5" H x 8½" W x 14" D (12.7 x 21.6 x 35.6 cm). **Net Weight:** 26 lbs. (57.3 kg).

HW-5400 SPECIFICATIONS – GENERAL: Overall Frequency Coverage: 80 through 10 meters, each band ±50 kHz; 10 MHz WWV; WARC bands operational. **Frequency Readout:** 7-digit vacuum fluorescent display with special symbols. **Readout Symbols:** – (Split), — (Out of Band), L (LSB), U (USB), C (CW Wide), C (CW Narrow), M (Memory), ¯ (Transmit). **Readout Accuracy:** To nearest 50 Hz. **Frequency Control:** Synthesized. **Synthesized Lock Indicators:** Display reads 'PLL' and LEDs show which loops are unlocked. Transmitter is disabled. **Dual Rate Frequency Tuning:** Slow = 50 Hz per step, 1.25 kHz per knob rotation. Fast = 1 kHz per step, 25 kHz per knob rotation. **Tuning Backlash:** None. **Split Frequency Operation:** Transmit from memory frequency, receive from displayed frequency. **Memory:** Store two frequencies per band. **Frequency Stability:** Less than 50 PPM drift from turn on. **Modes:** SSB Normal and Reverse; CW, Wide or Narrow. **Operating Temperature:** 0° to 40° C. **Power Requirements:** 11 to 16 VDC, 120/240 VAC with optional AC power supply. All specifications referenced to 13.8 VDC. **RECEIVER: Sensitivity:** Less than 0.35μV for 10 dB, S+N/N. **Selectivity:** With standard filter, 2.0 kHz minimum at 6 dB to 6 kHz maximum at 60 dB; With HWA-5400-2 optional filter, 1.8 kHz minimum at 6 dB; CW active audio filter, 250 Hz minimum at 6 dB centered at 700 Hz. **Overall Gain:** Less than 1 μV for 0.25 watt audio output. **Audio Output:** 2 watts minimum into 4 ohms; less than 10% THD. **AGC:** Selectable Fast or Slow (no more than 8 dB audio change for 3μV or greater input signal). **Intermodulation Distortion:** 70 dB at 25 kHz. **Image Rejection:** 80 dB minimum. **IF Rejection:** 100 dB minimum. **IF Shift Tuning:** ±600 Hz in Receive only. **Internally Generated Spurious Noise:** All below 1.0 μV. **Audio Hum and Noise:** Greater than 40 dB below maximum output. **Receiver Incremental Tuning:** ±350 Hz. **TRANSMITTER: RF Output:** High SSB, 100 watts PEP power minimum, except 80 watts on 10 meters. CW, 100 watts minimum, except 80 watts on 10 meters. **Duty Cycle:** Continuous SSB (voice). 50% receive-transmit ratio on CW; 5 min on, 5 min. off. **Load Impedence:** At least 90% rated power with less than 2:1 SWR. Protected against high VSWR. **Carrier Suppression:** 50 dB down from a 100 watt, single-tone (1000 Hz) output. **Unwanted Sideband Suppression:** 50 dB down from a 100 watt, single-tone (1000 Hz) output. **Spurious Radiation:** –60 dB minimum, referenced to 100-watt output. **Third Order Distortion:** 30 dB down from a 100 watt PEP two-tone output. **T/R Operation:** SSB = PTT or VOX, CW = full break-in (simplex only). **CW Sidetone:** 700 Hz to speaker or headphones. **Microphone Input:** High impedance (25k ohm) with –55 dBm rating. **Operation with External Linear Amplifier:** Linear relay, linear ALC rear panel connections. **Front Panel Meter:** S-units in Receive, ALC in Transmit. **Available Accessories:** HWA-5400-1 AC Power Supply with 12/24-hour clock and speaker; HWA-5400-2 2.0 kHz SSB Filter; HWA-5400-3 Frequency Entry Keypad kit. **Cabinet Dimensions:** 5" H x 11½"W x 14" D (12.7 x 29.2 x 35.6 cm). **Net Weight:** 24 lbs. (10.9 kg).

Introducing a breakthrough for Amateur Radio — the Heath SS-9000 Deluxe Synthesized

NEW

The age of the microprocessor-enhanced hamshack has finally arrived. All previous resources of skill and imagination are now being challenged by one rig:
the SS-9000.
Transceiver of the decade.

- **This is the Rolls Royce of transceivers: Fully microprocessor-based, entirely solid-state, broadbanded in design — delivers 100 watts to a 50 ohm load**
- **Microprocessor circuitry controls the entire operation of the SS-9000**
- **A built-in Terminal Interface with an RS-232 I/O port allows instant and direct control of operating parameters via ASCII terminal, modem or computer**
- **Nine-band operability, including the newly-allocated 10, 18 and 24 MHz WARC bands and WWV at 15 MHz**

Brave new Transceiver: The Heath SS-9000 is a quantum leap forward in terminal-controllable communications gear. Consummate in every engineering detail, its design evolved with the future of Amateur Radio in mind, and those operators who are exploring the leading edge of convergent radio and computer technology. Streamlined for ultraordinary results even without keyboard control, experienced amateurs will ultimately use it to establish new high standards for station, emergency, DX and contest performance.

Completely synthesized for absolute accuracy: A crystal-controlled master oscillator provides exact reference to phase-lock the BFO and HFO for super stability and repeatability. Likewise, a single precise VFO is tied to each display through 256 bytes of CMOS Random Access Memory. This extended on-board storage capacity accepts three separate inputs per band (preserved with battery backup) for a total of 27 frequencies to recall and work at will.

Two displays are better than one: Smart operators know our unique dual digital display is more than a cosmetic frill. Simultaneous working readout gives serious contesters and DX hunters greater advantage in frequency-handling speed and agility. Pushbutton exchange with (and copy into) memory or opposite display permits instantaneous QSY. Place it under terminal control and enjoy the versatility in QSO capture that shatters all precedent.

The Terminal Interface: At the heart of your SS-9000, an "intelligent" controller circuit assists a serial interface in maintaining communications protocol between external requests, via front panel controls or terminal guidance, and the internal circuits on the synthesizer, T/R and audio circuit boards. It allows two-way control/monitor communication between the Transceiver and a video terminal (such as the H-19 on pg. 71), hard-copy ASCII teletype, or computer (such as the H-89 on pg. 68).

Total control, simple controls: Commands are available to select, display and change the band, mode, all 27 operating and memory frequencies, passband shift, band scan and baud rates, lock and release one or all switches to their terminal-controlled or physical states and print *all* parameters. Keyboard command also allows you to place the SS-9000 in transmit or receive mode, assign and toggle T/R/Tr status on the dual readouts, and freely manipulate the three stored frequencies on each band, with full diagnostic error-prompting at the terminal.

An SS-9000 can be connected to the Heathkit SA-1480 Remote Coax Switch. When changing bands (either manually or via remote control, using the Motorized Band Switch) the proper antenna is selected *automatically*.

Free software: A 5¼" hard-sectored floppy diskette is supplied with every SS-9000. It demonstrates many ways of providing useful communication between a computer and the Transceiver, using graphics and video text to introduce you to its amazing control capabilities.

The PS-9000 Power Supply/Speaker is a perfectly matched component: As the SS-9000 powerplant, it provides 13.8 VDC for base operation with high temperature, short circuit and current surge protection. Each digital clock has independent 12- or 24-hour capability for local and UTC timekeeping.

This is the HF Transceiver the world had been waiting for. There is no other, no better system than the SS/PS-9000 team. See it at your nearby Heathkit Electronic Center. Try out the demonstration disk. Listen to what others say about its performance advantages. Then put it on the air from your club or QTH. *Discover the door to explore a new potential is wide open...*

SS-9000, Shpg. wt. 35 lbs. Assembled and tested Transceiver . . **2795.00**
PS-9000, Shpg. wt. 33 lbs. Assembled and tested Power Supply . **295.00**
SS6-9000, Shpg. wt. 74 lbs. Save $595 on System! Both ONLY . **2495.00**

PS-9000 SPECIFICATIONS — GENERAL: Output Voltage: 13.8 VDC, regulated (adjustable). **Maximum Output Current:** 25 amperes intermittent (50% - 10 minutes on-off) and 15 amperes continuous. **Power Requirements:** 110 to 130 VAC at 6 amperes or 220 to 260 VAC at 3 amperes, 50-60 Hz. **Regulation:** Less than 4% from no load to 25 amperes. **Ripple:** Less than 2% at 25 amperes. **Circuit Breaker:** 20 amperes for 110 to 130 VAC primary, 10 amperes for 220 to 260 VAC primary. **Current Limiting:** Over-current protected (set typically for 28 amperes). **Thermal Protection:** Automatic shutdown with over-temperature on the heat sink. **DUAL CLOCK: Display:** Two independent readouts with four digits and a colon. **Clock Format:** 12- or 24-hour display. **Accuracy:** Determined by the line frequency (no cumulative error). **Power Requirements:** 120 or 240 VAC, 50 or 60 Hz., 3.5 watts. **Cabinet Dimensions:** 6⅛" H x 9⅜" W x 13¾" D (15.6 x 24.4 x 34.9 cm). **Weight:** 33 lbs. (15 kg). Specifications apply when the Power Supply is used with the SS-9000.

SS-9000 SPECIFICATIONS — GENERAL: Tuning: 100 Hz per step, 5 kHz per knob rotation with pushbutton up and down scan (rate is internally adjustable). **Operation:** Split transmit receive or transceive from either readout. **Synthesized Lock Indicators:** Visual indication when synthesizer is unlocked. Transmitter is disabled. **Frequency Coverage (MHz):** 1.8-2.0,* 3.5-4.0,* 7.0-7.3,* 10.1-10.15, 14.0-14.350,* 18.068-18.168,* 21.0-21.450,* 24.890-24.990, 28.0-29.7,* WWV @ 15.0 (*Extended Frequency Coverage). **Frequency Stability:** Less than 3 ppm from turn-on for first 15 minutes; Less than 3 ppm/hour drift after 15 minutes warmup; Less than 20 ppm drift from 0°C to +40°C (single crystal-controlled 10 MHz frequency standard). **Modes of Operation:** LSB, USB, CW-Wide, CW-Medium, CW-Narrow, RTTY. **Operating Temperature:** 0°C to +40°C. **Power Requirements*:** 11 to 16 VDC with a nominal current maximum of 25 amps at 100 watts CW output. Receiver current is 2 amps nominal. (*All specifications are referenced to 13.8 VDC at 25°C ambient). **Rear Panel Connectors & Control:** Antenna (SO-239), Linear ALC In, Linear ALC Adjust, Low Power Enable, Spares (5), DC Power Input, CW Key Jack, External Transmit Audio In (2), Speaker Out, External Receiver Audio, T/R In, T/R Out, Mute, Mute (inverted), External Relay (linear), and RS-232 Interface. **TRANSMITTER: RF Power output:** SSB = 100 watts PEP minimum, CW & RTTY = 100 watts minimum. **Load Impedance:** 50 ohms. **VSWR:** Stable at any VSWR and load impedance. Cutback circuitry guarantees at least 80% of rated power at any VSWR less than 2:1 and a minimum of 15 watts at any VSWR. **Carrier Suppression:** 50 dB down from a 100 watt, single-tone (1000 Hz) output. **Harmonic Radiation:** 50 dB down below 50 MHz, 65 dB down above 50 MHz. **Spurious Radiation:** 50 dB down, except at 17 meters (40 dB down). **Third Order Distortion:** 30 dB down from a 100 watt PEP, two-tone output. **Unwanted Sideband Suppression:** 55 dB down from 100 watt, single-tone (1000 Hz) output. **T/R Operation:** SSB = PTT or VOX, CW = semi break-in. **CW sidetone:** 750 Hz tone, adjustable level. **Microphone Input:** High impedance (25k ohm) with −55 dBm rating. **RECEIVER: Sensitivity:** 0.3 μV for 10 dB (S+N)/N SSB on the 40 through 10 meter bands, 0.5 μV on the 160 and 80 meter bands. **Selectivity:** 2.1 kHz at 6 dB down, 5 kHz at 60 dB down. CW filters, CWM = 400 Hz at 6 dB down and 1.5 kHz at 60 dB down. CWN = 200 Hz at 6 dB down and 1 kHz at 60 dB down. **Overall Gain:** Less than 1 microvolt for a 0.25 watt audio output. **Audio Output:** 1.5 watts into 4 ohms at less than 10% THD. **AGC:** Fast-attack with switch selectable Off, Fast and Slow decay. **Intermodulation Distortion (20 kHz spacing):** −70 dB. **Image Rejection:** −80 dB (except −65 dB on the 17 and 12 meter bands). **Second IF Rejection:** −90 dB. **First IF Rejection:** −80 dB (except −60 dB on the 40 and 30 meter bands). **Internally Generated Spurious Signals:** All below 1 μV equivalent. **RIT:** ±250 Hz. **Available Accessories:** PS-9000 AC Power Supply/Speaker with built-in dual 12/24-hour clock and Customer Service Manual. **Cabinet Dimensions:** 6⅛" H x 14" W x 13¾" D (15.6 x 35.6 x 34.9 cm). **Weight:** 35 lbs. (15.9 kg).

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HF Transceiver

Fully assembled and tested. A transceiver so feature-conscious, it has no options!

Built-in Motorized Bandswitch rotates to desired setting under remote control

•

Four-function front panel meter indicates received signal strength, ALC, relative power out and speech compression level

•

Superior over-current, thermal and high VSWR protection incorporated for safe, worry-free operation at all times

•

One year limited warranty from Heath

•

Front panel hinges forward and all main circuit boards fan out for easy access and self-serviceability (Customer Service Manual will be available in early 1983)

•

Durable, die-cast zinc front panel

•

All front panel functions standard for intrinsic, value-adding versatility without the nuisance of extra-cost options

•

Twelve poles of distributed SSB filters for optimal selectivity during crowded conditions

•

Self-diagnostic capability will indicate various internal malfunctions on the fluorescent display (if they occur)

•

Main tuning dial has optically-encoded shaft for linkage-free control and zero backlash

•

Pushbutton up and down variable speed scan traverses a band in 16 selectable rates with 100 Hz final resolution and ultra-low drift

•

Diode balanced mixers and dual-gate MOSFETs provide much greater sensitivity and phenomenally high dynamic range

•

Made in America

Heathkit HW-101...easily the best buy in Amateur Radio!

$399.95

- 180 watts PEP; 170 W on CW
- 80 through 10 meter coverage
- USB, LSB, CW, PTT and VOX
- 0.35 μV receiver sensitivity
- Save $60 on this kit now!

With over 30,000 throughout the world, the HW-101 is an all-license SSB Transceiver that has proved to be a reliable champion under all conditions. The performance this rig has to offer makes it hard to believe you're operating on a budget.

You get an outstanding receiver. One with a high quality crystal IF filter to keep signals widely separated. Image and IF rejection of better than 50 dB help bring you world-wide reception that's clear and crisp. Add the optional 400 Hz narrow CW Crystal Filter for clean copy through the QRM.

The transmitter section's one of our very best. Triple action level control prevents distortion-producing overdrive. A rugged pair of 6146 finals pack a powerful punch behind your output signal, with an ALC exciter input for linear amplification.

Other features include a fast-acting AGC circuit, a front panel meter showing signal strength, plate current and relative power out. So you're always right on frequency and inside the band, a built-in 100 kHz calibrator is ready for reference.

The HW-101 is a kit you'll take pride in building, and is sure to win acclaim from all across the QSO spectrum. Easy to assemble circuit boards and color coded wiring harnesses speed assembly. Requires PS-23 Power Supply and HS-1661 Speaker.

Kit HW-101, 22 lbs. **Was $459.95 NOW ONLY 399.95**

SBA-301-2, 400 Hz CW Crystal Filter, 1 lb. **39.95**

Kit HS-1661, Matching Speaker, 5 lbs. ... **34.95**

This versatile Power Supply is ideal for your HF station. It provides a range of operating voltages for the HW-101 and other Amateur equipment. High voltage output is 700 VDC @ 250 mA with 300 VDC @ 150 mA and 250 VDC @ 100 mA low voltage taps. Provides fixed bias and 12.6 volt filament source. Excellent bias supply filtering and very low ripple. Overload and short circuit protected. 120/240 VAC, 50/60 Hz. Size: 6¾" H x 9" W x 4¾" D.

Kit PS-23, Shpg. wt. 17 lbs. **89.95**

Hard-working station accessories deliver more operating convenience

Remote VFO gives added capability

Provides split transmit/receive capability for DX, net operation. All solid-state. Multi-mode 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. Metal cabinet. 7¼" H x 10¼" W x 15¼" D. Only for the SB-104A Transceiver.

Kit SB-644A, Shpg. wt. 10 lbs. **79.95**

Versatile, 5-function Station Console

Features 24-hour, 6-digit clock; 10-minute ID timer w/auto reset; RF wattmeter w/200/2000 watt ranges; SWR bridge w/sensitivity control; manual/VOX-controlled phone patch with better than 30 dB isolation. 600 ohm input impedance. 1.8 to 30 MHz. 120/240 VAC, 50/60 Hz.

Kit SB-634, Shpg. wt. 13 lbs. **99.95**

HDZ-63-3, 3-ft. Coax w/conns., 1 lb. **4.95**

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

Packed with power and features, the SB-221 2kW Linear has a QSO-commanding voice

- **Lowest price-per-watt in 2 kW Linear Amplifiers**
- **Heavy duty power supply for reliable operation**
- **You can wire it easily for 120 or 240 VAC line**

More of what you're paying for: The Heathkit SB-221 2kW Linear Amplifier is the hottest performing, lowest cost amp available. It has the rugged dependability and superior design you *need* for the professional operating proof you seek. Like more QSO's across the spectrum. More DX recognition when the going gets tough. QSL's from every country, continent or contest you try...

More savings from the start: When you build it, *you save money for other gear* and reap years of lasting pride from the kit experience. In 2kW Linears, Heath has absolutely the lowest cost-per-watt against all competition. At only $.33 per watt, SB-221 is the clear price/performance leader.

More power in the pile-ups: A pair of world-famous 3-500Z's deliver 2000 watts of QRM-busting PEP on SSB, and load to 1kW on both CW and RTTY. A broadband pre-tuned pi input yields maximum efficiency with extremely low distortion over the 80-15 meter spectrum. Just 100 watts of exciter will drive it to full output – with the kind of contact signal that always catches the new DX, gets priority traffic through and your callsign heard clearly, year after year.

The SB-221 is no longer available. A new version matching the SS-9000 and HW-5400 Transceivers will be available in April of 1983.

If you've never used an amplifier before, you'll find that with an SB-221 in your hamshack, 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 transmit. It's that simple! You'll wish you had gotten it sooner.

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 cooling of the finals. Other features include ALC to prevent distortion-producing overdrive, plus front-panel switch-selected monitoring of grid current, relative power, and high voltage. The SB-221 also features a separate meter for measuring final amplifier plate current.

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:** 52Ω unbal. **Output impedance:** 50Ω 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 10A). Antenna relay (phono), ALC (phono), RF Input (SO-239), Ground post. RF Output (SO-239). **Tubes:** Two 3-500Z. **Power requirement:** 120 VAC, 50/60 Hz @ 20 amp. max. 240 VAC, 50/60 Hz @ 10 amp maximum. **Cabinet dimensions:** 8¼" H x 14⅞" W x 14½" D (20.96 x 37.78 x 36.83 cm).

The winning favorite among thrifty hams, SB-201 puts a 1200W kick in your SSB signal

$479.95

- **A rugged pair of 572B finals need 100-watt exciter**
- **The SB-201's forced air cooling is ideal for contesting**
- **Switchable multi-function metering puts you in control**
- **Features pre-aligned cathode-input circuits**

You can call all day during a pile-up. But if your signal doesn't measure up, that rare DX won't hear you. So...make yourself heard – put the Heathkit SB-201 1 kW Linear Amplifier in your station. It will punch holes in the QRM without putting a hole in your Ham-equipped budget.

Just 100 watts is all it takes to drive the 201's heavy-duty pair of forced air-cooled 527B's to a full 1200 watts PEP input on phone, and 1000 watts input on CW. So it's ideal for use with most popular transmitters or transceivers such as the HW-101 and the HW-5400. 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 the air as soon as you've finished building your kit. There's 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. And the thorough, illustrated, step-by-step Heathkit instruction manual will guide you every step of the way from unpacking to final plug in to assure you of an enjoyable kitbuilding experience.

From its front panel right on back to the rear apron, the FCC-approved Heathkit SB-201 1 kW Linear Amplifier is packed with features that will make you wonder how you got along without it.

Kit SB-201, Shpg. wt. 47 lbs. **479.95**

HDZ-63-3, 3' RG8/U Jumper with PL-259 Connectors, Shpg. wt. 1 lb. **4.95**

SB-201 SPECIFICATIONS: Band coverage: 80, 40, 20 & 15 meters. Maximum power input: 1200 watts PEP, 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 PEP. **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:** 6⅝" H x 14⅞" W x 13⅜" D.

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

Deluxe Antenna Tuner with dual wattmeter/SWR bridge matches 1.1:1 on antennas and loads

$249.95

- **Built-in wattmeter/SWR bridges make tuning a snap**
- **A single switch selects either one of two coaxial or balanced antennas, single-wire feed and bypass load**
- **Copper-plated steel chassis for best RFI suppression**
- **Eliminates the loss of precious power because of a mismatch between your transmitter and antenna**

Don't be caught on the edge of DX activity! If you need a rugged, dependable tuner to handle full legal power, our Deluxe Antenna Tuner can make the difference. It will put the clean, twin kilowatt thunderbolt of the SB-221 Linear (or its 1kW brother) to most efficient use by radiating every last watt of their capability from your antenna system.

By clearly indicating power out and f/r SWR with ±5% forward accuracy, this 2kW Tuner exactly matches your antenna to any frequency in the 160-10 meter spectrum. You're in complete control with a continuously variable inductor for an infinite number of impedance settings; bypass switch for tri-band beam or dummy load; versatile, 4:1 balun and inductor turns counter. A section in the assembly manual shows you typical high,- mid,- and low-range settings on individual antennas. The wattmeters have a range of 200 and 2000 watts (fwd) and 50/500W (ref), with accuracies of ±5% (avg). Join thousands of radio amateurs who are extracting the last possible measure of QSO-grabbing performance from their gear. *Build the Super Tuner!*

Ideal for MARS, CAP and WARC operation

Kit SA-2060, Shpg. wt. 20 lbs. ..... **Was $269.95, NOW ONLY 249.95**
HDZ-63-3, 3-ft. RG-8/U jumper with PL-259 connectors, 1 lb. **4.95**

Gain more operating bandwidth from dipoles and longwires with 80- to 10-meter Antenna Tuner

$169.95

- **Handles up to 2000 watts PEP on SSB or 1000 watts CW**
- **Continuously variable inductor assures a perfect match every time, with any feedline or configuration**
- **Erasable logging scale for band settings on front panel**
- **Ideal for MARS operation and allocated WARC '79 bands**
- **Matches coaxial, end-fed wire and balanced feeders**

Frustrated by a dipole that lacks sufficient bandwidth or an antenna that only covers one or two bands? Then the reliable SA-2040 Antenna Tuner is for you! Designed with a low-as-possible price that can't be beat, it still includes the same type of heavy-duty capacitors and almost every other feature of its big brother (above) – but without the 160 meter coverage and built-in wattmeter/SWR bridges. That way, you get the right amount of Tuner you need without paying for station accessories you already own.

Silver plated straps and roller contact assembly minimize RF loss at high frequencies and its large feed-through insulators are designed to withstand high voltage. SO-239 connectors mate to your 50-ohm system. It won't take long to get this kit on the air, and after tightening the cover, you can personalize your front panel with adhesive letters and numerals we've included. Compare this Tuner with all the competition – match power limits, features and price – you'll see our engineering quality and total performance value stand out. *Heath has more for the active Ham!*

FAST, EASY TWO-EVENING KIT

Kit SA-2040, Shpg. wt. 15 lbs. **169.95**
HDZ-63-3, 3-ft. RG-8/U jumper with PL-259 connectors, 1 lb. **4.95**

A real CW challenge – the HW-8 QRP Transceiver can work the world on a couple of watts

$179.95

- **80, 40, 20 and 15 meters CW; a minimum 3.5 watts in on 80 with quiet, 0.2 μV receiver sensitivity**
- **Adjustable T/R delay and semi-break-in capability with 2-position wide/narrow active audio filter**
- **Excellent mobile/portable rig; weighs only 4 pounds**

The world's most popular QRP CW Transceiver has a worthy reputation. The HW-8 provides you with maximum convenience in covering its 3.5-3.75; 7.0-7.25; 14-14.25 and 21-21.25 MHz operating ranges. This hot little rig features an RF and AF gain control, solid-state band switching, pushbutton band selection, a tunable preselector and direct conversion with RF amplification. Crystal-controlled heterodyne circuitry insures accurate frequency mixing. You'll get a minimum of 3.5 watts output on 80 meters, 3.0 watts in on 40 and 20, and 2.5 watts on 15. Operate your HW-8 on a campout, backpacking, or on a business trip; power it from your motorcycle battery, car lighter socket, go *'solar QRP'* or tune it up at home on 120/240 VAC with the HWA-7-1 Power Supply. The Heathkit HW-8 is a great performer that's going to give you hours of pure pleasure! Order yours and join the growing alliance of QRP-powered QSL-hunters. Requires headphones (see below). Accept the challenge. Have some fun. Keep in mind – *one watt works a lot!*

Kit HW-8, Shpg. wt. 6 lbs. **179.95**
Kit HWA-7-1, AC Power Supply operates HW-8 on 120/240 VAC, 4 lbs. **29.95**
GD-396, 600 Ω Superex Headphones, assembled, Shpg. wt. 1 lb. **9.95**

HW-8 SPECIFICATIONS: TRANSMITTER – Frequency Control: built-in VFO. **Frequency Stability:** Less than 150 Hz/hour drift after 60 minute warm-up. **Output Impedance:** 50 Ω. **Spurious and Harmonic Levels:** –35 dB or better. **Offset Frequency:** approximately –750 Hz, fixed on all bands. **RECEIVER – Sensitivity:** 0.2 μV for readable signal; 1 μV or less for 10 dB S + N/N. **Selectivity:** wide, –750 Hz @ –6 dB; narrow, –375 Hz @ –6 dB. **Audio Output Impedance:** 1000 Ω, nominal. **GENERAL – Frequency Stability:** less than 100 Hz/hour drift after 30 minute warmup. **Power Requirement:** 12-16 VDC, 90 mA, receive; 430 mA, transmit. **Dimensions:** 4¼" H x 9¼" W x 8½" D.

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

Novice Class License Course helps you discover the pride and potential of Amateur Radio

Now – for CBer's, electronic hobbyists, and everyone interested in operating world-wide two-way Amateur Radio equipment – Heath makes it easier than ever to pass the required FCC exam. Everything you need to learn comes with the Course!

$39.95

Achievement Guaranteed

- **Communicate with nearly a million other hams around the world ... right from your own home or car ... using CW on a variety of frequencies**
- **Take the Novice FCC test and ride the airwaves! You can't fail – Heath guarantees that you will pass! – or we'll refund the purchase price**

From Heath – the leader in Amateur Radio technology – here's a self-instruction program that's guaranteed to help you earn a Novice ticket! Everything you need to get your license and become part of a privileged fraternity is in this comprehensive, well-organized study aid, including information on how you apply to take the latest FCC exam. Also, it provides helpful guidelines for setting up and operating a good station when your license and personal callsign arrive!

This deluxe learning tool now contains 48 new pages of text material to prepare you for the latest FCC Novice License examination. Our update includes study of call sign groups (with prefix, zone and suffix types), many "Q" and alphanumeric abbreviations, RST signal reporting and Universal Coordinated Time (UTC) with a global conversion table provided. Also, coverage of basic circuit conditions, fusing, quarter-wave vertical and dipole antennas, proper calculation of their length for different bands, antenna installation and basic precautions, standing wave ratio problems and causes, station ground, block diagrams of functional novice stations, audible backwave, ripple and hum, zero-beating, and the mature operating practices and responsibilities of station control.

The Course is organized in nine separate modules corresponding to the subject areas you'll find covered in the Novice exam. Each subject is presented in a clear, step-by-step manner for progress at your own pace.

At the end of each module, a multiple-choice review checks your understanding and retention of the material. After Module 9, three practice exams and a final styled after the new FCC examination impart the experience and test-taking confidence you want to pass the first time with flying colors.

The Course includes two audio cassette tapes full of important knowledge. The first is an introduction to Amateur Radio, and explanation of the RST signal reporting system, a review of electronic circuit components, and a study of practical circuits. The second tape will teach you the International Morse Code in letter groups quickly and effectively, and then help boost your send and copy speeds to 5 words per minute for the CW test.

Upon completion of the entire Course, you'll be able to accurately send and receive code at five words per minute, and pass a 20-question multiple-choice written test from the Federal Communications Commission.

An attractive vinyl binder houses the nine modules and cassette tapes. As a bonus, you receive a handsome set of Operating Aids including a colorful 31" x 22" Frequency Spectrum Chart and a matching U.S. Call Area Map, a glossary of common abbreviations used during communication with other Amateurs, an explanation of the twelve most frequent 'Q' signals, instructions for making your own base station antenna, and much more!

We are so sure that this Course will help you get your first license, that if you fail to pass the new FCC Novice exam after completing the enclosed final practice exam, we will refund your money in full. Simply return the Course materials, along with your receipt and a copy of your rejection notice from the FCC. No better guarantee exists. You'll soon be on the air!

You can explore the wonders of this fascinating hobby in a unique way with performance-proven Heath equipment. Our kits are world-famous. They're easy fun to build, and they expand your understanding of practical electronics by giving you hands-on experience and 'tech-knowledgy.'

There's an indescribable thrill which comes from airing a QRP (low power) or legal-limit rig that you've just built with your own two hands! It's a feeling that harks back to the early days of our hobby (some call it a passion) when almost every piece of gear was 'home-brew' and every contact or call you made reflected the hard won know-how, loving care and electronic construction skills you had learned and applied to succeed. You're going to save money over comparable assembled units, plus save more by being able to perform your own service and maintenance, should it ever become necessary. And you can say with pride, *"I built it myself!"*

So ... if you've been putting off getting the Novice ticket because of fear of failing the code test or the technical exam ... or if you just didn't know where to start, the Heathkit/Zenith Novice License Course is the correct answer! It contains *everything* you need to get started on the right track toward the day when you put a rig on the air and start talking to the world. Order now – the exciting universe of Amateur Radio is waiting for you!

ER-3701, Shpg. wt. 7 lbs. **39.95**

Kit HD-1416, Oscillator (see below), Shpg. wt. 2 lbs. **22.95**

Build up your code speed fast with this handy CW kit

$22.95

Use this CW Code Oscillator to learn the Morse Code, get your code speed up and pass the FCC license exams in a simple and inexpensive way! It has a telegraph key with adjustable rebound, built-in speaker, volume and tone controls, plus a headphone jack for private listening. The key furnished with the kit is the only external item you require to form audible code characters. The manual includes sections on Operation, Application and Learning the Code. Once you get your license, the HD-1416 can serve as a sidetone oscillator for any transmitter using negative grid-block keying. Two-tone emerald cabinet is 2⅝" H x 4⅛" W x 4⅜" D. Operates on one long-life 9V battery (not included).

Kit HD-1416, Shpg. wt. 2 lbs. **22.95**

SAVE $12.95

Why delay? This is the ideal package – study the Course and get 'hands-on' Code practice!

We'll help you get started in Amateur Radio with a big 20% savings on the ER-3701 Novice License Course and HD-1416 Code Oscillator when you purchase the pair together. So you can save even more money, this offer includes a certificate good for 10% off your purchase of up to $100 of Heathkit Amateur equipment. If purchased separately, they'd cost $62.90

ERS-3701, Shpg. wt. 9 lbs. **49.95**

VISA MASTERCARD **Credit Card Orders Call TOLL-FREE: 800-253-0570**

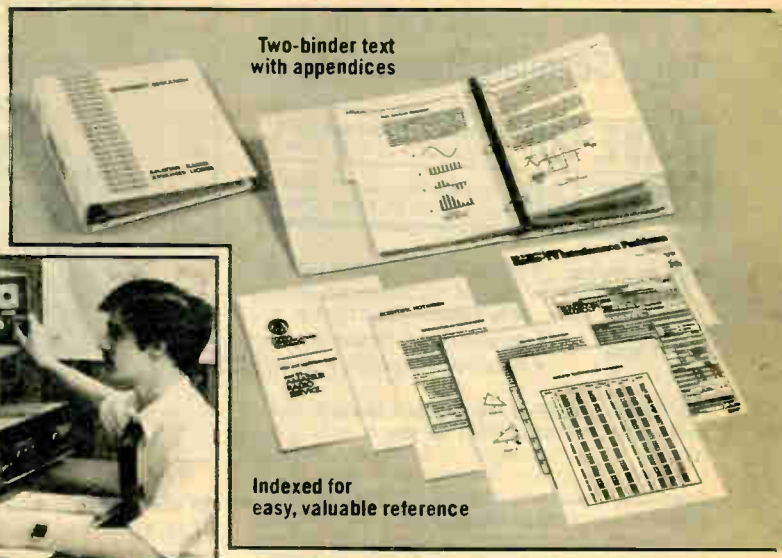
NEW

Advanced Class Amateur Radio License Course is the perfect incentive to upgrade

Prepared with the General Class license holder in mind, ER-3703 is the first completely up-to-date compilation of the technical and examination material required to help you achieve Advanced Class status. It assumes you possess a General license or have the equivalent skills and background knowledge to do so.

$49.95

- **Well-organized to make most efficient use of your time, we guarantee that you'll pass your FCC exam the first time – so sure in fact, that we will refund the cost of the program if you fail to pass after completing the enclosed optional final exam. That's confidence!**



In response to the intense interest of General hams to achieve Advanced operating privileges, we've produced a comprehensive self-education Course that's *guaranteed* to aid in obtaining their next license, and earn a new callsign.

Housed in a pair of matching vinyl binders, the Advanced License Course fills over 800 pages. Unlike many, this Course is not simply a repetitious list of questions and answers to be memorized for passing the exam, but a detailed source of technical and appendical material which will improve your overall knowledge and understanding of radio electronics at the Advanced Class level.

The FCC Element 4(a) written examination deals with the following subjects: Rules and Regulations, Radio Phenomena, Operating Procedures, Emission Characteristics, Electrical Principles, Practical Circuits, Circuit Components, Antennas and Transmission Lines, and Radio Communication Practices. ER-3703 covers them *all* in detail for the exam.

Two multiple-choice, 50-question exams at the end of the Course simulate the actual FCC test, and thereby give you "hands-on" test-taking experience.

The Advanced License Course is arranged in 8 learning units:

- **DC and AC Electronics**
- **Basic Circuits for Equipment Design**
- **Antennas, Feedlines and Propagation**
- **Semiconductors**
- **Transmitter and Receiver Circuits**
- **Station Operations**
- **Practice Examinations**
- **Measurements and Test Equipment**

In addition to the text, you receive a copy of Part 97, FCC Rules and Regulations for Amateur Radio Operation, "How to Identify and Resolve Radio-TV Interference Problems" and the FCC's Form 610 license test application.

Designed in the modular style proven most effective by educators, the Advanced License Course includes self-test reviews after each chapter to assure greater retention of the material. This format also makes it easy to identify problem areas *before* the FCC test. The self-instructional nature of the Course allows you to progress at your own pace and backtrack to review any subject.

Fully one-fifth of the 80-15 meter HF spectrum in four specific subbands (3800-3890, 7150-7225, 14200-14275 and 21270-21350 kHz) is allocated to the Advanced and Extra Class license holders. Why be left out? These are the choicest kilocycles, with more DX hot spots and experienced amateurs. Demonstrate your desire for self-improvement and upgrade your ticket with the Heathkit/Zenith Advanced Class License Course. Send us a copy of your new license or FCC notification of passing to receive 4.0 Continuing Education Units and a personalized Certificate of Achievement. Don't delay – start by ordering your guaranteed Course today!

ER-3703, Shpg. wt. 9 lbs. **49.95**

General License Course promotes Novice to voice communication

$49.95

- **Leave the CB or Novice bands behind and progress to the full range of Amateur Radio experiences. Send your words and images around the world!**

Move up to the General Class and get all the added privileges – more frequencies to operate on, plus voice transmission, radio teletype, slow-scan TV, facsimile, satellite activity – an impressive list of incentives that add up to more QSOs, QSLs and thousands of new friends gained via these modes.

This Course now contains additional new material to prepare you for the latest FCC examination.

An informative text takes you through the subjects covered on the new FCC written test. Its in-depth coverage will give you a wealth of concentrated information – more than enough to pass either the Technician or General Class written examinations. Later, keep it handy as a valuable reference.

The Course provides extra code practice to bring your send and copy speeds 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 more confidence to pass the code test comfortably. We won't let you fail!

Four simulated FCC written tests give you test-taking experience, and allow you to review problem areas so you'll be better prepared for the actual exam. Once you pass your General exam, send us a copy of your new license or FCC notice of passing to receive 5.0 CEU's and a Certificate of Achievement.

The General Course is arranged in 11 units:

- **Ham Radio Operation**
- **Direct Current**
- **Alternating Current**
- **Active Devices**
- **Electronic Circuits**
- **Measurements**
- **Transmitters**
- **Receivers**
- **Antennas**
- **Practice Exams**
- **Getting on the Air**

Your General License Course includes:

- **Two Vinyl Binders**
- **Two 90-min. Code Tapes**
- **New FCC Form 610**
- **4 Simulated Exams**
- **Station Log Book**
- **T.V.I. Booklet**
- **Complete Test**
- **Code Workbook**
- **FCC Exam Schedule**
- **FCC Rules and Regulations**
- **World Call Map**

Upgrading has never been easier because our Course has *everything* you need, including guarantee of passing the General Class exam – or we'll refund your money for the program materials when you return them with a copy of your FCC rejection notice. It's a claim exclusive to Heath.

You have nothing to lose – order the best today!

ER-3702, Shpg. wt. 24 lbs. **49.95**

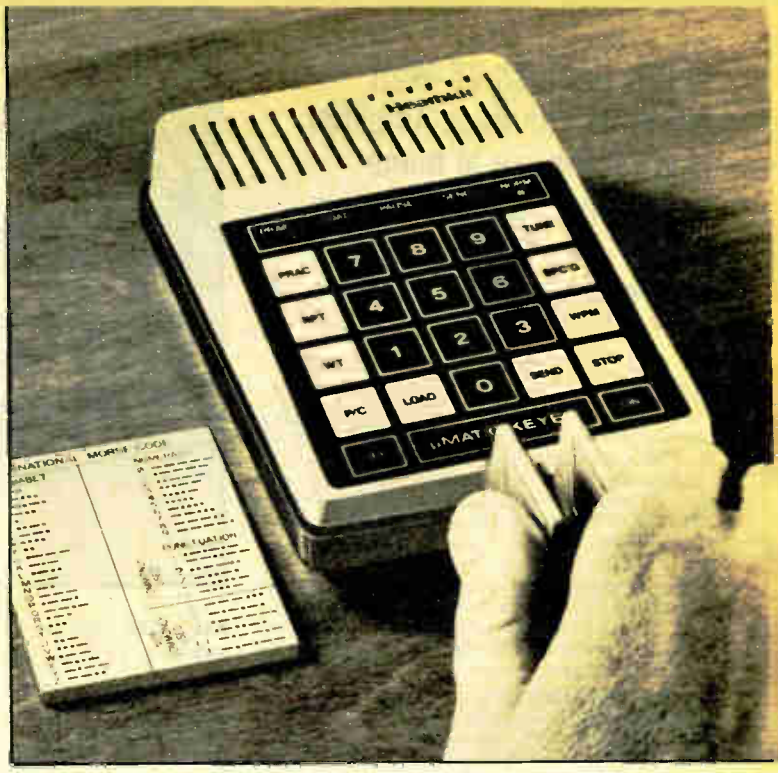
Alaska, Hawaii and Michigan Residents: Call 616-982-3411

The Heathkit SA-5010 μMatic™ Memory Keyer — best buy of its type in ham radio — has features that will improve the way you handle CW!

FAST, EASY 2-EVENING KIT

$99.95

- Brings more fun and results to your CW activity
- Includes removable capacitive-touch iambic paddles
- Up to 10 buffers are available for the storage of text or "command strings" so you can sequence alterations
- Highly flexible speed range of 1 to 99 words per minute
- Four-level random practice mode allows 6,400 different and repeatable 3000-character training sessions
- Rear panel jack lets you connect to your favorite keyer



The latest generation of Heathkit ham gear includes the most useful and feature-inclusive CW aid our hams could imagineer – the μMatic Memory Keyer. Ask anybody that uses one. It can revolutionize your operating practices, ease your hand fatigue, multiply QSOs – and incoming QSLs.

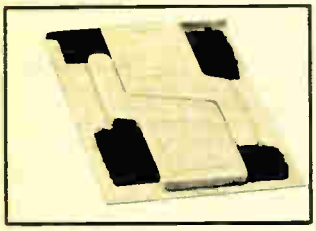
The compact, modern styling is made possible by our use of a custom microprocessor. It provides up to 10 variable-length buffers for storing up to 240 characters of text or commands, thus eliminating wasted memory space.

Memory is effectively increased by the use of patented "command strings" – which let you store text in several buffers and link them together in whatever sequence you desire. Command strings can also select the speed, weight, spacing and auto-repeat count for each of those messages. A special editing feature allows you to recover from any errors you make while loading a buffer.

Use the audible-feedback, 22-position keypad to select character formation speeds and spacing, any of 11 weight settings, pause, repeat count (up to 10 times), buffer number and mode with ease. Enter text at whatever speed and weight are comfortable for you, and send it with any other settings you wish. Then sit back, monitor the activity and collect contacts...

The easy-to-use capacitive paddles unplug and store inside the Keyer when not in use. Their removable compartment cover is silk-screened with the Morse Code for easy reference. Left handed? These paddles are reversible!

To boost copy, our unique Practice mode sends code groups of random length and selectable types (alpha, alphanumeric, and alphanumeric plus common or all punctuation). And, of course, you can choose any speed between 1 and 99 wpm, and any weight setting to sharpen your ear-to-the-airwave skills.



Text may be manually added into a buffer message being sent. Storing a Pause in text or command strings will cause the Keyer to rest automatically for insertion of serial numbers, special greetings or station RST reports.

A CMOS memory with battery backup retains the buffer contents, last-selected speed, spacing, weight and repeat count whenever the Keyer is turned off or unplugged. Built-in diagnostics check the microprocessor each time the μMatic Memory Keyer is turned on, and tests buffer memory whenever it is reset.

Other deluxe features include a built-in sidetone oscillator and speaker with volume/pitch controls, phonejack and earphone, entry error alarm, positive or negative keying, LED mode indication and a money-saving autoshutoff utility should you forget. The μMatic's die-cast zinc base is evenly weighted to reduce movement during keying. Requires only the 120 VAC power transformer cube below for full operation with a transmitter. Go ahead – order one today and discover the newest phase of CW fun!

Kit SA-5010, Shpg. wt. 3 lbs. **99.95**

PS-5012, 120 VAC Power Supply, Assembly, Shpg. wt. 1 lb. **15.95**

SA-5010 SPECIFICATIONS: Speed Range: 1 to 99 WPM. **Character/Word Spacing:** Less than or equal to speed setting. **Number of Buffers:** 1 to 10. May be used to store text or commands. **Buffer Size:** 240 characters plus commands, total. **Weighting:** Normal plus 5 light and 5 heavy settings. **Auto Message Repeat:** 0 to 9 (sent to 1 to 10 times). **Keyer Output:** Solid state: +250 volts @100 mA; – 40 mA (separate, protected output jacks). **Memory Backup:** 3 watch batteries (supplied) – 1 year typical life. (No battery drain unless the Keyer is removed from AC power source). **Sidetone:** Approximately 300 to 1500 Hz. adjustable. **Power Requirement:** External pluggable transformer (optional) or 11 to 16 volts DC @200 mA. **Dimensions (excluding paddles):** 1⅝" H x 4⅛" W x 6" D.

Electronic Keyer gives you dual-range word speeds

Your CW transmission can be 100% copy when this solid-state Electronic Code Keyer joins your base or portable station. You select between two ranges as the kit goes together: 10 to 35 or 10 to 60 wpm (continuously variable between each limit). Travel and tension of the paddles are adjustable. True iambic operation forms most characters with reduced wrist/fist movement. HD-1410 operates on 120 VAC or 12 VDC, and features adjustable volume and sidetone frequency, a built-in speaker, weighted cabinet, removable line cord, tune-up 'hold' switch, headphone jack, provision for connection to a hand keyer, and more. Measures just 3" H x 5" W x 7⅜" D.

Kit HD-1410, Shpg. wt. 4 lbs. **74.95**

Value-packed Dip Meter covers 1.6 to 250 MHz

This solid-state Dip Meter can determine the approximate resonant or operating frequency of energized or de-energized circuits and help you adjust traps, detect parasitics or function as a signal generator. A MOSFET paraphase amplifier and hot-carrier diodes provide more sensitivity and a better dip. It uses a Q-multiplier for greater detector sensitivity and a responsive 150 μA meter movement for positive marking. Operates on one 9V battery (not included) and goes anywhere you do. Once built, the rugged aluminum Meter and its accessories store handily in a molded gray carrying case. Assembly manual has detailed section on operation.

Kit HD-1250, Shpg. wt. 4 lbs. **79.95**

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

Dual HF Wattmeter will measure up to 2000 W PEP at ±5%

$89.95

- **Reads PEP or average power between 1.8 and 30 MHz**
- **Has a factory assembled and calibrated sensor**
- **Measures transmissions up to 200 and 2000 watts PEP forward and to 500 watts reflected**
- **Tune your transmitter for its optimum output with at least ±5% forward power accuracy**

The HM-2140 Dual HF Wattmeter is going to increase your Amateur station's efficiency by helping you operate more effectively in the low bands.

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 for the Amateur Radio bands within the high-frequency ranges on the 160, 80 40, 20, 15 and 10 meter bands, the HM-2140 can also be used for other services which may lie in between the Amateur bands.

It will help you tune your transmitter for optimum output power, adjust your antenna and antenna tuner for minimum standing wave ratios (VSWR) and provide you with an accurate power measurement when you use a good 50-ohm dummy load or a 1.1:1 (or less) VSWR antenna.

The Hams at Heath have designed the HM-2140 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 reading power, boasting ±5% forward power accuracy to give you precision measurements.

Pushbutton-switched high and low power ranges plus a factory-assembled and calibrated sensor insure accurate readings every time. Another switch enables you to read PEP and Average power from the same meters. A scale labeled BATT on the forward meter, when used with the front panel Sensitivity control, lets you observe the life condition of the battery. An additional scale on the reflected meter reads SWR directly from 1:1 to 3:1.

For complete portability in the field, this valuable instrument can be operated on a 9-volt battery (not included). Where AC power is available, you can use the PS-2350 Battery Eliminator below.

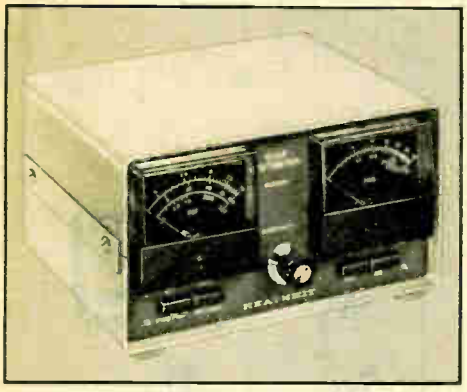
The Wattmeter is housed in a rugged aluminum cabinet which is styled in two-tone emerald to complement your other Amateur Radio gear. For added convenience of operation, the remote sensor can be mounted into the cabinet or up to four feet away from the meters and nearer to the transmitter's output cables.

The easy-to-follow assembly manual will guide you step-by-step from unpacking your kit through a short series of tests and adjustments (for which we provide all requisite tools). The manual also includes a section on operation, illustrations of several types of Amateur station setups using the Dual HF Wattmeter, a complete circuit description and detailed schematic.

You'll spend an enjoyable evening or two building this handy device for your modern station. Heathkit quality engineering assures you of an accurate HF Wattmeter that will provide you many years of reliable service.

Kit HM-2140, 3 lbs. . **Was $94.95, NOW ONLY 89.95**
PS-2350, AC Battery Eliminator, 1 lb. **7.95**
HDZ-63-3, 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), ±5%; 50 W (REF), ±7.5%. **Power requirement:** 9 volts DC (Battery NEDA Type #1604) or optional PS-2350 AC Adapter. **Dimensions:** 4⅛" H x 7½" W x 6⅜" D (10.48 x 19.05 x 16.19 cm).



VHF Dual Wattmeter reads power & SWR on 6- and 2-meters

$94.95

- **Measures your average forward power with a ±7.5% scale accuracy up to 300 watts**

The Heathkit HM-2141 VHF Dual Wattmeter gives you instant power readings on a variety of transmitters in the 50-175 MHz spectrum.

With it, you can measure forward and reflected average power and PEP with an insertion VSWR less than 1.05:1. Full-scale average forward power accuracy is ±7.5%. Simultaneous readings of transmitted output up to 30/300 watts forward and 10/100 watts reflected power make antenna tuning a snap, with noticeable results.

Standing wave ratio can be read directly from 1:1 to 3:1. Like its brother above, all functions are push-button easy and a factory-assembled and calibrated sensor guarantee performance to specification. Operates on 9V battery (not included) or on 120 VAC with optional power cube below.

Kit HM-2141, Shpg. wt. 5 lbs. **94.95**
PS-2350, AC Battery Eliminator, 1 lb. **7.95**
HDZ-63-3, 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), ±7.5% (AVG), 10 W (REF), ±10% (AVG) **Dimensions:** 4⅛" H x 7½" W x 6⅜" D.

Three of the very best base and mobile antennas

NEW

1 **Cushcraft's ARX-2B 134-164 MHz Ringo Ranger II** antenna has more gain, less wind load and more mechanical integrity. Features three ⅝-wave sections for 5.0 dBd gain, stainless steel hardware, low loss ABS insulator, seamless aluminum tubing, built-in coaxial lightning arrestor and compact decoupling radials. Rated for 1000 watts; 14 feet long; 2:1 VSWR Bandwidth is >3 MHz. Eliminate noise, and access more repeaters with the highest-gain 2-meter Omni!

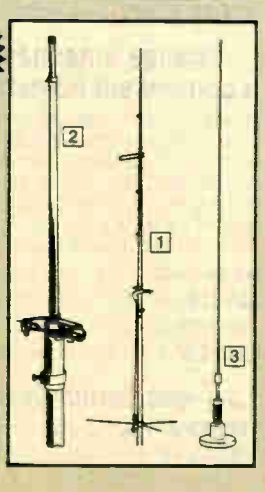
HDP-1475, Assembly required, Shpg. wt. 3 lbs. **39.95**

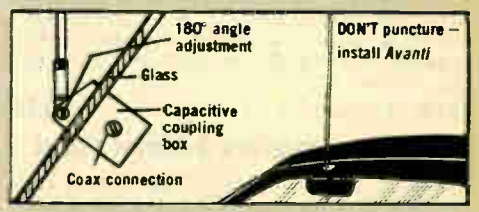
2 **Cushcraft's AR-2 135-175 MHz Ringo Standard Gain Antenna** is a popular ½-wave with 3.75 dB gain. Low angle of radiation gets out to fringe DX. Features lightning protection, low 1.1:1 SWR, 52Ω feed with PL-259 (coax not included). Rated 1000 watts. Enjoy more 2-meter activity!

HWA-202-11, Assembled, Shpg. wt. 2 lbs. **29.95**

3 **Cushcraft's Magnetic-mount Mobile Antenna** with grip-tight magnet in chrome-plated base makes it easy to air a signal in many vehicles – even your boat. Stainless steel whip needs no cutting. This ⅝-wave boasts 3 dB gain over 144-174 MHz. Includes PL-259 connector and coax.

HDP-1472, Assembled, Shpg. wt. 3 lbs. **37.95**





Mobile ½-λ Antenna mounts on glass

Avanti's 144-174 MHz 2-meter Antenna couples T/R signals right through the window of your car or RV, attaching easily with duo-bond foam tape. Hi-Q tuning unit is C-coupled *through the glass* to 33" outside whip. Patented end-fed design provides 3 dB gain in high-profile Omni pattern. Has 1.1:1 SWR; handles 150W. Includes instructions for clean removal from vehicle, and 15' of coax.

HDP-2402, Shpg. wt. 2 lbs. **34.95**

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

Cut annoying background noise with improved, lower-priced Cardioid Desk Mike

Directional pattern cuts noise level

Cardioid pattern of the new Heathkit Dynamic Microphone produces 20 dB front-to-back ratio to reduce background noise. 150 Hz to 15 kHz frequency response. Switch-selectable high- or low-impedance adapts to any radio. Also has switch-selectable VOX or PTT. 6' cord. Beige Cycolac case measures 7.43" H x 4.34" W x 5.84" D.

HDP-242, Assembled, Shpg. wt. 2 lbs. **59.95**

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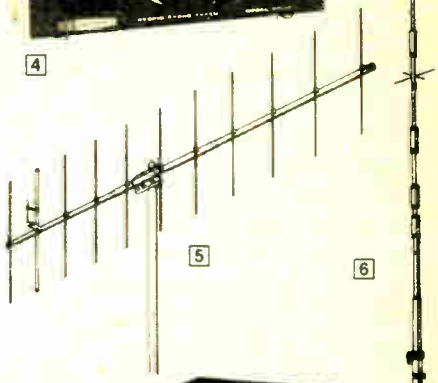

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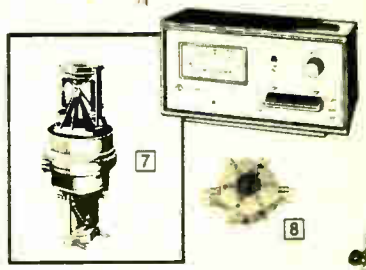

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1 Autopatch with Micoder™ II

Micoder II Microphone/Auto-Patch Encoder's 300-3000 Hz response is tailored for clean voice transmission. Up to 30 mV RMS maximum output for full modulation into a high-impedance port. Push-to-talk bar for convenient one-hand use. Accurate and stable tones to access repeaters, make phone calls. Includes 6' coiled cord, hanger clip. Uses 9 VDC cell (not included). Microphone and Encoder measures 3.75" H x 2.63" W x 1.75" D.

Kit HD-1984, Shpg. wt. 1 lb. **49.95**

2 Essential dummy load Cantenna

Helps you avoid unnecessary interference during tune-ups. Handles up to 1 kW of RF. Excellent VSWRs of less than 1.5:1 up to 300 MHz, and less than 2:1 up to 400 MHz. 50 ohms impedance. Transformer oil specified; not supplied.

Kit HN-31, Shpg. wt. 3 lbs. **24.95**

HDZ-63-3, 3' coax w/PL-259 conns.. 1 lb. .. **4.95**

3 Instant power at your fingertips

Provides extra 120 VAC outlets for your station, workshop, basement, garage. Max. load, 10 Amps. Has 11 switched three-hole outlets for killing power to equipment, 1 unswitched for clock or memory preservation. Includes fuse holder, fuse, 12' cord. Portable or permanent, for 120 VAC, 60 Hz power.

Kit HD-1274, Shpg. wt. 4 lbs. **24.95**

4 Phone Patch links to land line

Adds versatility to your station. Individual receiver/transmitter line gain controls simplify adjustment. The VU meter continuously monitors the unit's output and lets you adjust for maximum null depth to produce maximum isolation between the phone line and your station. Matches 3-16 ohm speakers, hi-Z or 600-ohm inputs. PTT operation. 2⅝" H x 9¼" W x 3⅜" D.

Kit HD-15, Shpg. wt. 3 lbs. **59.95**

5 Yagi Beam gives 2-Meter boost

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 50-ohm coax. 1000 Watts. Designed for vertical polarization and cut for 144-146 MHz. Boom length, 144," longest element, 40," turning radius, 81." Assembly required.

HDP-1470, Shpg. wt. 6 lbs. **47.95**

6 Cushcraft AV5 for long DX reach

A vertically-polarized, omni-directional antenna designed to provide complete CW and SSB coverage from 80-10 meters. SWR is 1.5:1 or less at resonance. Use with any transmitter or transceiver using 50-ohm output. Full legal power. Built-in coax connector takes PL-259. Assembly required.

HDP-1473, Shpg. wt. 10 lbs. **119.95**

7 Dual-Speed Rotator for beams

Couple the heavy-duty Alliance HD73 with your beam to achieve real DX success. For antenna with up to 10.7 sq. ft. wind load area. Has positive no-slip drive, automatic brake action. For 1⅜-2½" OD masts. 120 VAC, 60 Hz. Uses 6-conductor or 8-conductor cable listed below.

HDP-1295, Shpg. wt. 19 lbs. **129.95**

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**

8 Coax Switch changes antennas

Choose from up to four antennas or interconnecting equipment. Grounds all outputs not in use. Handles 2 kW PEP to 250 MHz. 50 ohms.

Kit HD-1234, Shpg. wt. 1 lb. **19.95**

9 "W2AU" Balun gives better match

Reduces TVI, balances antenna current distribution for maximum gain. Protects equipment from lightning. Use with dipole, vees, quads, yagis. Impedance ratio of 1:1. Rated for full legal power.

HDP-3615, Assembled, 1 lb. **19.95**

10 Low-Pass Filter ends TVI trouble

70 dB attenuation reduces TVI. Insertion loss, <0.3 dB. 160-10 meters. 50Ω. Full legal power.

HDP-3700, Shpg. wt. 2 lbs. **34.95**

HDZ-63-3, 3-ft. Coax w/connectors,, 1 lb. .. **4.95**

11 Change antennas instantly with a convenient Remote Coax Switch

Saves money – replaces five expensive coax feed lines with just one. LED shows which antenna is connected. Erasable front panel. Accepts signals to 150 MHz, rated for full power. 50-70 ohm impedance. Includes U-bolt mounting assy. Control Box, 3⅜" H x 5¼" W x 5¼" D; Remote, 8¼" H x 4⅝" W x 7½" D. Use 8-wire cable listed below.

Kit SA-1480, Shpg. wt. 8 lbs. **129.95**

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**

Low-loss Zenith Coaxial cable

HDZ-63-3, 3' w/PL-259 conns., 1 lb. **4.95**

HDZ-63-10, 100' w/PL-259 conns., 10 lbs. **29.95**

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

Heath/Dana Speed Control increases driving comfort, reduces fatigue on long car trips

$79.95

- **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 Installation Kit, 7 lbs. ..... **Was $99.95, NOW ONLY 79.95**

CSA-2048-1 Installation Kit. 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. **9.95**

CSA-2048-2 Installation Kit. For '73-'75 Honda Civic, '75-'82 Honda CVCC or '77-'82 Honda Accord. Shpg. wt. 2 lbs. **19.95**

CSA-2048-3 Installation Kit. For '75-'82 Corollas, Shpg. wt. 2 lbs. **19.95**

CSA-2048-4 Installation Kit. For '73-'82 Toyota Corona, Celica, Crown, and Mark II, '75-'78 Toyota Pickup; '75-'77 Datsun 610/710, '77-'82 Datsun 810, '75-'82 Datsun 280-Z, ZX; '81-'82 Datsun Pickup. Shpg. wt. 1 lb. **9.95**

CSA-2048-5 Installation Kit. For the following fuel-injected cars: '76-'82 Volkswagen Rabbit, Dasher, Scirocco; '76-'82 Audi Fox. Shpg. wt. 2 lbs. **19.95**

CSA-2048-6 Installation Kit. For '75-'82 Datsun B-210, '77-'80 Datsun F-10/310. Shpg. wt. 2 lbs. **19.95**

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 it.

Vacuum Servo attaches to throttle

Electronic control

Siren/PA system for emergency service vehicles

Here's a budget priced, but reliable Siren and Public Address system for your community's volunteer emergency unit or rescue squad – and it's available in either kit or factory-assembled and tested form. It features a 55 watt siren with automatic or manual wail or yelp 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 the vehicle. Pushbutton low-noise microphone ensures clear voice reproduction at all normal levels of amplification.

Gimbal mount makes the GD-18 easy to install. Solid-state circuitry with temperature and voltage compensated amplifier stage provides years of reliable service. The GD-18 can be used with positive or negative ground vehicles.

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. **89.95**

GDA-18-1, Exterior horn, assembled. Shpg. wt. 10 lbs. **99.95**

Kit GDA-18-2, Concealed horn, Shpg. wt. 10 lbs. **99.95**

Includes versatile gimbal-mount bracket

SAVE $20.00

On these Siren/PA systems! If purchased separately, $189.90

GD-18A, (Kit GD-18 & Exterior horn) Shpg. wt. 27 lbs. ... **169.90**

GD-18B (Kit GD-18 & Concealed horn) Shpg. wt. 28 lbs. **169.90**

Exhaust Analyzer checks efficiency of your car

You'll add great diagnostic capabilities to your automotive test equipment with the Heathkit CI-1080 Exhaust Analyzer. An easy-to-read meter measures air-to-fuel ratio and combustion efficiency to tell you instantly whether your car's air-to-fuel mixture is unnecessarily too rich or too lean to attain maximum performance, efficiency and fuel economy.

Besides measuring your automobile's air-to-fuel ratio and combustion efficiency, the CI-1080 Exhaust Analyzer also indicates the percentage of carbon monoxide in your car's exhaust. This percentage gives you a relative figure you can use to compare your exhaust emissions with the manufacturer's specifications and the clean air standards applicable to your state of residence.

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. Powered by car's 6 or 12 VDC electrical system. Not for diesel engines. To use on cars with catalytic converters, you must remove the EGR valve.

Kit CI-1080, Shpg. wt. 6 lbs. **119.95**

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

Capacitive Discharge Ignition gives quick 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 your hard-earned money, too.

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. **59.95**

Perform auto tune-ups professionally with the Deluxe Solid-State Ignition Analyzer

ONLY $574.95

- **Displays primary and secondary patterns on 12" CRT**
- **Measures RPM, dwell angle and ignition voltage**
- **Performs ignition advance tests with COA-2600-4**
- **Shorts out cylinders to facilitate balance tests**

Designed for the auto hobbyist yet perfect for the professional garage operation, our top-of-the-line Ignition Analyzer assures you of a precision auto tune-up every time. It provides the most asked-for features in an instrument of quality. Rock-steady parade patterns are made possible by the latest design in inductive pickup circuitry and switch selection of 4, 6 or 8 cylinders.

Has two voltage ranges: 0-2 V for corroded connections and points measurements and 0-20 V for battery condition and general distribution checks.

Cylinder selection buttons can be pushed in multiple numbers so that banks of cylinders can be shorted out for power balance checks with the built-in tachometer, and for electrical display of one or more cylinders. Front panel switches allow both parade and superimposed displays of primary and secondary waveforms with 10:1 and 2:1 trace expansion.

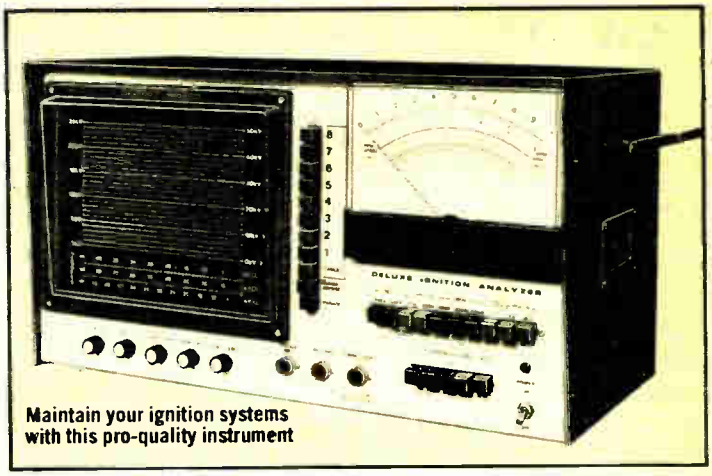
High-temperature, oil- and gas-resistant neoprene insulated cables provide easy, positive connections to engine. Includes adaptor for GM HEI ignition systems. For use with 4, 6 or 8-cylinder (4-cycle), or 2-rotor Wankel engines and standard, transistorized or C-D ignitions.

Kit CO-2600, Shpg. wt. 83 lbs. **574.95**

Timing Light/Advance Meter plugs directly into CO-2600 Ignition Analyzer and provides a bright flash that registers clearly in daylight. Built-in advance meter measures distributor advance from 0 to 60 degrees at 1500 to 4500 rpm. Ten-foot cable with connector included.

Kit COA-2600-4, Shpg. wt. 3 lbs. **59.95**

Alternator Test Adaptor for CO-2600 Ignition Analyzer.
COA-2600-2, Shpg. wt. 1 lb. **14.95**

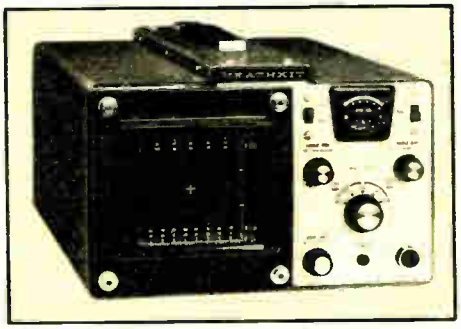


Maintain your ignition systems with this pro-quality instrument

CO-2600 SPECIFICATIONS: CRT Size: 12 inches (diagonal). **Meter Size:** 8 inches. **Signal Pickup:** Direct for primary, inductive for parade trigger and capacitive for secondary. **Tachometer Ranges:** 1000, 3000 and 6000 RPM. **Voltmeter Ranges:** 2, 20 VDC. **Tachometer/Voltmeter Accuracy:** ±3% of full scale on any range. **Scope Vertical Expansion:** 2 to 1 minimum. **Operating Temperature Range:** 32 to 122 degrees F (0 to 50 degrees C). **Power Requirement:** 120/240 VAC, 50/60 Hz. **Overall Dimensions:** 12⅞" H x 25¼" W x 14⅜" D (32.72 x 64.14 x 35.89 cm). **Optional Accessories for the CO-2600 Ignition Analyzer:** COA-2600-4 Timing Light Advance Meter, COA-2600-2 Alternator Test Adaptor, COA-2600-3 Deluxe Scope Cart

Solid-State Ignition Analyzer tunes for less

- **Ideal test instrument for garage mechanics, service stations and automotive hobbyists**
- **Clamp-on, inductive pulse pickup method**
- **Built-in tachometer**
- **One of the most useful car care tools to own**
- **Four different patterns: primary or secondary in parade or superimposed**
- **Expand 2 to 1 vertical and 10 to 1 horizontal**



Following the tune-up specifications for any auto and using the Analyzer Operation Handbook, you can detect shorted spark plugs, bad points, defective wiring, worn distributor parts, incorrect dwell angle, cam wobble, plus coil or condenser defects and transistorized or capacitive discharge problems.

Use it with any standard, transistorized or C-D ignition on 3, 4, 6 or 8-cylinder engines with distributors. Includes adapter for GM HEI systems. Optional 12V Inverter mounts to unit's rear panel for portable or 'on the road' tests.

Kit CO-1015, Shpg. wt. 22 lbs. **249.95**

Kit COA-1015-1, 12 VDC lighter-socket Power Inverter, 3 lbs. **39.95**

Automatic Battery Charger

Don't let a weak battery make you miss important work and social commitments. The winter chill can't kill your battery when you have the Heathkit Automatic Battery Charger standing by! Solid-state, ten-amp rating will keep your battery at full charge for easier starts in any weather and better overall performance. Won't operate unless properly connected. Can't overcharge the battery – a protection circuit shuts unit off when fully charged. Easy to use, too! Just connect the cables (included) to 12-volt battery terminals and plug into AC outlet. Dimensions: 5½" H x 9" W x 6⅜" D.

Kit GP-21, Shpg wt. 12 lbs. **59.95**

Deluxe Scope Cart aids viewing and mobility

Keeps the CO-2600 Ignition Analyzer at the ideal viewing angle for easy reading. Rolls from place to place on casters for maximum convenience. Frees workbench for other projects.

COA-2600-3, Shpg. wt. 25 lbs. **44.95**

Portable Engine Analyzer has digital accuracy

- **Measures dwell, engine speed, plus DC voltage, resistance and current**
- **Battery-operated power gives full portability**
- **Meets GM specs for use with 1981 and later models with Computer Command Control**
- **Valuable, money-saving diagnostic instrument which conserves your money and auto care time, all at once**
- **3-evening assembly**

The new Heathkit CM-1551 is a versatile, *precision* Portable Engine Analyzer with 10 megohm input impedance. It's carefully designed to measure dwell angle, engine RPM, voltage drop, current and resistance. A 3½-digit liquid crystal display – easy to read even in bright sun – provides the resolution you need to adjust idle speed, rapidly test the battery, generator or alternator, voltage regulator, starter and all other electrical circuits on 4, 5, 6 and 8-cylinder engines with the accuracy of a professional racing mechanic.

Using the optional Shunt Accessory, the Engine Analyzer can measure starting current, plus battery charging and discharging current – up to 400 amps with ±5% accuracy. Compartment holds Accessory and leads when not in use.

Power is supplied by a 9-volt battery (not included), so there are fewer wires under the hood. Has automatic polarity, LO BAT and overrange indication.

Kit CM-1551, Shpg. wt. 5 lbs. **129.95**

CMA-1550-1, 400-Ampere Shunt Accessory, Shpg. wt. 1 lb. **14.95**

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

Quiet, dependable Screw-Drive Garage Door Opener ends strain and struggle

NEW

- **The easiest-to-install screw-drive system available**
- **Door re-opens instantly if obstructed during closing**
- **All necessary materials for solid suspension supplied**

The Electronic Command Garage Door Opener is an investment that pays off immediately in convenience and security. Is the weather bad? Or is it dark as you pull into the drive late at night? Touch the button on a wireless transmitter in your vehicle and watch the door open automatically, to greet you with 80 watts of clear illumination as the car rolls into safety and dry shelter! Touch the button again – the door closes and *positively locks* to prevent anyone from opening it on the outside by hand. Security-timed light shuts off five minutes after opening or closing operation is complete.

No garage door is too big or too small. The powerful ⅓ hp motor opens even the heaviest doors up to 18 feet wide. A spring shock absorber cushions vibrations and allows for up to 2 inches of ice build-ups, driveway gravel and other impediments. Up-limit, down-limit and obstruction pressures are adjustable.

Transmitters and receiver are all solid-state and digitally encoded with 256 different signal combinations so you can set and change your own anytime. The Electronic Command Garage Door Opener System installs in a day, with do-it-yourself ease and no special tools. Operator housing requires 120 VAC/60 Hz. UL listed. Provide added welfare for your family, plus extra safety and value to your home – order today and say 'open sesame' by touch control!

Transmitter, Receiver, Dual Switch and Screw-Drive Door Opener Mechanism.
GD-3509, Shpg. wt. 22 lbs., Motor Freight **189.95**

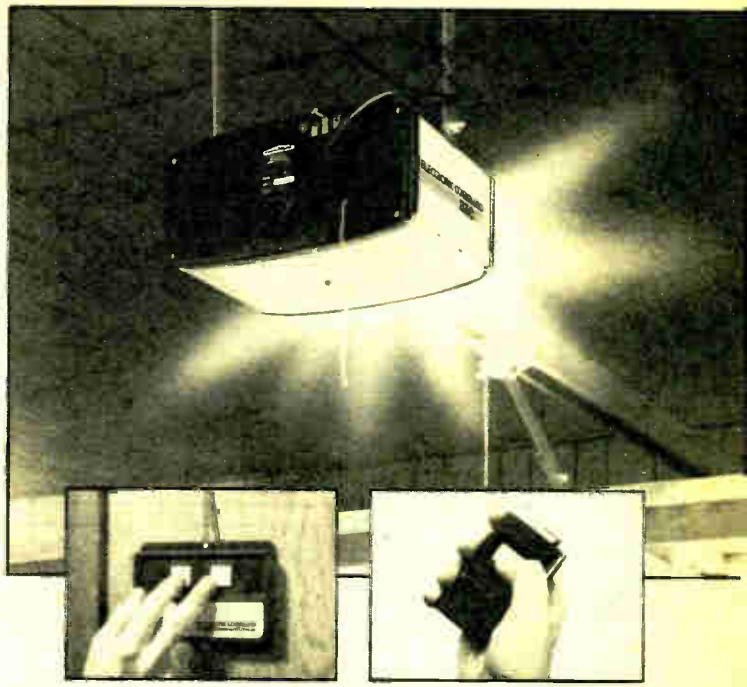
Transmitter, Receiver Single Switch and Chain Drive Door Opener Mechanism.
GD-3409, Shpg. wt. 47 lbs. **149.95**

GDP-3309-A, Transmitter only, Shpg. wt. 1 lb. **29.95**

GDP-3319-A, One Transmitter, one Receiver for 3-wire system, 1 lb. **59.95**

GDP-3329-A, Two Transmitters, one Receiver for 3-wire system, 2 lbs. .. **89.95**

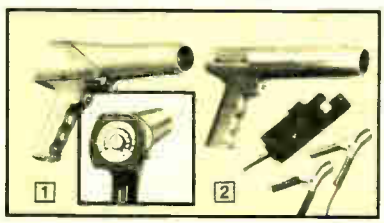
Power Transformer for adapting 2-wire Opener to 3-wire system.
GDA-3309-3, Shpg. wt. 1 lb. **9.95**



Inside Wall Switch and Hand Transmitter activate the microprocessor electronics

Heathkit Timing Lights pulse brighter than daylight

[1] **Deluxe Timing Light** has built-in Advance Meter and Tach for 2- or 4-cycle and rotary engines. Measures mechanical/vacuum advance to 60° from 1500-4500 rpm. Tachs engine to 4500. Inductive pickup clips around #1 spark plug wire. Polarity protected; powered by 12 VDC. Includes all cables, pickup, clips.



Kit CI-1096, Shpg. wt. 4 lbs. **79.95**

[2] **Value-priced Timing Light** has same features, minus Advance/Tach Meters.
Kit CI-1040, Shpg. wt. 3 lbs. **39.95**

Three-in-one Tune-Up Meter saves on engine repair

This kit enables you to make simple dwell, engine speed and battery voltage tests you normally pay a mechanic to do. Combines a distributor cam dwell meter (scaled for 3, 4, 6 and 8 cylinders), an electronic tachometer (0-4500 rpm) and a 0-20V DC voltmeter in a single, compact meter. For 6/12-volt pos/neg ground systems, and solid-state or high-energy ignitions. Power is obtained from engine. Complete with leads, instructions and the opportunity to keep your autos in top shape for less, any season of the year.

FAST, EASY 1-EVENING KIT

Kit CM-1073, Shpg. wt. 4 lbs. **49.95**

Protect your valuables in car, van or boat ultrasonically

Invisible waves guard against theft in any enclosed vehicle, sensing movement to trigger a 50 second alarm using horn. Automatic reset resumes protection. Has entry and exit delays. Fast, 4-wire hookup.

Kit GD-1568, 2 lbs. **59.95**

GDA-1568-1, Pin Switches for hood and trunk, 1 lb. **6.95**

GDA-1558-1, Horn Relay Switch for autos w/o relay, 1 lb. **4.95**

Professional-grade Engine Analyzer pinpoints trouble

Locate problems in alternator or generator, voltage regulator, distributor, condensor, plugs, starter, battery and electrical accessories. Tests conventional, magneto, transistorized and most capacitive discharge systems with pos or neg ground and 4, 6 or 8 cylinders. Color-coded 6" meter. Requires three 'C' cells (not included). Accessories and Handbook supplied.

Kit CM-1050, Shpg. wt. 8 lbs. ... **114.95**

Install a Digital Quartz Clock/Timer

Displays 4-digit time in 12-hour format; switches freely to 24-hour Trip Timer or 10-minute stopwatch without disturbing setting or accuracy. Highly dependable! Measures 1⅝" H x 4⅝" W x 3⅓" D.

Kit GC-1415, Clock with Trip Timer, 2 lbs. .. **34.95**

Matching Speedometer/Tachometer

Illuminated display registers with ±1 mph accuracy to 199, with functions for mph, kph and x100 rpm. 1⅝" H x 4⅝" W x 3⅓" D.

Kit CI-1265-1, 3 lbs. **59.95**

Kit CI-1265-2, for cars w/CS-2048, 3 lbs. . **49.95**

Kit CSA-2048-1, for front wheel drive, 1 lb. .. **9.95**

Build a Wiper Delay for safer driving

Annoyed by fog and drizzle? End wiper switch fumbling! Solid-state circuitry lets you delay sweeps up to 30 seconds during drizzle, or 0.5 secs for downpours. Fits most single and 2-speed electric wiper systems.

Kit CH-1068, Shpg. wt. 2 lbs. **19.95**

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

Heathkit Programmable Auto Horn lets your car, truck, boat or RV express itself musically

$49.95

- **Choose from 16 internally pre-programmed tunes. Enter one from our music book of 50 tunes, or add your own tunes**
- **Select songs instantly with 3-button in-car keypad**

Enjoy driving more than before! The easy-to-build Heathkit Programmable Car Horn installs in any car, truck, boat or RV with a 12 VDC, negative ground electrical system. It lets you select from 16 pre-programmed tunes, choose a song from a book of nearly 50 tunes, or program your own tune.

The heart of this Programmable Horn is a microprocessor with 16 pre-programmed tunes – varying from the brief, but exciting "Charge!" to a full 46-beat presentation of "The William Tell Overture."

A full keyboard inside the main unit – with a full 13-note octave, rest and hold keys, allows you to program any tune you want into the two memory circuits – without wires – and you can change tunes as often as you wish. An external control enables you to adjust the tempo to produce the quickness of a marching tune, or to slow down to the relaxed beat of "Suwanee River."

The 3-button external keypad, which mounts at any convenient location on the steering column or instrument panel, lets you select any of three different tunes. Two of the tunes can be pre-programmed selections. Or choose two of your own tunes and one pre-programmed tune. Programming guide included.

A weatherproof, 4-ohm, 4-watt speaker (included) mounts behind your vehicle's grille – or at any other convenient outside location.

An easy-to-build three-evening kit, the Heathkit Programmable Car Horn includes all necessary parts, a step-by-step Heathkit manual – even solder!

Kit CH-1276, Shpg. wt. 3 lbs. **49.95**

CH-1276 SPECIFICATIONS: Tones: 13, with frequencies from 261 to 522 Hz, ±1%. **Voicing:** Trumpet (approx.). **Sound Pressure Level:** 96 dBA at 1 Meter. **Power Requirement:** 10-17 VDC. **Idle Current:** Less than 95 mA at 13.2 VDC with ignition off. **Cabinet Dimensions:** 1½" H x 7¾" W x 4⅞" D.

Pre-programmed Musical Car Horn tunes:

Taps	Reveille	Never on Sunday
Yankee Doodle	O Sole Mio	Somewhere My Love
Wedding March (Mendelssohn)	Wedding March (Wagner)	Greensleeves
Stars and Stripes Forever	William Tell	Post Time
The Great Gate of Kiev	Dixie	Charge
	Colonel Bogie March	

...you can also program your own tunes!

Use Electrical Systems Course to repair your car at home

$39.95 for EAC-1

- **Covers starting, charging, accessory/body electrical systems**
- **Features hands-on experiments to show repair procedures**

Effective audio-visual teaching method covers major sections of the auto electrical system. Four modules give you an education in automotive electrical systems – complete with hands-on projects. Learn about auto electrical principles, charging systems, starting systems, accessory and body electrical circuits. Earn 4 Continuing Education Units – score at least 70% on the final exam.

SAVE $19.85 on all Modules. EAC-1, 23 lbs. **39.95**

EA-11, Module 1/Elect. Principles, 5 lbs. **14.95**
EA-12, Mod. 2/Starting System, 5 lbs. **14.95**
EA-13, Mod. 3/Charging System, 5 lbs. **14.95**
EA-14, Mod. 4/Acc. & Body Elec. Sys., 5 lbs. **14.95**

These courses can also prepare you for NIASE exams. Write NIASE, 1825 K St. NW, Wash., DC 20006.

Learn how to tune-up your car with Ignition Systems Course

$49.95

- **Learn to tune Chrysler/Ford/GM std. and electronic ignitions**
- **Detect problems early to save costly, time-consuming repairs**

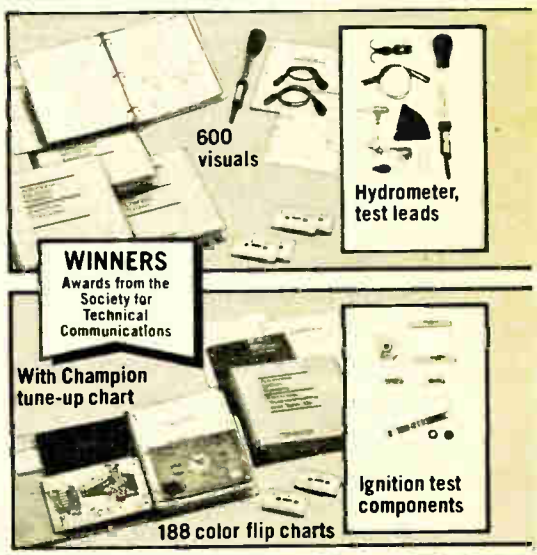
Audio-visual course teaches ignition principles, theory of electronic and computer-controlled ignitions and how to dismantle/change/reassemble ignition components. Earn 4 CEUs – score 70% on final exam. Projects require engine and ignition analyzers, timing light, compression tester and vacuum pressure gauge.

EA-2000, 12 lbs. **49.95**

Compression tester, vacuum pressure gauge and "T" fitting. EAC-2-1, 1 lb. **14.95**

SAVE $14.90! Order EAC-1, EAC-2000 and EAC-2-1. $104.85 separately. **EAS-2000,** 32 lbs. **89.95**

These courses can prepare you for NIASE exams. If you pass final exam and fail NIASE exam, return Course materials and receipt for refund of full purchase price.



[1] Reliable Electronic Ignition Tester

$19.95

- **Takes the guesswork out of locating defective components in electronic ignitions**

Tests battery condition, function of reluctor and pickup coil, switching of primary coil and location of faulty component in primary ignition circuit. 0.75" H x 2.50" W x 5.50" L. Requires some ignition knowledge. Pickup coil test won't work on '78 and newer Omnis, Horizons, K-cars with Hall-effect ignitions.

Kit CI-2055, Shpg. wt. 2 lbs. **19.95**

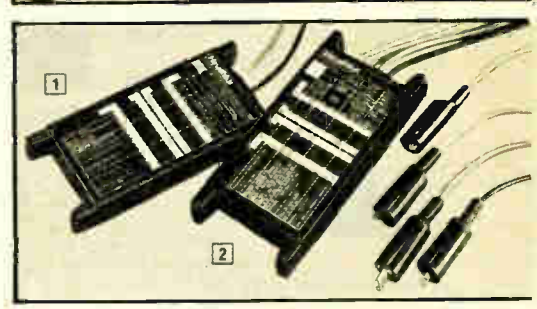
[2] Low-cost Charging System Tester

$19.95

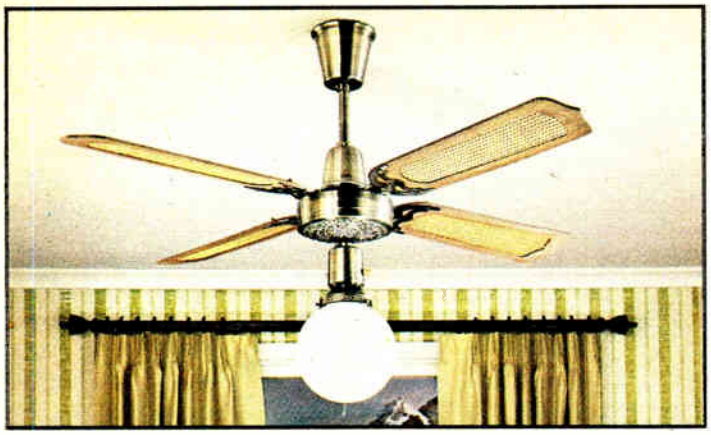
- **Lets you quickly diagnose faulty components in your car or truck's charging system**

Three quick tests tell you if battery is sufficiently charged, if alternator is charging battery, if voltage regulator is faulty and if alternator is functioning. Keep one in your car to save labor for road emergencies. For 12 VDC, negative ground systems. Enclosed in ¾" H x 2½" W x 5½" D case.

Kit CI-2065, Shpg. wt. 2 lbs. **19.95**



See our Electronics (pgs. 30-43), Computer (pgs. 78-80) and Weather (p. 4) Courses.



Energy-saving Decorative Ceiling Fan has even more value-adding features

ONLY $149.95

- **Our new fan has improved capabilities and appearance – yet it's still economically priced!**
- **Saves energy and money – both in winter and summer**
- **Adds a beautifully decorative touch to any room**

Our new Ceiling Fan is an even better value! It now features an infinitely variable speed control so you can adjust air movement to fit your exact needs. A forward/reverse switch allows you to reduce heating costs by bringing warm air down from the ceiling, and save in summer by cooling for pennies a day.

Now includes Decorative Light Kit, a $16.95 value: By making this optional feature standard, this fan features dual-function versatility.

You'll be proud to display this beautiful fan in your home: The motor assembly is finished in handsome Antique Brass. The wooden fan blades (measuring 50.5" tip-to-tip when installed) feature decorative wicker/cane inserts. Or flip blades over for solid wood appearance.

Easier kit assembly: Assemble this product in as little as one hour!

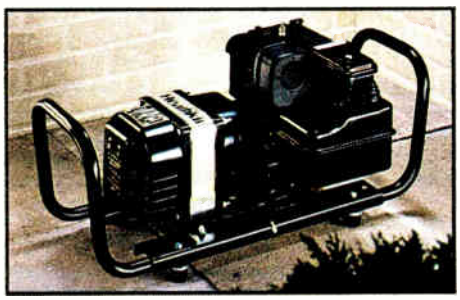
Includes manufacturer's three-year limited warranty: This UL approved device uses 120 VAC, 60 Hz power. Not for ceilings under 8 feet high.

Kit GO-1338, Shpg. wt. 25 lbs. ..... **ONLY 149.95**

"Go-anywhere" instant emergency electricity

NOW ONLY $399.95

- **Emergency, on-location power for hams, home-owners, Civil Defense, fire depts., campers, hunters, others**
- **Priced lower than most similar models**



Don't be without electrical power: The Heathkit Portable Power System's 120 VAC, 60 Hz alternator supplies the power you need. Up to 2200 Watts (enough to operate a chain saw or refrigerator-freezer during a blackout) is available at a duplex three-prong, 20-amp, breaker-protected circuit.

Economical, long-running: The 5 hp Briggs and Stratton gas engine can run up to 1¾ hours, at half load, on a tankful of regular gas, unleaded gas or gasohol. Voltage regulation is ±5%, frequency variation only 4 Hz, from no load to full load at 3600 rpm. RFI is eliminated by a resistive spark plug. Noise is controlled by a low-tone muffler. To reduce sparking, add optional GUA-1820-1 Spark-Arresting Muffler (required in California; below). 16" H x 15" W x 31" L.

SAVE $80! Kit GU-1820, 112 lbs. ..... **Was $479.95, NOW ONLY 399.95**

GUA-1820-1, Optional Spark-Arresting Muffler, 1 lb. **3.95**

Beat the energy crisis – split wood quickly with low-cost, easy-to-build Heathkit Log Splitter

$589.95

- **Saves time – splits logs for even the largest fireplaces – splits logs faster than by hand**
- **10-ton ram, triple angle steel wedge split wood**
- **Easy-to-build kit takes just one evening to assemble**

Save your back and watch your woodpile grow: The easy-to-build GU-1810 splits logs up to 21" long easily and quickly. High-torque, four-cycle, five-horsepower Tecumseh gas engine operates 4.5 gpm, pressure relief-protected hydraulic pump. Engine and pump build up to 1550 psi to drive ram with up to 10 tons of splitting force! Six-inch, triple-angle steel wedge splits most woods with ease. Twenty-four second automatic return frees handle to ready next log.

No more standing around: Three-position, one-hand lever features non-locking forward, neutral and detented reverse with automatic stop or return to ready ram for next log. Tubular log cradle firmly holds logs safely for you for splitting at a comfortable (15" above ground) work level – no more wobbling logs or strenuous stooping. Cradle and frame made from industrial-grade steel. Pump, cylinder use seven quarts of automatic transmission fluid (not supplied).

Weight-balanced design: The Heathkit Log Splitter can be wheeled right to your worksite. Steel-base threaded stand unscrews for easy transportation to worksite (not road towable). Fits in car trunk, station wagon or pickup truck. One-gallon tank holds enough regular or unleaded gas for hour of splitting.

Priced to fight the energy crisis: Much less than other similar units. Start splitting wood the time-saving Heathkit way now. 31" H x 31.5" W x 52.75" D.

Kit GU-1810, Shpg. wt. 210 lbs., Motor Freight **589.95**

Power Inverter puts AC in home, RV, boat

- **Designed for boaters, campers, other remote and emergency uses**
- **Lets you use an electric razor, lamp, TV or other small appliance (up to a total load of 175 Watts) – even if 120 VAC, 60 Hz power is not available**

Use many comforts of home in the field: Watch radar weather reports on TV during power outages. The easy-to-build, lightweight MP-10 converts power from a 6 or 12 VDC source to 120 VAC square wave power, with a continuous power rating of up to 175 Watts. 120 VAC power available at two standard receptacles. No moving parts to wear out. Rated efficiency, up to 80% under normal working load. Protected by a 25-amp fuse. For high starting current motors, use GU-1820 at left. 4.75" H x 5.13" W x 7.38" L.

Kit MP-10, Shpg. wt. 8 lbs. **69.95**

Efficient Electronic Air Cleaner installs in any furnace for fresher, healthier air

$149.95

- **Automatic – works with most present heating/cooling systems**
- **Easier than ever to build and install – no tinsnips, metalwork or special wiring required**
- **New 1" wide filters replace existing furnace filters**
- **Each cycle removes over 70% of contaminants from air**

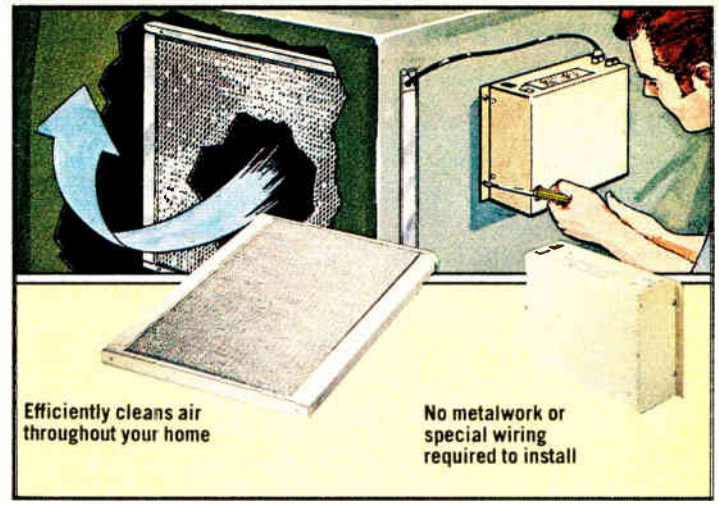
Breathe clean, fresh air again: Remove pollen or other allergens, clear stale cigarette smoke – or keep the air in your modern, well-insulated home clean. Removable filter is easy to clean. Pneumatic mechanism actuates air cleaner by sensing when heating/cooling system turns on. Two filters may be used at the same location with single power supply. 120 VAC, 60 Hz. Power Supply, 8" H x 12"W x 4" D. Power supply and at least one filter required to operate. Kits differ in filter size; check filter size and capacity before ordering.

Kit GD-2196, Power Supply (needs Filter Accessory below). 5 lbs. **149.95**

Filter Accessories (require GD-2196 Power Supply Kit above):

GDA-2196-1, 20" x 25" x 1", 1000 cfm, Shpg. wt. 3 lbs. **99.95**

GDA-2196-3, 16"x 25"x 1", 800 cfm, Shpg. wt. 3 lbs. **99.95**



Clear any room of airborne contaminants with portable Electronic Air Cleaner

- **Features removable charcoal filter, easy-clean electrostatic filter**
- **Runs for just pennies a day**
- **Saves money – helps cut cleaning costs**

Keeps room air fresh and clean: The GD-1297 Electronic Air Cleaner is the ideal way to keep any room's air fresh and clean all year long – especially in today's tighter, better-insulated homes – or if your family has an allergy sufferer.

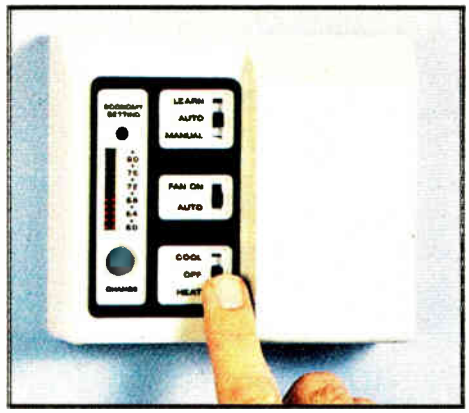
Now includes casters, at no extra cost: Easily roll the GD-1297 from room to room, using four GDA-1297-1 Deluxe Casters (a $13.95 value) – included at no extra cost!

Use in rooms to 25' x 30': Three-speed fan moves 250 cfm of air to clear away cigarette smoke, or to clear the air after a cooking disaster. It can also keep air fresh at as little as 10 cfm.

Build in one evening: No soldering required – power supply, variable-speed fan control and filter are pre-built. Beautiful Southern Pecan vinyl finish. 120 VAC, 60 Hz. 26½" H x 17¼" W x 13½" D (67.31 x 43.82 x 34.29 cm).

Kit GD-1297, Shpg. wt. 59 lbs. **249.95**

GDA-1297-2, Replacement Charcoal Filter for GD-1247 and GD-1297, Shpg. wt. 2 lbs. ... **9.95**



Intelligent Seven-Day Thermostat controls heating/air conditioning, reduces energy usage

- **Now available in money-saving kit form**
- **Directly replaces present thermostat**
- **Patented features help save more energy and money than other thermostats**

First truly intelligent setback thermostat: Use one pushbutton to program significantly more energy savings than other thermostats.

Awarded two U.S. patents (others pending): Cold-Weather Compensator makes sure room temperature reaches your desired setting – exactly at the time you select. It monitors the rate of temperature change, turning on your furnace earlier in the morning if it was colder the evening before. Cycle-Match allows up to six different temperature settings per day, and up to seven daily programs.

More energy-saving features: Slow-Cycle increases efficiency by slowing down on-off cycling, yet keeps home within 1.5F of desired setting. Econo-Save keeps temperature as low as 54F when you're away from home – then warms the home for your return.

Uses present 2, 4 or 5-wire, 24 VAC power. Not for dual-stage heat pumps. 4.5" H x 5.5" W x 1.5" D.

NEW! Kit NE-1210, Shpg. wt. 1 lb. **69.95**

SAVE! $15.00! NEP-1210. Assembled. Shpg. wt. 1 lb. ..... **Was $99.95, NOW ONLY 84.95**

Save energy and money three ways on motor-operated devices with the Watt Wizard Power Factor Controller

- **Developed by NASA to reduce power used by inductive motors on spacecraft**
- **LEDs show energy-saving performance**
- **Qualifies for 15% Federal tax credit**

Three-way savings: Gain a Federal tax credit amounting to 15% of purchase price (if you qualify, use same forms as NS-1100 on p. 26) – save up to 60% of the cost of running motorized electrical devices (drill presses, power saws, grinders and other devices in home or shop) – and prolong the life of those devices, with the Watt Wizard.

Allows motors to run efficiently: The Watt Wizard saves energy, saves money and prolongs the life of motorized electrical devices by allowing them to operate at optimum voltage and speed (as little as 60-80 VAC, instead of 120 VAC).

Most importantly, LEDs tell you how well the Watt Wizard works on a particular device: Order one unit now – and try it on each of your motor-driven devices. Then buy more later, when performance on those devices is known.

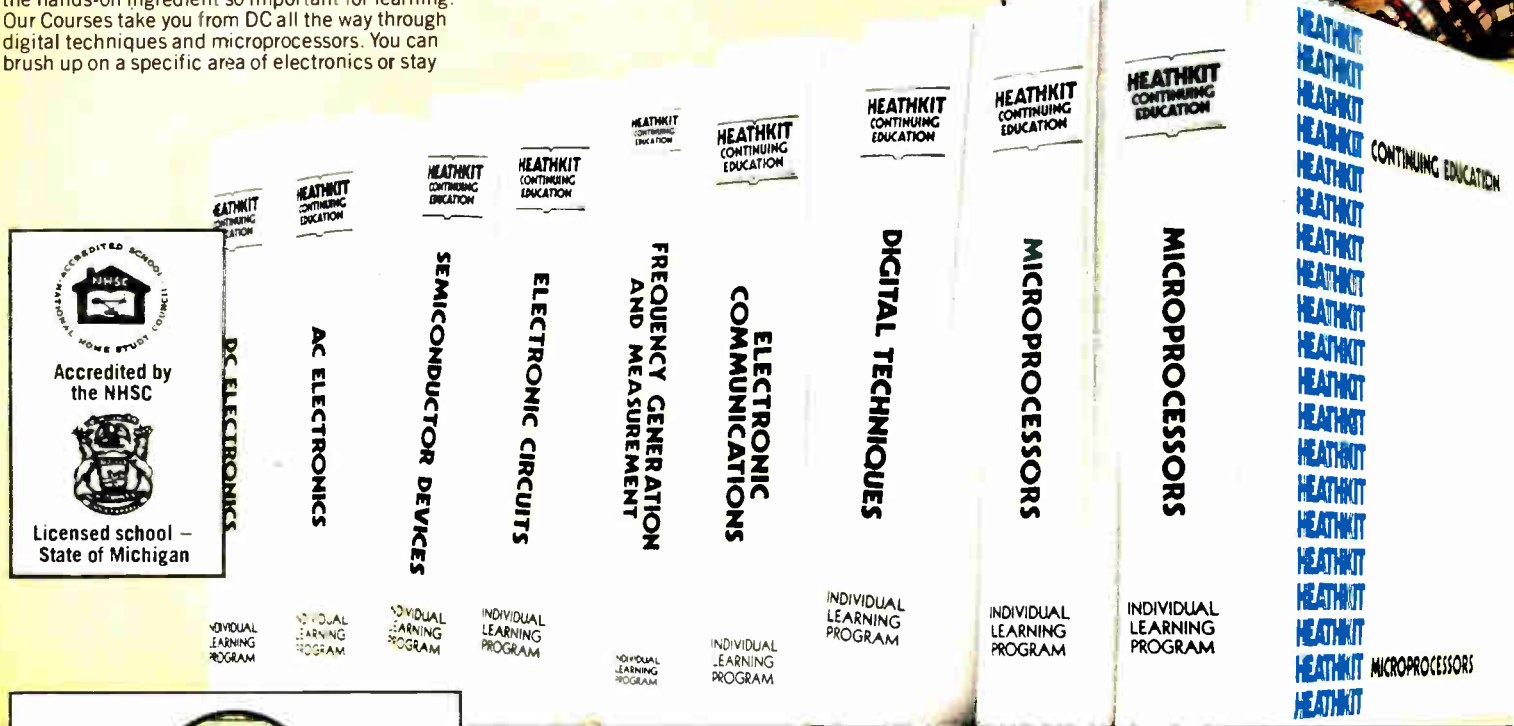
Comes with a full one-year limited warranty from the manufacturer. 120 VAC, 60 Hz. Fused at 15 amps. Overall Dimensions, 4" H x 2⅞" W x 1½" D (10.16 x 7.32 x 3.81 cm).

NEP-1662, Assembled, Shpg. wt. 1 lb. **39.95**

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

Heathkit/Zenith Educational Courses save you time and money

Heathkit/Zenith Educational Courses are the low-cost, time-saving way to learn. The easy-to-follow format saves time, and you pay far less than for comparable adult education or vocational courses. Clearly-written, well-illustrated programmed-learning texts and audio/visual aids (used with most courses) speed learning, and experiments provide the hands-on ingredient so important for learning. Our Courses take you from DC all the way through digital techniques and microprocessors. You can brush up on a specific area of electronics or stay abreast of new technological advances as they unfold. And you can study specialized courses in computer programming, amateur radio licensing and automotive repair to fit your training needs. You can earn Continuing Education Units by taking our Heathkit/Zenith Courses, and your course may qualify as a tax deduction – check with IRS.



Accredited by the NHSC

Licensed school – State of Michigan

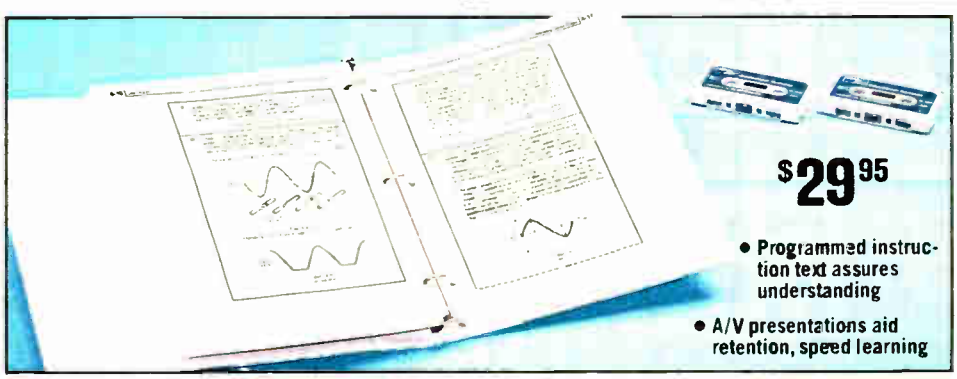
Earn College Credit for taking many Heathkit/Zenith courses

The American Council on Education, a nationally recognized accrediting authority, recommends that member colleges grant credit for several of our courses. See "The National Guide" for course recommendations.

If you have taken the course and passed the examination for any of the courses on pages 32 through 39 (EE-3101, -3102, -3103, 3104, -3105, -3201, -3401) or EC-1100 on page 78, you may be eligible for college credit. Check with your college first.

If your college participates in this program, and you have taken the course and passed the final exam, order the Heathkit/Zenith College Credit Program Exam. To order, simply take the course number (for example – EE-3101) and change the prefix to ECC. In our example you would specify ECC-3101 to order the exam.

ECC-3101, ECC-3102, ECC-3103, ECC-3104, EE-3105, ECC-3201, ECC-3401, ECC-1100, Shpg. wt. 1 lb. each ..... **each 25.00**



Award-winning, non-technical Concepts of Electricity Course

Not sure you can grasp electronic principles? This award-winning Course will show you how easy it is. No technical background is required for this Course, which uses audio/visual teaching methods to introduce you to electricity. And the Concepts of Electricity Course can serve as a valuable introduction to rest of the Heathkit/Zenith Basic Electronics Series (EE-3101 through -3105, featured on pages 32 through 34).

A programmed-instruction text, enhanced by clear visuals and two audio cassettes, teaches you each concept in an easy to follow sequence to build a solid foundation. Review examinations throughout the Course check your knowledge to insure that you learned the required material.

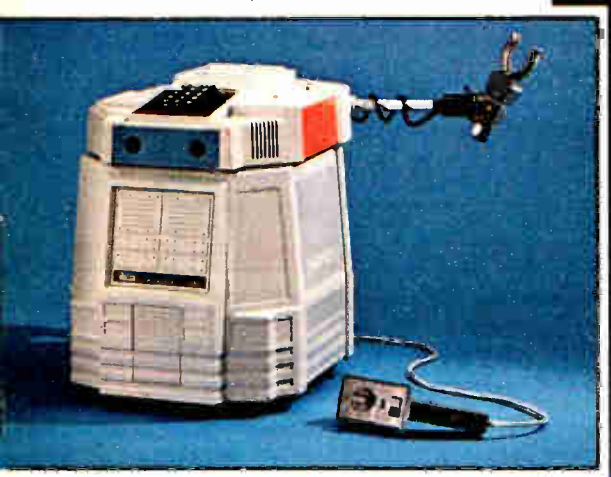
When you complete the Course, you will know the basics: Ohm's Law, series and parallel circuits, electromagnetism, direct and alternating current, generators, motors, and basic meter operation. Upon completion, pass the optional final examination with a score of 70% or better, and you will earn 1.0 Continuing Education Unit and an attractive Certificate of Achievement.

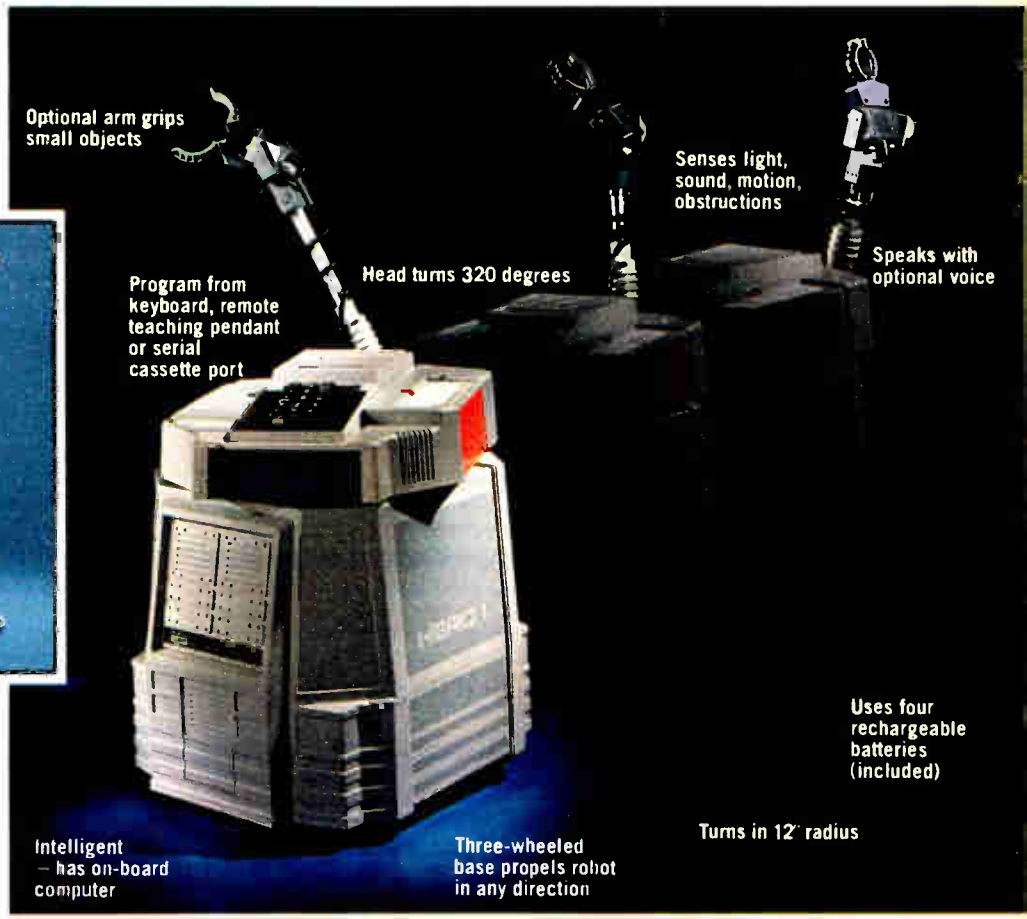
EE-3100, Shpg. wt. 5 lbs. **29.95**

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

NEW Introducing the world's first sophisticated teaching robot, HERO 1 — one of the most

Your new robot will move. See. Hear. Speak. And learn whatever you teach it – while it teaches you robotics with help from the companion Heathkit/Zenith educational course. It's also remarkably inexpensive, with the HERO 1 Robot Kit available for only $999.95 – and the assembled Robot, complete with arm and voice, priced at $2499.95.





HERO 1 is a full-featured robot:

- Controlled by on-board computer
- Exceptional maneuverability – goes in any direction, turns in 12" radius
- Senses light, sound, motion and obstructions in its path
- Can pick up small objects, speak with optional Arm and Voice
- Includes rechargeable batteries, external battery charger and experimental circuit board

One of the most important microprocessor-controlled devices since the introduction of the microcomputer: HERO 1 is a completely self-contained, electromechanical robot capable of interacting with its environment.

Functions free of any external control: Controlled by a programmable on-board computer, the robot has electronic sensors to detect light, sound, motion and obstructions in its path. It can travel over pre-determined courses and repeat specific functions on a pre-determined schedule.

It can also be programmed to pick up small objects with the optional ET-18-1 Arm and Gripper Mechanism (below, right), and speak with the optional ET-18-2 Phoneme Voice Synthesizer (also below, right).

Highly maneuverable: Using a three-wheeled base with both drive and steering on one wheel, the robot travels any direction and turns in a 12" radius.

A computer on wheels: Program HERO 1's on-board 6808 microprocessor to guide the robot through various complex maneuvers, activate the robot's sensors and modify the robot's behavior in response to inputs from its on-board sensors and real-time clock. The straightforward programming process allows step-by-step debugging and other corrections, as needed.

HERO 1 can be programmed in three different ways: Through the keyboard mounted on the robot's head, with its hand-held remote-control teaching pendant, or through its serial cassette port (using programming previously stored on a conventional audio cassette tape recorder). The computer can store programs with over 1,000 individual steps.

Program HERO 1 to guard your home, plant: It automatically detects intruders in its range and warns them away verbally. And HERO 1 can remain on guard for extended periods of time, using its power-conserving "sleep" mode.

Grabs and speaks with optional accessories: Capable of seven axes of motion, the optional ET-18-1 Arm and Gripper Mechanism lets you program HERO 1 to pick up small objects. The arm extends, retracts and turns – performing mechanical tasks with precision. The robot can also be programmed to speak complete sentences with the optional ET-18-2 Speech Synthesizer.

Experimental circuit board included: Expand HERO 1's capabilities to the very limits of the user's skills and imagination. This board allows the user to design circuits for interfacing with the robot's computer.

Includes on-board rechargeable batteries and charger: When HERO 1 tells you that its batteries need charging, use the robot's external battery charger. HERO 1 can be operated while its batteries are charging.

An even more significant "first": Remarkable though the robot is, its companion Robotics Education Course (see opposite page) provides an even more thorough grounding for you or those working with you in robot technology.

HERO 1 and the Robotics Course bring the learning process to life: You quickly get a hands-on grasp of industrial electronics, mechanics, computer theory and programming as applied to robots by putting them into action.

You teach it – it teaches you: HERO 1's only limitations are your imagination and ingenuity in programming, as you challenge its capabilities.

The list of capabilities goes on almost indefinitely: With the appearance of HERO 1, in production now and ready for you, the learning age of robotics has arrived. Now you can work with your own robot to develop your electronics, mechanics and programming skills – at a highly affordable price.

Kit ET-18, Basic HERO 1 Robot (less arm, voice), 69 lbs. **999.95**

ET-18-1, HERO 1's Arm (Arm and Gripper Mechanism), 6 lbs. **399.95**

ET-18-2, HERO 1's Voice (Phoneme Speech Synthesizer), 1 lb. **149.95**

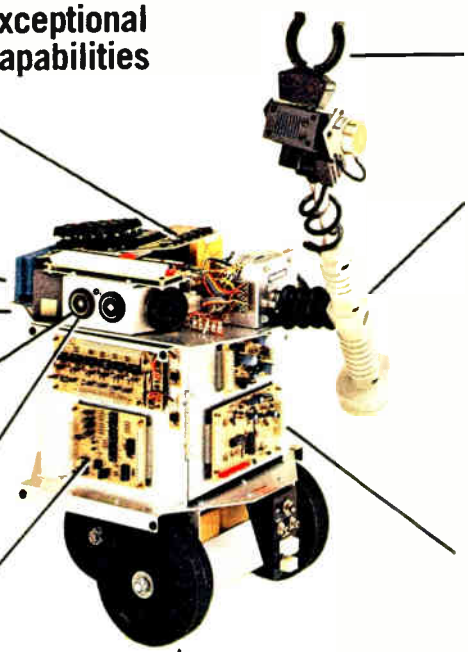
SAVE $50.00! Kit ETS-18, Complete HERO 1 Robot (with arm, voice), Shpg. wt. 91 lbs. ..... **$1549.85 separately, NOW ONLY 1499.85**

ETW-18, Complete Assembled Robot (with arm, voice), 70 lbs. **2499.95**

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

important microprocessor-controlled devices ever conceived

Exceptional capabilities



Convenient Control Panel: Control HERO 1 from the keyboard on his head. You can also use the remote teaching pendant, or a program written on cassette tape.

HERO 1 can talk (with optional accessory): With the optional ET-18-2 Phoneme Speech Synthesizer, the robot can simulate human speech – with four levels of inflection.

HERO 1 can see: The robot's light sensor beam can detect ambient light over the entire visible spectrum, with excellent resolution – down to one part in 256.

HERO 1 can hear: The robot's omnidirectional sound sensor can hear ambient sound from 200 to 5000 Hz, with the same one-part-in 256 resolution.

Detects still and moving objects: HERO 1's twin ultrasonic beams can "see" movement up to 15 feet away, and can determine the range of an object up to eight feet away.

Experimental Circuit Board included: HERO 1's breadboarding area provides direct access to an I/O port, user-defined interrupt, CPU control lines and power.

Highly maneuverable: HERO 1's three-wheel drive system, with one wheel both driving and steering, allows the robot to move any where – and to turn in a 12-inch radius.

HERO 1's Hand, part of its optional Arm, grips small objects: The gripper can hold up to a pound when fully retracted and horizontal – pivots up to 350 degrees.

Optional ET-18-1 Arm available: Rotates up to 250 degrees. pivots wrist up to 180 degrees, extends or retracts gripper over a five-inch track.

"Learn" mode lets you teach HERO 1: Just switch to "Learn" mode and take the robot through your task. It remembers – and repeats the steps at your command.

"Sleep" mode conserves power: This makes HERO 1 ideal for home and plant security duty – when it sees intruders, it "wakes up," and warns them away verbally.

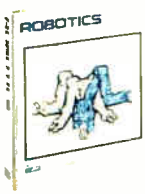
Self-contained rechargeable batteries: Two separate power systems – one for the logic circuits and a second for the drive system. External recharger included.

World-famous Heathkit manual: Easy-to-follow instructions from the world's largest builder of electronic kits guide you through each kitbuilding step.

NEW

Course provides a complete, comprehensive education in robot technology

$99.95



- **The 1200-page self-instruction text – Heathkit/Zenith's most extensive to date – has 11 chapters covering robot fundamentals**
- **Progress at your own pace – self-test exams in each unit help you check your progress**
- **Optional experiments give you hands-on experience with our HERO 1 Teaching Robot**
- **Earn 8 CEUs and a Certificate of Achievement**

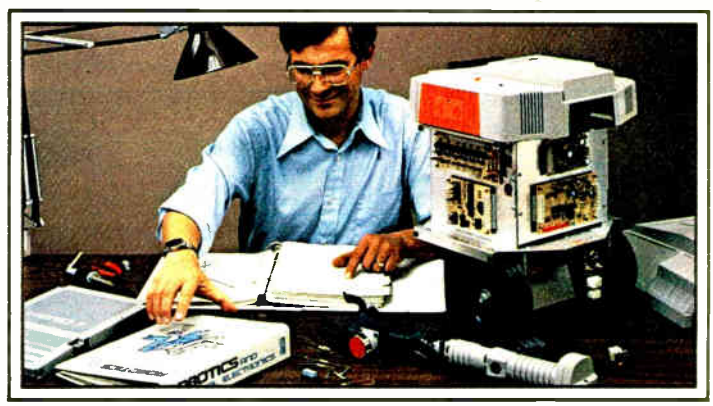
The most extensive course ever developed by Heathkit/Zenith Educational Systems: The 1,200-page text, which fills two three-ring binders, consists of 11 separate units covering the basics of robotics – each unit fully illustrated with charts and diagrams.

These subject areas are covered in the Heathkit/Zenith Robotics Course:

1. Robot Fundamentals
2. AC and Fluidic Power
3. DC Power and Positioning
4. Microprocessor Fundamentals
5. Robot Programming
6. Heathkit/Zenith Robot Microprocessor
7. Data Acquisition (Sensors)
8. Data Handling and Conversion
9. Voice Synthesis
10. Interfacing
11. Industrial Robots at Work

Progress at your own pace: The programmed self-study materials guide the student, step-by-step, until important concepts are mastered. Self-test reviews at the end of each unit make sure you understand what you've studied, before moving on to the next unit.

Use the ideal learning aid for robotics: Use the HERO 1 Robot on the opposite page to bring the learning process to life. By letting you apply what you've just learned, you get the type of reinforcement that makes 'learning-by-doing' one



of the most effective education methods ever devised. The course is also fully functional without the robot.

Prerequisites: You should complete EE-3101 DC Electronics (p. 32), EE-3102 AC Electronics (p. 33), EE-3201 Digital Techniques (p. 35) and EE-3401 Basic Microprocessors (pgs. 36-37) – or have a basic knowledge of those subjects – before starting the Robotics Course.

Earn 8 Continuing Education Units (CEUs) and a Certificate of Achievement from Heathkit/Zenith Educational Systems: Pass the optional final examination with a 70 percent or better score.

EE-1800, Robotics Course, Shpg. wt. 12 lbs. **99.95**

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

Completely updated DC Electronics Course — your entrance to the world of electronics

$49.95

- **An excellent starting point for the person just beginning to learn electronics**
- **Course updated; new audio-visual accessory available**
- **Develop a detailed knowledge of electronics rapidly**

Ready to learn electronics? The Heathkit/Zenith DC Electronics Course is the place to start. In addition to a concise and complete knowledge of basic electronics, you'll develop a foundation for expanding your knowledge with other courses available. It covers current, voltage, resistance, magnetism, Ohm's Law, electrical measurements, inductance and capacitance. The course has been completely updated to ensure that you learn the most up-to-date information available.

Learning is easy the Heathkit/Zenith way! This professionally-designed course leads you step-by-step to a complete understanding of DC electronics. This self-instructional text allows you to learn at your own pace, in the comfort of your home. The optional audio-visual presentation adds a new dimension to this learning format. Hands-on experiments increase your knowledge by putting your newly-gained information to work immediately on 20 practical exercises. A mathematics review is included.

Test yourself as you learn: Reviews are spaced throughout the text to give you a chance to check your progress. You can earn valuable Continuing Education Units (CEUs), a national method of recognizing your participation in non-credit educational courses. With a passing grade of 70% or better on the optional final examination, you'll receive 2.0 CEUs. Heathkit/Zenith Educational Systems will also award you a Certificate of Achievement — further proof of your knowledge.

Completely updated

New, optional audio-visual accessory aids learning

Parts for experiments included with course

The DC Electronics Course includes: Your comprehensive text in a durable vinyl binder and all electronic components needed for the valuable hands-on experiments. To complete the experiments, you need the ET-3100B Experimenter/Trainer (below) and a VOM like the IM-5217 (p. 51). The optional Audio-Visual Accessory enhances your understanding of DC Electronics, and expands on material presented in the course.

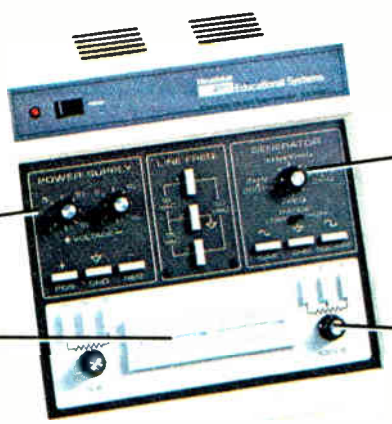
EE-3101A, Shpg. wt. 6 lbs. **49.95**

SAVE $10! EES-3101B, includes EE-3101A and ET-3100B Kit Trainer, Shpg. wt. 13 lbs. **129.90**

EEA-3101A, Audio-Visual Accessory (two tapes and illustration book enhance DC Electronics Course), Shpg. wt. 1 lb. **19.95**

EE-3101S, Spanish-Language DC Electronics Course (less EB-6101-30 Parts for experiments, see page 43), Shpg. wt. 7 lbs. **54.95**

Experimenter/Trainer adds to your knowledge



Used for seven Heathkit/Zenith electronics courses

Improved dual-variable power supplies

Solderless breadboarding sockets simplify circuit construction

Two-range variable sine and square wave signal generator

1K and 100K linear potentiometers

$89.95 Kit

- **Develop practical electronics experience as you learn with the Heathkit/Zenith Electronics Courses**
- **After you've completed your training, use the ET-3100B for breadboarding your own circuits**

The ET-3100B Experimenter/Trainer is easy to use and provides you with the practical experience that really helps drive home important points. Designed for use with the Heathkit/Zenith DC, AC, Semiconductor, Electronic Circuits, Electronic Communications, Electronics for Hobbyists and Test Instruments Courses.

You can save money by ordering your ET-3100B Experimenter/Trainer in kit form, or by buying it along with a Heathkit/Zenith Electronics Course.

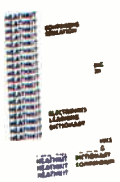
Kit ET-3100B, Heathkit/Zenith Electronic Experimenter/Trainer, Shpg. wt. 6 lbs. ... **89.95**

ETW-3100B, Assembled Trainer, Shpg. wt. 6 lbs. **159.95**

MONEY BACK GUARANTEE:

All self-instruction courses carry a complete money-back guarantee. If you are dissatisfied, return all course materials (except the trainer) and your receipt for a full refund.

Electronics Dictionary



Sixteen topic outlines make this dictionary more than just a book of definitions. It's actually a low-cost electronics "short-course." This 832-page Learning Dictionary, from Heathkit/Zenith, should be a part of your professional reference library.

EB-1010, Shpg. wt. 3 lbs. **14.95**

Buy several courses for BIG SAVINGS!

Includes five courses: DC Electronics, AC Electronics, Semiconductor Devices, Electronic Circuits and Electronic Test Equipment — along with the ET-3100B Experiment/Trainer Kit. If components purchased separately, $379.70.

SAVE $50! EES-3115B,
Shpg. wt. 56 lbs. ..... **ONLY 329.70**

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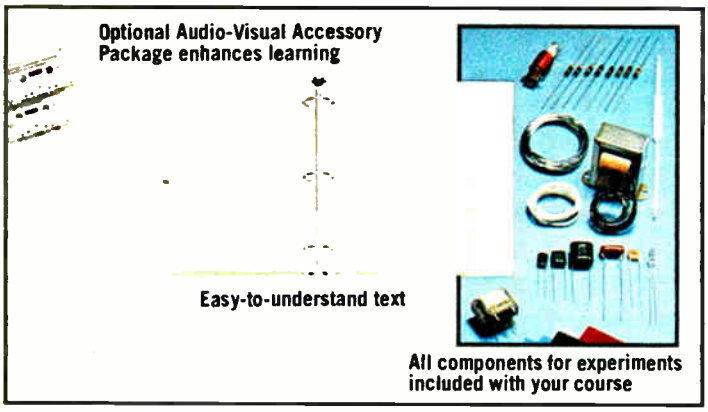


AC Course expands your electronics education

$54.95

- **Advance your knowledge of electronics with a complete understanding of alternating current**
- **Picks up your education where the Heathkit/Zenith DC Electronics Course leaves off**
- **Completely updated to bring you the latest, most accurate information on the subject**

Easy-to-understand self instruction course advances your knowledge of electronics theory. The Heathkit/Zenith AC Electronics Course provides complete and comprehensive coverage of all the principles of alternating current. Completely updated.

Programmed learning makes it easy: As with all the other Heathkit/Zenith self-instruction courses, you begin with basic theory and you continue adding to your store of information until you are ready for the next concept. You work at your own pace, then complete reviews to measure your progress. The concepts you study will come to life as you conduct nine experiments that turn theory into practical experience.

The Heathkit/Zenith AC Electronics Course provides you with a detailed understanding of alternating current. Your text covers such topics as; Alternating Current, what is it and where is it used? Generating AC, AC values and waveforms, AC measurements – meters, oscilloscopes, resistance and calculations. Capacitive circuits including a review of capacitors and capacitance, capacitors in AC circuits, RC circuits and a complete discussion of the various applications of capacitive circuits. You'll continue on to Inductive Circuits. The text discusses inductors and inductance, the use of inductors in AC circuits along with a section on RL circuits. A detailed section of the AC Electronics Course is devoted to tuned circuits – the RLC circuit, resonance, series resonance, Q and bandwidth in series, parallel resonance and LC filters. You'll complete your study of AC Electronics with a look at transformers, including transformer ratios, losses and applications.

In short, you'll vastly expand your knowledge of electronics in a fairly short time. With Heathkit/Zenith courses, you work at your own speed in the comfort of your home.

Earn Continuing Education Units: Pass the optional final exam to receive 1.5 CEUs, a nationally-recognized method of acknowledging adult continuing education. It is suggested that you complete DC Electronics Course EE-3101A, or have equivalent knowledge, before beginning this course. The optional Audio-Visual Accessory Package, which includes cassettes/and printed visuals, helps speed learning. An ET-3100B Trainer and a Volt-Ohm Meter (VOM) are suggested to complete experiments.

EE-3102A, Shpg. wt. 7 lbs. **54.95**

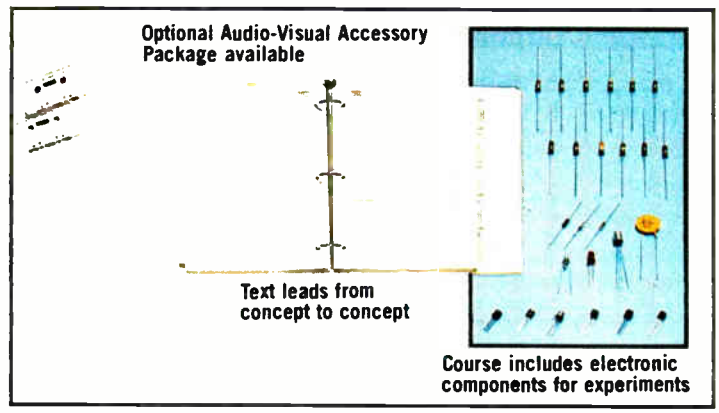
EEA-3102A, Optional Audio-Visual Accessory Package, Shpg. wt. 1 lb. .. **19.95**

SAVE $10! **EES-3102B,** EE-3102A and ET-3100B Kit Trainer, Shpg. wt. 13 lbs. **134.90**

Spanish Language AC Electronics Course: Translation of this course, less EB-6102-30 Parts for experiments (see page 43).

EE-3102S, Shpg. wt. 7 lbs. **59.95**

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



Semiconductor Devices Course – the third step

$54.95

- **Completely updated with the most recent information from the fast-moving world of solid-state electronics**
- **Continues your electronic studies with complete coverage of solid-state devices**
- **More hands-on experiments for practical experience**

The Heathkit/Zenith Semiconductor Devices Course introduces you to the exciting world of solid-state electronics with its coverage of transistors and integrated circuits. These devices have revolutionized the world of electronics, making possible the development of credit card-sized radios, calculators and other electronic appliances.

As always, you learn step-by-step, building upon fact after fact until you've developed a complete understanding of a concept or theory. Regular reviews reinforce your education and point out your strong areas – and those that need more work. A total of eleven experiments add to your understanding of these important concepts.

Proven self-instruction design: This effective Heathkit/Zenith course uses an integrated teaching approach to help assure maximum learning – and maximum retention. Self-instruction lets you learn at your own pace, while an optional Audio-Visual Accessory Package is available to help learning even more. Hands-on experiments, using the optional ET-3100B Trainer, give you first-hand experience with semiconductor devices.

Your Heathkit/Zenith Semiconductor Devices Course will provide you with in-depth knowledge of semiconductor fundamentals including the importance of semiconductors, semiconductor materials, germanium and silicon and conduction in doped germanium and silicon. You will learn about semiconductor diodes and their characteristics, construction and applications. You'll also learn in detail the characteristics and usage of the zener diode.

A unit on diodes includes a discussion of the tunnel diode, the varactor diode and high-frequency diodes. Other topics covered include bipolar transistor operation, bipolar transistor characteristics, field-effect transistors, thyristors, integrated circuits and optoelectronic devices, including LEDs.

We suggest the ET-3100B Trainer, a volt-ohm meter and, optionally an oscilloscope to complete the experiments included in the course. It is suggested that you complete EE-3101 DC Electronics Course and the EE-3102 AC Electronics Course as prerequisites, or have equivalent knowledge, before beginning this course.

Earn 3.0 Continuing Education Units (CEUs) and a Certificate of Achievement from Heathkit/Zenith Educational Systems – score 70 percent or better on the optional final examination.

EE-3103A, Shpg. wt. 6 lbs. **54.95**

EEA-3103A, Optional Audio-Visual Accessory Package, wt. 1 lb. **19.95**

SAVE $10! **EES-3103B,** EE-3103A and ET-3100B Kit Trainer, Shpg. wt. 11 lbs. **134.90**

Spanish Language Semiconductor Devices Course: Translation of this course, less EB-6103-30 Parts for experiments (see page 43).

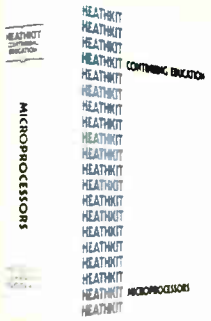
EE-3103S, Shpg. wt. 6 lbs. **59.95**

Learn about microprocessors, microcomputers and programming at your own pace with this award-winning Heathkit/Zenith Course

Heathkit
Zenith
Educational Systems

WINNER
International Award
Society for Technical Communication

- **COMPLETE:** Covers all the basics of microprocessors, microcomputers and programming – even includes hands-on hardware/memory interfacing and programming experiments
- **EFFICIENT:** Programmed-learning design and audio visual aids, combined with 19 hands-on experiments, mean you learn about microprocessors faster and more effectively
- **PROVEN:** The Heathkit/Zenith Microprocessor Self-Instruction Course has introduced thousands of people like you to microprocessors, microcomputers, interfacing and programming
- **ECONOMICAL:** Learn effectively for less – with our complete guarantee of satisfaction



As soon as you begin the Microprocessor Self-Instruction Course from Heathkit/Zenith Educational Systems, you will start learning about microprocessors, microcomputers and computer programming in a complete, efficient and well-organized way. You'll understand microprocessor basics, computer arithmetic, programming and interfacing – everything you need to know to get a headstart in the exciting world of computers.

No previous background? The Heathkit/Zenith Microprocessor Course has adopted the finest models of successful self-instruction technique. Concise, steady-paced textbooks, colorful audio-visual presentations and hardware experiments make important microprocessor theory, application and design easier for you to understand.

You start by learning or reviewing the basics of computer number systems and codes. Next, you apply that knowledge as our prize-winning Microprocessor Course takes you step-by-step through computer arithmetic, programming, examination of popular microprocessors, interfacing and input/output operations you can put to use immediately.

The Heathkit/Zenith Microprocessor Course is organized into ten learning units: Unit 1, Number Systems/Codes, covers decimal, binary, octal and hexadecimal numbering systems; conversions, binary codes and positional notation. **Microcomputer Basics, Unit 2,** teaches you terms and conventions, introduces you to several instructions and shows how programs are written and executed. **Unit 3, Computer Arithmetic,** covers binary addition, subtraction, multiplication and division, two's complement arithmetic and Boolean logical operations like NOT, AND, OR, Exclusive-OR and INVERT.

The fourth unit of the Course is an Introduction to Programming, including branching, conditional branching, algorithms and programming instructions. **The 6800 Microprocessor is covered in Units 5 and 6,** and includes a study of architecture, instruction set, addressing modes, stack operations, subroutines, input/output operations and interrupts. **Units 7 and 8 teach the important concept of Interfacing.** You'll learn the fundamentals of interfacing, interfacing

SAVE $25 Order EE-3401 Course and ET-3400A Trainer together. If purchased separately, $329.90.
ETS-3400A, Shpg. wt. 19 lbs. . . **ONLY 304.90**

Our Microprocessor Trainer helps you learn about computers, interfacing and programming procedures the hands-on way

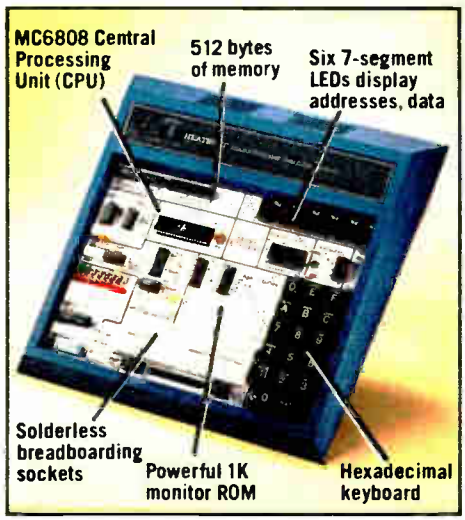
Functioning as a miniature digital computer, the ET-3400A Trainer is used with the experiments in the EE-3401 and EE-3402 courses. It features a built-in 1K ROM monitor program for controlling unit operation. It also has a six-digit hexadecimal 7-segment LED display for address and data read-outs, and monitoring internal logic states.

The 17-key hexadecimal keyboard permits you to access memory location to examine contents, then step forward or backward to examine other memory locations, change the contents of memory locations, examine and/or alter any of the MC6808 microprocessor's internal registers, set break points for program debugging, or reset the MPU. The flexible instruction set of the MC6808 permits five addressing modes, and uses two accumulators, an index register and stack pointer.

The ET-3400A has 512 bytes of Random Access Memory (RAM) built-in. It also features 8 buffered binary Light-Emitting Diodes (LEDs) for display of breadboard logic states, 8 SPST DIP switches for binary input to breadboarding circuits, and a breadboarding socket for prototyping, memory and interfacing circuits.

All microprocessor address, control and data busses are 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. Built-in +5, +12 and −12 VDC power supplies provide internal power needs. The ET-3400A requires 120 VAC, 60 Hz power. Draws 30 watts. Dimensions of the Heathkit ET-3400A Microprocessor Trainer are 3.5" H x 12.2" W x 11.75" D (8.89 x 30.99 x 29.85 cm), without the ETA-3400 Trainer Accessory.

The programming and interfacing experiments supplied with the EE-3401 and EE-3402 courses are implemented on the ET-3400. The Trainer is a flexible general-purpose training unit and microprocessor breadboard. Use it in 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 Microprocessor Trainer Accessory (opposite page) for increased personal microcomputing power and versatility.



For serious students, the ETA-3400A Microprocessor Trainer and ETA-3400 Microprocessor Trainer Accessory are a superior pair of educational tools.

Kit ET-3400A, Shpg. wt. 7 lbs. **229.95**
ETW-3400A, Assembled, 6 lbs. **329.95**
Kit ET-3400-AE, Trainer for 240 VAC, 50 Hz power, Shpg. wt. 6 lbs. **249.95**

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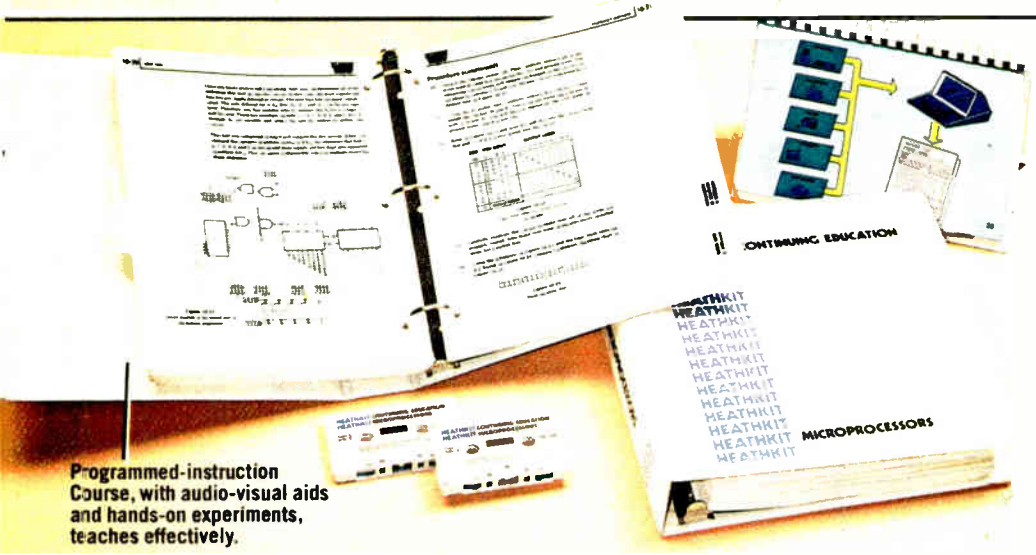
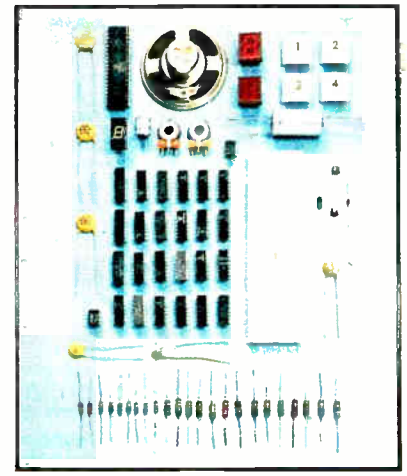


Programmed-instruction Course, with audio-visual aids and hands-on experiments, teaches effectively.



Includes 62 components for experiments.

Random Access Memory (RAM), interfacing with displays, interfacing with switches, the Peripheral Interface Adapter (PIA) and using the PIA.

Programming experiments are the subject of Unit 9. You will write and experiment with a wide variety of increasingly complex programs. In an early experiment you will actually turn the ET-3400A Trainer (described below) into a teaching machine that will give you drills and practice in computer numbering systems. In later experiments in the Course, you will use all instructions and addressing modes. You experiment with subroutines, stack operations, and more.

In the final unit of the Heathkit/Zenith Microprocessor Course, Interfacing Experiments, you put into practice everything you have learned about programming and interfacing. Using the electronic components supplied with the Course, you convert the ET-3400A into a digital clock, a musical instrument and a digital voltmeter. You experiment with address decoding, PIAs, input and output of data, parallel-to-serial conversion techniques, digital-to-analog and analog-to-digital conversion techniques, and interrupts.

Units 1-6 and Unit 9 assume no prior knowledge of electronics. Units 7, 8 and 10 assume knowledge equivalent to the Heathkit/Zenith EE-3201 Digital Techniques Course (described on page 35).

This course comes with 62 electronic components – everything you need to complete the course experiments. These components include RAMs, a Peripheral Interface Adapter (PIA) chip, a digital-to-analog converter, op-amps and a variety of other microprocessor-oriented devices. The ET-3400A Microprocessor Trainer (below, left) is required to perform the experiments.

Passing the optional final exam, with a 70% or better score, will earn you a full 8.0 CEUs. A classroom version of this course is available on page 43.

With the computer age upon us, now is the time to begin your education in microprocessors, microcomputers, and programming by ordering the tried and proven Heathkit/Zenith EE-3401 Microprocessor Course today.

To continue your microprocessor education after completing this course, take the EE-3402 Microprocessor Interfacing Course on page 39. It picks up where this course left off – and uses the same ET-3400A Trainer.

EE-3401, Shpg. wt. 12 lbs. **99.95**

Optional Film Slides duplicate the audio-visual flip charts.
EE-3401-1, Shpg. wt. 2 lbs. **60.00**

Optional 35mm Filmstrip duplicates audio-visual flip charts in filmstrip form.
EE-3401-2, Shpg. wt. 1 lb. **20.00**

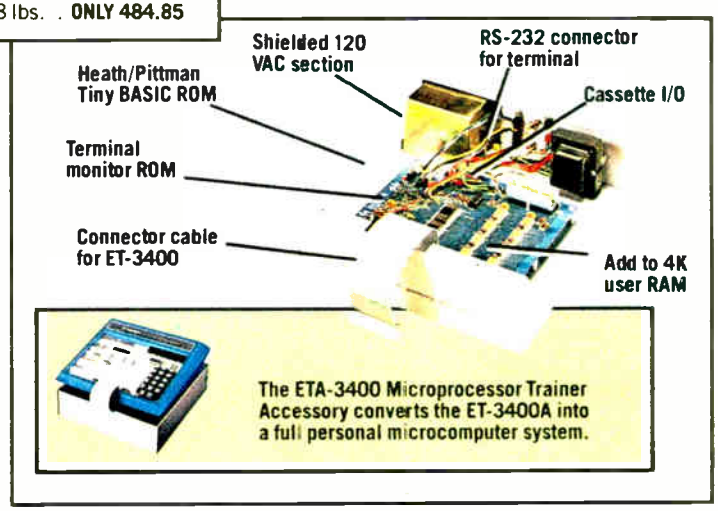
SAVE $70 Order EE-3401, ET-3400A, ETA-3400 and ETA-3400-1 together. $554.85 separately.
ETS-3401A, Shpg. wt. 28 lbs. . **ONLY 484.85**

ETA-3400 Accessory turns Microprocessor Trainer into a complete microcomputer system

When you add this Accessory, you turn your ET-3400A Trainer into a computer system. It provides you with more computing power – so you can run longer, more sophisticated programs through your ET-3400A Trainer. The Accessory's memory can even be expanded to 4K bytes of RAM by adding the optional ET-3400-1 3K Chip Set (order from the listing below).

A serial interface with EIA and 20 mA loop formats in the Accessory allows you to hook up a video terminal, such as the H-19 on page 73, or a 20 mA ASCII teletype machine. It also provides a cassette interface, enabling you to store programs on convenient cassettes. The ROM monitor/debugging 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 in ROM lets you program in easy-to-learn BASIC language. User function lets you run machine code routines from BASIC – the same machine code routines you learn in the EE-3401 Microprocessor Course.

The ETA-3400 connects to the ET-3400A 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, experiments in the EE-3401 and EE-3402 courses which use timing loops will be changed. It is recommended that all EE-3401 and EE-3402 experiments be completed before adding this Accessory. An H-19 Video Terminal is required to use BASIC and monitor software features of the ETA-3400.



The ETA-3400 Microprocessor Trainer Accessory converts the ET-3400A into a full personal microcomputer system.

For 120/240 VAC, 50/60 Hz. The ETA-3400 measures 3" H x 11" W x 12" D.

Kit ETA-3400, Shpg. wt. 8 lbs. **175.00**
EWA-3400, Factory assembled and tested, Shpg. wt. 8 lbs. **275.00**
ETA-3400-1, Optional 3K Chip Set, Shpg. wt. 1 lb. **49.95**

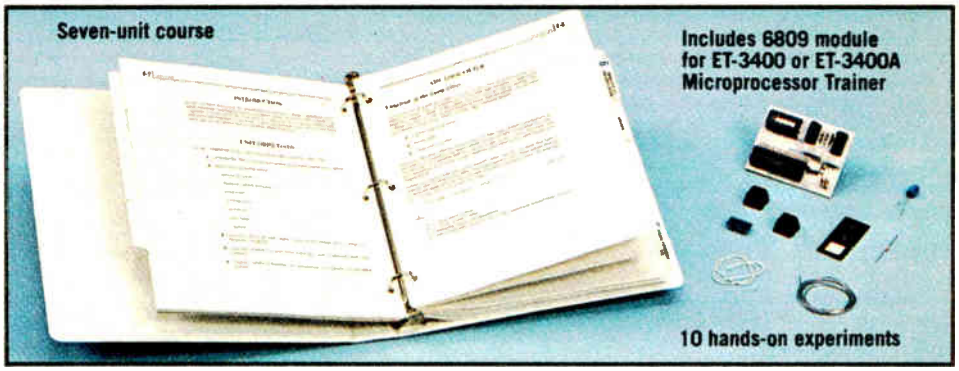
Alaska, Hawaii and Michigan Residents: Call 616-982-3411

Advanced Microprocessor Course: Program and interface the 6809 family

NEW

$99.95

- **Includes an assembled module which converts your ET-3400 or ET-3400A into an advanced 6809 microprocessor trainer**
- **This advanced microprocessor has a flexible instruction set with over 1400 different commands available**
- **Text has 10 programming experiments which give you hands-on experience with the 6809 family**



Advanced – and effective – learning: Progress to programming and interfacing the advanced 6809 microprocessor with the new Heathkit/Zenith EE-3404 Advanced Microprocessor Course.

The seven-unit text covers 6809 programming and interfacing completely: In Unit 1, you learn Fundamental 6809 Concepts and Chip Structure – including the 6809 design philosophy, evolution and improvements. 6809 Addressing Modes are discussed in Unit 2. Unit 3 covers 6809 Registers and Data Movement Instructions, while Arithmetic, Logic and Test Instructions for the 6809 are taught in the fourth unit.

Branch and Miscellaneous Instructions are covered in Unit 5. The sixth unit covers 6809/6809E Input and Output Signals – while 6809/6809E Interfacing and Applications are the subjects of the final unit.

Adapter module for trainer included: The course includes a special adapter module which converts the ET-3400 or ET-3400A Microprocessor Trainer into a 6809-based microprocessor trainer. This assembled module includes a handy debugging routine, contained in the 2 KB ROM monitor program.

Four appendices are included with the text: They include listings for the 6809/6809E Instruction Set and the 6820/6821 Peripheral Interface Adapter (PIA), specification sheets for the MC6809/MC68A09/MC68B09, MC6809E/MC68A09E/MC68B09E, MC6829, MC6839 and MC6842, microprocessors and peripheral devices, and a summary of the MC6809 instruction set.

Hands-on programming experiments enhance your understanding of the subject: Ten optional programming exercises, which use the ET-3400 or ET-3400A Microprocessor Trainer (not included), reinforce the concepts presented in the text.

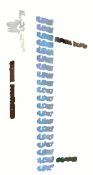
Prerequisite: The prerequisite for taking the EE-3404 Advanced Microprocessor Course is successful completion of the EE-3401 Microprocessor Course or equivalent knowledge.

Earn 3 Continuing Education Units and a Certificate of Achievement: Pass the optional final examination, with a score of 70 percent or better, to receive these items of recognition from Heathkit/Zenith Educational Systems.

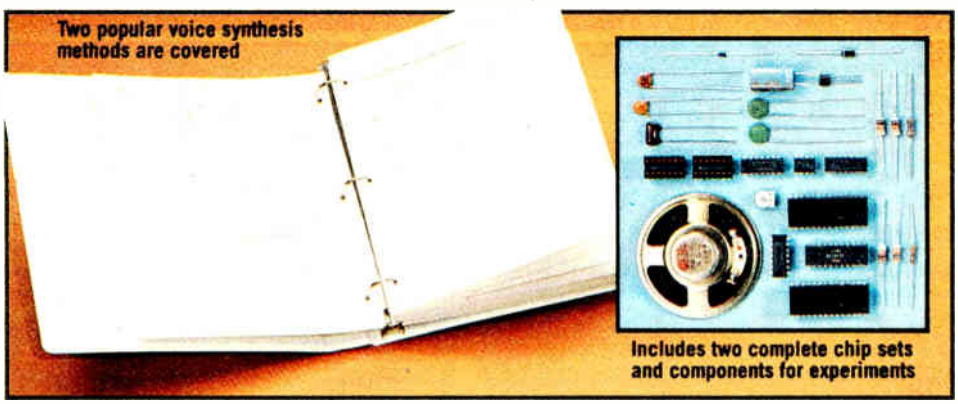
Guaranteed: If you're not satisfied, return all course materials (less trainer) for a refund of the purchase price.

EE-3404, Shpg. wt. 6 lbs. **99.95**

Complete Voice Synthesis Course explains the latest fundamentals and techniques



- **Covers voice synthesis hardware and software**
- **Includes complete chip sets for digitized and phoneme voice synthesis**
- **Experiments in the text give hands-on experience**



Get on speaking terms with your computer: The Heathkit/Zenith EE-3403 Voice Synthesis Course teaches you this state-of-the-art technique in an easy-to-follow format with hands-on experiments that will have your ET-3400 or ET-3400A Microprocessor Trainer talking to you in no time. This five-unit course consists of a 250-page text filled with experiments in voice synthesis, along with the chip sets and other electronic components necessary to complete the experiments.

Covers two voice synthesis methods: The course teaches both digitized voice synthesis (fixed vocabulary with human voice qualities) and phoneme voice synthesis (which allows you to reproduce any English word).

Practical course features a great deal of experimentation: EE-3403 cuts through the technical fog and gets right down to how to program and inteface the two most popular voice synthesis methods. The course is also valuable in helping you understand the alternatives available in speech synthesis. It can be a real money-saver to a design engineer, for example, who wants to explore the wide range of capabilities and problems of various synthesizers.

Complete chip sets for digitized and phoneme voice synthesis are included:

1. The digitized chip set contains both a ROM chip and a synthesizer chip – featuring a vocabulary totaling more than 200 words.
2. The phoneme synthesizer is self-contained on a single chip.

If purchased separately, the chip sets alone would cost over $150.

Course covers subject completely: The five-unit text covers voice synthesis in a clear, concise manner. You'll also learn the basic hardware and software necessary for breadboarding computer-synthesized speech – and the programming and interfacing you'll need for both digitized and phoneme voice synthesis. And it prepares you to write machine code programs tailored for the ET-3400 and ET-3400A Microprocessor Trainers.

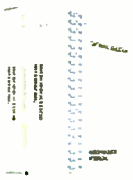
When you complete this course, you'll be able to make your Heathkit/Zenith ET-3400 or ET-3400A Microprocessor Trainer (necessary for the course – see page 36) talk. Prerequisites for Voice Synthesis are the EC-6800 Introduction to Microprocessors Course (page 42), or the EE-3401 Introduction to Microprocessors Course (page 36), or equivalent knowledge.

Earn 3 Continuing Education Units and a Certificate of Achievement: Pass the optional final examination with a 70% or better score.

EE-3403, Shpg. wt. 4 lbs. **129.95**

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

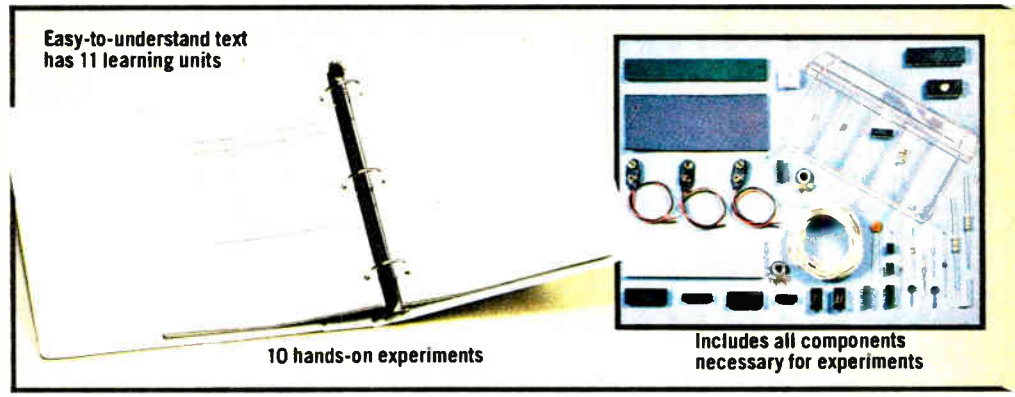
Learn more about interfacing microprocessors — and about advanced microprocessors



- **The first low-cost course which deals with microprocessor interfacing concepts and techniques**
- **Advance your education after completing EE-3401 successfully (or gaining equivalent knowledge)**
- **750-page text has 10 all-new hands-on interfacing experiments; all components necessary for experiments included**

$99.95

Heathkit/Zenith Educational Systems now offers three effective courses in the microprocessor field with the Microprocessor Interfacing Course offering more advanced knowledge.



The first low-cost educational course in its field: Now you can afford to add to your knowledge of microprocessors and interfacing, with the EE3402 Microprocessor Interfacing Course from Heathkit/Zenith Educational Systems.

Picks up where the EE-3401 Microprocessor ends: Designed for people who have a working knowledge of microprocessor fundamentals and desire to gain additional knowledge about microprocessor interfacing techniques and more advanced microprocessors, the EE-3402 Microprocessor Interfacing Course is the natural starting point to expand knowledge after completing EE-3401.

Course materials: This Heathkit/Zenith educational course consists of a 750-page text, divided into 11 learning units, with 10 experiments to provide hands-on experience in microprocessor interfacing – as well as all the components necessary to perform those experiments.

The text, contained in two attractive vinyl binders, concentrates on teaching additional microprocessor interfacing techniques: However, it also provides in-depth coverage of the 6800 family of microprocessors – and introduces the student to the powerful 6809 and 68000 microprocessors.

Unit 1, Advanced PIA Interfacing and Analog Conversion, discusses fundamental concepts of the Peripheral Interface Adapter (PIA), PIA addressing, PIA initialization, I/O control techniques (using the PIA), digital-to-analog converters and analog-to-digital converters. Serial data formats and standards, asynchronous/synchronous transmission and ASCII coding, parallel-to-serial conversion and the Asynchronous Communications Interface Adapter (ACIA) are covered in **Serial Data Communications, Unit 2.**

Unit 3, Peripheral Devices, teaches the fundamentals of standard serial conversion (TTL/RS-232C, TTL/20 mA current loop, RS-232C/20 mA current loop, TTL/KCS and modems), peripheral I/O devices (the teletypewriter, printer, CRT terminal and TV receiver output) and mass storage peripheral devices (audio cassette and floppy disk systems).

Memory Devices, Unit 4, covers dynamic random access memory (RAM) and read-only memory (ROM) – as well as bubble, charge-coupled (CCD) and Josephson junction memory devices. Dynamic versus static RAM, the MCM4116 dynamic RAM, mask-programmed ROM, programmable ROM (PROM), electrical erasable ROM (EEROM) and the 2708 EPROM are explored.

Unit 5 discusses Programmable Timers – including general concepts of programmable timers, addressing, initializing and operating the 6840 programmable timer module (PTM), timer output mode tasks and timer input mode tasks. **The 6800 Family of Microprocessors** (including the 6808, 6802, 6801, 6803 and 6805) and their development are covered in **Unit 6.**

Unit 7 discusses the 6809 Advanced Microprocessor in depth. Among the areas covered are the register structure and instruction set, addressing modes (including inherent, immediate, direct, extended, register, indexed, indirect and relative addressing) and interface lines.

The 68000 Advanced Microprocessor is introduced in three parts – Units 8, 9 and 10. Addressing modes, the instruction set, interface lines, process states and exception processing and other areas are covered.

Additional text material included: Appendices to the course text include data sheets and a summary of the 6800 family of microprocessors.

Check your progress as you go: Unit examinations, included with each unit of the course, help you check your progress through the course material.

The courses's 10 hands-on experiments are in Unit 11 of the text:

Experiment
1: Display Multiplexing, using the PIA
2: I/O Control and Handshaking, using the PIA
3: Analog-to-Digital (A/D) Conversion and ADC Interfacing
4: Parallel-to-Serial Conversion, using the 6850 ACIA
5: Serial Standard Conversion
6: 2708 EPROM Programming
7: ROM/EPROM Interfacing
8: 6840 PTM Output
9: 6840 PTM Input
10: 6809 Software Operation

A multitude of components are included with the course: These components help you perform the experiments. They include a 6821 PIA, a 6850 ACIA, a 2708 EPROM, a 6840 PTM, an analog-to-digital (A/D) converter, an RS-232C Serial Interface Driver and Receiver, an optoisolator and other TTL chips.

Continuing Education Units (CEUs) available: Passing the optional final examination, with a grade of 70% or better, will earn 7.0 Continuing Education Units and a Certificate of Achievement.

Prerequisite: The EE-3401 Microprocessor Course (pages 36 and 37) should be successfully completed before starting this course.

Required accessory: The Heathkit ET-3400 or ET-3400A Microprocessor Trainer (p. 36) is necessary to perform the experiments in this course.

Money-back guarantee: As with all Heathkit/Zenith courses, the Microprocessor Interfacing Course carries a money-back guarantee. If you're not satisfied, return the course materials for a refund (not applicable to trainer).

EE-3402, Shpg. wt. 11 lbs. **99.95**

SAVE $30.00 on complete microprocessor education

Save by purchasing the complete package: Heathkit/Zenith Educational Systems offers a complete microprocessor education package, at a lower cost than if you purchased all of the components separately.

Includes two courses and trainer: Both the popular EE-3401 Microprocessor Course and the EE-3402 Microprocessor Interfacing Course are included in the EES-3402 package. You also get the versatile Heathkit/Zenith ET-3400A Microprocessor Trainer, necessary to perform the experiments in both courses.

If you purchased these items separately, your cost would be $429.85.

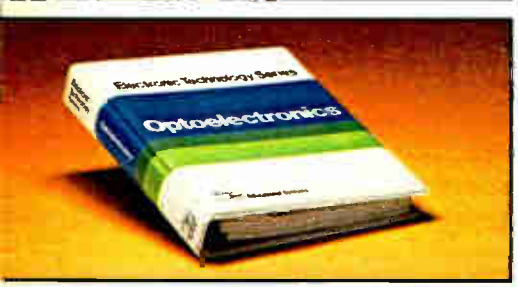
SAVE $30.00! EES-3402, Shpg. wt. 49 lbs. ..... **ONLY 399.85**

Includes EE-3401 and EE-3402 courses

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

Advanced Electronics Series conveys specialized information in an easy-to-learn, hands-on format

Whether you're an electronics professional, student or hobbyist, the Heathkit/Zenith Electronics Technology Series is a rewarding way to get the latest information. Discover the easy, fast, fun way to learn – with our Self-Instruction Courses. They're economical and flexible, too. Experiments follow concise text presentation – components included – and the ET-3300A Trainer gets you working. Classroom versions of these Heathkit/Zenith courses are on p. 43.

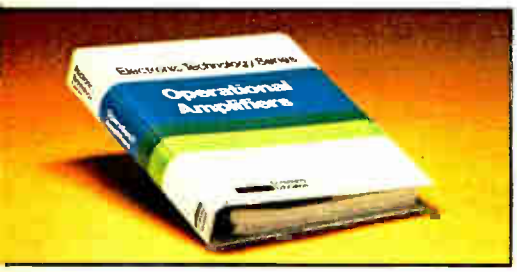


Get the latest on Optoelectronics with this thorough course

Basic optical terms and concepts are presented here in their most current contexts. Course covers the types of available light sources and optoelectronic displays – including driving and multiplexing. Acquaints you with light-sensitive components such as photodiodes, phototransistors, solar cells and optocouplers – their design and applications. Laser and fiber optics theory and operation are also discussed.

Parts for experiments included. Required for experiments: ET-3300A. Recommended: milliameter and voltmeter – or a VTVM like the IM-5218 (p. 51) and a scope like the IO-4105 (p. 65). Prerequisites: DC and AC (EE-3101A and -3102A, pgs. 32-33) or equivalent; some experience in optics or electronics. 3 CEUs.

EE-105, Shpg. wt. 5 lbs. **59.95**
Kit ET-3300A, Breadboard, 6 lbs. **99.95**
ETW-3300A, Assem. Breadboard, 6 lbs. **169.95**
SAVE $10.00 – Buy Course and Breadboard Kit.
EES-105A, Shpg. wt. 11 lbs. **149.90**



Op Amps and ICs: presented in easy-to-digest units

Comprehensive 358-page text details measurements of common op amp parameters, basic op amp linear circuits, integrator and differential circuits, and design and performance of op amp constant current sources. Also discusses current/voltage and voltage/current converters, Norton and BiFET op amps.

Components for experiments included; ET-3300A required for experiments. Recommended: an oscilloscope like IO-4105 (p. 65), a multimeter like IM-2260 (p. 61), and a frequency generator like IG-1271 (p. 56). Prerequisite: Basic Electronics (EE-3101A through 3104A, pgs. 31-34) or equivalent knowledge. 3 CEUs.

EE-101, Shpg. wt. 5 lbs. **39.95**
Kit ET-3300A, Breadboard, 6 lbs. **99.95**
ETW-3300A, Assem. Breadboard, 6 lbs. **169.95**
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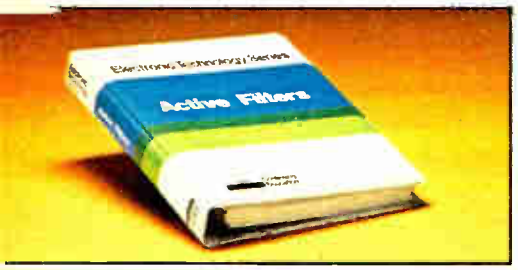
EES-101A, Shpg. wt. 11 lbs. **129.90**



Gain know-how of Active Filters at a reasonable price

Course teaches proficiency in designing active filters with op amps, plotting and predicting frequency responses, designing and breadboarding first-order low- and high-pass filters, and designing second- and higher-order filters, bandpass and state variable filters.

ET-3300A or ET-3100B Breadboard required for experiments (NOTE: ET-3100B, p.32, cannot be used with other courses in Advanced Series). An oscilloscope like the IO-4105 (p. 65) and a frequency generator like the IG-1271 (p. 52) are helpful. Prerequisite: EE-101 Op Amps or equivalent. 3 CEUs.

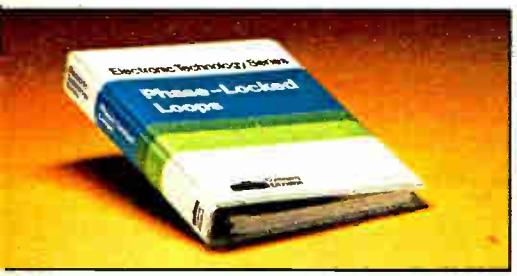
EE-102, Shpg. wt. 5 lbs. **34.95**
Kit ET-3300A, Breadboard, 6 lbs. **99.95**
ETW-3300A, Assembled Breadboard, Shpg. wt. 6 lbs. **169.95**
SAVE $10.00 – Buy Course and Breadboard Kit.
EES-102A, Shpg. wt. 11 lbs. **124.90**

Understanding and using the versatile IC Timer

Understand the workings, functions, and applications of common IC timers – in output drive circuits, time-delay relay circuits, wide-range pulse generators, voltage/frequency converters, freewheeling power-fail oscillators, timers, and alarms. 348-page text is well-written; also serves as a helpful electronics reference.

Durable vinyl binder housing; components for experiments included. Requires ET-3300A for experiments. Recommended: IO-4105 Oscilloscope (p. 65), IM-2260 Multimeter (p. 61) or similar. Prerequisite: EE-3201 Digital Techniques Course (p. 35) or equivalent knowledge. 3 CEUs.

EE-103, Shpg. wt. 5 lbs. **39.95**
Kit ET-3300A, Breadboard, 6 lbs. **99.95**
ETW-3300A, Assem. Breadboard, 6 lbs. **169.95**
SAVE $10.00 – Buy Course and Breadboard Kit.
EES-103A, Shpg. wt. 11 lbs. **129.90**



Learn about Phase-Locked Loops – and how to build them

Phase-Locked Loops and their ingredients – the phase detector, loop filter and voltage-controlled oscillator – are presented the simple, easy Heathkit/Zenith way. Learn on this integral aspect of radio and TV communications at your own pace. The 268-page text is thorough, and the reviews and tests are helpful checkpoints.

Components for experiments included. ET-3300A Trainer required for experiments. We also suggest a DC voltmeter like the IM-5284 (p. 56) and a single-trace oscilloscope like the IO-4105 (p. 65). To learn more efficiently, use an oscilloscope like the IO-4205 (p. 65) and an audio signal generator like the IG-5218 (p. 52).

EE-104, Shpg. wt. 5 lbs. **49.95**
Kit ET-3300A, Breadboard, 6 lbs. **99.95**
ETW-3300A, Assem. Breadboard, 6 lbs. **169.95**
SAVE $10.00 – Buy Course and Breadboard Kit.
EES-104A, Shpg. wt. 13 lbs. **139.90**

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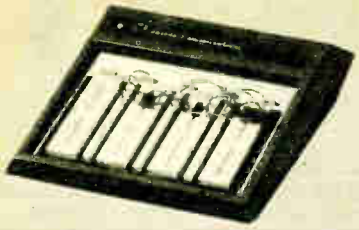
Breadboard for advanced experiments, circuit design



$99.95 Kit

- **Solderless sockets save time**
- **Hefty built-in power supply**
- **Current limiting for short circuit protection**
- **Build this Trainer yourself and save $70**

Master advanced electronics skills: Use the high-quality ET-3300A Laboratory Electronic Breadboard from Heathkit/Zenith Educational Systems. Solderless sockets make it quick and easy to perform experiments, test components and design circuits – and they're flexible enough to accommodate any size dual in-line integrated circuit package.

Suggested to complete experiments: Use the ET-3300A Laboratory Electronic Breadboard to complete the experiments in the following Heathkit/Zenith Advanced Electronics Courses: the EE-101 Op-Amps Course, the EE-103 IC Timers Course, the EE-104 Phase-Locked Loops Course and the EE-105 Optoelectronics Course. The Breadboard can also be used with the EE-102 Active Filters Course.

Safety protection: The ET-3300A's built-in power supply is current-limited at rated current to protect against short circuits. It also cuts down set-up time, and does away with tangling, intrusive wires. The power supply provides +5 VDC (±4%) current at 1.5 Amps, +12 VDC current at 100 milliamps or −12 VDC current (±2%) at 100 mA.

Build the versatile ET-3300A Laboratory Electronic Breadboard yourself – and save a big $70: Or purchase the completely assembled and tested ETW-3300A Laboratory Breadboard. Requires 120 VAC, 60 Hz power. Listed by Underwriters' Laboratories. Overall dimensions of the ET-3300 are 3½" H x 12" W x 12" D (8.89 x 30.48 x 30.48 cm).

Kit ET-3300A, Shpg. wt. 6 lbs. **99.95**
ETW-3300A, Assembled, Shpg. wt. 6 lbs. **169.95**

SAVE $55 on skills package

Discount offer on Heathkit/Zenith Advanced Electronic Series and ET-3300A Laboratory Circuit Breadboard Kit (EE-101 Op Amps Course, EE-102 Active Filters Course, EE-103 IC Timers Course, EE-104 Phase-Locked Loops Course and EE-105 Optoelectronics Course). Purchased separately, $324.70. Order this system now, and start expanding your electronics skills.

EES-1015A, 34 lbs. **269.70**

AK, HI, MI: Call 616-982-3411

Learn Linear Circuits the hands-on Heathkit/Zenith way

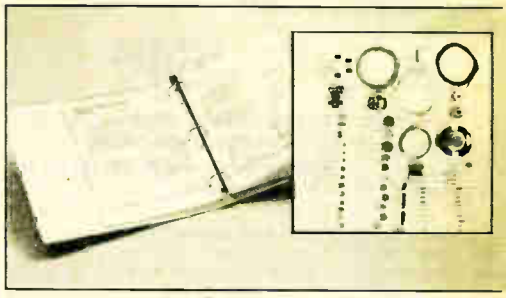
$49.95

- **Build each circuit as you learn**
- **Deals with basic circuits and modifications**
- **Includes 86 parts (worth over $45) for building over 30 linear circuits**

Study and build a circuit "file" series. The concisely arranged explanations and diagrams in this course move smoothly into the hands-on experience you require, in logical progressive order. The course describes a circuit and how it operates, presents a complete schematic, and details several modifications. Bipolar transistors, field-effect transistors, the 555 timer and 741 op amp linear circuits are covered.

All the parts you'll need to build various amplifiers, oscillators, astable and monostable multivibrators, pulse position and pulse width modulators, active filters and more are provided.

The Linear Circuits Course is time-efficient, economical. Because it's a Heathkit/Zenith Self-Instruction Course, you set your own study hours, save money on equivalent college or technical school courses. Move quickly through concepts



you understand right away; spend more time on those you have difficulty with.

We recommend using our ET-3300A Trainer, but all circuits can be constructed and tested on your own breadboards. To observe circuit operation, you'll need a voltmeter like the IM-5218 (page 51) and an oscilloscope like the IO-4205 (page 65). DC and AC Electronics, and Semiconductor Devices Courses (EE-3101A to -3103A, pgs. 32-33) or equivalent knowledge is a prerequisite.

Earn 4.0 Continuing Education Units with a 70% grade on the optional final exam.

EH-701, Shpg. wt. 2 lbs. **49.95**

Learn TTL and CMOS circuits by doing with this course

$59.95

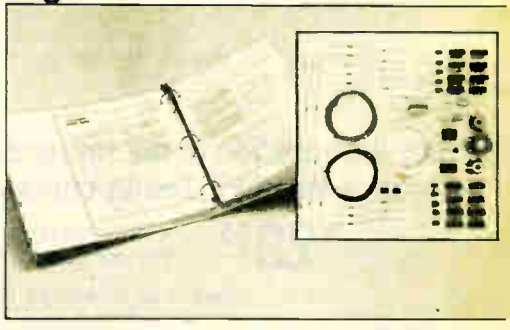
- **Completely covers subject**
- **Circuit "file" format**
- **Components provided worth over $70**
- **Uses the natural learn-by-doing approach**

You'll be building circuits right away: Simply study the concise text and diagrams, then begin constructing circuits yourself.

You'll develop your skills when it's convenient for you, at a comfortable pace. The modular format progresses logically through over 50 circuit types, including the 7447 BCD to seven-segment decoder, the D- and J-K-type edge-triggered flip-flops, the four bit adder, the CMOS 100-kHz crystal oscillator, and the quad bilateral switch.

This course is also an economical way to learn – you'll save the cost of a college or tech-school course, use parts with a retail value of more than the $59.95 cost of the course!

These state-of-the-art circuits can be built with your own breadboard and power supplies, or use the ET-3300A Trainer. To observe circuit operation, you'll need a voltmeter like the IM-5218 (p. 51) or equivalent, and an oscilloscope like the IO-4205 (p. 65). Courses in AC and DC Electronics, and Semiconductor Devices (or other experience) are prerequisites – EE-3101A through -3103A on pages 32-33.



Earn 6 CEUs: Score 70% on optional final exam.

EH-702, Shpg. wt. 3 lbs. **59.95**

SAVE $30! Purchase the EH-701 Linear Circuits and EH-702 TTL/CMOS Circuits Courses together. If purchased separately, $109.90.

EHS-712, Shpg. wt. 6 lbs. **79.90**

Practical, fun soldering course

$17.95

- **Equipment hints provided**
- **Useful for amateur or pro**

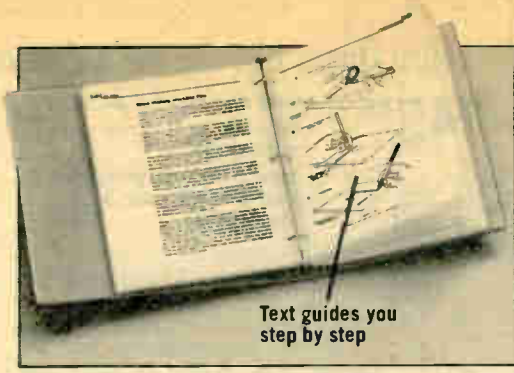
Proper soldering techniques mean quality; this course teaches professional soldering skills in a highly-detailed, easy-to-follow format. Circuit board, components and solder are provided for construction of a two-transistor light oscillator. Requires a soldering iron and small hand tools (described on page 50).

EI-3133, Shpg. wt. 1 lb. **17.95**

Learn to design, assemble Printed Circuits

$64.95

- **Learn pattern and photographic circuit design techniques**
- **Design and build PC boards for two electronic kits**


Text guides you step by step

Design and etchant materials included

Includes components for two useful kits

Learn to make your own printed circuit boards, or copy those in magazines, with our fun, easy course. Get to know the properties of PC board materials; learn how to design, layout and prepare artwork – and how to transfer drawings. You'll design PC boards using the pattern and photographic circuit layout techniques; study different etching techniques and conformal coating; and learn automatic assembly. **You'll build two popular and useful kits** from PC boards you make. Construct the GD-600 Photoelectric Lamp Switch and GD-1287 Touch Switch to get complete design-to-building skills – a sound basis for electronics competence. Course comes complete with materials for designing, layout and etching of PC boards. 2.0 CEUs. Course not available outside continental U.S.

EI-3134, Shpg. wt. 7 lbs. 64.95

Hobbyists – learn basic electronics

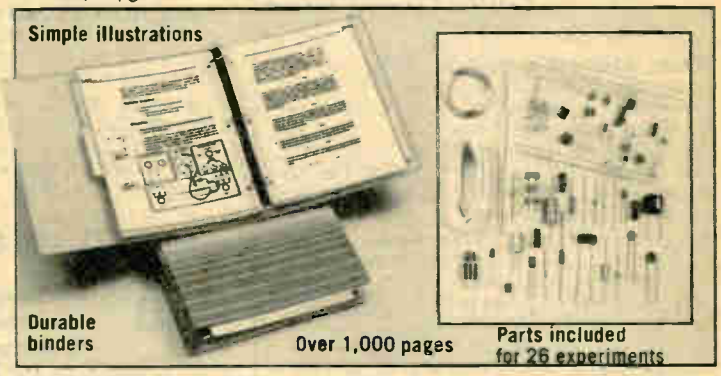
$64.95

- **Build and experiment with 26 different electronic circuits**
- **Easy-to-digest units guide you**

Hobbyists interested in any of several fields of electronics will find this course useful. Seven units of text and 26 corresponding experiments assure your understanding of do-it-yourself electronic projects, let you emphasize the skills you want.

Learn the basic principles of direct current, alternating current, active devices, electronic circuits, digital electronics and digital computers. And, take a look at the range of electronic hobbies. Experiments (parts included) let you put ideas presented in the course to work – using the ET-3100B Trainer (p. 32), a multimeter like the IM-5284 (p. 56), and oscilloscope like the IO-4105 (p. 65). 4 CEUs.

EE-3140, Shpg. wt. 11 lbs. 64.95



Easy introduction to microprocessors with this effective Heathkit/Zenith course

$29.95

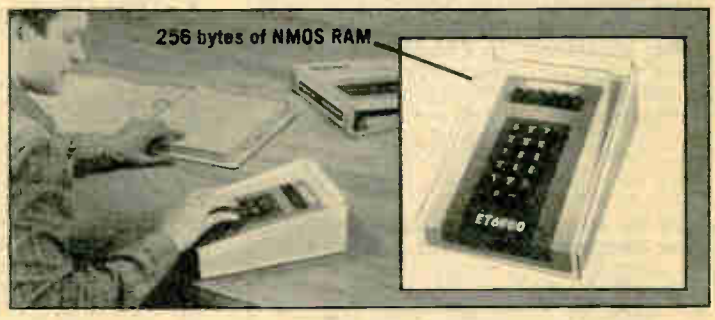
- **No knowledge or experience required**
- **Trainer gets you programming**

Instruct yourself in an increasingly important technology – save time and money in the process. The Introduction to Microprocessors Course shows you how microprocessors operate, number systems and codes, and computer arithmetic and microprocessor programming, in six concise self-instruction units with detailed illustrations.

A typical microprocessor is described in the final units. Programming experiments placed throughout the text (optional ET-6800 Microprocessor Trainer at right) assist your understanding of the microprocessor. Earn 4 CEUs.

EC-6800, Shpg. wt. 9 lbs. 29.95

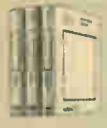
SAVE $20.00. Buy EC-6800 Course and ET-6800 Trainer Kit together.
ETS-6800, Shpg. wt. 29 lbs. 109.90



Trainer is mini digital computer: The ET-6800 Trainer has an 8 bit parallel, NMOS, bus-oriented central processing unit. You can access memory locations, enter programs, single-step through programs, alter memory.

Kit ET-6800, Shpg. wt. 17 lbs. 99.95

Audio-tutorial math courses are low-cost way to learn quickly



Comprehensive texts combined with audio cassettes present math concepts clearly, aid retention. Reviews and tests (included) are valuable knowledge checkpoints.

Algebra Course: Learn algebra basics quickly with well-written text, workbook and 10 audio cassettes. Eight units cover polynomial arithmetic, factoring, algebraic functions, exponents and radicals, linear equations, inequalities and more. Earn 3 CEUs.

EM-4, 7 lbs. 24.95

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EM-5, 7 lbs. 24.95

SAVE 66⅔% on Think Metric, U.S.A. Course: Learn the international system of weights and measures in a fun and easy way. A self-instruction text and audio cassette acquaint you with metric measurements, and shows you how to convert from English to metric. 1 CEU.

EM-2, Shpg. wt. 4 lbs. ... Was $14.95, NOW 5.00

Cassette Recorder/Player

We recommend the ECP-3801A Cassette Tape Recorder/Player for use with audio-tutorial courses. Built-in microphone; play, rewind, fast forward, stop, eject and record functions. Counter and reset button. This quality product is assembled and tested; not a kit.

ECP-3801A, Assembled, 4 lbs. 60.00

Premium 30-minute cassette tapes.
ECP-3802, Three cassettes, 1 lb. ... 6.00

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Slides and filmstrips available

Color slides or 35 mm filmstrips (as listed below) duplicate the flip charts included in the self-instruction versions of the Heathkit/Zenith Microprocessor Course (pgs. 36-37), Automotive Tune-Up and Automotive Electrical Courses (p. 24). Flip chart not included in classroom versions.

EE-3401-1, Microprocessor Slides, 2 lbs. . . . **60.00**

EE-3401-2, Microprocessor Filmstrip, 1 lb. . **20.00**

Filmstrip for Automotive Tune-up Course.
EB-20-70, Shpg. wt. 1 lb. **14.95**

Filmstrip for Auto Electrical Systems Course.
EB-10-70, Shpg. wt. 1 lb. **29.95**

Call for free information and price schedules on the full line of Classroom Courses

Alabama	205-822-1326
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Dist. of Columbia	804-741-2580
Florida	305-647-5373
Georgia	305-647-5373
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Kansas	913-722-4713
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Minnesota	612-533-0000
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Missouri	314-837-8059
Montana	503-640-1729
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New Mexico	602-945-6605
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Utah	702-358-0829
Vermont	617-285-9028
Virginia	804-741-2580
Washington	503-640-1729
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Teachers, training directors: Heathkit/Zenith Classroom Courses are designed to fit your custom training needs

Now you, as a training director or teacher, can apply famous Heathkit/Zenith learning courses to meet your own training needs: Application-oriented with just the right amount of theory and a maximum emphasis on real-world application of the theories learned, Heathkit/Zenith Classroom Courses incorporate the latest technical material available.

Classroom Courses are available in these areas:

- **Exploratory Courses** – Concepts of Electronics, Printed Circuit Boards
- **Fundamental Electronics Series** – DC Electronics, AC Electronics, Semiconductor Devices, Test Equipment, Electronic Communications
- **Advanced Electronics Series** – Operational Amplifiers, Active Filters, Integrated Circuit (IC) Timers, Phase-Locked Loops, Optoelectronics
- **Digital Techniques**
- **Microprocessor Technology**
- **Computer Programming Series** – BASIC and Assembly Language Programming
- **Automotive Courses** – Automotive Tune-Up, Automotive Electrical Systems

Organized in three separate publications: Each course is designed for greater student and teacher convenience. The student text is the core of the learning material, supported by a workbook with exams and experiments keyed to the text. The instructor's guide lets the teacher add his or her experience and guidance – providing each student with a fully rounded learning experience.

Separate parts packs contain all components for implementing the workbook experiments: To complete experiments, assembled Heathkit/Zenith trainers are required (see list below).

Heathkit/Zenith Classroom Courses are the answer for industries, governments and schools who want to teach technical subjects efficiently at minimum cost: Many of these multi-media courses employ the latest techniques in programmed instruction for fast, thorough mastery by students.

Review the extensive list of Heathkit/Zenith Classroom Courses below: Then, contact us for more information on these courses.

Earn CEUs on certain Classroom Courses with these exams

A new opportunity: Now students and employees using classroom versions of certain Heathkit/Zenith courses can earn Continuing Education Units (CEUs) – a nationally recognized measurement of achievement in non-credit secondary education. Each package contains ten copies of that course's CEU examination, with full instructions.

CEU Exam for DC Electronics Classroom Course.
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Course	Text Shpg. wt. 2 lbs.	Price	Workbook Shpg. wt. 2 lbs.	Price	Instructor's Guide Shpg. wt. 1 lb.	Price	Assembled Trainer Wt. 6 lbs.	Price	Parts Shpg. wt. 1 lb.	Price	Cassettes Shpg. wt. 1 lb.	Price
Concepts of Electronics	EB-6140 (3 lbs.)	19.95	EB-6140-40 (1 lb.)	9.95	EB-6140-50	8.95	ETW-3100A	149.95	EB-6140-30	24.95	NOT USED	
Printed Circuit Boards	EB-6134 (1 lb.)	18.95	EB-6134-40 (1 lb.)	9.95	EB-6134-50	8.95	NOT USED		EB-6134-30 (2 lbs.)	19.95	NOT USED	
DC Electronics	EB-6101	19.95	EB-6101-40	9.95	EB-6101-50	8.95	ETW-3100A	149.95	EB-6101-30	19.95	EEA-3101	12.95
AC Electronics	EB-6102	19.95	EB-6102-40	9.95	EB-6102-50	8.95	ETW-3100A	149.95	EB-6102-30	15.95	EEA-3102	12.95
Semiconductor Devices	EB-6103	19.95	EB-6103-40	9.95	EB-6103-50	8.95	ETW-3100A	149.95	EB-6103-30	15.95	EEA-3103	12.95
Electronic Circuits	EB-6104	19.95	EB-6104-40	9.95	EB-6104-50	8.95	ETW-3100A	149.95	EB-6104-30	29.95	EEA-3104	12.95
Test Instruments	EB-6105 (4 lbs.)	19.95	EB-6105-40	8.95	EB-6105-50	8.95	ETW-3100A	149.95	EB-6105-30	24.95	NOT USED	
Electronic Communications	EB-6106	17.95	EB-6106-40 (1 lb.)	9.95	EB-6106-50	8.95	ETW-3100A	149.95	EB-6106-30	29.95	NOT USED	
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Active Filters	EB-602	18.95	EXPERIMENTS IN TEXT		EB-602-50	8.95	ETW-3300A	169.95	EB-602-30	14.95	NOT USED	
IC Timers	EB-603	18.95	EXPERIMENTS IN TEXT		EB-603-50	8.95	ETW-3300A	169.95	EB-603-30	29.95	NOT USED	
Phase-Locked Loops	EB-604	18.95	EXPERIMENTS IN TEXT		EB-604-50	8.95	ETW-3300A	169.95	EB-604-30	29.95	NOT USED	
Optoelectronics	EB-605	14.95	EB-605-40 (1 lb.)	9.95	EB-605-50	8.95	ETW-3300A	169.95	EB-605-30	29.95	NOT USED	
Digital Techniques	EB-6201 (3 lbs.)	24.95	EB-6201-40	10.95	EB-6201-50	8.95	ETW-3200A	169.95	EB-6201-30	29.95	EEA-3201	12.95
Microprocessors	EB-6401 (4 lbs.)	24.95	EB-6401-40 (1 lb.)	10.95	EB-6401-50	8.95	ETW-3400A	329.95	EB-6401-30	54.95	EB-6401-60	12.95
Microprocessor Interfacing	EB-6402 (5 lbs.)	24.95	EB-6402-40 (1 lb.)	10.95	EB-6402-50	8.95	ETW-3400A	329.95	EB-6402-30	59.95	NOT USED	
6809 Microprocessors	EB-6404 (1 lb.)	24.95	EXPERIMENTS IN TEXT		EB-6404-50 (2 lbs.)	8.95	ETW-3400A	329.95	EB-6404-30	69.95	NOT USED	
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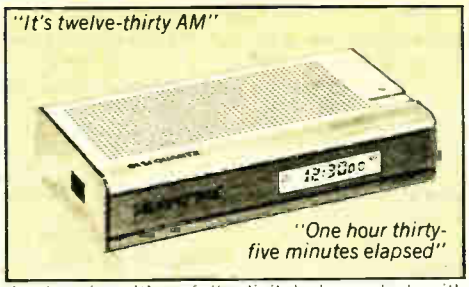
Talking Digital Clock has alarm, timer, stopwatch

- **Fits in a shirt pocket**
- **Ham clubs! Add time to your repeater IDs**

$79.95



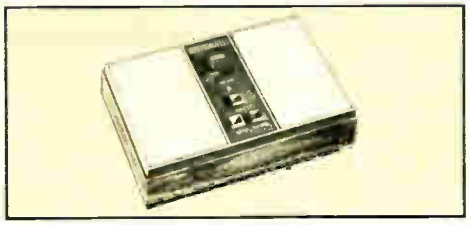
Speech synthesis technology makes possible the clock that talks. On your desk or on the go, Talking Time will keep you apace of any schedule. A new revolution in timekeeping, it's a fully digital alarm clock with multi-function liquid crystal display – and ten hour elapsed timer that can *tell the time* in a natural electronic 'voice' when you press a button, or at preset 1, 5 or 30 minute intervals. Quartz-accurate time is displayed continuously. As a stopwatch, it records accumulated time and speaks lap time at preset intervals. Use it to time sports, speeches, travel time, darkroom work and many other events that require precise feedback. A soft voice and music will wake you with time, melody and "Please hurry!" reminders 5 and 10 minutes after alarm setting. Includes chime and Boccherini's minuet, variable volume, 2 AA batteries, pop-up tiltstand and handstrap.

GDP-1660, Assembled and tested. Shpg. wt. 1 lb. **79.95**

FM Wireless Intercom System keeps you in touch

- **PLL circuit gives you quiet, clearly heard voice transmissions**
- **Pleasant call tone alerts other units**

$49.95



Need a reliable method of remote telecontact? Here's a wireless intercom without bothersome hookups that you can use anywhere indoors – from baby's room to laundry, from garage to kitchen – as long as the units are on the same AC house circuit. Simply plug each unit into an outlet and you're ready to communicate better. Lightweight and portable, they move from room to room with you. Order as many as you need for complete coverage. Your voice is transmitted over the wiring in your home, which also supplies the operating voltage for each unit. Dictate switch locks intercom in talk mode for hands-free operation or monitoring. A large 3" speaker broadcasts every message clearly. Cabinets are 8⅝" H x 3" W x 5¾" D and may be wall-mounted for convenience.

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

Electronic Metronome aids practice precision

FAST, EASY 1-EVENING KIT

- **Variable beats per minute for most efficient tempo-teaching**
- **No springs; operates on two 9V batteries for long performance**
- **Handsome cherry cabinet**

$24.95

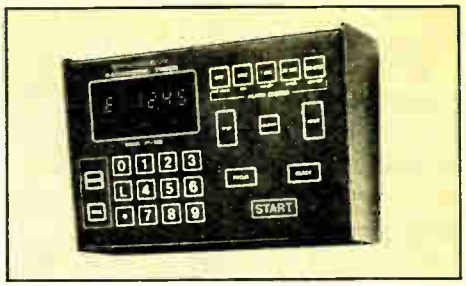
Whatever the instrument, a Heathkit Electronic Metronome will maintain a steady beat so you can practice confidently at the correct tempo. A finely-scaled front panel knob turns the unit on and is continuously variable between 40 and 210 beats per minute. A rear panel control adjusts the volume from a soft tapping to a loud, conventional "tick-tock" rhythm. The Metronome even includes a handy chart label that the builder can affix to the bottom of the cabinet so the musician may relate the number of beats per minute to tempos in different time signatures. It's the practical and efficient way to practice any music and achieve the desired results. Batteries not included. 6¾" H x 3¾" W x 4" D. Treat yourself or the new musician in your life and order one today!

Kit TD-1257, Shpg. wt. 2 lbs. **24.95**

Start getting consistent film developing quality

- **Memory will recall ten program steps**
- **Auto-sequencing; greater versatility**

$129.95



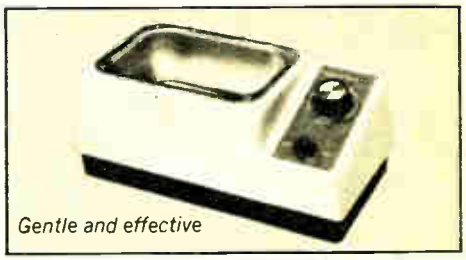
Great photos will result with the Programmable Darkroom Timer! Features a 4-digit, 12-hour LED clock to time your steps perfectly. Alarm settings marked at 1, 30, and 60 second intervals in any combination. Ten second end-of-cycle alarm tells you when to begin pouring from tank. Enlarger and safelight outlets toggled so one turns on when the other goes off. Optional Auxiliary Outlet turns on external device (such as color drum) during countdowns in Process mode. Optional Foot Switches make operation even easier. Chemical-resistant metal case. 120/240 VAC.

Kit PT-1500, Shpg. wt. 5 lbs. **129.95**
PTA-1500-3, Optional Auxiliary Outlet, Shpg. wt. 1 lb. **14.95**
PTA-1500-1, Optional Single Foot Switch, Shpg. wt. 1 lb. **10.95**
PTA-1500-2, Optional Dual Foot Switch, Shpg. wt. 3 lbs. **26.95**

Ultra-efficient Ultrasonic Cleaner purges dirt

- **Cleans and sanitizes precious items that might be damaged by abrasive scrubbing or harsh solvents**
- **Enjoy brighter, more eye-catching jewelry**

$119.95



This scientific method is the fastest, most effective way to deep clean dirt, stains and undissolved solids from watch parts, glass, coins, components, dentures, decorator paint brushes, etc. *Fine jewelry sparkles like new!* Simply fill the stainless steel tank with a safe cleaning solution, set the timer – and the 41 kHz Ultrasonic Cleaner does the rest! You'll be amazed at how quickly and easily your possessions come clean. 4⅝" H x 11" W x 5¾" D. 120 VAC. Professional artists, jewelers and watchmakers have used the ultrasonic method for years; now this low-cost kit lets you take advantage of the process. "*Impossible*" to clean? Never again!

Kit GD-1151, Shpg. wt. 5 lbs. **119.95**

Digital Thermometer fulfills all temperature needs

- **Highly accurate and always reliable – ideal for dozens of applications**

$49.95

This dependable Digital Thermometer will deliver perfect readings every time – wherever you need accurate temperatures in a hurry! The bright red LED display never needs calibration or a mercury "shakedown." Wand senses from 32° to 230°F (0° to 110°C) with ±0.2°F (±0.1°C) biomedical accuracy and 0.5% overall accuracy with 0.1° F or C resolution. Solid-state circuitry assures easy-to-read 4-digit temperature in less than 10 seconds. Flashing decimal warns of low battery. Weighs only 5.5 ounces, fits comfortably in your hand. Operates on one 9V battery up to a year. When speed and accuracy count, trust and rely on *electro-therm.*

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

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

Use a Digital Scale to accurately monitor weight loss and progress to a more compelling figure

$99.95

- **Battery operated for accuracy and safety anywhere**
- **No-wear electronic strain-gauge mechanism sensitive to weight change as small as 1/10 of a pound or kg.**

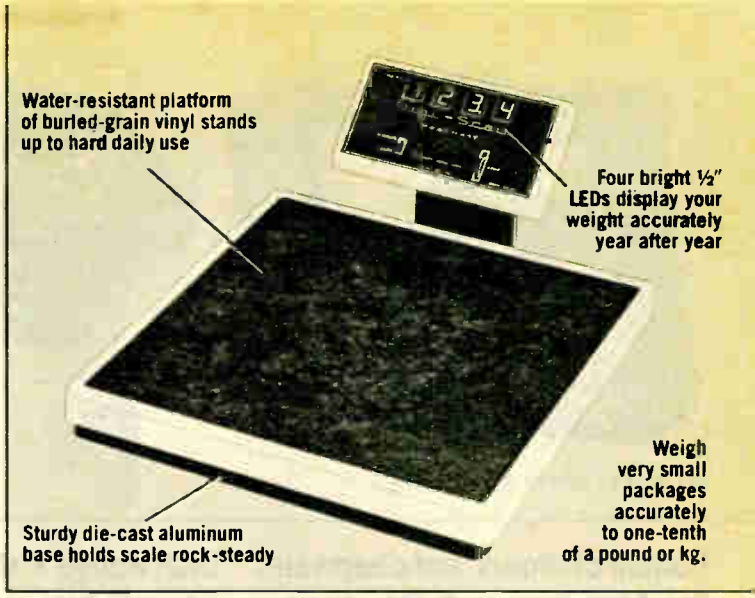
The Heathkit Digital Scale is a multi-purpose balance that offers far more accuracy than mechanical scales. Dieters and fitness enthusiasts can closely watch their weight improve, and everyone will enjoy a precision readout on items requiring accurate measurement. An electronic transducer element eliminates the springs and weights that wear out in conventional scales.

Four bright, easy-to-read ½" digits display the weight. You decide whether to wire the kit to read in pounds or kilograms. Features both manual and automatic modes; in manual, the display is on constantly and can measure weights as small as 2 ounces. to a 300-lb. capacity. On automatic, it conserves power by remaining off until weight is placed on the platform.

A manual zero adjustment makes it easy to weigh small items. This special offset feature means you can weigh the baby without weighing the blanket. Safe to use after the shower. Requires 6 'C' cell batteries (not included).

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

GDW-1186, Assembled and tested with non-detachable readout wired to display in pounds only, Shpg. wt. 9 lbs. **149.95**



Guests love the Programmable Musical Doorbell

$49.95

- **Program it to play up to 16 beats of your favorite tunes**
- **Easily programmed for your mood or any special occasion**
- **Includes song book with over 50 programmable melodies**

Bring a little music into your everyday life with the touch of a button. Greet your friends with a tune by building this Electronic Doorbell for your home. It's a versatile and ingenious replacement for the conventional doorbell, buzzer or simple chime. Imagine the pleasant reaction and smiles on visitor's faces when they're greeted with a friendly song you've selected to fit any circumstance. It's a very uniquely warm way to say "welcome!"

Changing tunes is easy, by arranging wire leads on a one-octave 'keyboard' behind the front panel. The songbook includes 15 college songs, 7 seasonal songs plus 9 Christmas songs, 5 to commemorate special occasions – and many more to celebrate your mood. The assembly manual has programming instructions for a variety of tunes, or compose your own. Controls for adjusting volume, tone, speed and delay characteristics add synthesized variety to any tune. Attaches easily to existing doorbell transformer. And extra speakers may be wired on to spread the music around your home. You'll even know which door to answer, as the back door button will activate only a portion of the tune you select. Extend a musical hello – and own the neighborhood's most unique chimes! Install it in your home, then surprise and greet every caller this New Year with a new kind of musical merriment.

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

3-Tune Doorbell greets with beautiful music

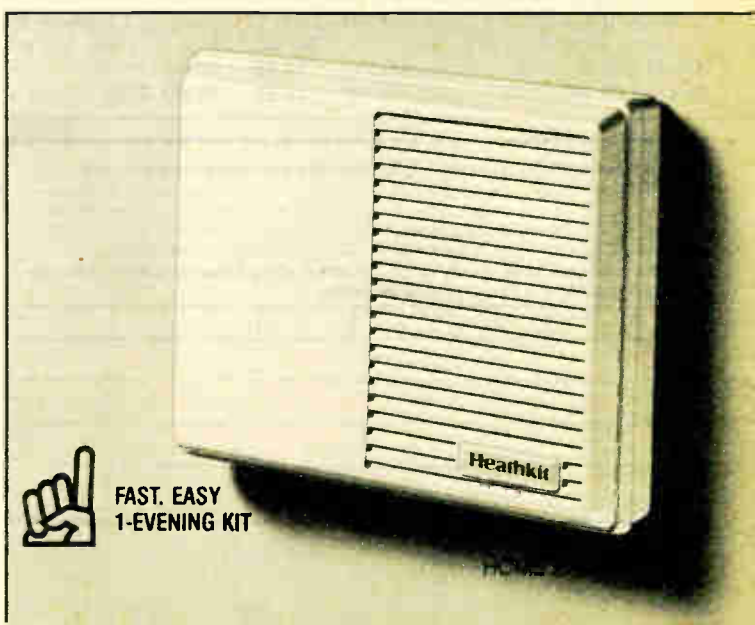
$19.95

- **Can be built and easily installed in a single night**
- **Adjustable volume carries tune throughout your home**
- **The low-cost way to put a difference in your doorbell**

If you want to replace your ho-hum doorbell with one that plays a tune or two, the Electronic Doorbell is a kit you'll be proud to install new, or switch with your old-fashioned ringer. The TD-2089 plays three diverse selections: an upbeat 4-note ring, a short tune (Beethoven's *Für Elise*) and a long tune *(Romance)*. Each tune is reproduced polyphonically by an IC synthesizer.

Quickly select different tunes for front and back door by jumping wires to small sockets. Assembly requires almost no hardware, as the circuit board snaps firmly into the attractive case and spring clips hold the speaker. For extra sound, remote speakers can be added to extend music throughout your home. Hidden connections are made through plug-in jacks and a 10-foot extension ribbon lets you change tunes or service the unit at table level rather than on the wall. Two "C" cell batteries (not included) power the low-drain electronics while your present 10 to 16 volt doorbell transformer supplies your pushbutton circuits. Case size is 5.9" H x 4.75" W x 1.25" D. Spread the joy of music by putting a warm and classical spirit of welcome in your home...and open the door to a friendly smile every time!

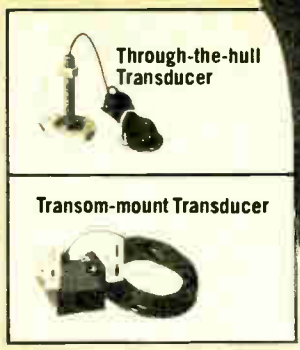
Kit TD-2089, Shpg. wt. 1 lb. ..... **WAS $24.95, NOW ONLY 19.95**



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

HEATH HAS A BETTER MARINE VALUE!

All three Sounders feature noise rejection circuitry.



Bottom contours and deepwater fish can't hide from the *Seeker*™

- **Get permanent record of best spots and depths**
- **One chart can last for 13 continuous hours**

The Heathkit *Seeker* Chart Recording Depth Sounder is a super-sensitive fish-finder with greater accuracy than conventional units, so you can return again and again to where the fish concentrate. It's bottom-recording accuracy makes it a valuable navigation aid for following coast lines and mapping lake bottoms. *Best of all, it's priced at about ⅓ the cost of comparable recording depth sounders.*

You get a wider picture of what's below: An extra-wide beam 50 kHz transducer, three depth ranges (5 to 200,' 200-400' or 400-600'), sensitivity and special "white line" controls allow you to mark more fish and set your line accordingly. Switch-controlled marker puts vertical line on chart for reference. Rugged, water-tight housing has locking hinged panel for quick chart roll replacement, and lighted front panel for night reading. Gimbal mount lets you install the *Seeker* anywhere, and remove it for theft protection or storage. Includes one roll of chart paper. Operates on boat's 12 VDC system.

Kit MI-2910-1, with thru-hull transducer & 30' cable, 17 lbs. . . . **Was $349.95, NOW ONLY 299.95**

Kit MI-2910-2, with transom-mount transducer & 30' cable, Shpg. wt. 17 lbs. **349.95**

MIA-2910-1, two rolls of chart paper, 2 lbs. . **10.95**

Save $15.75! MIS-2910-1, 12 rolls, 12 lbs. . . **49.95**

Dual Range Fish Spotter always delivers professional results

- **All solid-state circuitry for improved sensitivity and dependable readings every time**

A Heathkit Deluxe Fish Spotter should be standard tackle for any serious angler. It can help increase the size and weight of your catches by detecting fish swimming between the surface and any preset depth you choose. Two ranges, 0-60 or 0-240 feet, insure the high accuracy and definition so important in an instrument of this type. Fish entering the transducer's ultrasonic range will trigger an audible alarm as a bright neon indicator shows the exact depth. Relatively small variations in fish location can be observed while your boat is in motion.

Two precision instruments in one portable package: MI-2901 will stand duty as a dependable depth sounder for navigation through unknown waters, *and* search underwater areas to determine the *best* fishing spots. Has sensitivity control, corrosion-resistant aluminum case, sun-shielded dial and watertight ceramic transducer element with suction cup mount. Powered by two 6-volt lantern batteries (not included). Take it with you in any boat and come home with more fish in your cooler!

Kit MI-2901, Shpg. wt. 8 lbs. **129.95**

Scanning Transducer Bracket: (Not shown) For use with MI-2901. C-clamp mounting, scans 360°, locks in any position. Accepts 1⅜" transducer.

Kit MIA-2900-1, Shpg. wt. 4 lbs. **39.95**

Dual-Range Depth Sounder can double as a thermocline finder

- **Navigate safely; find one or a school of fish**
- **Protect your hull from scrapes or puncture**

Whether you're fishing, cruising or scuba diving, this Dual Range Depth Sounder adds extra safety measure to your boating season pleasure. When selected, a high-pitched beeping alarm alerts you to shoals or submerged objects projecting above any preset depth from 5 to 240 feet, *thus eliminating the need for continuous visual monitoring.* Two ranges, one for depths to 60 feet and one for depths to 240 feet, provide extremely accurate readings. Underwater objects located above a preset depth trigger a bright neon flash alongside the perceived depth from the object on one of two circular scales. In addition to its use as a fine navigational instrument, a sensitivity control aids in discriminating between bottom readings and those returned by single or schools of fish. Water-resistant, black Cycolac case has a glare-free bezel with sun shield and super bright neon indicator to make depth reading easy day or night. Gimbal mount and quick-disconnect power and transducer leads allow for easy removal when your boat is not in use. Powered by your boat's 12 VDC battery.

Kit MI-1031-1, with thru-hull transducer & 25' cable, Shpg. wt. 8 lbs. **114.95**

Kit MI-1031-2, with transom transducer & 25' cable, Shpg. wt. 8 lbs. **114.95**

YES, I'd like my friends to know I handcraft my kits with special care and pride.

☐ I'd like to have ____ solid brass name plate(s) with my name engraved on them. I understand the price of $2.00 for one plate, and the price of $1.60 each for two or more plates covers first-class postage and handling. I've enclosed $____ with my regular kit purchase for my personalized GDP-1225 Brass Name Plate(s).

Please print your name plainly in capital letters using a maximum of 14 characters (including spaces) in the boxes provided below.

Name: _____

Address: _____

City: _____ State: _____

GDP-1225 Zip: _____

Brass Name Plate adds prestige to your kit

$2.00 for one plate

$1.60 each, 2 or more

Be proud of your kitbuilding skill! Hand-made quality and the pride of craftsmanship helped make our nation great. Adding your name to a kit product reflects the painstaking care you've invested in it. The Heathkit Name Plate is made of solid brass, brushed to a jeweler's finish and has a self-adhesive backing for easy, no-mess application. Fill out the adjacent coupon and include it with your order of Heathkit products from this catalog.

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

Sailboaters! Powerboaters! The low-cost Heathkit Speedometer/Trip Log gives you outstanding speed and log accuracy

$99.95

- **Keeps track of your boat's speed and distance with ±5% accuracy, updated 30 times per minute**
- **Designed to be used on all types of hulls**
- **Save $30 on these kits – both were $129.95**

Upgrade your boat by installing the low-cost, but highly accurate Heathkit Digital Speedometer/Trip Log. For sailors, it allows you to trim sails for maximum racing speed. For fishermen, it lets you control boat speed for the best lure action, and mark distances to your favorite "hot spots." For powerboat owners, it improves navigation for reduced fuel consumption. And for water skiers, it lets you earmark speeds for safe towing of one or more skiers.

The most accurate speedometer/log of its kind! The Heathkit Digital Speedometer/Log features integrated circuits for precise speed and readouts. These circuits, which include 3 active filters, constantly compute and update your average speed every 2 seconds with ±5% accuracy. In addition, the circuits and filters also keep track of distance traveled with the same accuracy. And, you get this accuracy no matter what type of boat hull you have, because the Speedometer/Trip Log also features a special adjustment control that enables you to fine-tune the circuits to the shape of vour hull.

It features an easy-to-read display that shows speed and distance: Our Speedometer/Trip Log's readout is an automatic backlighted display with three ½" digits. With the flip of a switch, it will show speed in mph (or knots), from 0.1 to 40 mph; or tell you distance traveled from 0 to 99 miles (nautical miles).

It's tough and durable: The housing, including the on-off and speed/distance switches, is completely sealed for protection against salt spray and corrosion.

It's available in two models: you can order the MI-2958 Speedometer/Trip Log for your sailboat or the MI-2956 Speedometer/Trip Log for power boat. What's more, you have a choice of transducers to correctly match the necessary transmitting unit to your individual hull. Just pick the MIA-2950-1 thru-hull transducer or the MIA-2950-2 transom-mount transducer.

1 **Kit MI-2958,** Sailboat Speedometer/Trip Log, Shpg. wt. 4 lbs. **99.95**

2 **Kit MI-2956,** Powerboat Speedometer/Trip Log, Shpg. wt. 4 lbs. .. **99.95**
MIA-2950-1, Thru-Hull Transducer, Shpg. wt. 2 lbs. **39.95**
MIA-2950-2, Transom-Mount Transducer. Shpg. wt. 2 lbs. **29.95**

MI-2958 & MI-2956 SPECIFICATIONS: Speed Range: 0.1 to 45 mph or knots. **Log Range:** 0 to 99.9 miles or nautical miles, auto reset @ 100. **Speed and log accuracy:** 15%. **Display:** 3 digit LCD, non-blinking with automatic backlighting. **Display Update:** 2 seconds. **Power Req:** 11 to 16 VDC (from boat's system or 2-6 VDC lantern batteries), reverse polarity protected. **Dim: MI-2958:** 5" diam. by 4½" deep. Requires a 4⅛" hole for mounting. **MI-2956:** 2½" H x 7.0" W x 5½ D.

Automatic, dual-range Digital Depth Sounder has five selectable alarm depths for added safety

$174.95

- **Detects changes in depth from 2 to 499 feet**
- **Alerts you to depth changes audibly & visually**
- **Built-in, adjustable keel offset for greater accuracy**

Pays for itself if it sounds the alarm just once! A great aid for coastal navigation. Features self-adjusting range selection that monitors water's depth from 2' to 499'. Also has a self-adjusting gain for accurate depth readings in fresh or salt water. Crystal oscillator updates depth readings every 0.9 seconds. Big, easy-to-read LCD display with auto night light shows depth in 0.1' increments from 2' to 9.9', tells depth in 1' intervals from 10' to 499'.

Has 5 alarm settings at 2', 4', 10', 20', and 40'. Built-in keel offset automatically subtracts displacement hull depths for exact depth readings. Made from weather-resistant materials. Back connector for MI-2917 or MI-2918 Remotes.

Kit MI-2916-1, Depth Sounder with Thru-Hull Transducer, 8 lbs. **174.95**
Kit MI-2916-2, Depth Sounder with Transom-Mount Transducer, 7 lbs. **164.95**
Kit MI-2916-3, Depth Sounder with Flush-Mount Transducer. 8 lbs. ... **184.95**

MI-2916 SPECIFICATIONS: Frequency: 200 Hz. **Accuracy:** ±5%, ±1 count. **External Control:** On-off switch. **Operating Temperature Range:** 32°F to 122°F. (0°C to 50°C). **Power Requirements:** 10 to 17.7 VDC. **Dimensions:** 2½" H x 7.0" W x 5½" D. (6.4 x 17.8 x 14.0 cm).

Delivers depth reading and proximity alarms to the helmsman via remote repeaters below

3 SAVE! on these Digital Remote repeater stations

Works off the MI-2916 above. Features same display, sealed cabinet, independent alarm settings, keel-offset capability; includes 25-ft connector cable. **SAVE $50.00!** Was $119.95, now reduced to $69.95. Same overall dimensions as MI-2916, with tilt-view mount bracket.

Kit MI-2917, Shpg. wt. 4 lbs. **69.95**

4 SAVE! on Flush-mount Digital Readout for Sailboats

5" diameter, operates like MI-2917. **SAVE $28.00!** Requires MI-2916.

Kit MI-2918, Remote with visual warning only, Shpg. wt. 4 lbs. **89.95**
Kit MIA-2918-1, Audible warning alarm for MI-2918, Shpg. wt. 1 lb. .. **12.95**

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

EASY ORDERING INFORMATION

BY PHONE: CALL TOLL-FREE! 800-253-0570

ORDER TOLL-FREE: 800-253-0570, using your Heath Revolving Charge (min. purchase $500) or Visa or MasterCard credit cards (min. purchase $10). 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 49.

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 about your order.
- 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:

- Heath Revolving Charge Plan. No money down. Up to two years to pay. Minimum order required to open or add-on to account. $500. 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. Sorry, we cannot accept HRC orders for replacement parts. Use credit cards below.
- MasterCard and Visa credit plans. 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 and sign the order form. NOTE: We now accept credit card orders for replacement parts.
- 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). Zone B covers: AZ, CA, CO, FL, ID, MT, NV, NM, OR, TX, UT, WA, WY. Zone D covers: HI (Honolulu). Zone E covers: AK (Anchorage).

Shpg. Wt.	Zone 1 & 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	BLUE LABEL AIR SERVICE CHARGE Zone A & B	Zone D	Zone E
1	$1.47	$1.49	$1.54	$1.60	$1.68	$1.75	$1.91	$2.77	$4.53	$4.60
2	1.55	1.61	1.70	1.83	1.99	2.15	2.48	3.74	5.71	5.73
3	1.63	1.73	1.86	2.06	2.30	2.55	3.05	4.71	6.89	6.86
4	1.71	1.84	2.02	2.29	2.61	2.94	3.60	5.68	8.07	7.99
5	1.79	1.96	2.18	2.52	2.92	3.32	4.07	6.65	9.25	9.12
6	1.87	2.07	2.33	2.74	3.14	3.64	4.54	7.62	10.43	10.25
7	1.95	2.18	2.49	2.89	3.38	3.95	5.02	8.59	11.61	11.38
8	2.03	2.30	2.64	3.06	3.63	4.27	5.55	9.56	12.79	12.51
9	2.11	2.41	2.75	3.25	3.93	4.63	6.08	10.53	13.97	13.54
10	2.19	2.52	2.87	3.46	4.22	5.00	6.62	11.50	15.15	14.77
11	2.28	2.60	3.00	3.68	4.51	5.38	7.15	12.48	16.33	15.90
12	2.36	2.66	3.10	3.89	4.80	5.75	7.69	13.45	17.51	17.03
13	2.41	2.72	3.19	4.02	4.96	5.95	7.97	14.42	18.69	18.16
14	2.46	2.82	3.32	4.13	5.12	6.14	8.24	15.39	19.87	19.29
15	2.51	2.93	3.47	4.28	5.26	6.32	8.48	16.36	21.05	20.42
16	2.58	3.05	3.63	4.35	5.40	6.49	8.72	17.33	22.23	21.55
17	2.68	3.17	3.78	4.48	5.53	6.65	8.94	18.30	23.41	22.68
18	2.77	3.29	3.94	4.67	5.72	6.83	9.15	19.27	24.59	23.81
19	2.86	3.41	4.09	4.87	5.97	7.15	9.35	20.24	25.77	24.94
20	2.95	3.52	4.24	5.06	6.22	7.46	9.55	21.21	26.95	26.07
21	3.05	3.64	4.40	5.26	6.48	7.78	9.73	22.19	28.13	27.20
22	3.14	3.76	4.55	5.45	6.73	8.09	9.91	23.16	29.31	28.33
23	3.24	3.88	4.71	5.65	6.98	8.41	10.08	24.13	30.49	29.46
24	3.33	4.00	4.86	5.84	7.24	8.72	10.40	25.10	31.67	30.59
25	3.42	4.11	5.01	6.04	7.49	9.04	10.79	26.07	32.85	31.72
26	3.51	4.23	5.17	6.23	7.74	9.35	11.17	27.04	34.03	32.85
27	3.60	4.35	5.32	6.43	8.00	9.67	11.56	28.01	35.21	33.98
28	3.70	4.47	5.48	6.62	8.25	9.98	11.94	28.98	36.39	35.11
29	3.79	4.59	5.63	6.82	8.50	10.30	12.33	29.95	37.57	36.24
30	3.88	4.70	5.78	7.01	8.75	10.61	12.71	30.92	38.75	37.37
31	3.98	4.82	5.94	7.21	9.01	10.93	13.10	31.90	39.93	38.50
32	4.07	4.94	6.09	7.40	9.26	11.24	13.48	32.87	41.11	39.63
33	4.17	5.06	6.25	7.60	9.51	11.56	13.87	33.84	42.29	40.76
34	4.26	5.18	6.40	7.79	9.77	11.87	14.25	34.81	43.47	41.89
35	4.35	5.29	6.55	7.99	10.02	12.19	14.64	35.78	44.65	43.02
36	4.44	5.41	6.71	8.18	10.27	12.50	15.02	36.75	45.83	44.15
37	4.53	5.53	6.86	8.38	10.53	12.82	15.41	37.72	47.01	45.28
38	4.63	5.65	7.02	8.57	10.78	13.13	15.79	38.69	48.19	46.41
39	4.72	5.77	7.17	8.77	11.03	13.45	16.18	39.66	49.37	47.54
40	4.81	5.88	7.32	8.96	11.29	13.76	16.56	40.63	50.55	48.67
41	4.91	6.00	7.48	9.16	11.54	14.08	16.95	41.61	51.73	49.80
42	5.00	6.12	7.63	9.35	11.79	14.39	17.33	42.58	52.91	50.93
43	5.09	6.24	7.79	9.55	12.04	14.71	17.72	43.55	54.09	52.06
44	5.19	6.36	7.94	9.74	12.30	15.02	18.10	44.52	55.27	53.19
45	5.28	6.47	8.09	9.94	12.55	15.34	18.49	45.49	56.45	54.32
46	5.37	6.59	8.25	10.13	12.80	15.65	18.87	46.46	57.63	55.45
47	5.46	6.71	8.40	10.33	13.06	15.97	19.26	47.43	58.81	56.58
48	5.55	6.83	8.56	10.52	13.31	16.28	19.64	48.40	59.99	57.71
49	5.65	6.95	8.71	10.72	13.56	16.60	20.03	49.37	61.17	58.84
50	5.74	7.06	8.86	10.91	13.81	16.91	20.41	50.34	62.35	59.97
Add lbs	.09 lb	.11 lb	.15 lb	.19 lb	.25 lb	.31 lb	.38 lb	.97 lb	1.18 lb	1.13 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, or of excessive length, have been adjusted to provide correct postage.

Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone
006-009	8	286-293	4	423	3	541-546	3	800-803	5
010-069	5	294-295	5	424-426	4	547-548	4	804-805	6
070-089	4	296-297	4	427-432	3	549	3	806-807	5
090-099	5	298-299	5	433-436	2	550-566	4	808-816	6
				437-457	3	567	5	820-822	5
100-108	5	300-303	4	458	2	570-572	4	823-826	6
109	4	304	5	460-462	3	573-588	5	827	5
110-119	5	305-307	4	463-464	2	590-597	6	828-832	6
120-123	4	308-329	5	465-466	1	598-599	7	833	7
124-126	5	330-334	6	467-469	2			834	6
127-128	4	335-338	5	470-472	3	600-609	2	835-838	7
129	5	339	6	473	2	610-619	3	840-847	6
130-152	4	340	6	474-475	3	620-623	4	850-864	7
153	3	350-352	4	476-477	4	624-628	3	865-884	6
154-160	4	354	5	478	3	629-668	4	890-898	7
161	3	355-359	4	479-489	2	669-679	5		
162-163	4	360-361	5	490-491	1	680-687	4	900-921	8
164-165	3	362	4	492	2	688-693	5	922-928	7
166-199	4	363-369	5	493-495	1			930-934	8
		370-386	4	496-499	3	700-722	5	935	7
200-232	4	387	5			723-727	4	936-960	8
233-237	5	388	4	500-516	4	728-768	5	961	7
238-259	4	389-397	5	520-524	3	769	6	962-976	8
260-261	3			525	4	770-778	5	977-979	7
262-278	4	400-406	3	526-528	3	779-789	6	980-987	8
279	5	407-409	4	530-534	2	790-792	5	988-994	7
280-283	4	410-412	3	535-539	3	793-799	6	995-999	8
284-285	5	413-422	4	540	4				

MONEY-BACK MANUAL PREVIEW

All kits come with manuals, but if you'd like to see how easy kitbuilding is, order the manual first. 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, HW-101, AJ-1600, AP-1800, AR-1650, SB-104A, SB-614, IG-1275, IG-5257, WH-17, SO-4235, VF-7401, and ET series which are $8 each. Assembly and operations manuals for the following are $15 each: GR-4000, AR-1650, GR-2001, H-89. Manuals for HCM-817-1, HCM-837-1 and HCM-847-1 are $20 each. Manuals not available for Educational Courses. Add 10% shipping/handling for each manual. Write Heath Co., Parts Dept., Benton Harbor, MI 49022.

HEATH PHONE DIRECTORY FOR ASSISTANCE AND INFORMATION

Product Orders (TOLL FREE except Alaska, Hawaii & Michigan) (8:00 A.M.-8:00 P.M. Eastern Time)	800-253-0570
Product Orders for Alaska, Hawaii & Michigan (24-hour number – 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 – Hardware	616-982-3309
• Computers – Software (8 AM – 4:30 PM, ET, Weekdays):	
Operating Systems, Languages, Utilities	616-982-3860
Applications Programs	616-982-3884
8 AM-Noon and 1-4:30 PM, Eastern Time, Weekdays only.	

HEATH CAREER OPPORTUNITIES: Positions are available for qualified engineers, technicians, technical consultants and technical writers with expertise in computer hardware/software, instrumentation or communications. If you're interested in a career with us, send 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 warranty for any 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 President's Corner

Dear Friends:

It's exciting to be at the forefront of technology, because that's where we get interesting peeks into the future.

Over time, our Heathkit engineers have had many opportunities to introduce new technologies at the consumer product level. We typically don't invent those technologies. But we do have a real nose for finding interesting ways to apply them.

That's how we came up with some of the first true high-fidelity amplifiers, the first fully-transistorized audio equipment and the first digitalized channel readouts on a television screen. In fact, we had a field day with digital electronics – ultimately designing fully electronic digital clocks, digital readout marine equipment, ham radio equipment, weather instruments ... even the first home bathroom scales to give you pounds and ounces in wonderfully-lighted electronic digits. All in hands-on, learn-about-it kit form.

Now the microprocessor has opened up whole new horizons. You've already seen the beginnings of what can be done with these miraculous little devices – and the parade has hardly started. Future product potentials are literally mind-boggling.

All of which brings me to the front cover subject of this catalog. Several years ago, we theorized that robots and robotics were destined to play an important part in our future lives. We weren't certain just how, but nonetheless the idea was compelling. Further, if any company were to pioneer practical hardware, software and educational materials for the general field of robotics and artificial intelligence, it seemed it surely ought to be Heath. The results of this effort are presented on pages 30 and 31. We think you'll share our excitement and enthusiasm for these avant-garde new robotics products.

Also, on pages 92 and 93, you'll find a new technology-loaded television receiver (we think we can still call it a television set) that does things no other TV has done before. Our amateur radio friends will find a brand new HF transceiver on pages 8 and 9 that represents an excellent value in state-of-the-art communications equipment. Pages 66 and 67 present the kit versions of our new H/Z-100 Series Computers that many of you have been waiting for. And weather enthusiasts will want to check out the Digital Humidity Meter introduced on page 2.

In addition, you'll find a new 1200 baud modem for vastly improving the speed – and lowering the cost – of your computer telecommunications.

All in all, an exciting new line-up of "high-tech" Heathkit products.

The best to you in 1983 –

William E. Johnson
President

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.

1. If you want to preserve your rights under the Act, here's what to do if you think your bill is wrong or if you need more information about an item on your bill:
   a. Do not write on the bill. On a separate sheet of paper write (you may telephone your inquiry but *doing so will not preserve your rights under this law*) the following:
      i. Your name and account number (if any).
      ii. A description of the error and an explanation (to the extent you can explain) why you believe it is 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.
      iii. The dollar amount of the suspected error.
      iv. Any other information (such as your address) which you think will help the creditor to identify you or the reason for your complaint or inquiry.
   b. Send your billing error notice to the address on your bill which is listed after the words, "Send Inquiries to."
      Mail it as soon as you can, but in any case, early enough to reach the creditor within 60 days after the bill was mailed to you. If you have authorized your bank to automatically pay from your checking or savings account any credit card bills from that bank, you can stop or reverse payment on any amount you think is wrong by mailing your notice so the creditor receives it within 16 days after the bill was sent to you. However, you do not have to meet this 16-day deadline to get the creditor to investigate your billing error claim.
2. The creditor must acknowledge all letters pointing out possible errors within 30 days of receipt, unless the creditor is able to correct your 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.
3. After the creditor has been notified, neither the creditor nor an attorney nor a collection agency may send you collection letters or take other collection action with respect to the amount in dispute, but periodic statements may be sent to you, and the disputed amount can be applied against your credit limit. You cannot be threatened with damage to your credit rating or sued for the amount in question, nor can the disputed amount be reported to a credit bureau or to other creditors as delinquent until the creditor has answered your inquiry. *However, you remain obligated to pay the parts of your bill not in dispute.*
4. If it is determined that the creditor has made a mistake on your bill, you will not have to pay any *FINANCE CHARGES* on any disputed amount. If it turns out that the creditor has not made an error, you may have to pay *FINANCE CHARGES* on the amount in dispute, and you will have to make up any missed minimum or required payments on the disputed amount. Unless you have agreed that your bill was correct, the creditor must send you a written notification of what you owe; and if it is determined that the creditor did make a mistake in billing the disputed amount, you must be given the time to pay which you normally are given to pay undisputed amounts before any more *FINANCE CHARGES* or late payment charges on the disputed amount can be charged to you.
5. If the creditor's explanation does not satisfy you and you notify the creditor *in writing* within *10 days* after you receive his explanation that you still refuse to pay the disputed amount, the creditor may report you to credit bureaus and other creditors and may pursue regular collection procedures, but the creditor must also report that you think you do not owe the money, and the creditor must let you know to whom such reports were made. Once the matter has been settled between you and the creditor, the creditor must notify those to whom the creditor reported you as delinquent of the subsequent resolution.
6. If the creditor does not follow these rules, the creditor is not allowed to collect the first $50 of the disputed amount and *FINANCE CHARGES*, even if the bill turns out to be correct.
7. If you have a problem with property or services purchased with a credit card, you may have the right not to pay the remaining amount due on them, if you first try in good faith to return them or give the merchant a chance to correct the problem. There are two limitations on this right:
   a. You must have bought them in your home state or if not within your home state within 100 miles of your current mailing address; and
   b. The purchase price must have been more than $50.

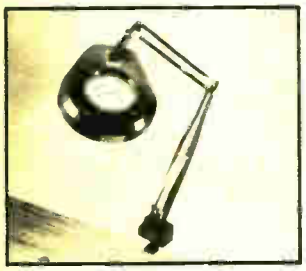
However, these limitations do not apply if the merchant is owned or operated by the creditor, or if the creditor mailed you the advertisement for the property or services.

Around home...or for your next kit project...choose from these helpful, trouble-saving aids

Magnifier Lamp enlarges your fun

The multi-purpose Magna-Lux offers the functional flexibility and illumination you need to work hands-free with clear, amplified vision. A 39" lock-jointed arm supports a 3¾" diameter, 3-diopter lens which magnifies 175% for ease of viewing. The pivotal, 2-axis lamphead houses one 40W appliance bulb (included). Black only. 120 VAC. It will bring your brightest ideas to light!

GDP-208, Shpg. wt. 4 lbs. **29.95**



Larger-view Magnifier lamp

Easy-on-the-eyes fluorescent lighting and 5" distortion-free glass lens with 2 to 1 magnification combine to take the strain out of close-up work. Energy-stingy 22-watt circle tube (included) provides glare-free lighting. Features black enamel housing, safety diffuser and 45" steel arm. Clamps to horizontal surface. UL listed, 120 VAC.

GDP-200, Shpg. wt. 7 lbs. **79.95**

3-D Binocular Magnifiers

Three finely-ground lenses enlarge detailed circuitry 2½ times for easy viewing, keeping hands free to position and solder components. Headband adjusts to fit all hat sizes. Cushioned foreband. Focus viewpoint at 8." Washable frame is lightweight and durable. A real visual aid.

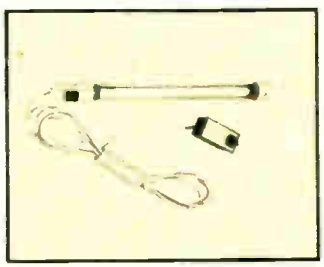
GDP-201, Assembled. 1 lb. .. **19.95**

Extension Lamp directs more light

This eye-saving Lamp is fully mobile, and features a conical shade to direct ample light right where you need it most. Steel extension arm with spring expansion reaches 32," swings 360° to illuminate workspace. Uses incandescent bulb (not included). Quickly portable; 4-way mounting bracket clamps horizontally or vertically. 120 VAC.

GDP-202, 4 lbs. ...**Was $26.95, NOW ONLY 19.95**

Handy Fluorescent Trouble Light



This safe, 15-watt protected lamp throws a more illuminating light – without the usual eye-straining glare and shadows of incandescent bulbs. Long-reaching 25-ft. line cord allows greater freedom of movement; fully-shielded tube (included) is less likely to cause breakage accidents. Size: 26" L x 2½" W x 2½" D. 120 VAC.

GDP-206, Shpg. wt. 4 lbs. **19.95**

Complete kitbuilder's Tool Set

Features a Weller 25W soldering iron with two tips, wire strippers, a pair of diagonal cutters, 4" long-nose pliers, a ⅛" blade screwdriver, a phillips screwdriver, a ¼" nut driver, a soldering aid tool, and a spool of solder. Molded storage tray keeps each tool in place in the durable 3" H x 10¾" W x 10" D carrying case. An ideal starter set for the active hobbyist!

GHP-1270, Shpg. wt. 3 lbs. .. **39.95**

Soldering equipment to meet your kitbuilding needs

1 **Weller WTCPN Soldering Station** features a temperature-controlled 60-watt element in a pencil iron. Ideal for soldering heat- and voltage-sensitive components where a precision touch is essential. Exclusive transformer-powered, closed loop system automatically controls output and iron temperature to keep 1/16" screwdriver tip consistently hot. Low-voltage design provides maximum safety and longer tip life. Balanced handle design has cool grip for sure comfort. Station includes lightweight plug-in soldering iron, heat-shielded holder on sturdy base (transformer inside), 700°F tip, 6' power cord, tip storage tray and removable tip-cleaning sponge. 120 VAC. Assembled and ready to help build kits!

GDP-1108, Shpg. wt. 5 lbs. **79.95**

Set of five 700°F assorted tips for above.

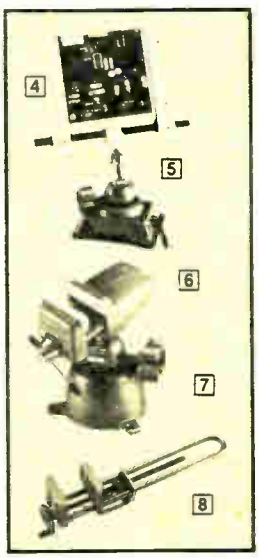
GDP-1109, Shpg. wt. 1 lb. **17.95**

2 **Three-Heat Soldering Station Kit** features secure stand with metal heatshield to protect both you and iron from burns or breakage. High, medium and low heat settings provide temperatures to meet all requirements. Has 6-volt, 25W element with 3/16" chisel tip and 6' power cord. 120 VAC.

Kit GH-17A, Shpg. wt. 5 lbs. **49.95**

3 **Weller's 860°F, 25-Watt Soldering Iron** has a slim, iron-clad ⅛" chisel tip for close point-to-point wiring and integrated circuit work. Our best-selling iron – one that's perfect for all your kits and projects! 120 VAC.

GDP-207, Shpg. wt. 1 lb. **14.95**



PanaVise System lends a hand

4 **PC Board Holder** grips and holds almost any size circuit board super-steady for soldering. Tilts 220° Spring-loaded; fits vacuum or standard-height base.

GDP-1254, Shpg. wt. 2 lbs. **19.95**

5 **Vacuum Base** attaches securely for temporary mounting on smooth surfaces. Powerful rubber suction pad holds without marring. Accepts GDP-1253, -1254 and -1255 heads.

GDP-1252, Shpg. wt. 2 lbs. **19.95**

6 **Vertical Vise Jaw Head** with nylon pads opens 2¼" to grip parts without marring.

GDP-1253, Shpg. wt. 2 lbs. **17.95**

7 **Standard Height Base** installs semi-permanently for GDP-1251, -1254 and -1255.

GDP-1251, Shpg. wt. 2 lbs. **14.95**

8 **Vertical Vise Head** with padded jaws will open fully 6½" to hold bulkier items.

GDP-1255, Shpg. wt. 2 lbs. **15.95**

See Heathkit/Zenith Soldering Course on pg. 41

12-Socket Multiple Outlet Box

A real handyman's problem solver! Has 11 switched outlets, plus one unswitched outlet for clock or memory save. Fused for full protection. 10A maximum load. 12' cord. 120 VAC.

Kit HD-1274, Shpg. wt. 4 lbs. **24.95**

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

Accuracy and economy are yours with easy-to-build Heathkit Test Instruments

1 Portable, versatile VOM

Single test probe makes all measurements quickly: The extremely versatile Heathkit IM-5218 VTVM features seven DC voltage, rms and peak-to-peak AC voltage and resistance ranges. Ideal for use with solid-state and digital equipment.

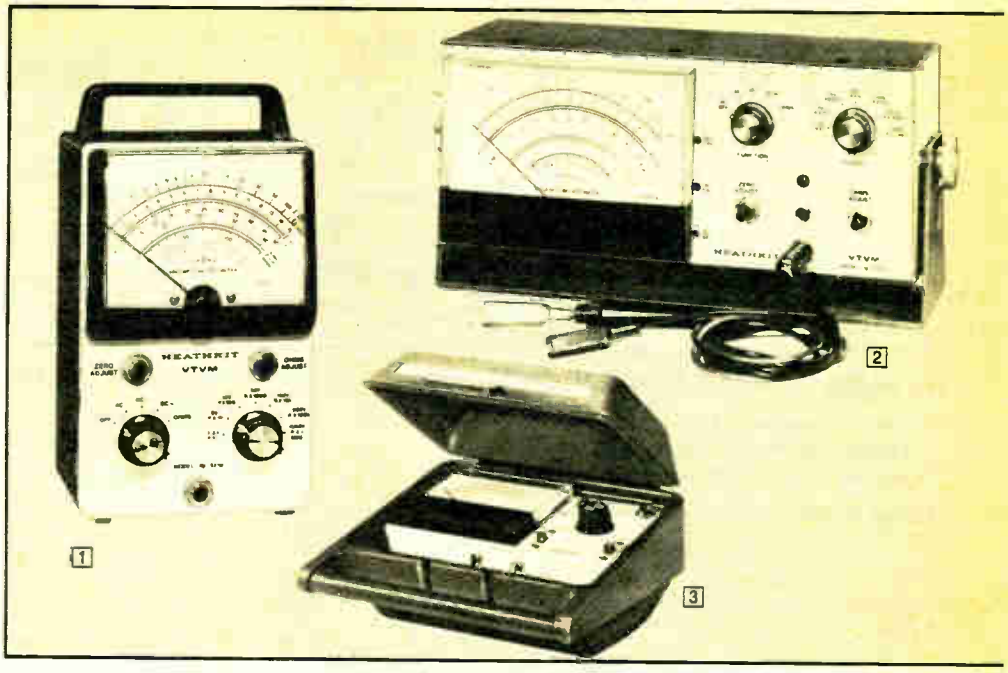
You can measure: 0-1500 volts DC and rms volts AC, 0.4 to 4000 peak-to-peak volts AC and 1 ohm to 100 megohms of resistance. Offers ±3% DC accuracy and ±5% AC accuracy; precision network resistors (with 1% accuracy) for reliable, precise resistance measurements.

Wide 25 Hz to 1 MHz, ±1 dB frequency response: Allows you to conduct a wide variety of AC measurements. A large, 4.5" color-coded 200 μA meter movement and scale makes delicate readings a snap.

In addition to its practicality, you save by building it yourself the easy Heathkit way! The step-by-step manual shows you how. Uses 120/240 VAC, 50/60 Hz power and one 1.5 VDC "C" cell (not included). Measures 7⅜" H x 4 11/16" W x 4¼" D (18.75 x 11.91 x 10.8 cm).

Kit IM-5218, Shpg. wt. 5 lbs. **77.95**

IM-5218 SPECIFICATIONS: Meter Scales: DC and AC (rms) Voltage: 0-1.5, 15, 50, 150, 500, 1500 V full scale. **AC (p-p) Voltage:** 0.4, 14, 40, 140, 1400, 4000 V full scale. **Resistance:** 10 ohm center scale x1, x10, x100, x1000, x10k, x1 Meg. **Input Resistance:** 11 megohms, 1 megohm in probe.



2 Bench-type VTVM for the shop or the lab

Always ready for service: The IM-5228 is a professional looking, bench-type version of the popular IM-5218 VTVM. In addition to features found on the IM-5218, the IM-5228 also ensures ease of use with all calibration controls centrally located on the front panel. You can measure 0-1500 rms VAC/VDC and 0.1 ohm to 1000 megohms. ±3% DC voltage accuracy, ±5% AC voltage accuracy. Requires one 1.5 VDC "C" cell, not supplied. Operates on 120/240 VAC, 50-60 Hz. Rugged, handsome cabinet measures a compact 5" H x 12 11/16" W x 4¾" D (12.7 x 33.23 x 12.07 cm).

Kit IM-5228, Shpg. wt. 6 lbs. **79.95**

PKW-4, Wired Replacement Probe for IM-5218 or IM-5228 VTVMs, Shpg. wt. 1 lb. **19.95**

IM-5228 SPECIFICATIONS: DC Voltage: Input Resistance: 11 Megohms (1 Megohm in probe) on all ranges. **Circuit:** Balanced bridge (push-pull) using twin triodes. **AC Voltage: Frequency Response:** 25 Hz – 1 MHz, ±1 dB (800 ohm source, refered to 60 Hz). **Input Resistance and Capacitance:** 1 megohm shunted by 40 pF, measured at input terminals 1200 pF at probe tip).

3 Portable IM-5217 VOM for use anywhere

Perfect for in-field use by car buffs, campers, boaters, others: Four voltage and resistance ranges make the Heathkit IM-5217 Portable VOM ideal for making all common measurements. It's easy to build and easy to use. Measures 0-500 Volts AC or DC (function switch allows measurement of AC and DC without changing test lead connections) and 1 ohm–1 megohm. High imput impedance avoids circuit loading. Wide frequency response for audio measurements. Checking semiconductors is a breeze with a special 1.5 Volt ohmeter. Requires two 9 VDC cells and one 1.5 VDC "C" cell (not included). Attractive, durable carry-along cabinet measures 5⅜" H x 9⅜" W x 9" D (13.67 x 23.83 x 22.86 cm).

Kit IM-5217, Shpg. wt. 4 lbs. **44.95**

IM-5217 SPECIFICATIONS: DC Voltage Ranges: 1.5, 15, 150, 500 Volts full scale. **Accuracy:** ±3% full scale. **Input Resistance:** 10 Megohms on all ranges. **AC Voltage: Ranges:** 1.7, 15, 150 and 500 volts full scale. **Input Resistance:** 1 Megohm on all ranges. **Input Capacitance:** Approximately 100 pF (50 pF on 500 Volt range). **Frequency Response:** 10 Hz-1MHz, ±1dB. **Ohmmeter:** Rx1, Rx100, Rx10k, Rx10M (10 ohms center scale).

Wide-range Heathkit Portable FM Deviation Meter

$159.95

- **Check operation of FM transmitters and signal generators**
- **Two front panel jacks for easy oscilloscope hook-up**
- **Uses battery or AC power**

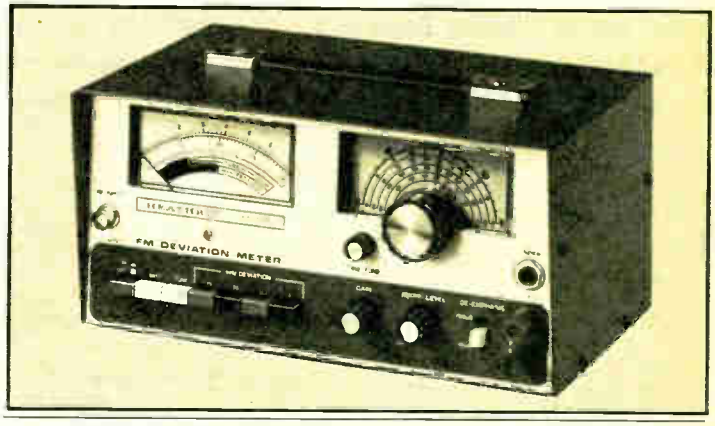
Easy-to use: All controls and jacks on the Heathkit IM-4180 are located right on the front panel for easy access. You can select from four deviation modulation ranges just by pressing a pushbutton. Ranges available for use are from 2 to 75 Hz. Lock in UHF FM signals with the convenient coarse and fine tuning controls. Measures peak FM deviation between 25 and 1000 MHz. An 8 ohm jack allows you to connect a speaker or a pair of headphones. Controls are provided to allow you to select the appropriate de-emphasis for audio signals. Easy to read meter. 5" H x 10.31" W x 7.19" D. Requires ten 1.5 VDC "AA" cells (carbon-zinc, alkaline or nickel-cadmium – not included) or the optional IMA-4180-1 Battery Charger-Eliminator below.

Kit IM-4180, Shpg. wt. 7 lbs. **159.95**

Kit IMA-4180-1, Battery Charger-Eliminator for IM-4180, Shpg. wt. 2 lbs. **29.95**

Swiveling Telescopic Antenna. Monitor transmitter/generator performance without physical connection to the IM-4180.

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



IM-4180 SPECIFICATIONS: Carrier Freq. Ranges: Fundamental, 25 to 50 MHz. **Deviation Ranges:** 0-2, 0-7.5, 0-20 & 0-75 kHz. **Accuracy:** ±3% full scale. **Input Imped.:** 50Ω **Max. Input:** 5 V. **Scope Output:** 13 mV/kHz peak.

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

Precision Heathkit instruments for the hobbyist or service technician

Versatile low-cost function generator

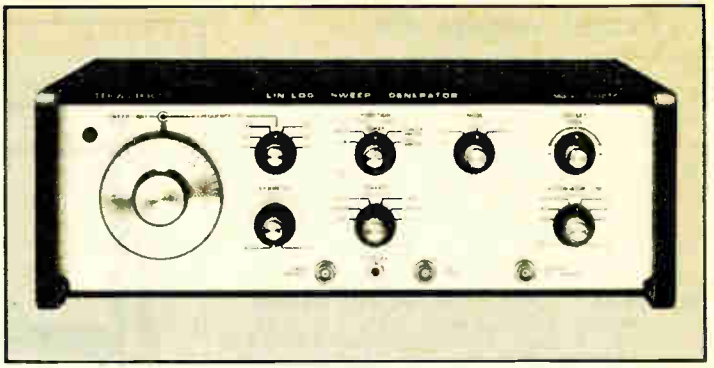
- Generates sine, square and triangle waves
- Features wide frequency range, high accuracy
- Well-designed, compact instrument is easy to use

Designed for a multitude of testing and calibration applications: The IG-1271 provides sine, square and triangle waves from 1 Hz to 1 MHz. Just select the waveform desired, set the frequency multiplier and fine tune to the desired frequency. Accuracy is better than 3%, full scale.

Exceptional attenuation capabilities: You can step attenuate up to 50 dB in 10 dB steps, and fine-tune an additional 20 dB with a continuously variable control. Output is short-circuit protected and provides up to 10V (p-p) signal into a 50-ohm load. For 120/240 VAC, 50/60 Hz power. Draws 15 Watts. Neat, compact cabinet measures just 3" H x 7½" W x 8⅞" D (7.62 x 18.42 x 22.56 cm). The sturdy case has a convenient carrying handle that also serves as a bail to tilt case to proper angle for best viewing.

Kit IG-1271, Shpg. wt. 7 lbs. **159.95**

SG-1271, Assembled and calibrated. Shpg. wt. 6 lbs. **225.00**



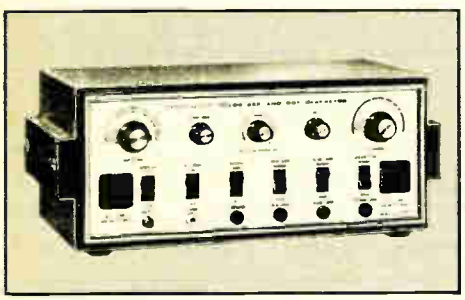
Deluxe Lin/Log Swept-Function Generator

- Generates sine, square and triangle-wave outputs
- Produces CW, burst, linear and log sweeps
- Has variable symmetry, variable offset, VCG input

All the capability and accuracy you demand, at a low kit price: Provides sine, square and triangle waveforms PLUS swept-function waveforms for convenient frequency response tests. Also has pen lift and chart control signals for use with Heath chart recorders and others.

Six modes provide versatility for extensive test and service procedures: Generates continuous output (CW), gated CW, a burst mode that completes a variable integral number of output cycles and linear/log sweeps over a 1000:1 sweep range. Also has a 50 dB switch attenuator, variable between ranges; adjustable symmetry from 5% to 95%; variable offset; analog, sweep and sweep gate outputs for convenient system control; VCG input for external control of main generator. For 120/240 VAC, 50/60 Hz power. Measures 5⅜" H x 15" W x 11⅞" D (13.67 x 38.1 x 30.18 cm).

Kit IG-1275, Shpg. wt. 15 lbs. **349.95**



Color Bar/Dot Pattern Generator

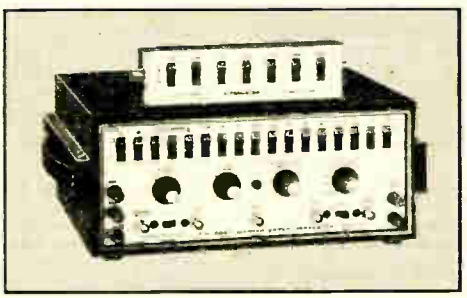
- Makes servicing color TV sets easy

Has many useful TV servicing features: The IG-5228 Color Bar and Dot Pattern Generator provides 12 different patterns – plus a clear raster for purity adjustments. The patterns are available in the exclusive Heath 3 x 3 display, or in the familiar 9 x 9 display.

Provides video signal: A greater than 1 Volt (peak-to-peak) video signal, modulated (at a level variable to 50,000 μV) on NTSC television channels 2-6; variable ±, going video; front panel gun shorting switches; lead piercing grid jacks and sync output; 4.5 MHz sound carrier oscillators. Also has two 500 Watt AC outlets.

Easy to build: The comprehensive, step-by-step Heathkit manual shows you the way. For 120/240 VAC, 50/60 Hz power. Measures 5¼" H x 13½" W x 8" D (13.34 x 34.29 x 20.32 cm).

Kit IG-5228, Shpg. wt. 8 lbs. **147.95**

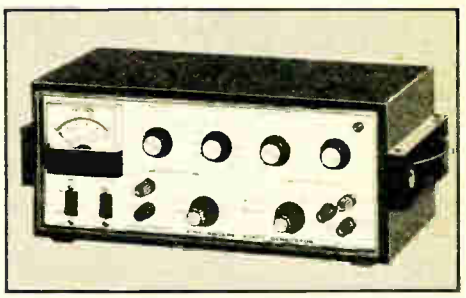


Post Marker/Sweep Generator

- For alignment of TV and FM receivers

Makes TV, FM receiver alignment fast and easy: The IG-5257 Post Marker/Sweep Generator mixes one or more marker signals with demodulated signal from test circuit. 15 markers, carrier markers for NTSC television channels 4 and 10, diode modulator, video-sweep modulator, 400 Hz tone for FM alignment. For 120 VAC, 60 Hz power. Overall dimensions, 5.15" H x 13.38" W x 12" D. (13 x 33.99 x 30.48 cm).

Kit IG-5257, Shpg. wt. 16 lbs. **274.95**



Sine/Square Wave Audio Generator

- Time-saving, low-cost instrument

For gain and frequency response measurements, harmonic distortion checks and other tests: Provides low-distortion 1 Hz-100 kHz sine waves. 5 Hz-100 kHz square waves from 0.003-10 Volts. Square wave output has fast 50 nS rise time for audio response – or as a trigger for digital circuit testing. For 120/240 VAC. Measures 5.13" H x 13.25" W x 7" D.

Kit IG-5218, Shpg. wt. 10 lbs. **139.95**

SG-5218, Assembled/calibrated, 10 lbs. ... **195.00**

Test accessories for a variety of uses

Test Lead Set: 1.5 meter black/red cables w/4 mm shielded plugs, red sprung hook, red prod and black shrouded crocodile clip.

PKW-200, Assembled and tested, 1 lb. ... **15.95**

PK-3A, RF Probe for DC Voltmeters. 1 lb. .. **12.95**

30 kV DC Probe: Multiplies by 100. For meters with 10 megohm input unless shown otherwise.

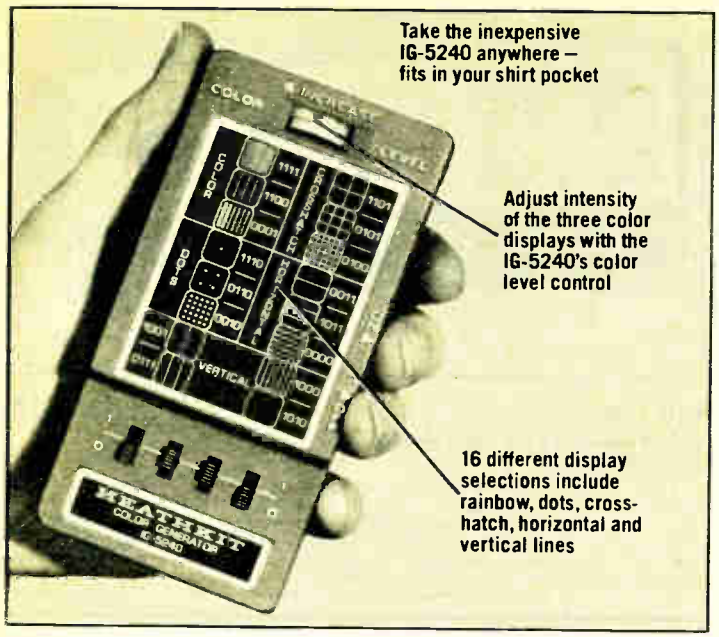
Kit IMA-100-10, w/banana plug, 1 lb. **14.95**

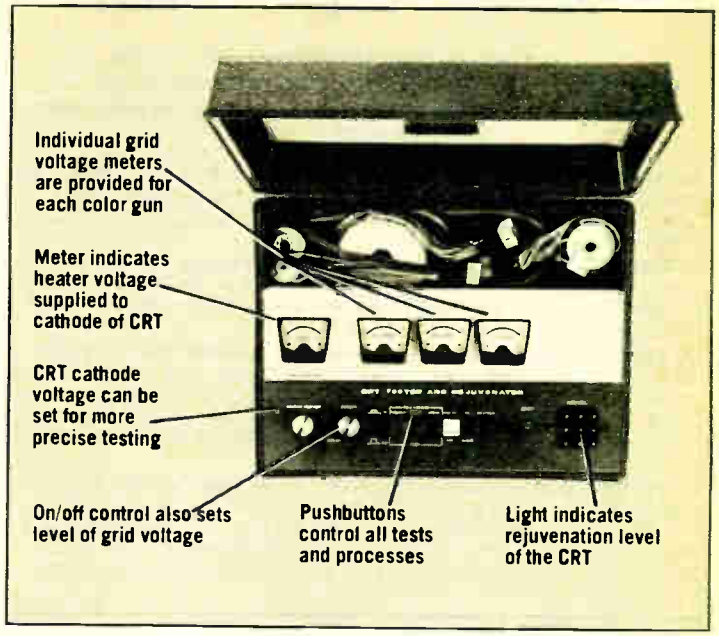
SMA-100-10, Assem. w/phone plug, 1 lb. .. **19.95**

Kit IMA-100-11, for 11M meters, 1 lb. **14.95**

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

These low-priced Heathkit test instruments speed TV servicing work





Hand-Held Color Alignment Generator aids television field servicing

$74.95

- **Outstanding performance, shirt-pocket size**
- **16 different displays, including three in color**
- **Battery-operated for portable in-the-field use**

Real precision, accuracy and stability: The IG-5240 Color Alignment Generator features a crystal-controlled carrier and color oscillator. Its size makes it convenient to take along for in-the-field service.

Easy to operate: Simply connect the output cable to the VHF terminals of any Color TV. The RF carrier frequency is calibrated to NTSC Channel 4. Four program slide switches select any of the 16 available displays. A color level control adjusts the intensity of the three color displays. A battery saver circuit turns the display off automatically after it's been on for a minimum of five minutes. This feature conserves battery power, letting you get the most efficient operation and longest possible life from your batteries.

Light and portable: Two 9 VDC transistor cells (not included) provide eight or more hours of continuous operation. 5.4" H x 2.75" W x 1.15" D.

Kit IG-5240, Shpg. wt. 2 lbs. **74.95**

IG/SG-5240 SPECIFICATIONS: Display Patterns: Raster, blank, Horizontal Lines, 1-7-15. Vertical Lines, 1-11-21. Crosshatch or dots, 1 x 1, 7 x 11 or 15 x 21 matrices. Rainbow, no luminance. Grated Rainbow, 3 or 10 bars with luminance. **Chroma Carrier:** 3563.795 MHz, ±0.005%, crystal-controlled. **Master Timer:** 377.616 MHz, ±0.005%, crystal-controlled. **RF Output:** 5000 μV minimum, into 300 ohms. **Video Modulation:** Approximately 50%.

Give old, worn picture tubes new life with low-cost CRT Checker/Rejuvenator

$139.95

- **Use on almost all current cathode-ray tubes (CRTs) – even in-line-gun tubes**
- **Works on color and black-and-white picture tubes**
- **Separate testing, cleaning and rejuvenation**

Test, clean and rejuvenate almost all current CRTs, color and black-and-white: Positive-action pushbuttons control all tests and processes for easier operation. Individual color guns can be cleaned, tested and rejuvenated by using the front panel pushbuttons. Separate meters for each gun allow easy tracking of the individual grid circuits.

Easy to use: Main power control also sets control grid voltage level. Separate heater voltage meter allows monitoring of the heater voltage supplied to the CRT cathode. Indicator lamp visually confirms CRT shorts. Visual restoration indicator glows brighter as the rejuvenating current is increased. A separate cleaning process is applied after rejuvenation to assure proper tube operation.

Easy to build: Step-by-step Heathkit manual shows you how. Includes 4' heavy-duty test cable. For 120/240 VAC. 5.12" H x 13.5" W x 10" D.

Kit IT-5230, Shpg. wt. 9 lbs. **139.95**

IT-5230 SPECIFICATIONS: Sockets Supplied: 14-pin for 90-degree color tubes; 13-pin for in-line color tubes; 8-pin for black-and-white tubes; 7-pin for black and white tubes. **Heater Supply Voltage:** Variable from 2 Volts to 12 Volts, at 1 Amp.

Yoke/Flyback tester for TV service technicians

Checks windings of yokes, flybacks, coils and general mid-frequency (10 to 100 kHz) coils. Good/bad ring test with ±1 ring accuracy at 10 mark on highest range. Measure drive signals, focus and anode voltage with IMA-100-10 below. For 120/240 VAC, 50/60 Hz power. Measures 6.88" H x 5.75" W x 10.75" D (17.47 x 14.61 x 27.31 cm).

Kit IT-5235, Shpg. wt. 8 lbs. **94.95**
ST-5235, Assembled. Shpg. wt. 7 lbs. **140.00**
Kit IMA-100-10, 30 kV Probe, 1 lb. **14.95**
SMA-100-10, Assembled Probe, 1 lb. **19.95**

Lightweight, easy-to-build 40 kV Probe Meter

40 kV Probe Meter makes TV tube voltage measurements faster and more convenient. Just attach the ground clip to the TV chassis; place the probe against the tube's high-voltage connector. On-off switch conveniently mounted on handle. Features ±3% accuracy. You can finish this easy-to-build Heathkit product in just one evening. The IM-5210 measures 1.5" H x 1.88" W x 15" L (3.81 x 4.78 x 38.1 cm).

Kit IM-5210, Shpg. wt. 2 lbs. **29.95**

For the designer's or experimenter's workbench — the Heathkit DC Tri-Output Power Supply

$109.95 Kit

- **Versatile — use it for designing digital circuits**
- **One fixed 5 VDC output, two variable VDC outputs**
- **3 floating outputs can be connected in any combination for a variety of output voltage currents**

Here's one of the lowest priced power supplies, yet one of the most versatile, too. It's the IP-2718 Tri-Output Power Supply, and it features one fixed 5 VDC output, plus two continuously variable 20 VDC outputs for all your circuit design work and experimentation.

All three voltage outputs can be connected in a wide variety of combinations to supply your DC circuits with the voltage they need. Each output operates independently, or can be "strapped" with another in series or parallel for all your circuit voltage and current needs – fixed or "float."

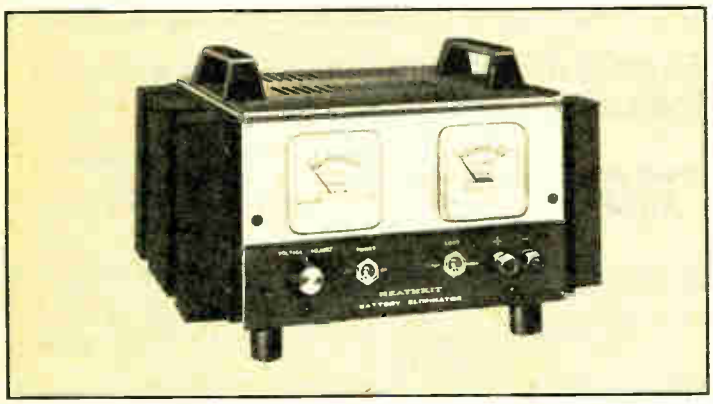
The 5 VDC output is handy in digital experimenting and design, and with a 1.5 amp rating, it has enough current to power many of today's logic devices. The two variable 20 VDC outputs provide 0.5 amps each, and feature a special clutch-couple control that allows you to "track" each output at specified voltage differences – a useful feature when designing analog circuits that require both positive and negative voltages.

The voltage outputs are short-circuit proof, with automatic current limiting for added protection. Each output's voltage and current can be monitored easily through the switchable front-panel meter. All the outputs and controls are readily accessible on the front panel, and clearly marked for easy operation. The housing is constructed of durable metal, and painted in instrument blue with beige trim.

Kit IP-2718, Shpg. wt. 12 lbs. **109.95**

Factory assembled and tested IP-2718.
SP-2718, Shpg. wt. 12 lbs. **195.00**

IP/SP-2718 SPECIFICATIONS: Outputs: 5 VDC @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. **Dimensions:** 4½" H x 10⅜" W x 9" D



Handy Heavy-Duty Power Supply/Battery Eliminator

$169.95

- **Provides variable 9-15 VDC capable of 12 amps continuous, 20 amps intermittent**

For DC applications where high-current capability is necessary. Provides continuous variable voltage from 9-15 V with fixed output regardless of load. Extra-large transformer for low ripple operation. Two easy-to-read meters let you monitor both current and voltage. Housing is painted in instrument blue and beige trim. The IP-2715 is the ideal Power Supply/Battery Eliminator to meet your service bench requirements.

Kit IP-2715, Shpg. wt. 31 lbs. **169.95**

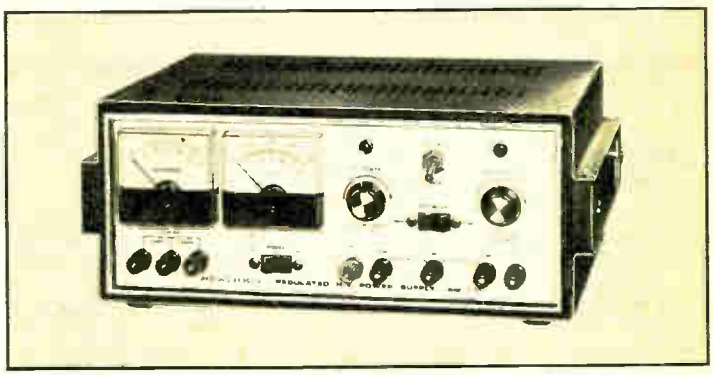
IP-2715 SPECIFICATIONS: Output Voltage: Variable from 9-15 VDC. **Output Current:** 12 amps continuous, 20 amps intermittent (per derating curve in manual). **Ripple:** Less than 1% at full load. **Regulation:** Less than 2% variation from no load to full load. **Fuses:** 7A, 3 AG slow-blow primary; 20A 3 AG output. **Power Requirement:** 120/240 VAC, 50/60 Hz, 840 Watts. **Dimensions:** 5¼" H x 11" W x 11" D (13.3 x 27.9 x 27.9 cm).

Variable Isolated AC Supply adds more service versatility

360 volt-amps, AC, continuous output. Switch selected. Fused at 1 A & 3 A ranges. 120/240 VAC. Features instrument blue cabinet that measures 5.5" H x 15" W x 10.5 D.

Kit IP-5220, 28 lbs. **154.95**

SP-5220, Assembled, 26 lbs. **190.00**



Improved, low-cost Heathkit 0-400 VDC Power Supply

$179.95 Kit

- **Insulated binding posts for positive and negative high voltage & bias operation**

New solid-state control circuitry for improved perforance: Provides 0-400 VDC output at 0-100 mA continuous, 125 mA intermittent. Line and load regulation is less than 1% from no load to full load. Ripple is less than 10 mV from DC to 1 MHz. Features two meters: two scale voltmeter measures from 0-400 or 0-150 volts; and an ammeter that measures from 0-150 mA.

Kit IP-2717A, Shpg. wt. 19 lbs. **179.95**

Factory assembled and tested IP-2717A.
SP-2717A, Shpg. wt. 20 lbs. **239.95**

IP/SP-2717A SPECIFICATIONS: Additional Outputs: 0-100 VDC at 1 mA variable bias voltage, 6.3 VAC at 4 amps, 12.6 VAC at 2 amps. (25 VA max. AC load). Filament voltage. **Regulation:** Output variation less than 1% from no load to full load. **Ripple:** Less than 10 millivolts rms. **Output Impedance:** Less than 10 ohms, DC to 1 MHz. **Power Req:** 120/240 VAC, 50/60 Hz. **Dimensions:** 5⅛" H x 13¼" W x 11" D.

Continuously variable 1-15 VDC Regulated Power Supply

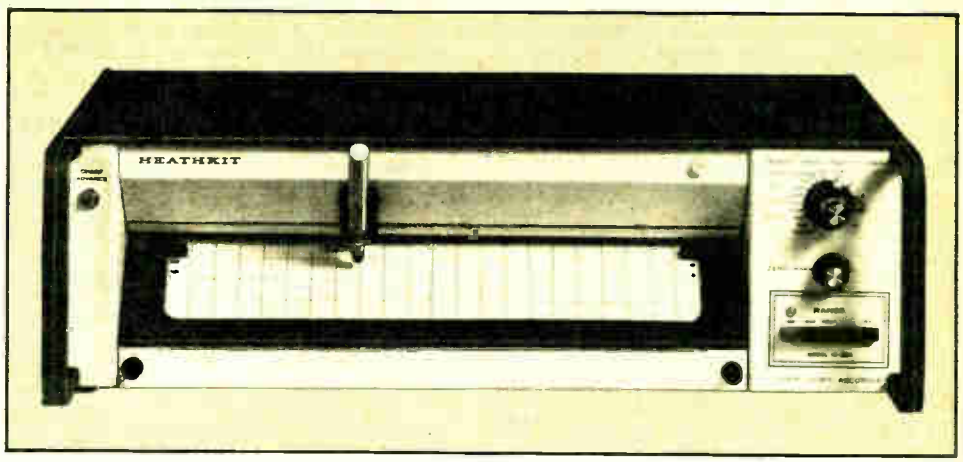
The IP-2728 Power Supply helps in servicing, testing or designing low-voltage solid-state equipment. Features a continuously adjustable 1-15 VDC at 500 mA output, with a 500 mV line, 50 mV load regulation, and fully adjustable limiting current. AC or DC programming. 120/240 VAC. 4⅜" H x 5½" W x 5¾" D.

Kit IP-2728, Shpg. wt. 5 lbs. **44.95**

VISA MasterCard **Credit Card Orders Call TOLL-FREE: 800-253-0570**

Accurate Heathkit Strip Chart Recorder provides reliable, wide-range measurements

- **Less than 0.5% error, full scale**
- **Digital chart drive for 10 speeds**
- **English or metric measurements**
- **Rear panel connector for total control from a remote location**
- **Built-in switchable input filter**



Belongs in your lab: The IR-5204 offers standard features that are extra-cost options with many competitive products – such as digital chart drive, a built-in filter and remote control capability.

Digital chart drive: Provided by a precision stepper motor with no backlash, as in common in gear train designs. To prevent damage to the recorder, the pen servo shuts off when the charted signal exceeds full scale deflection.

Has 10 chart speeds: Available in either inches or centimeters per minute, via the IR-5204's stepper motor. All chart speeds are instantly selectable with the front panel rotary switch – and are accurate to better than 0.5%.

Four calibrated input spans are available at the touch of a pushbutton: 10 mV, 100 mV, 1 V and 10 V full scale. Variable span capacity is built in, enabling you to extend the range to 100 V full scale.

Many noise problems are eliminated by a built-in switchable input filter: When switched into the circuit, both normal and common mode rejection are increased by 20 dB. Noise rejection is even greater at higher frequencies.

Allows total TTL-compatible recorder control from a remote location: Just plug into the IR-5204's rear panel connector.

Pushbutton chart advance is standard: As are external chart drive input capability, electric pen lift with disposable nylon-tipped pens, metric conversion, built-in rack handles and the necessary hardware for rack mounting. 120/240 VAC, 50/60 Hz. Measures 5.34" H x 17.41" W x 12.31" D.

Kit IR-5204, Shpg. wt. 22 lbs. **339.95**

SR-204, Assembled and tested Strip Chart Recorder, 22 lbs. **495.00**

IR-5204/SR-204 SPECIFICATIONS: Chart Width: 10 inches (25 cm with optional metric drive). **Chart Speeds:** 10, 5, 2, 1, 0.5, 0.2, 0.1, 0.05, 0.02, 0.01 inches/minute (cm/min. with metric conversion installed). **Balance Time:** 0.5 second for full scale (filter out). **Overshoot:** Less than 1% of full scale.

Nylon-Tip Pens for IR-5204/SR-204 Strip Chart Recorder:

SU-406-92, Red Pen, Shpg. wt. 1 lb. **3.95**

SU-406-93, Blue Pen, Shpg. wt. 1 lb. **3.95**

Chart Paper for IR-5204/SR-204/SR-205 Chart Recorders: All 120' long.

Inch-calibrated: Has 0.1" divisions. 0-100 right-to-left.

SU-445-17, Shpg. wt. 2 lbs. **6.95**

Centimeter-calibrated: Offset 4 cm on right, 0-100 right-to-left.

SU-445-18, Shpg. wt. 2 lbs. **6.95**

Disposable Nylon Pens for IR-5207/SR-207/SR-206 Chart Recorders:

Pens for chart recording speeds under 1 inch per minute:

SU-205-3, Long Red Pen, Shpg. wt. 1 lb. **3.95**

SU-205-6, Short Red Pen, Shpg. wt. 1 lb. **3.95**

SU-205-4, Long Blue Pen, Shpg. wt. 1 lb. **3.95**

Pens for chart recording speeds over 1 inch per minute:

SU-205-5, Long Red Pen, Shpg. wt. 1 lb. **3.95**

SU-205-7, Short Blue Pen, Shpg. wt. 1 lb. **3.95**

Laboratory-type Decade Resistance Box

Invaluable as a variable multiplier or shunt, a variable substitution resistor, or as a leg for AC and DC bridges: The IN-3117 helps solve complex resistance problems, where a large range of measurement values is necessary. Covers 1 ohm to 999,999 ohms in 1-ohm steps. 0.5% tolerance. 1 Watt resistors. Features rugged case and binding posts for easy test set-ups. 5" H x 7.5" W x 6.63" D (12.7 x 19.05 x 16.84 cm).

Kit IN-3117, Shpg. wt. 3 lbs. **59.95**

Complete Test Lead Set has a wide variety of uses

2000/ VRMS, 20A max.: Two 1.5 meter cables. 4 mm shrouded plugs, red sprung hook, red prod, black shielded croc clip.

PKW-200, Shpg. wt. 1 lb. **15.95**

50-Ohm Termination for counters and oscilloscopes

Helps eliminate measurements errors in counters, scopes: Covers DC to 1 GHz range. Power rating, 1 Watt. VSWR: at 250 MHz, 1.2:1; at 600 MHz, 2:1.

SU-511-50, Shpg. wt. 1 lb. **14.95**

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

Distortion Analyzer for amplifiers and receivers

Outstanding sensitivity and bandwidth: The IM-5258 measures total harmonic distortion (THD) down to 0.03% from 5 Hz to 100 kHz, with ±5% accuracy. Six ranges cover 0.03 to 100% harmonic distortion. The wide frequency range of the IM-5258 allows you to check and service audio amplifiers and receivers which claim the finest specifications.

Residual distortion in the IM-5258 is a very low 0.03% or less: The front panel meter is accurate to within 0.5% of full scale.

Features auto-null control: Simply rough-tune the analyzer and flip the auto mode switch. The analyzer automatically balances the incoming signal, eliminating the need for delicate and time-consuming manual fine tuning.

Also functions as a 1 mV to 300 VAC voltmeter: Features ±5% accuracy in this function as well. Maximum input impedance is one megohm, shunted by 70 pF. Not for use in strong RF fields. For 120/240 VAC, 50/60 Hz power. Attractive, sturdy case measures 5.38" H x 15" W x 11.5" D (13.67 x 38.1 x 29.21 cm).

Kit IM-5258, Shpg. wt. 17 lbs. **234.95**

IM-5258 SPECIFICATIONS: Frequency Range: 5 Hz to 100 kHz in five ranges: 5-10 Hz, 10-100 Hz, 100-1000 Hz, 1-10 kHz, 10-100 kHz. **Distortion Measurement Ranges:** 0.3 to 100%, full scale, in six ranges with a 1-3-10 sequence. **Residual Distortion:** 0.03% or less. **Input Impedance:** 1 megohm, shunted by 70 pF maximum. **Required Input Level:** 316 mV RMS for distortion measurements.

The 5280-Series – The basics for the beginner

No matter if you're a seasoned electronics pro or if you're just starting out, the 5280-Series of test equipment from Heathkit provides you with a dollar-saving way to equip your own test bench. Each of the high-quality test instruments is priced under $50.00, so you don't have to spend a lot of money. And, they represent the Heathkit quality you've come to expect.

1 Four-function Multimeter

Versatile: The IM-5284 High-Performance, Solid-State Multimeter allows you to quickly measure volts, ohms and DC current. A large, easy-to-read panel meter makes measurements a snap. Measures AC/DC Voltage to 1000 volts with 3% DC and 5% AC accuracy. Measure DC current to 1000 mA, with 4% accuracy. A total of four resistance ranges up to X1 megohm. Includes needed test probes. Requires one "C" cell, and two 9 VDC cells or IPA-5280-1 Power Supply (below, right). Measures 5¾" H x 11" W x 7¾" D (14.61 x 27.94 x 19.69 cm).

Kit IM-5284, Shpg. wt. 5 lbs. **47.95**

IM-5284 SPECIFICATIONS: DC Voltmeter: Ranges: 0-1, 0-10, 0-100, 0-1000 volts full scale. **Accuracy:** ±3% of full scale. **AC Voltmeter: Ranges:** 0-1, 0-10, 0-100, 0-1000 volts full scale. **Accuracy:** ±5% of full scale. **DC Milliammeter: Ranges:** 0-1, 0-10, 0-100, 0-1000 mA full scale. **Accuracy:** 4% of full scale. **DC Input Resistance:** 10 megohms. **AC Input Resistance:** 1 megohm.

2 RF Oscillator for alignment of radio, TV equipment

A necessary service aid: The IG-5280 RF Oscillator is ideal for use in aligning tuned stages of AM, FM, and television receivers. Provides output in five separate bands; 310 kHz to 110 mHz and up to 220 mHz on harmonics. A 1 kHz audio output, available at a front panel jack, can be used to isolate circuit defects in receiver audio stages. The IG-5280 is supplied with all required probes and test leads. It requires two 9 VDC cells or the IPA-5280-1 Power Supply (below, right). Measures 5¾" H x 11" W x 7¾" D (14.61 x 27.94 x 19.69 cm).

Kit IG-5280, Shpg. wt. 5 lbs. **49.95**

IG-5280 SPECIFICATIONS: RF Output: Frequency Range: 310 to 110 mHz, in five bands; 100 mHz to 220 mHz on harmonics. **Output Voltage:** Approx. 100 mV. **Internal Modulation:** 1 kHz. **Audio-Frequency Output: Frequency:** 1 kHz. **Output Voltage:** 2.0 volts rms, open circuit.

3 Versatile, wide-range Sine/Square Wave Audio Oscillator

Multi-function versatility: You'll wonder how you managed to get along without the IG-5282 Sine/Square Wave Audio Oscillator. It counts as necessary equipment in a wide variety of audio testing situations. Since all components mount on a single circuit board, kit-building time is greatly reduced. Provides frequency output in four ranges – from 10 to 100 kHz, in both sine and square wave modes. During signal tracing, you can use the IG-5282 as an audio signal source. With the necessary additional equipment, you can use the sine wave output for audio stage gain and distortion analysis. The square wave output, along with appropriate associated equipment, can be used to determine frequency response. Requires two 9 VDC cells or the IPA-5280-1 Power Supply (shown below, right). Measures 5¾" H x 11" W x 7¾" D (14.61 x 27.94 x 19.69 cm).

Kit IG-5282, Shpg. wt. 5 lbs. **49.95**

IG-5282 SPECIFICATIONS: Frequency Output: 10 Hz to 100 kHz in four ranges. **Sine Wave Output Voltage:** 0-3 volts rms. **Square Wave Output Voltage:** 0-3 volts peak. **Power Requirements:** two nine volt batteries or the optional IPA-5280-1 Power Supply.

4 RCL Bridge for design, testing

A low-price Heathkit value: The IB-5281 RCL Bridge is the answer to your needs in testing and design. With the IB-5281, you can easily determine unknown values of capacitance, inductance and resistance. You are provided with the versatility of three separate ranges in each function. Indicates capacitance from 10 pF to 10 μF, inductance from 10 μH to 10H and resistance from 10 ohms to 10 megohms. As always, the step-by-step Heathkit manual makes this instrument easy to build. Only one circuit board needs wiring. Provided with a rugged molded cabinet and component clips. Needs two 9 VDC batteries or IPA-6280-1 Power Supply (below, right). Measures 5¼" H x 11" W x 7¾" D (14.61 x 27.94 x 19.69 cm).

Kit IB-5281, Shpg. wt. 5 lbs. **49.95**

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.

5 Audio circuit Signal Tracer

Track down problem circuits: A diode-equipped RF probe pinpoints failing components and stages. The IT-5283 Signal Tracer will be welcome on your bench when it's time to troubleshoot defective equipment. By using the straight-through DC position you can use the IT-5283 to track down and identify failing audio components and systems. In the audible mode, the IT-5283 Signal Tracer emits a tone which changes in frequency, dependent upon the test point voltage or resistance. That allows you to quickly and simply isolate problems by tracing signal flow through logic circuits. Requires two 9 volt DC cells, or the IPA-5280-1 Power Supply (below, right). Measures 5¾" H x 11" W x 7¾" D.

Kit IT-5283, Shpg. wt. 5 lbs. **49.95**

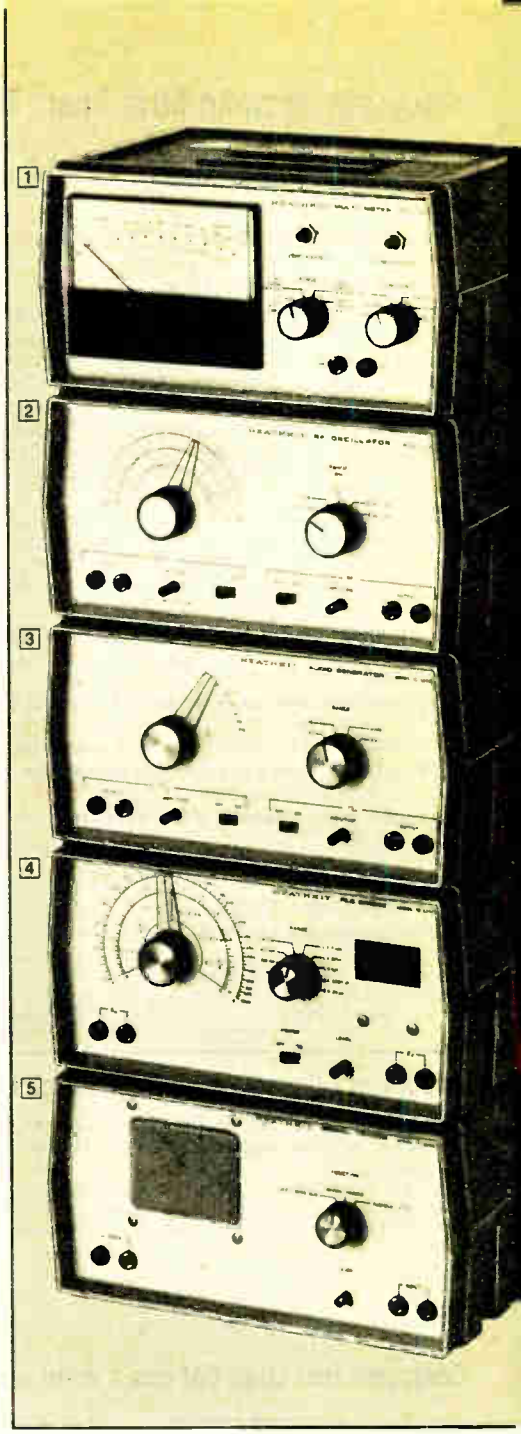
IT-5283 SPECIFICATIONS: Functions: Speaker substitution (16 ohms impedance, audio or RF signal tracing, audible VOM (volt ohmmeter). **Speaker:** 3" permanent magnet type, 16 ohms impedance. **Power Requirement:** Two 9 VDC transistor-type batteries (not included) or IPA-5280-1 Power Supply below. **Overall Dimensions:** 5¾" H x 11" W x 7¾" D (14.61 x 27.94 x 19.69 cm). **Net Weight:** 3 lbs. (1.4 kg).

120/240 VAC Power Supply features added convenience

Power for the 5280-series: The Heathkit name stands for value – and the IPA-5280 Power Supply provides it. Powers all five instruments at the same time. Will provide 120 or 240 VAC power without rewiring. Features include half-wave rectification, capacitor filtering and dual-integrated circuits. For 120/240 VAC, 50/60 Hz power. Draws 7 Watts maximum. Measures 6" H x 3¾" W x 3" D (15.24 x 9.53 x 7.62 cm).

Kit IPA-5280-1, Shpg. wt. 3 lbs. **34.95**

IPA-5280-1 SPECIFICATIONS: Output Voltage: –9 and – 9 VDC, ±9%. **Maximum Output Current:** 100 milliamps. **Fuse:** 1/16-Amp, 3 AG, Slow-blow type.



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Hand-held Digital Capacitance Meter features auto-ranging, leakage detection

$159.95

- **Measures up to 199.9 mF with +0.2% basic accuracy, automatically selects proper measuring range**
- **Built-in polarized "Kelvin" test sockets for more accurate capacitance measurements**
- **Detects leaky capacitors with special circuitry**
- **Large 3½-digit Liquid Crystal Display (LCD)**
- **Hand-held meter uses standard 9 VDC battery**

The compact IT-2250 measures capacitance from 0 pF to 199.9 mF. Measuring all types of capacitors (mica, glass, paper, polystyrene, mylar, electrolytic, air-gap, ceramic and others), an auto-ranging feature automatically selects the correct range of measurement from a choice of ten ranges. The capacitance measurement is then shown on its 3½-digit LCD. Four LEDs indicate unit of measurement (pF, nF, µF or mF).

"Kelvin" terminal design permits measurement directly at the capacitor leads to minimize error. And a special zero control allows for the elimination of stray capacitance in the instrument.

For measuring electrolytic and other capacitors with a low operating voltage, the IT-2250 supplies a low test voltage (superimposed on a low bias voltage). A remote cable lets you test capacitors that can't be connected directly.

Another key feature of the IT-2250 is its ability to detect a leaky capacitor. A nomogram is provided so you can translate the readings you obtain, using the two separate leakage switches, into approximate values of shunt or internal capacitor leakage resistance.

Protection from excessive current is provided by clamp diodes and a ¼ Amp fuse when the IT-2250 is turned on, and by a 2.2 ohm, 2 Watt resistor across the input jacks when the instrument is turned off.

Uses 9 VDC battery, or 120 VAC line current with optional PS-2350 (below).

Kit IT-2250, Shpg. wt. 3 lbs. **159.95**

IMA-2215-1, Leather Carrying Case for IT-2250, Shpg. wt. 1 lb. **14.95**

PS-2350, 120 VAC Battery Eliminator, Shpg. wt. 1 lb. **7.95**

IT-2250 SPECIFICATIONS: Ranges: 199.9 pF, 1999 pF, 19.99 nF, 199.9 nF, 1.999 µF, 19.99 µF, 199.9 µF, 1999 µF, 19.99 mF, 199.9 mF. **Accuracy: Using Laboratory Standards:** 199.9 pF, 1999 pF, 19.99 nF, and 199.9 nF ranges, ±(0.2% of reading +1 count +0.5 pF); 1.999 µF, 19.99 µF, 199.9 µF, 1999 µF, 19.99 mF and 199.9 mF ranges. ±(5% of reading +1 count). **Using Heath-Supplied Standards:** 199.9 pF, 1999 pF, 19.99 nF and 199.9 nF ranges, +(0.75% of reading +1 count +0.5 pF); 1.999 µF, 19.99 µF, 199.9 µF, 1999 µF, 19.99 mF and 199.9 mF ranges, ±(6% of reading +1 count). NOTE: The accuracy of the Heathkit IT-2250 Capacitance Meter depends on whether you calibrate with the Heath-supplied standards or laboratory standards. Specifications are listed above for both methods of calibration. Accuracy specifications apply for a temperature range of 67 to 77 degrees F (19 to 25 degrees C). **Conversion and Display Rate:** For values up to 1999 µF, less than 1.5 seconds; For values up to 199.9 mF, less than 10 seconds. **Display:** 3½ digit (maximum count, 1999) liquid crystal. **Testing Voltage:** 2.00 VDC maximum; typically varying from 0.6 to 1.4 VDC. **Operating Temperature Range:** 32 to 104 degrees F (0 to 40 degrees C). **Storage Temperature Range:** −4 to +140 degrees F (−20 to +60 degrees C). **Battery Life:** Approximately four to ten hours, in continuous operation. **Battery Indicator:** Displays "LO BAT" warning when battery is down to approximately 5 VDC. **Overall Dimensions:** 2" H x 3.25" W x 7.5" L (5.06 x 8.26 x 19.05 cm). **Net Weight:** 16 ounces (450 grams), including battery.

See our kits on display at Heathkit Electronic Centers – Units of Veritechnology Electronics Corporation

Parts and service available. Retail prices on some items may be slightly higher.

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★ **Heathkit Satellite Earth Stations on display at these stores.**

The Heathkit Digital Multimeter line features advanced capabilities and attractive styling

Top-of-the-line IM-2264: full set of features

$239.95

- **Auxiliary analog peak/null meter allows measurement trends to be easily determined**
- **Switch-enabled alarm is useful in circuit tracing**
- **Crest warn indicator alerts user to possible measurement error for non-sine wave inputs**

Has all features of the IM-2262 DMM at left – and more: The IM-2264 offers full-function versatility, highly accurate readings and special operator convenience features – all at a suprisingly affordable price.

Measurement capabilities: Voltage from 200 mV to 1000 VDC/750 VAC, current from 200 μA to 10 Amps and resistance from 200 ohms to 20 Megohms. In addition, semiconductor functions can be checked.

True RMS capability: This feature allows the IM-2264 to provide accurate AC measurements from both sine wave and non-sine wave inputs.

Additional features make operation even more convenient: A flashing crest warn LED alerts the operator when the crest factor of AC inputs is excessive – which could lead to possible measurement error for non-sine wave inputs.

A switch-enabled alarm function allows quick testing of voltage and continuity, without having to view the display. The audible alarm sounds for voltage or current displays above 200 counts on any range, and for resistance measurements when the input is less than 200 counts on any range. An auto-polarity analog meter reflects 0 to full scale measurements to supplement the digital display – making nulls, peaks and measurement trends easier to follow.

Outstanding protective circuitry: All measurement functions have input protection. DC and AC current ranges (except the 10 Amp range) are protected by diode, circuit breaker and fuse circuits – with an easily accessible fuse.

The resettable rear panel circuit breaker, unique to the IM-2264, provides protection on current measurements from 200 μA to 2000 mA, making fuse replacement for moderate overloads necessary. Resistance ranges are electronically protected to 350 Volts (peak). Floating measurements up to 500 Volts (peak) from earth ground can be made with the fully-isolated circuitry.

Use in-field or on your test bench: Operates on six carbon-zinc, alkaline or nickel-cadmium batteries (not included) – or on 120 VAC, 60 Hz power with the optional Heathkit PS-2404 Battery Eliminator (see page 59). Has test circuit. LO-BAT indicator and circuit to recharge nickel-cadmium batteries.

Kit IM-2264, Shpg. wt. 7 lbs. **239.95**

IM-2264 SPECIFICATIONS: Crest Warn: Operation: Front panel LED flashes for excessive crest factor condition on AC voltage and current, or excessive normal mode signal on DC voltage and current. On 200 mVAC range, function may be used to indicate digital logic pulses. **Alarm: Operation:** Audible tone (switch-enabled) sounds on voltage and current functions for input levels greater than 200 counts on range selected; on resistance function, for input levels less than 200 counts on range selected. **Meter: Operation:** Continuously monitors input levels.

IM-2262: full-function versatility, accuracy

$189.95

- **Features attractive styling in low-profile cabinet**
- **Offers expanded measurement ranges and improved performance with state-of-the-art circuitry**
- **True RMS capability provides accurate AC readings from both sine wave and non-sine wave inputs**

Step up from low-cost meters: The IM-2262 Portable Digital Multimeter provides more measurement ranges and better performance for the serious hobbyist, service technician or design laboratory – at a competitive price.

Attractively styled: The IM-2262 is not only functional, it's attractive. Our designers invested unprecedented time and effort in styling this compact, low-profile instrument. Measuring 3" H x 8.5" W x 11" D (7.62 x 21.59 x 27.94 cm) with handle folded, the cabinet features a special color-coded front panel with pushbutton switches – for additional convenience and ease of use.

Measurement ranges: The IM-2262 measures voltage from 200 mV (full scale) up to 1000 VDC and 750 VAC, DC and AC current from 200 μA (full scale) up to 10 Amps, resistance from 200 ohms to 20 Megohms (full scale). The resistance function includes a low (0.2 Volt) test voltage, up to the 2000 kilohm range, to allow in-circuit measurement of semiconductors. A diode test allows checking of semiconductor functions.

Uses extremely accurate, stable state-of-the-art technology: One MOS/LSI integrated circuit contains all the dual-slope, analog-to-digital conversion circuitry – including the automatic polarity indication and automatic decimal point placement functions. The IM-2262 features a laboratory full scale accuracy of 0.25% DC, 0.5% AC (with frequency response specified up to 20 kHz). Built-in references, which allow fast and easy calibration in the field, provide full scale accuracies of 0.5% DC, 1% AC (up to 10 kHz).

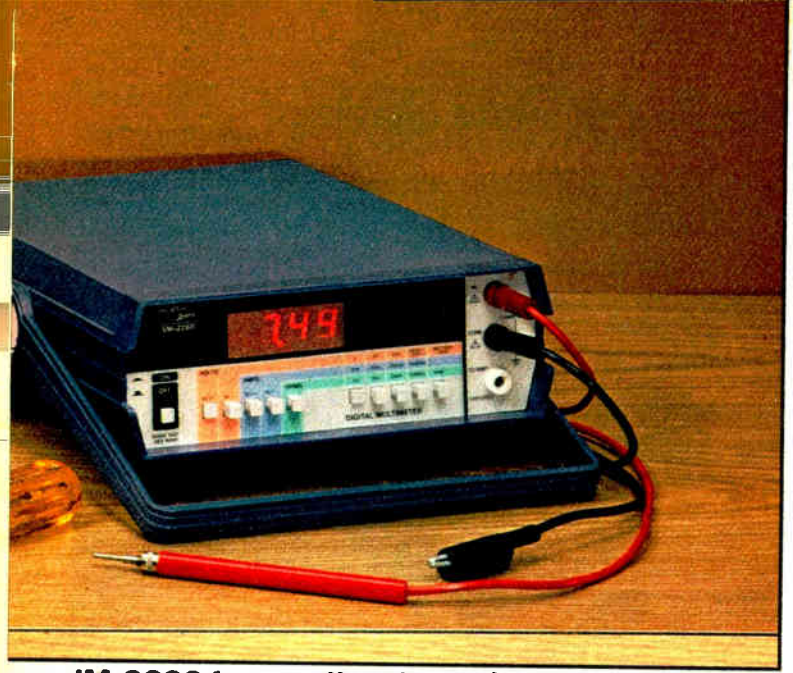
Input protection is provided on all measurement functions: Fully-isolated circuitry allows floating measurements up to 500 Volts (peak) from earth ground.

Uses battery or AC power: The IM-2262 operates on six 1.5 VDC carbon-zinc, alkaline or nickel-cadmium cells (not included) for portable in-field use. It can also use 120 VAC, 60 Hz power, with the optional Heathkit PS-2404 Battery Eliminator (see page 59). A battery test circuit allows a direct check of battery condition, with a LO-BAT indicator lighting automatically when battery voltage reaches a low level. And a built-in circuit recharges nickel-cadmium batteries in as little as 24 hours, with the unit turned off.

Kit IM-2262, Shpg. wt. 5 lbs. **189.95**

IM-2262 SPECIFICATIONS: Maximum Allowable Input: Voltage: 1000 VDC or VDC plus peak AC (On AC voltage, 750 VAC or 1000 VDC plus peak AC, limited to 10(6) V-Hz), except 350 VDC or DC plus peak AC momentary (On AC voltage, 250 VAC or 350 VDC or DC plus peak AC momentary) on 200 mV and 2 V ranges; **Current:** 2 A on 200 μA-2000 mA ranges; 10 A (20 A for 30 sec.) on 10 A range; **Resistance:** 350 VDC plus peak AC or 250 VAC. **Diode Test:** Forward and reverse conduction.

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



IM-2260 for excellent low-priced performance

NOW ONLY
$119.95

- **Compact, lightweight, 3½-digit multimeter features good performance over many ranges**
- **Measures 1 mV to 1000 VDC (750 VAC), 1 mA to 10 Amps and 1 ohm to 20 Megohms, also performs diode test**
- **Attractively-styled, low-profile cabinet**

Many capabilities at a low price: The IM-2260 Portable Digital Multimeter is one of the best bargains available on the market. This versatile instrument tests DC voltage (in four ranges up to 1000 Volts), AC voltage (in four ranges up to 750 Volts), DC and AC current (in five ranges up to 10 Amps) and resistance (in five ranges up to 20 Megohms).

Special measuring features: Checks of forward conducting voltage and reverse leakage resistance help determine whether a semiconductor is good or bad. Low 0.2 Volt resistance test voltage (2K-2000K ranges) allows accurate in-circuit resistance checks.

Features state-of-the-art LSI measuring circuitry: A special MOS/LSI (metal oxide semiconductor/large scale integration) integrated circuit contains all of the IM-2260's measuring and display circuits. This advanced, reliable circuitry helps ensure more accurate and stable readings.

Also has automatic polarity indication and automatic decimal point placement: Pushbutton switching and a special color-coded front panel add convenience. Built-in references ensure accurate calibration.

Well-protected: Input protection provided on all functions. Voltage ranges protected to 1000 V. Current functions (except 10A range) protected by diode and fuse circuits. Resistance ranges protected to 350 V. Fully isolated circuitry allows floating measurements up to 500 V (peak) from earth ground.

Features attractive styling: The cabinet has a carrying handle which doubles as a stand which can position the LED display at a convenient viewing angle.

Available in money-saving kit form, or fully assembled: The easy-to-build IM-2260, as well as the factory assembled and tested SM-2260, uses six 1.5 VDC carbon-zinc, alkaline or nickel-cadmium "C" cells (not included). Both versions can also run on 120 VAC with optional PS-2404 Battery Eliminator (see page 59). Battery test function helps ensure more accurate measurements by monitoring internal battery voltage. A built-in circuit charges nickel cadmium batteries. This Heathkit product measures 3" H x 8.5" W x 11" D.

SAVE $5.00! Kit IM-2260, 5 lbs. ..... **Was $124.95, NOW ONLY 119.95**

SM-2260, Assembled and tested, Shpg. wt. 4 lbs. **179.95**

IM/SM-2260 SPECIFICATIONS: Voltage: Ranges: 2, 20, 200 and 1000 VDC; 2, 20, 200 and 750 VAC. **Accuracy:** DC, ±0.5%, ±1 count; AC (50 and 60 Hz), ±1.0%, ±1 count (referenced to 60 Hz reading). **Frequency Response:** 40 Hz to 1 kHz, ±0.5%. **Input Impedance:** 10 megohms (for AC, shunted by approximately 100 pF). **Current: Ranges:** 2 mA, 20 mA, 200 mA, 2000 mA, 10 Amps. **Accuracy:** DC, ±1.5%, ±1 count (except ±3.5% on 10 Amp range); AC, ±2.0%, ±1 count (except ±4.0% on 10 Amp range), 40 Hz to 1 kHz. **Resistance: Ranges:** 2 kilohms, 200 kilohms, 2000 kilohms, 20 Megohms. **Accuracy:** ±0.25%, ±1 count, except ±0.5% on 20 Megohm range.

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

Accurate, affordable IM-2215 Hand-Held DMM

$99.95 Kit

- **Measures AC and DC voltage, current, resistance**
- **Has built-in references for in-field calibration**
- **Large, easy-to-read 3½-digit LCD display**

Here's the hand-held portable digital multimeter you need – at a great low price!

Designed to test semiconductors: Special full-scale alternating high-to-low test voltage, available through all six ranges, makes the IM-2215 ideal for testing semiconductors and in-circuit resistance.

Easy one-hand operation: Pushbutton switching and built-in calibration references make the IM-2215 ideal for in-the-field use. The 3½-digit liquid crystal display (LCD) features large, easy-to-read digits, automatic polarity indication and automatic decimal point placement for fast measurements.

State-of-the-art measuring circuitry: High-sophisticated dual-slope, analog-to-digital conversion circuitry is contained in one MOS/LSI integrated circuit. This circuitry provides accurate and stable performance in all modes.

Double protection for the IM-2215 and your circuits: All measurement functions are protected by fuse and diode against overloads and transients. Voltage and current inputs are separated to provide extra protection to the instrument and the circuitry being tested.

Use long-lasting battery power or line current: Special low current drain design allows up to 200 hours of operation on one 9 VDC cell (not included). Battery condition is continuously monitored, with a "Lo-Bat" warning displayed during the last 20% of battery life. Also operates on 120 VAC with optional PS-2350 Battery Eliminator (below). Includes pivoting stand; places the display at a convenient angle for bench use. 2" H x 3.5" W x 7.5" L.

Kit IM-2215, Shpg. wt.2 lbs. **99.95**

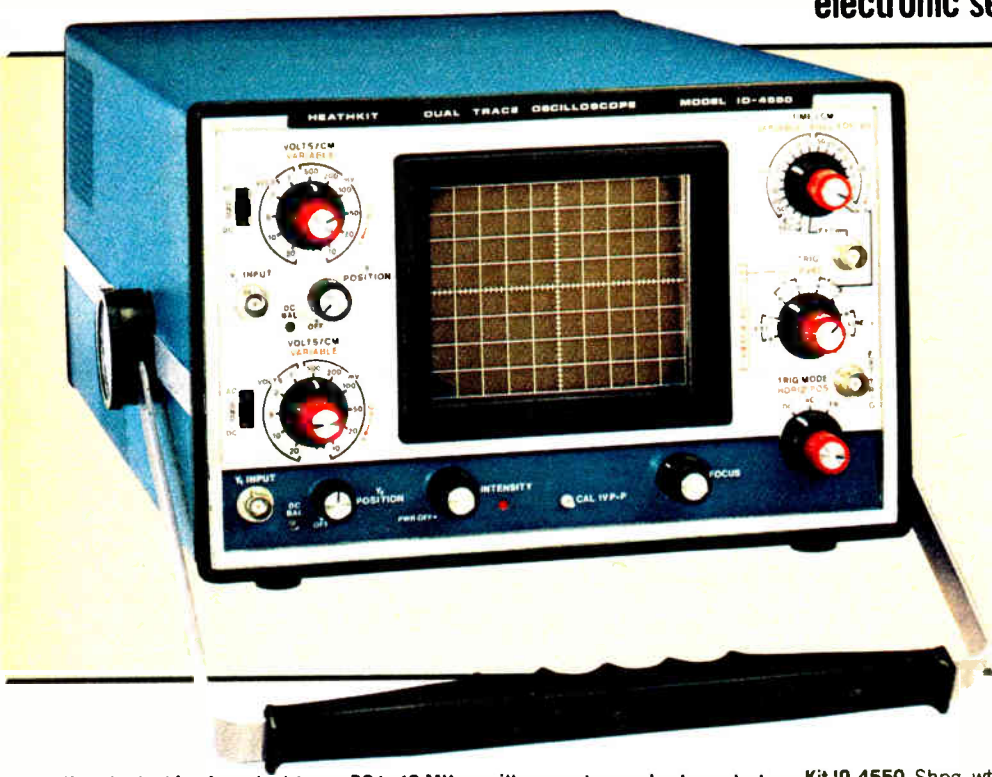
SM-2215, Assembled and tested, Shpg. wt. 2 lbs. **129.95**

IMA-2215-1, Rugged Leather Carrying Case with belt loop, 1 lb. **14.95**

PS-2350, 120 VAC Battery Eliminator, Shpg. wt. 1 lb. **7.95**

IM/SM-2215 SPECIFICATIONS: Voltage: Ranges: DC, 200 mV, 2 V, 20 V, 200 V, 1000 V; AC, 200 mV, 2 V, 20 V, 200 V, 750 V (rms). **Accuracy: Lab Standards:** DC, ±0.25% of reading + 1 count (SM-2215, ±0.1%); AC, ±0.5% of reading + 3 counts. **Built-in Standards:** DC, ±0.35% of reading + 1 count; AC, ±0.6% of reading + 3 counts. **Input Impedance:** 10 megohms (shunted on AC by approximately 100 pF). **Frequency Response for AC Measurements (25 deg. C, + 10 deg. C):** On 200 mV, 20 V and 200 V ranges, 40 Hz-1 kHz (± 1% of reading – 3 counts); on 2 V and 750 V ranges, 40 Hz-400 Hz (± 1.5% of reading – 3 counts). **Current Ranges:** DC, 2 mA, 20 mA, 200 mA; AC, 2 mA, 20 mA, 200 mA, 2000 mA. **Accuracy:** DC, ±0.75% of reading + 1 count (SM-2215, ±0.35%); AC, 2 mA range, ±1.5% of reading + 3 counts, 40-200 Hz; other AC ranges, ±1.5% of reading + 3 counts, 40 Hz-1kHz. **Resistance: Ranges:** 200.2K, 20K, 200K, 2M, 20M, ±0.25% of reading + 1 count (SM-2215, 2K-2M; ±0.15%). 20 Megohms range, ±2% of reading + 1 count.

The high-performance Heathkit IO-4550 Dual-Trace 10 MHz Oscilloscope is the ideal scope for your electronic servicing and design work



- Value-packed oscilloscope has a full set of performance-enhancing features
- Features CRT with brighter trace for easier reading in both ambient light conditions, faster writing speed
- Two vertical input channels, each with maximum input sensitivity of 10 mV/cm
- Sensitivity adjustable from 10 mV/cm to 20 V/cm with 1-2-5 attenuator
- Has 19 calibrated time base steps — ranging from 200 nS/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, level control allow precise triggering at any point on the positive or negative slopes of the trigger signal
- A calibrated 1 Volt peak-to-peak square wave signal is available at the IO-4550's front panel, to make probe compensation easier
- Mu-metal shielding eliminates errors caused by electromagnetic interference
- Fully-regulated high-voltage power supply provides more reliable, repeatable readings
- Just four printed circuit boards mean faster, easier assembly of this Heathkit product

If you're looking for a dual-trace, DC to 10 MHz oscilloscope to round out your test bench, look no farther. The IO-4550's extra-bright trace allows easy reading, even in high ambient light conditions. 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. Facilities are included to help determine the frequency of a waveform. X-Y operation helps assure accurate phase measurements.

The IO-4550's digitally-controlled time base provides automatic triggering, so no stability control is necessary and fewer adjustments are required. 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.

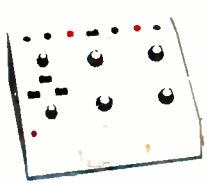
The IO-4550 will be a welcome addition to your test bench. Order it for your service work, experimentation or design work today. The IO-4550 can be wired for either 120 or 240 VAC. Calibration requires a precise source of square waves, such as the IG-4505 (page 65). To add to this oscilloscope's versatility, see the assembled PKW-105 X1/X10 Scope Probe (also on page 65).

Kit IO-4550, Shpg. wt. 27 lbs. **459.95**

Assembled and tested version of IO-4550.
SO-4550, Assembled, Shpg. wt. 25 lbs. **695.95**

IO/SO-4550 SPECIFICATIONS: VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm-20 V/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%. **Attenuator: Vertical Input: Impedance:** 1 megohm, shunted by 38 pF. **Maximum Input:** 400 Volts peak, combined AC and DC. **Connector:** BNC. **Modes:** Single, Y1 or Y2 selected by position control; Dual, Chopped (200 kHz) or alternate automatically selected by time/cm switch. **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. **Polarity:** Positive input causes right-hand deflection. **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. **GENERAL: Operating Temperature Range:** 50-104 degrees F (10-40 degrees C). **Power Supplies:** Fully regulated. **Power Requirement:** 120/240 VAC, 50/60 Hz, 70 Watts. **Overall Dimensions:** 6.93" H x 12.88" W x 19.25" D (17.6 x 32.71 x 48.89 cm), without handle.

Curve Tracer tests semiconductors



The IT-3121 lets you inspect bipolar transistors, diodes, SCRs, triacs, FETs and other semiconductors for use in specific applications. Extensive manual tells how to interpret displays. Extra leads included. Requires DC-5 MHz oscilloscope for proper operation. For 120/240 VAC power. Dimensions, 4.5" H x 11.25" W x 10" D. Step-by-step instructions make this Heathkit product easy to build.

Kit IT-3121, Shpg. wt. 10 lbs. **124.95**

Accurate Diode/Transistor/FET Tester

Use the IT-3120 to test conventional (bi-polar) transistors, diodes, field-effect transistors (FETs), SCRs, triacs and unijunction transistors. Test in or out of circuit. Shows gain (DC beta), transconductance (Gm), leakage current. Sturdy metal case. Uses two 1.5 VDC "D" cells (not supplied). Overall Dimensions of the Heathkit IT-3120 Diode/Transistor/FET Tester are 5" H x 9.44" W x 8.13" D.

Kit IT-3120, Shpg. wt. 5 lbs. **79.95**

Logic Probe for TTL, CMOS circuits

The Heathkit IT-7410 Logic Probe 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 nS, and shows intermediate or "bad" logic levels. Includes 34" power leads and a detachable high-frequency ground clip. This useful, easy-to-assemble Heathkit instrument measures 0.75" H x 1" W x 9.25" L (1.91 x 2.54 x 23.50 cm).

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

VISA MasterCard **Credit Card Orders Call TOLL-FREE: 800-253-0570**

Get dual-trace capability, extra-value features at an economical price with the Heathkit IO-4205

- **Compare two signals simultaneously for added versatility**
- **Outstanding 10 mV/cm vertical sensitivity for most applications**
- **Stable triggering circuit for solid waveform displays**
- **Extra stability from a fully-regulated power supply**
- **Seven switchable, calibrated time bases (200 mS/cm to 0.2 uS/cm)**

Dual-trace capabilities at a single-trace price: Put the dual-trace DC to 5 MHz IO-4205 Oscilloscope to work for you, handling the sophisticated needs of today's electronic technician! This versatile Heathkit oscilloscope lets you compare two signals simultaneously for input-output comparisons, checking phase relationships and many other functions.

Versatile triggering capabilities: You can select an external time base, or one of seven calibrated internal time bases from 200 milliseconds/centimeter to 0.2 microseconds/centimeter. A special TV position on the trigger selector control allows low frequencies to pass – while high frequencies are rejected, so the IO-4205 can easily trigger on the vertical component of a complex television signal. A stable triggering circuit (not the recurrent-type sweep usually found on other oscilloscopes in this price range) contributes to the IO-4205's solid waveform displays.

Vertical input sensitivity is an excellent 10 mV/cm. And 11 calibrated attenuator positions, up to 20 V/cm, will accommodate a wide range of inputs.

High-quality, easy-to-read CRT: Accurate measurements can be easily made on the bright, 8 x 10 cm CRT screen.

Extra-value features provide stable measurements: The IO-4205's fully-regulated power supply provides 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.

Easy-to-build, easy-to-use: 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. To calibrate the kit version of this Heathkit oscilloscope, the IG-4505 Deluxe Oscilloscope Calibrator (offered below) is required. Both the kit and assembled versions of the IO-4205 Oscilloscope operate on 120/240 VAC, 50/60 Hz line current – drawing just 50 Watts of power.

Dual-Trace Oscilloscope Kit.
Kit IO-4205, Shpg. wt. 25 lbs. **349.95**
Assembled and tested Dual-Trace Oscilloscope.
SO-4205, Shpg. wt. 20 lbs. **495.95**

IO/SO-4205 SPECIFICATIONS: VERTICAL: Bandwidth: DC to 5 megahertz, ±3 d8. **Sensitivity:** 10 millivolts/centimeter. **Attenuator:** 1-2-5 sequence, calibrated and variable. **Rise Time:** 70 milliseconds. **Overshoot:** Less than or equal to 5 percent at 1 kilohertz. **Impedance:** 1 megohm, shunted by 38 picofarads. **Sweep: Type:** Triggered. **Range:** 200 milliseconds to 0.2 microseconds in seven steps, plus variable. **Trigger Source:** Y1, Y2, External, Line. **Trigger Modes:** AC, DC or TV; plus or minus slope; automatic or normal. **HORIZONTAL: Sensitivity:** 0.1 Volt/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 centimeters viewing area, blue-green medium-persistence phosphor, 5-inch round flat-face tube. **Accelerating Potential:** Approximately 1.6 kilovolts. **Graticule:** Screened, 8 x 10 centimeters. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Overall Dimensions:** 8" H x 13" W x 17" D (20.32 x 33.02 x 43.18 cm).

Low-priced, professional DC-5 MHz Oscilloscope

- **External or seven internal time bases**
- **10 mV/cm vertical input sensitivity – ideal for most applications**
- **Regulated low-voltage power supply, mu-metal shielding provide stability**
- **Extra-bright 8 x 10 cm CRT screen**

Ideal for single-trace scope applications: Here's your chance to put a professional DC-5 MHz single-trace oscilloscope on your test bench at traditional Heathkit savings.

Easy triggering, solid waveforms: The IO-4105's triggering circuit and fully-regulated low-voltage power supply help provide stable waveform displays. And it can trigger on the vertical component of a complex television signal, thanks to a special feature of the trigger selector control that allows low frequencies to pass – while high frequencies are rejected.

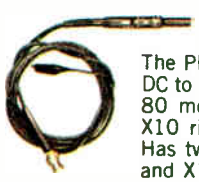
Use internal or external time bases: Internal time bases can either be variable, or in one of seven steps ranging from 200 mS/cm to 0.2 uS/cm. External inputs from DC to 1 MHz are accepted by the horizontal amplifier.

Excellent vertical input sensitivity: Rated at 1 mV/cm. Combined with attenuation up to 20 V/cm, the IO-4105 accepts a wide range of inputs.

Calibration required; use the IG-4505 Deluxe Oscilloscope Calibrator below, right. For 120/240 VAC. 8" H x 13" W x 17" D.

Kit IO-4105, Shpg. wt. 25 lbs. **269.95**

Useful X1/X10 Scope Probe



The PKW-105 Scope Probe covers DC to 15 megahertz (X1) and DC to 80 megahertz (X10) bandwidths. X10 rise time, 4.0 nanoseconds. Has two-position multiplier for X1 and X10 probe tip. Compensation range of 15 to 50 picofarads. This product includes a 4.5-foot cable and probe with three-position slide switch.

PKW-105, Assembled and tested, Shpg. wt. 1 lb. **29.95**

Handy oscilloscope accessories

Low-Capacitance Probe for direct or X10 operation. 3.3 or 1 megohm input resistance. Banana plug/BNC wiring.

Kit PK-1, Shpg. wt. 1 lb. **14.95**

Demodulator Probe: Use to check RF, IF distortion. Maximum input: 500 VDC, 30 VAC rms. Banana plug/BNC wiring.

Kit 337-C, Shpg. wt. 1 lb. **12.95**

Deluxe Oscilloscope Calibrator

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

Kit IG-4505, Shpg. wt. 4 lbs. **59.95**

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

Introducing Heath/Zenith's newest, most powerful computer — The H/Z-100 Series — now

NEW

As low as

$2199.00 Kit

for low-profile model

This complete 16-bit/8-bit desktop computer includes two sophisticated microprocessors, super-high memory capacity, industry-standard S-100 expansion bus, a 320 KB disk drive, easy-touch keyboard and low-maintenance design — all in a durable earthtone-color cabinet!

Look at everything the H/Z-100 Series offers:

- **Runs both 16-bit software and 8-bit software, at very fast speeds**
- **Expanded memory capacity — up to an incredible 768K bytes of RAM!**
- **Both serial and parallel I/O ports for telecommunications extendability**
- **Color, monochrome video capabilities**
- **Add optional 8" floppy disk drives — or an internal Winchester disk drive (to be available in early 1983)**
- **A soft-sectored 5.25" floppy disk drive, with 320 KB capacity, built-in**
- **High-efficiency power supply saves energy, helps computer run cooler for added life**

[1] ZF-120-22, shown with two disk drives

Offers outstanding performance for everyone: Those with little or no computer experience will appreciate the H/Z-100's ease of operation and the time-saving, money-saving advantages it provides. Those with programming experience and the need to use more advanced languages will enjoy our newest, most capable computer's power and versatility.

Dual microprocessors to run more advanced software: To run today's higher-speed, higher-performance 16-bit software programs, you need an H/Z-100 Series computer. Its advanced 8088 microprocessor makes a significant difference by processing information in great detail with astonishing speed.

Most existing programs won't become obsolete, either, because the H/Z-100 also handles 8-bit software programs with an 8085 microprocessor – including many current Heath/Zenith software programs.

Many software programs now available from Heath/Zenith: You can obtain both 16-bit and 8-bit software programs to run on your H/Z-100 Series Computer. The 16-bit programs, including the Z-DOS Operating System, Z-BASIC Color Language and Microsoft Multiplan Electron Spreadsheet, are shown on page 67. Software for the H/Z-100's 8-bit side is described on pages 67 and 74-77.

Has 128K bytes of Random Access Memory to handle larger software programs: With the H/Z-100 Series Computers, you get real power to answer those bigger, more comprehensive questions. Its standard 128K RAM complement is expandable to over three-fourths of a megabyte (768K bytes) – compared to a 64K RAM standard for many desktop computers.

Supports video graphics for beautiful presentations: The H/Z-100 gives you everything needed to support the high-impact graphics capability that many business presentations demand. On the H/Z-100's 640 x 225 pixel video screen you can create extensive charts, graphs and symbols for reports and other documents.

Designed to grow as your computing needs grow: There are card slots available internally in the H/Z-100, allowing the system to support memory expansion and additional peripheral devices as your needs change. This allows your investment to grow, decreases the chance of obsolescence and increases future upgradability of the system.

Three input/output ports for total communications flexibility: The H/Z-100 lets you access a world of information. Two RS-232C Serial ports and one parallel interface port provide almost limitless communications capabilities. You can plug in dot matrix and letter-quality printers; using a modem and a telephone, you can communicate with other computers, word processors, bulletin boards, data banks, printers and other data communications devices.

High-capacity disk drive: A 5.25" floppy disk drive with 320K bytes of data storage capacity, eliminates the need for an external disk drive. You get faster access speed and real portability.

Add most any optional 8-inch floppy disk drive: The H/Z-100 Series Computers' standard disk controller can also address 8" floppy disk drives using softsectored disks in the IBM 3740 format.

Optional Winchester disk drive (available early 1983) provides built-in big job capacity: Replacing one of the H/Z-100's 5.25" floppy disk drives, the optional Winchester drive provides the multi-megabyte data storage capacity needed for large accounting, inventory or technical jobs that used to require an expensive minicomputer system.

High-efficiency power supply saves energy, provides quieter operation: Lower power usage allows you to add more accessories to the H/Z-100.

New kit versions are easy to build! Step-by-step Heathkit manuals show you the way. And many components are pre-assembled for faster kitbuilding.

[1] **All-In-One H/Z-100 Series Computer:** Features 16-bit (8088) and 8-bit (8085) microprocessors to run both new 16-bit and most existing 8-bit Heath/Zenith software programs, a five-slot IEEE-696 (S-100) expansion chassis (disk controller occupies one slot), built-in soft-sectored 5.25" disk drive, built-in high-resolution 12" diagonal monochrome video display, monochrome graphics with 144,000 dots, and professional typewriter-style keyboard – in a single housing!

Add Z-219-1 Color Video RAM (p. 67) and ZVM-134 Color Monitor (p. 72) for color graphics. 120/240 VAC. 13½" H x 19½" W x 19½" D.

Heathkit **NEW! Kit HSA-120-21,** non-glare amber CRT, 125 lbs. . . **2349.00**

Heathkit **NEW! Kit HSG-120-21,** non-glare green CRT, 125 lbs. . . . **2349.00**

Heathkit **NEW! Kit HSW-120-21,** non-glare white CRT, 125 lbs. . . **2349.00**

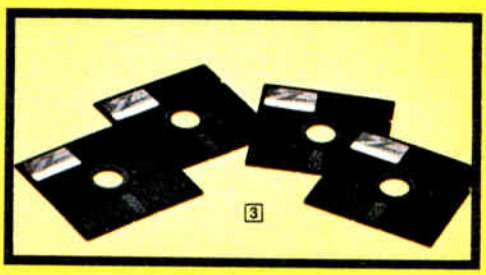
Zenith data systems **ZF-120-22,** Assembled and tested All-In-One Z-100 Computer with non-glare green CRT and two 5.25" disk drives, Shpg. wt. 68 lbs. **4099.00**

VISA MasterCard **Credit Card Orders Call TOLL-FREE: 800-253-0570**

available in both easy-to-build kit and assembled form!

2 (Shown with optional ZVM-121 High-Resolution Monochrome Video Display)

Can also be used with optional High-Resolution Color Video Display (p. 72)



3

Low-profile H/Z-100 Series Computer

Compact (under 8" high), yet powerful: Add the optional ZVM-121 Monochrome Video Display (p. 72) – or for exciting color graphics, add the optional ZVM-134 Color Video Display (p. 72; requires Z-219-1 Color Video RAM on some models). For 120/240 VAC, 50/60 Hz power. 7⅛" H x 19" W x 19½" D.

2 **ZF-110-22,** Assembled Low-Profile Computer with color graphics capability (has two Z-219-1 Video RAM Sets below), 128K RAM and two 5.25" floppy disk drives for 640K bytes of on-line storage, 62 lbs. **3999.00**

NEW! ZF-100-21, Assembled Low Profile Computer with monochrome graphics capability, 128K RAM and one 5.25" disk drive, 49 lbs. **3249.00**

NEW! Kit HS-100-21, Low-Profile Computer Kit with monochrome graphics capability, 128K RAM and one 5.25" disk drive, 91 lbs. **2199.00**

Z-205-1, Memory Upgrade Kit (upgrades H/Z-100 Series Computers from 128K bytes to 192K bytes of RAM, Shpg. wt. 1 lb. **180.00**

Z-219-1, Color Video RAM Chip Set (two sets needed to provide HS/ZF-100 and HS/ZF-120 computers with color capability), 1 lb. **160.00**

NEW! Z-207-3, Second Disk Drive for kits and ZF-100-21, 5 lbs. ... **395.00**

SAVE $95! When purchased with computer **300.00**

H/Z-100 SERIES SPECIFICATIONS: DATA STORAGE: Disk Controller: Standard Z-207 Controller, supporting both 5.25" and 8" drives simultaneously. Two 320 KB 5.25" floppy disk drives standard; 8" floppy disk drives optional; optional 5 megabyte Winchester disk drive available in early 1983. **EXPANSION:** Five IEEE-696 (S-100) standard card slots available for expansion. Disk controller occupies one S-100 slot. **DISPLAY: Display Format:** 24 lines x 80 characters, plus 25th line for user information. 225 lines of 640 dots in graphics mode. **Character Set:** 128-character ASCII set, upper and lower case. **Character Type:** 8 x 9 dot character block (0.2" H x 0.1" W), definable to other values using software. **Color:** Red, green, blue, white, black, cyan, magenta and yellow. Color memory RAM standard in Z-110, optional in H/Z-120. **Cursor:** Blinking, underline or reverse video. **Cursor Addressing:** Relative and direct. **Tab:** Eight columns, software-addressable. **Video:** Normal or reverse video, by character. **Video Output:** Z-110, RGB; H/Z-120, monochrome std. **KEYBOARD: General:** Sculptured, typewriter-style keyboard with 108 keys. **Numeric Keypad:** 18 keys (including cursor control keys). **Special Function Keys:** 13. **INPUT/OUTPUT PORTS: Serial I/O:** Two EIA RS-232C serial interface ports, at 110 to 38,400 baud. **Parallel I/O:** Centronics-compatible printer port with a 25-pin D connector.

3 Software for the H/Z-100 Series Computers

H/Z-100 software is supplied in soft-sectored 5.25" floppy diskette form, with operating manual included.

H/Z-100 16-Bit and 8-Bit Starter Package: Z-DOS and CP/M-85 Operating Systems, Microsoft BASIC/Z-BASIC Languages and Multiplan Spreadsheet.
ZSS-100-1, 26 lbs. ..... **$900.00 separately, ONLY 500.00**

Z-100 16-Bit Starter Package: Includes Z-DOS 16-Bit Disk Operating System, Z-BASIC Language and Multiplan Electronic Spreadsheet.
ZSS-100-2, 18 lbs. ..... **$575.00 separately, ONLY 350.00**

Z-DOS 16-Bit Operating System: Z-DOS (also known as Microsoft MS-DOS and IBM PC-DOS) lets you run advanced programs (like Multiplan, Microsoft BASIC and Z-BASIC) – and many IBM PC programs – on the H/Z-100. Has device-independent I/O, advanced error recovery, variable-length records, full program relocatability.
OS-63-4, Shpg. wt. 5 lbs. **150.00**

CP/M-85 8-Bit Operating System: Use of CP/M-85 on the H/Z-100 makes use of many current 8-bit software programs possible. Has capabilities of CP/M-80 (page 20), and features fast running speed.
DS-53-2, Shpg. wt. 5 lbs. **150.00**

Microsoft BASIC Interpreter: See page 76 for full details on this powerful programming language. Requires CP/M-85 Operating System above.
MS-253-1, Shpg. wt. 3 lbs. **175.00**

Z-BASIC Color Language: An extended version of the Microsoft BASIC Language Interpreter above, fully utilizing the color capabilities of the H/Z-100 Series Computers. Requires Z-DOS Operating System above.
MS-463-1, Shpg. wt. 5 lbs. **175.00**

See many more H/Z-100-compatible software programs, including the Microsoft Multiplan 16-bit Electronic Spreadsheet, on pages 74-77.

H-100 Computers are FCC Class B Certified for home and business use. Z-100 Computers are Class A Certified for commercial use. Z-100 use in residential areas may require correction of radio/TV interference.

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

Choose an H-89 All-In-One Computer to fit your needs — and save $300!

A complete microcomputer system in one convenient package, the H-89 All-In-One Computer includes two powerful microprocessors, a professional video terminal, a built-in 5.25-inch floppy disk drive for convenient data storage and three RS-232C Serial Interface Ports for telecommunications extendability!

NOW AS LOW AS
$1399.00 Kit

- **48K bytes of Random Access Memory (RAM) power standard — expandable to 64K bytes**
- **CP/M-capable — without modifications**
- **Choose from anti-glare or standard CRT screens**

Two separate Z-80 microprocessors are built into the H-89: Separate microprocessors for the computer and video terminal mean they never have to share processing power — enabling the computer to process information at higher speeds.

Three RS-232C Serial Interface Ports are standard: The built-in EIA Standard Three-Port Serial Interface lets you add more peripherals (such as printers and modems) to your All-In-One Computer.

Optional disk controller increases storage capacity: The H-89's built-in 5.25-inch floppy disk drive can store up to 100K bytes of data on a single disk. With the optional Z-89-37 Soft-Sectored Disk Controller Board (page 69), you can expand the built-in storage capacity to 160K bytes per disk.

If you need more storage, buy the external disk system that fits your needs: The H-77/Z-87 Floppy Disk System (shown on page 69) can provide up to 200K bytes of on-line data storage, using the H-89's standard hard-sectored disk controller board (up to 320K bytes, using the Z-89-37 Disk Controller Board). Depending on the controller board used, the H-77/Z-87 can use hard- or soft-sectored disks.

The H-37 Floppy Disk System (also shown on page 69), which uses the Z-89-37 Disk Controller Board and soft-sectored disks, can provide significantly more data storage — up to 1.28 megabytes (640K bytes per drive — using one standard H-17-4 Drive and one optional drive).

Use the All-In-One as a professional video terminal (with appropriate software): It has all display functions of the H-19 Smart Video Terminal (shown on page 72). Up to twenty-four 80-character lines can be displayed on the 12" diagonal CRT screen, as well as a software-controlled 25th line.

Typewriter-format professional keyboard: Controls all terminal functions. The keyboard can display the entire ASCII character set, both upper and lower case — along with 33 graphics symbols.

Select baud rates up to 9600 through the keyboard: Control 32 functions from keyboard or computer. Direct cursor addressing lets you insert or delete characters anywhere. Use reverse video to add emphasis by reversing white on black.

H-89A SPECIFICATIONS: CPU AND MEMORY: Clock: 2.048 MHz. **Memory:** 8K bytes used by system for ROM and RAM; 8K reserved. **VIDEO TERMINAL: CRT: Display Size:** 6½" H x 8½" W (16.51 x 21.59 cm). **Character Size:** Approximately 1/5" H x 1/10" W (0.51 x 0.25 cm). **Character Type:** Upper case and lower case without descenders, 5 x 7 dot matrix; Lower case with descenders, 5 x 9 dot matrix; Graphics, 8 x 10 dot matrix. **Keyboard:** 84 keys (60 alphanumeric keys and 12 function/control keys) — plus a 12-key numeric/control pad. **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:** 60 Hz at 60 Hz line frequency, 50 Hz at 50 Hz line frequency. **Edit Functions:** Insert and delete character or line. **Erase Functions:** Erase line or page, from beginning of line or page, to end of line or page. **Bell:** Audible alarm on receipt of ASCII BEL. **Video:** Normal and reverse, by character. **ACCESSORIES: Interfacing:** Three EIA Standard RS-233C Serial Interface Ports are provided. **GENERAL: Operating Temperature Range:** 50-95° F (10-35° C). **Power Requirement:** 120/240 VAC, 50/60 Hz, 90 Watts. **Dimensions:** 13" H x 17" W x 20" D (33.02 x 43.18 x 50.8 cm).

Kit and assembled products are available

Heathkit computer

Kit computer products are sold under the Heathkit name, and meet Federal Communications Commission requirements for use in residential areas.

Zenith data systems

Most of the fully assembled and tested computer products shown in the pages of this catalog are offered to you under the Zenith Data Systems name.

Calculator-format 12-key numeric pad: Makes entering arithmetic programs faster. Shifted functions give you control to make insertions or deletions.

Save when you buy the H-89 All-In-One Computer: And if you plan to use the computer for business purposes, ask your tax advisor about possible tax credits which could provide additional savings.

SAVE $496 on H-89 Computer Kits: With 48K RAM, 100 KB disk drive, single-density disk controller and up to $985 in software at no extra charge (see below).

Heathkit **Kit HS-89-2,** with anti-glare green CRT, Shpg. wt. 96 lbs. ..... **Was $1925.00, NOW ONLY 1429.00**

Heathkit **Kit HS-89-3,** with standard white CRT, Shpg. wt. 96 lbs. ..... **Was $1895.00, NOW ONLY 1399.00**

Get software at no extra charge!

Choose three of these programs when you buy an H-89: HDOS or CP/M; Microsoft BASIC Interpreter, Compiler; FORTRAN; COBOL; Magic Wand; SuperCalc. (Applies only to single-quantity purchases.)

Accessories for H/Z-89 and Z-90 Computers

Assembled 64K RAM Expansion Kit: Expands 48K H/Z-89s to 64K.
WH-88-16, Assembled, Shpg. wt. 1 lb. **115.00**

16K RAM Expansion Kit: Expand converted H-19 Terminals, older H/Z-89 Computers in 16K increments — up to 48K bytes of RAM.
H-88-2, Shpg. wt. 1 lb. **29.00**

Three-Port RS-232C Serial Interface: For older H/Z-89s.
HA-88-3, Shpg. wt. 2 lbs. **150.00**

H-88-5, Cassette Interface, 2 lbs. **49.00**

Wire Wrapping Board w/bus connectors: Make custom circuits. Takes 48# 16-pin sockets (54# 14-pin, others). Uses HCA-6, HCA-7 below.
Kit H-88-10, Shpg. wt. 1 lb. **30.00**

Wire Wrapping Kit: Wire wrapping tool, 50' wire, 200 pre-cut, pre-stripped wires (50 each in 1", 2", 3" and 4" lengths).
Kit HCA-6, Shpg. wt. 1 lb. **13.95**

Wire Wrapping Socket Kit: 36# 3-level sockets (14- to 40-pin).
Kit HCA-7, Shpg. wt. 1 lb. **29.95**

Dust Cover: Protects H/Z-89s, H/Z-19s from airborne contaminants.
HCA-5-89, Shpg. wt. 1 lb. **14.00**

VISA MasterCard **Credit Card Orders Call TOLL-FREE: 800-253-0570**

Increase the disk storage capacity of your H/Z-89 or Z-90 Computer

Add up to 1.28 megabytes of on-line disk storage: Designed especially for use with the H/Z-89 and Z-90 Computers, these external floppy disk systems give you even more flexibility in configuring the amount of disk storage you need for your computer system applications.

Your choice of data storage capacity: The H-37 provides up to 1.28 megabytes of additional data storage – while the H-77/Z-87 provides up to 320K bytes.

Use up to three drives in your system: When you use one of these systems with your H/Z-89 or Z-90, you have room for up to three 5.25-inch disk drives on a single controller board. With multiple drives, you can mount operating system and program disks at the same time. And because these peripherals work with the H/Z-89 and Z-90, your system will work harmoniously.

Space-saving design: Each 5.25" floppy disk drive installs vertically into the durable metal cabinet, so the H-37 and H-77/Z-87 systems take up less space than units with horizontally-mounted disk drives.

The H-37 features high-capacity disk drives: Its double-sided 96 tpi disk drives provide up to 6.4 times the storage capacity of our single-sided 5.25-inch drive: Store up to 640K bytes per drive – for a total capacity of up to 1.28 megabytes! For easier kitbuilding, the disk drives are assembled and tested.

Enhanced software capabilities: With the double-sided H-37's greater data storage ability (double the capacity of single-sided 5.25-inch disk drives), you can more fully utilize most of our software programs. Many software packages are available on soft-sectored 5.25-inch floppy disks, compatible with the H-37. See pages 74-77 for more details.

Field-proven H-77/Z-87 available: Using single-sided 5.25" disk drives, this reliable data storage system is available with one or two drives – to provide up to 200K bytes of data storage (up to 320K bytes of data storage when the Z-89-37 Soft-Sectored Disk Controller Board is used).

Compatible disk controller boards: The H-77/Z-87 Floppy Disk System can run from either the H-88-1 Single-Density Disk Controller Board (standard with H/Z-89 Computers) or the Z-89-37 Double-Density Disk Controller Board (standard with Z-90 Computers; with H/Z-89s, see below). The H-37 Floppy Disk System requires the Z-89-37 Controller Board.

Easy ordering method: Use the configuration and ordering charts (below, right) to order the H-37 or H-77/Z-87 Floppy Disk System that's right for you.

Designed for 120/240 VAC, 50/60 Hz power, the H-77/Z-87 and H-37 Floppy Disk Systems are housed in a structural foam cabinet matching the decor of the H/Z-89 and Z-90, measuring 8⅝" H x 8⅞" W x 15" D (21.92 x 22.56 x 38.1 cm).

The Heath H-37, H-77 and Zenith Data Systems Z-87 Floppy Disk Systems are FCC Class B Certified for normal use in homes or businesses.

Disk storage accessories

Soft-Sectored Disk Controller Board for H/Z-89 Computers: Increases data storage capacity of disk drives below.
Z-89-37, Assem., 4 lbs. **299.00**

Hard-Sectored Disk Controller Board for H/Z-89 Computers: Use only with H-17-1 Single-Sided Floppy Disk Drives below.
H-88-1, Assem., 3 lbs. **150.00**

Double-Sided Floppy Disk Drive for H/Z-37 Disk Systems: Stores up to 640K bytes on a compatible disk. Requires Z-89-37 above.
H-17-4, Assem., 5 lbs. **550.00**

Single-Sided Floppy Disk Drive for H-77/Z-87 Disk Systems: Stores up to 160K bytes per disk when used with Z-89-37, 100K when used with H-88-1 Controller Board. Also for H-88, H/Z-89 and Z-90 Computers.
H-17-1, Assem., 5 lbs. **295.00**

Dust Cover: Protects H/Z-37 and H-77/Z-87 Disk Systems from airborne contaminants.
HCA-5-77, Shpg. wt. 1 lb. **14.00**

Software compatibility:

Heath/Zenith software programs are available in 5.25-inch hard-sectored, 5.25-inch soft-sectored floppy disk or 8-inch soft-sectored floppy disk formats – for use with most Heath/Zenith disk systems.

H/Z-89 Computer/5.25" Disk System Configuration Chart

System Components	Hard-Sectored Disk Storage	Soft-Sectored Disk Storage	Total Disk Storage Capacity
H/Z-89 (Note 1)	One 100 KB internal drive	—	100 KB
H/Z-89 (Note 1) H-77/Z-87 (Note 2)	One 100 KB internal drive, one or two 100 KB external drives	—	200 or 300 KB
H/Z-89 (Note 1) Z-89-37	—	One 160 KB, single-density internal drive	160 KB
H/Z-89 (Note 1) Z-89-37 H-77/Z-87 (Notes 2, 3)	One 100 KB or 160 KB internal drive	One (or two) 160 KB, single-density external drive	260 or 420 KB
H/Z-89 (Note 1) Z-89-37 H-37 (Notes 2, 3)	One 100 KB internal drive	One (or two) 640 KB, double-density external drives	740 KB or 1.38 MB

NOTES: (1) When ordering an HS-89, use -2 or -3 for desired CRT. (2) When ordering an HS-77 or HS-37, use -1 or -2 for desired number of drives. (3) H-37s require Z-89-37 Disk Controller.

How to order external 5.25" disk storage for H/Z-89s, Z-90s

Drives	Storage Capacity		Order Model		Shpg. wt.	Price
	With H-88-1	With Z-89-37				
One H-17-1 (Single-Sided	100K bytes	160K bytes	Kit HS-77-1	—	34 lbs.	525.00
Two H-17-1 (Single-Sided)	200K bytes	320K bytes	Kit HS-77-2	—	47 lbs.	795.00
			—	Z-87-89, Assem., for H Z-89	28 lbs.	999.00
			—	Z-87-90, Assem., for Z-90	28 lbs.	999.00
One H-17-4 (Double-Sided)	—	640K bytes	Kit HS-37-1	—	34 lbs.	795.00
Two H-17-4 (Double-Sided)	—	1.28 megabytes	Kit HS-37-2	—	47 lbs.	1295.00

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

[1] H-8 Computer: Immediate plug-in flexibility at a budget-pleasing price

- **8080A CPU standard – powerful Z-80 CPU available separately**
- **Fully-buffered bus with seven plug-in positions, heavy-duty power supply**
- **Large software selection available**

Meets today's needs – and tomorrow's, too: Put together almost any combination of plug-in memory, interfacing and accessory modules in the H-8's seven module positions. And choose from an expanding selection of peripherals and software for exceptional flexibility.

8080A CPU Card is pre-assembled for faster and easier kitbuilding: Includes 8080A microprocessor, clock, systems controller and ROM monitor. Exclusive fifty-pin fully-buffered bus provides room for memory and interfacing. Front panel keyboard for octal data entry. Nine-digit front panel readout monitors activity. Built-in speaker provides audible feedback and special effects. Effective convection cooling system allows the H-8 to operate quieter and cooler.

Requires 16K RAM and operating system software for normal operation.

Heathkit **Kit H-8,** Shpg. wt. 30 lbs. ..... **NO LONGER AVAILABLE**

Z-80 CPU Card: Includes a powerful H/Z-89-type Z-80 Central Processing Unit and all features of HA-8-8 Extended Configuration Option below. NOTE: Not exchangeable with 8080A CPU Card; trade-in not accepted.

HA-8-6, Assembled, Shpg. wt. 5 lbs. **199.00**

HA-8-8, Extended Configuration Option with single-button boot-up (enables the H-8 to use the industry standard CP/M-80 Operating System and the high-capacity H/Z-47 8-Inch Floppy Disk System), Assembled, Shpg. wt. 1 lb. **29.00**

H-8 SPECIFICATIONS: Microprocessor: 8080A. **Monitor:** In on-board 1K x 8 ROM. Octal addresses, data input and display from the front panel. **Interrupts:** Seven, priority-vectored. **Chassis Capacity:** Seven locations on the mother circuit board for memory and interfacing cards. Four memory cards, one bus expansion maximum. **Power Requirement:** 120/240 VAC, 50-60 Hz, 150 Watts. **Overall Dimensions:** 6.5" H x 16¼" W x 17" D (16.51 x 41.28 x 43.18 cm)

[2] **Get high data storage capacity with H-17 5.25" Floppy Disk System:** Take advantage of the hundreds of disk-based software programs available for the H-8 Computer. It stores dozens of programs on a single disk. And you can rapidly access any of those programs, whenever you need it.

The H-17 can provide up to 300K bytes of on-line data storage (using additional drives and modification kit). Data is stored on 5.25-inch, floppy disks – easier to handle and load than paper tapes or cassettes.

Includes one 100 KB disk drive, an interface/controller circuit board which plugs directly into the H-8's mainframe, a built-in power supply and one blank hard-sectored 5.25-inch floppy disk.

Requires H-8 with 48K RAM and operating system software (page 75). For 120/240 VAC, 50/60 Hz power. Draws 75 Watts. Measures 6¼" H x 13½" W x 13½" D (15.89 x 34.29 x 34.29 cm).

Kit H-17, with one drive, Shpg. wt. 28 lbs. .... **NO LONGER AVAILABLE**

Three-Drive Modification Kit for H-17: More programming versatility – increases capacity to three 5.25-inch floppy disk drives, instead of two. Includes new sheet metal and three-drive cable, fan and power supply components. Requires H/WH-17 and operating system software to operate. Drives not included.

Kit H-17-3, Shpg. wt. 10 lbs. **49.00**

Kit H-17-1, Optional Second or Third 100 KB Disk Drive, 5 lbs. **295.00**

UP TO $985 OF SOFTWARE AT NO EXTRA CHARGE!

Choose three programs when you buy a computer system: HDOS or CP/M, Microsoft BASIC Interpreter or Compiler, FORTRAN, COBOL, Magic Wand, SuperCalc. (Applies only to single-quantity purchases.)

H-8 memory, interfacing and accessories

64K Wired Random Access Memory (RAM) Board: Expand to the H-8's full 64K-byte RAM capacity on a single board. Uses less room and power than previous memory boards – so you can add more interfacing and accessories. Comes with 32K RAM standard; expand to 48K or 64K bytes with one or two WH-8-16 Expansion Sets below.

WH-8-64, Assembled, Shpg. wt. 2 lbs. **398.00**

16K Byte RAM Chip Expansion Set for WH-8-64 Memory Board: Use one or two sets to expand the WH-8-64 to 48K or 64K bytes.

HA-8-16, Shpg. wt. 1 lb. **55.00**

NEW! Soft-Sectored Floppy Disk Controller Board: Greatly expand disk storage capacity. Allows the H-8 to use the H-37 Soft-Sectored Floppy Disk System (p. 69), with up to 640 of storage per disk. Can also be used with the H-17, increasing the capacity of a single-sided, single-density 5.25" disk to 160KB. Requires HA-8-6 above.

WH-8-37, Assembled, Shpg. wt. 4 lbs. **395.00**

NEW! H-8-19, Z-80 Replacement ROM and Front Panel Keycaps allow access to all Z-80 registers without adding WH-8-37 Board, 2 lbs. **20.00**

H-8-9, PAMGO ROM for 1- or 3-button boot-up instead of 10, 1 lb. **7.00**

H-8-5, 1200 Baud Serial/Cassette Interface with one serial port for console terminal (not to connect H-8 to H/WH-14), 3 lbs. **69.00**

Music Synthesizer System: Uses two shielded cables (included) to connect to stereo. True D/A converter for 27.5-3300 Hz. freq. response, nine harmonics, four-part stereo harmony. Enter songs from sheet music – even if you don't read music. Requires H-8 with 24K RAM, H-17 and video terminal like H/Z-19.

HA-8-2, Assembled, Shpg. wt. 3 lbs. ... **NO LONGER AVAILABLE**

Wire Wrapping Board: Accepts eighty 16-pin sockets, three 50-pin flat cable connectors. Includes bus connectors, heat sink, 5V regulator and miscellaneous hardware. Uses HCA-6 and HCA-7 on p. 68.

Kit H-8-10, Shpg. wt. 1 lb. ..... **NO LONGER AVAILABLE**

H-8 Hobbyist/Word Processing System

48K RAM, 100KB disk storage, four serial interface ports. Has H-8, WH-8-64 64K Memory Board with 32K RAM, HA-8-16, H-8-4 Interface, HA-8-8, 100K-byte H-17 Disk System, H-19 Video Terminal.

SAVE UP TO $985! Select three programs at no extra charge, from the list at left. Specify model numbers when ordering.

HKS-85, Shpg. wt. 140 lbs. ..... **NO LONGER AVAILABLE**

VISA MasterCard **Credit Card Orders Call TOLL-FREE: 800-253-0570**

Choose standard or anti-glare CRTs with the H-19A Smart Video Terminal

$595.00 Kit
with standard white CRT

- **Available with anti-glare green or standard white CRT screens**
- **Z-80 microprocessor for fast data handling**
- **Heavy-duty typewriter-style keyboard with separate 12-key numeric pad**
- **Interfaces with most standard systems; also DEC VT-52 software-compatible**

Exceptional capabilities for its price: Compatible with systems using the DEC VT-52 Terminal and with other systems using an RS-232C Serial Interface, the H-19A Professional Video Terminal gives you outstanding performance. It has microprocessor intelligence for complete screen control – and it's filled with features to operate at optimum speed and efficiency.

Configure the H-19A from the keyboard – from an outside computer – or from special interior switches: 32 functions can be controlled from keyboard or computer. A 12-key numeric pad, in calculator format, makes math program entry faster and easier. Displays the entire ASCII character set, upper and lower case. Thirty-three graphics characters and eight user-function keys are also available for extra flexibility.

High-resolution video display screen: The H-19A shows 24 80-character lines (plus software-controlled 25th line). Make corrections or edit – anywhere on the screen – using direct or relative cursor addressing.

The H-19's ROM listing is available below: It helps you understand how this powerful, versatile video terminal operates – or to help you alter its personality and cursor control protocols to match those of other terminals.

Using only 45 watts of 120/240 VAC, 50/60 Hz power, the H-19A Professional Video Terminal measures 13"H x 17"W x 20"D (33.02 x 43.18 x 50.80 cm).

Professional Video Terminal with anti-glare green CRT.
Kit HS-19-2, Shpg. wt. 52 lbs. **625.00**

Professional Video Terminal with standard white CRT.
Kit HS-19-3, Shpg. wt. 52 lbs. **595.00**

Source Listings for ROM of H-19 and H-19A Video Terminals.
H-19-1, Shpg. wt. 1 lb. **25.00**

HCA-4, Black Fabric Anti-Glare CRT Filter for H-19/H-19A, 1 lb. **19.95**

HCA-5-89, Dust Cover for H-19 and H-19A, Shpg. wt. 1 lb. **14.00**

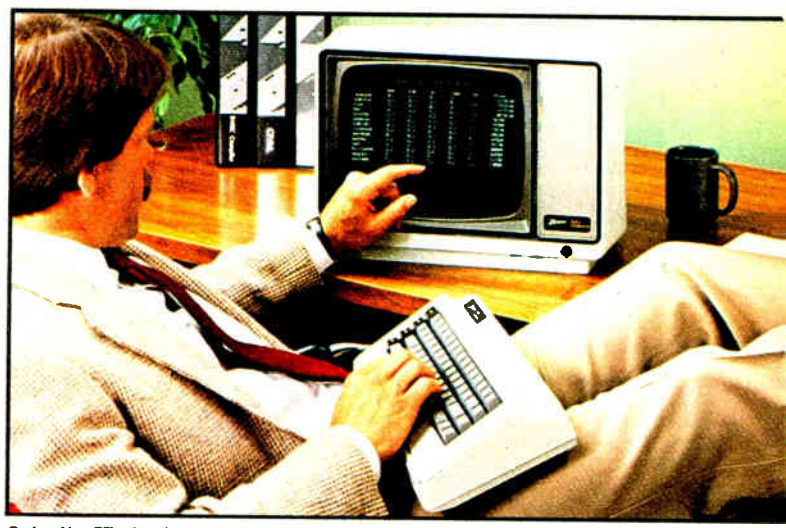
H-19A SPECIFICATIONS: Microprocessor: Zilog Z-80. **Display Size:** 6.5"H x 8.5"W (16.51 x 21.59 cm). **Character Size:** Approximately 0.2"H x 0.1"W (0.508 x 0.254 cm). **Character Set:** 128 (95 ASCII, 33 graphic). **Character Type:** 5 x 7 dot matrix (upper and lower case) and 5 x 9 dot matrix (lower case with descenders). **Keyboard:** 84 keys (60 alphanumeric, 12 function), 12-key numeric pad. **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:** Page or line – or to end of line, end of page, beginning of line or beginning of page. **Scroll:** Automatic scrolling, line/page freeze. **Video Modes:** Normal and reverse, by character. **Bell:** On receipt of control G. **Communications: Interfacing:** EIA Standard RS-232C Serial Interfacing. **Baud Rate:** 110 to 9600. **Communications Mode:** Full- or half-duplex. **Parity:** Even, odd and none. **Compatibility:** ANSI and DEC VT-52. **Handshaking:** Software, control S-control Q; all RS-232 Serial Lines tied high internally. Buffered terminal is capable of keeping up with most operations and normal scrolling text output, at 9600 baud or less.

An assembled commercial product of this type is also available. For a full description of the Zenith Data Systems Z-19 Video Terminal, send for the new Heath/Zenith Computer Catalog (see page 74 for coupon).

Low-Cost Personal Terminal for instant information in home or office

Easy to use with many no-cost features, the ZT-1 Personal Information Terminal from Zenith Data Systems let you "talk" with time-sharing services and other devices over standard telephone lines.

- **Has Bell 103-compatible modem, monochrome video display**
- **Can also be used as an electronic typewriter – or get data printouts – with optional printer (at extra cost)**



Access a world of information: Use the ZT-1 to communicate with information services or data banks, another ZT-1 or any data terminal that has a Bell 103-compatible modem. Choose from news, sports, weather, business and financial news, to catalog shopping, education and career planning, science, technology and access to powerful mainframe computer systems, such as CompuServe and the Source (at possible extra cost).

Easy to use: Built-in cues and prompts make it easy to communicate, even for a person without typing skills or computer training.

Direct-connect modem built-in: The ZT-1's Bell 103-compatible modem can automatically dial telephone numbers or answer the phone line in data mode. In voice mode, it can also act as your personal automatic telephone dialer. Its directory can store up to 26 frequently-used telephone numbers, each of which can be dialed with a single keystroke.

A 24-hour clock runs when the ZT-1 is turned on: Keep track of real time, or the elapsed time of calls to time-sharing services and/or long-distance numbers.

High-resolution Monochrome Video Display also included: The ZVM-121 displays 25 80-character lines on a bright, easy-on-the-eyes 12" diagonal green CRT.

Typewriter-style, 73-key data entry keyboard: The ZT-1's keyboard allows simple, positive entry of commands. Types a 108-character ASCII set. 120 VAC, 60 Hz. 11.75"H x 16.25"W x 12"D, not including monitor.

Order No. ZT-1, with one-button access to CompuServe, 32 lbs. **699.00**

Order No. ZT-1A, with one-button access to the Source, 32 lbs. **699.00**

ZTA-1-1, Parallel Cable to connect ZT-1 Series Terminals to Centronics-style printers (like the MX-80A), Shpg. wt. 2 lbs. **25.00**

The assembled and tested ZT-1 Information Terminal meets FCC Class B radio-frequency interference (RFI) requirements for use in homes or businesses.

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

Use one of these high-quality modems to communicate with other computers

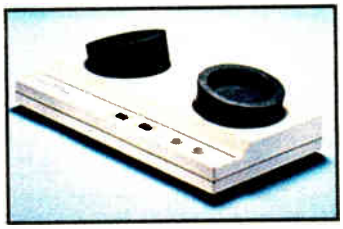
Hayes Smartmodem 1200 speeds calls

NEW

Our fastest, most versatile modem: Communicate with other computer systems at up to four times the speed of most modems – up to 1200 baud! Reduce communications time, phone charges. Half- or full-duplex operation. Automatically dials, answers calls. Accepts commands from a terminal keyboard – or under program control. Compatible with Bell 103 modems. Includes phone-modem cable. Requires HCA-11, single-line telephone for use with terminals; for computers, serial I/O and CPS (p. 77) also required. 120 VAC. 2" H x 5.46" W x 9.53" L.

WH-53, Assembled and tested. Shpg. wt. 4 lbs. **695.00**
HCA-11, RS-232 Computer-Modem Cable. 1 lb. **20.00**

Versatile Acoustic Modem is ideal for any phone



Many practical and useful applications: The economical, fully assembled Lexicon Lex-11 Acoustic Modem lets your computer talk to other computers over standard telephone lines. This stand-alone FSK (frequency shift keying) modem has selectable originate and answer modes. Operates in half-duplex or full-duplex modes. Compatible with Bell 103 modems. Two self-testing modes verify the Lex-11's capabilities. RS-232C Serial Interface included. Powered from 120 VAC, 60 Hz line by UL- and CSA-listed AC Adapter (included). Measures 2.4" H x 10" W x 5.5" W (6.90 x 25.4 x 13.95 cm).

WH-23, Assembled and tested. Shpg. wt. 3 lbs. **159.00**

Auto-dial/auto-answer Hayes Smartmodem 300

Low-cost auto-dial, auto-answer versatility: Automatically dial and communicate with other computer systems – or automatically answer incoming calls. Program-controlled in any language by ASCII strings. Accepts commands issued from a terminal keyboard – or under program control. Half- or full-duplex operation to 300 baud. Compatible with Bell 103 modems. Includes phone-to-modem cable. Requires HCA-11 Cable (above) and a single-line telephone for use with terminals; for computers, serial I/O and CPS (p. 77) also required. For 120 VAC, 60 Hz power; AC adapter included. 2" H x 5.46" W x 9.53" L (5.08 x 13.86 x 24.2 cm).

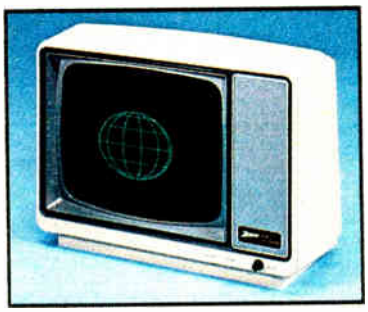
WH-43, Assembled and tested. Shpg. wt. 3 lbs. **279.00**

Hayes Chronograph for time-keeping

Perfect for time-sharing, electronic mail and home security applications: Keep any RS-232C-compatible computer system up-to-date. Provides for timed-access, dated messages and recording elapsed on-line access time. Use with Hayes Stack Smartmodem above to send electronic mail at night, when phone rates are lowest. Quartz crystal control for precise timekeeping. 120 VAC, 60 Hz. Three 1.5 VDC "AA" cells (not included) provide battery backup during power failures. 2.6" H x 5.5" W x 9.6" D. NOTE: Not recommended for novice users; software interfacing not currently available from Heath/Zenith.

WH-42, Assembled and tested, Shpg. wt. 4 lbs. **249.00**

Add video, color or sound to your system with these high-quality accessories



High-resolution ZVM-121 Monochrome Video Display

Use with Z-100, most popular computers: Accepts direct EIA monochrome video, gives performance comparable with higher-priced units. Green 25 x 80 CRT display is easy on the eyes, has excellent character definition. Select 40- or 80-character lines. 120 VAC. 11.75" H x 16.25" W x 12" D.

ZVM-121, Assembled in Orchard Tan, Shpg. wt. 18 lbs. **139.95**
ZVM-121-Z, Assembled in Z-100 earthtone colors, 18 lbs. **139.95**

Type-'N-Talk Text-to-Speech Synthesizer

Has many computers talking: Unlimited vocabulary. Built-in microprocessor has 750-character memory. Has 1-Watt, 8 ohm amplifier; speaker not included. Uses one RS-232 port at 75-9600 baud. 120 VAC. 3.1" H x 7.7" W x 5.2" D. NOTE: Not recommended for novices at this time; requires HCA-13 Cable and a modified print driver routine.

WH-12, Assembled and tested, Shpg. wt. 5 lbs. **299.00**
HCA-13, Custom RS-232 Cable to connect WH-12 to H-8 and H/Z-89, 1 lb. **20.00**

High-resolution Color Video Display

NEW

Outstanding 640(H) x 225(V) pixel resolution: Ideal for most systems needing high-resolution capability, including H/Z-100s. Takes direct RGB video inputs; displays twenty-four 80-character lines. 20 MHz bandwidth, 20 nS rise time for better definition. Use in home or office – has UL, CSA, FCC Class B approvals. 120 VAC, 60 Hz. Measures 13½" H x 20" W x 15" D.

ZVM-134, Assembled and tested, Shpg. wt. 38 lbs. **699.00**
ZVM-134-1, Cable to connect ZVM-134 to Z-100 Computer, 2 lbs. **20.00**
ZVM-134-2, Cable to connect ZVM-134 to IBM Personal Computer, 2 lbs. **20.00**

Color Video Display for computers, VCRs, cameras

Accepts direct NTSC composite video: Modulation interference is eliminated by special Heath/Zenith circuitry. This 13" diagonal display uses fully automatic color processing for a stable picture. An audio amplifier and speaker are built-in. Has 75-ohm RCA-type phone jack for video input, miniature phone jack for Hi-Z audio input. UL and CSA listed; meets requirements of 21 CFR, Subchapter J for X-radiation. For 120 VAC, 60 Hz power. Measures 14" H x 20.25" W x 14.75" D (35.56 x 51.44 x 37.47 cm).

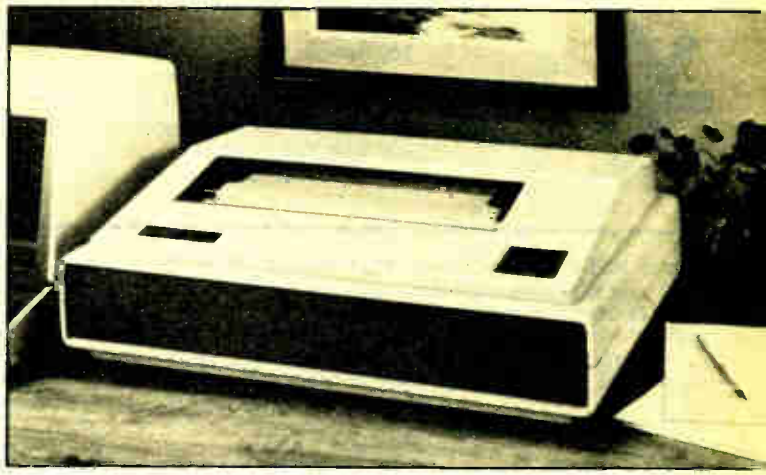
GDZ-1320, Assembled and tested. Shpg. wt. 42 lbs. **399.95**

VISA MasterCard **Credit Card Orders Call TOLL-FREE: 800-253-0570**

The Heath/Zenith 25 Dot Matrix Line Printer Features uncommon speed and quiet — available in colors to match H/Z-100 Computer

$899.00 Kit

- **Our fastest printer — over 150 characters/second**
- **33 graphics characters — compatible with most Heath/Zenith computers and terminals**



We've packed the latest state-of-the-art features into the 25: You get faster speed, versatile paper handling facilities, quiet operation and rugged construction — all at an affordable cost. This bi-directional printer can output over 150 characters per second — translating into up to 300 lines per minute (with 10-column lines), or 65 lines per minute (with 132-column lines).

Quiet printing: A specially-designed cabinet completely encloses the 25's printing mechanisms, reducing home or office sound levels.

Full printing capability: The 25 can print the full 96-character ASCII set (upper and lower case, with descenders and underlining). It can also print the block graphics characters (except reverse video) provided with most Heath/Zenith computers and terminals.

Has quad tractor feeds with adjustable width: This allows the printer to handle standard edge-punched, single or multiple forms (up to six parts thick) fan-fold paper. The 25's extended-life ribbon cartridges "plug in" for fast and easy no-mess replacement.

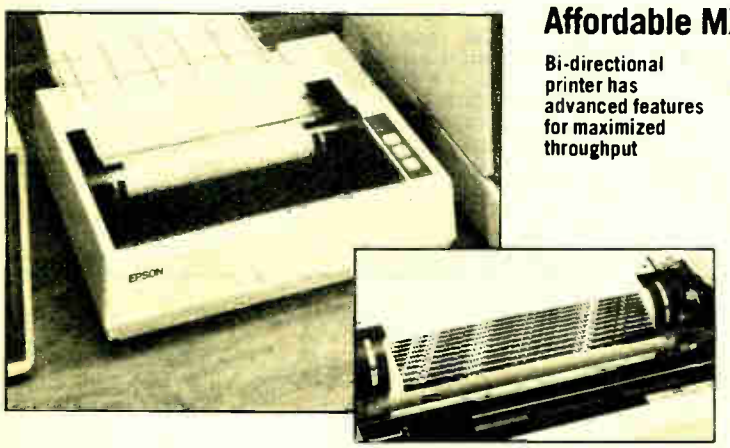
Features variable pitch (10, 12, 13.2, or 16.5 characters per inch): This allows the 25 to print up to 222 characters per line (at 16.5 cpi on a 13.5-inch wide line). Six or eight lines per inch vertical spacing is available. Horizontal and vertical tabs are adjustable.

Interfaces to most computers and terminals: Communication occurs via an RS-232C Serial Interface or a 20 mA current loop, with handshaking adjustable by reverse channel and busy control signals. Communication speeds are adjustable from 110 to 9600 baud.

More extra-value features: A "paper out" indicator, "jammed" indicator and self-testing capabilities are included with the 25 Dot Matrix Line Printer. For 120/240 VAC, 50/60 Hz power. Overall Dimensions, 8¼" H x 26½" W x 18½" D (20.96 x 67.31 x 46.99 cm).

Kit H-125, Printer in H/Z-100 colors, Shpg. wt. 85 lbs. **899.00**

Z-125, Assembled Printer in H/Z-100 colors, Shpg. wt. 82 lbs. ... **1499.00**



Affordable MX-80A Dot Matrix Printer with graphics

Bi-directional printer has advanced features for maximized throughput

Now printing an expanded cast of graphics characters: Including subscripts, superscripts, italics, underlining and 64 other block graphics characters. The MX-80A, which outperforms many printers costing a lot more, can also reproduce the full 96-character ASCII set.

Throughputs a fast 46 lines per minute (using 80-character lines): Pick 40-, 66-, 80- or 132-character lines for up to 12 different printing combinations.

Includes paper tray, one ribbon: Communicates with Heath/Zenith computers via MX-80-3 Interface below (needs HCA-10 Cable, see computer catalog), or the Z-89-11 I/O Board (p. 69; needs HCA-14 Cable, see computer catalog). Includes Centronics-style 8-bit parallel interface for use with ZT-1 Terminal (HCA-14 needed). 120 VAC. 4.2" H x 14.7" W x 12" D.

MX-80A, Assembled Printer, Shpg. wt. 17 lbs. **499.00**

MX-80-3, Buffered RS-232C Serial Interface, Shpg. wt. 1 lb. **135.00**

MX-80-4, ROM Set to add extended graphics set to MX-80s (not for use with MX-80-2), Shpg. wt. 2 lbs. **60.00**

HCA-5-80, Dust Cover for MX-80 and MX-80A, Shpg. wt. 1 lb. **14.00**

Diablo Printer for word processing systems

Ideal for applications requiring letter-quality printing: The WH-54 combines the latest in microelectronic technology (eliminating most field adjustments) with a field-proven daisy wheel printing mechanism.

Uses metal and plastic Diablo print wheels, with complete interchangeability: This allows use of durable metal print wheels in high-production applications.

Uses efficient bi-directional printing: Prints up to 35-40 characters per second. RS-232C Serial interface (compatible with Bell 102, 113, 212 and equivalent modems) and 768-byte print buffer run at 110-1200 baud.

Versatile: Prints entire 96-character ASCII set (upper and lower case) on forms up to 15.5 inches (39.3 cm) wide. Forms up to 27/1000 inch (0.0686 cm) thick can be accommodated with a single adjustment.

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 power. 9.25"H x 23.5"W x 15.75"D (23.49 x 59.69 x 40 cm).

WH-54, Assembled Printer, Shpg. wt. 70 lbs., Motor Freight **2295.00**

HUG makes your Heath/Zenith computer even more powerful with its 700-program software library

Heath User's Group

- **Access to the HUG Software Library's over 700 low-cost programs**
- **A one-year subscription to HUG's information-packed REMark magazine**
- **Participate in REMark's interactive forum with other HUG members**
- **On-line bulletin board available**

1. Access to the HUG Software Library: A constantly updated and expanded collection of programs, subroutines and procedures written by members.

2. The HUG Software Library Catalog: Listing each program by name, description, language, version, hardware and software required.

3. A one-year subscription to REMark Magazine (mailed monthly): This exclusive periodical contains reviews of new Heath/Zenith computer products – and also serves as an open forum, where members of HUG can share new hardware modifications, software enhancements, applications programs and other ideas.

4. One of the top users' group bulletin boards in the world: The HUG Bulletin Board has the latest news on Heath/Zenith computers and HUG activities. All you need is a HUG membership, a modem program and a MicroNet time-sharing membership.

5. A vinyl-covered, three-ring HUG binder: Contains the HUG Handbook, with hints on how to make the most of your membership (some local users' groups have been formed to increase membership benefits). Use this binder to store software documentation, REMark and other materials.

6. The official HUG Identification Card: Your ticket to HUG benefits.

You'll find a HUG application enclosed with each Heath computer; Z-89 computers come with a one-year HUG membership at no extra charge! If you don't own a Heath/Zenith computer, fill out and return the form below.

Send to: HUG Membership, Hilltop Road, St.Joseph, MI 49085.

Yes, I want to become a member of HUG and keep up to date on the latest Heath/Zenith microcomputer developments, while I increase my utility and applications software library.

I've enclosed $_____ (U.S. Funds only) to cover the cost of my membership. NOTE: No charge orders or billings are accepted.

Name _____

Address _____

City _____ State _____ Zip _____

Country _____

Signature _____

	HUG Membership Rates (per year, in U.S. Funds)		
	U.S.	Canada/Mexico	International
New Members:	$18	$20	$28
Renewal:	$15	$17	$22

HEATH/ZENITH COMPUTER CATALOG COUPON! **FREE**

MAIL TO: Heath Company, Dept. 300-859
Benton Harbor, MI 49022

Name _____

Address _____ Apt. No. _____

City _____ State _____ Zip _____

36 full-color, full-size pages

New Heath/Zenith Computer Catalog!

The complete line of computer products from your strong partner: Our complete line of reliable, low-cost 8- and 16-bit microcomputers is led by the new Z Machine! And an outstanding selection of easy-to-use, problem-solving software solutions is available.

Get your copy today: The free Heath/Zenith Computer Catalog is available at your nearby Heathkit Electronic Center (see the store list on pages 52-53 and 57) – or mail the coupon at left.

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(Check all boxes which apply, sign and return to HEATH COMPANY (HEATH). Another Sublicense Grant form must be used with each future SOFTWARE order.)

- ☐ **Microsoft BASIC Compiler**
- ☐ **Microsoft BASIC Interpreter**
- ☐ **Microsoft COBOL**
- ☐ **Microsoft FORTRAN**
- ☐ **Microsoft MACRO-80**
- ☐ **Peachtree General Ledger**
- ☐ **Peachtree Accounts Payable**
- ☐ **Peachtree Accounts Receivable**
- ☐ **Peachtree Inventory Management**
- ☐ **Peachtree Sales Invoicing**
- ☐ **Peachtree Property Management**
- ☐ **Peachtree CPA General Ledger**

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Heath/Zenith has easy-to-use software solutions for your business and home needs

Heath/Zenith offers quality software: Everyone promises to fill your needs – but you know to be certain things are right, you have to be involved. No one knows your needs as well as you. And no one else truly understands your problems. That's why Heath/Zenith, your strong partner, offers many software packages – versatile, easy-to-use solutions.

For greatest ease of use, many of these solutions are menu-driven – and utilize easy-to-understand English-like commands.

A wide variety of software solutions are listed here – including operating systems, programming languages, utility and applications programs, and the Heath User's Group software library. For an even greater selection of problem-solving, fill out the coupon on page 74 and send for the FREE Heath/Zenith computer catalog.

OPERATING SYSTEMS SOFTWARE

Industry standard CP/M-80 Operating System

- **Over 200,000 microcomputer owners use CP/M-80**
- **Provides common hardware interface with flexibility**

Features: Eight-bit CP/M-80 2.2 opens the door to more languages, utilities and applications software than any other 8-bit disk operating system (DOS).

File, disk management: Fully dynamic named-file allocation, program/peripheral output control, random/sequential data access. BIOS accesses disk drives, accesses peripherals. BDOS minimizes head movement, wear. CCP controls input/output of programs.

Utilities: Two-pass assembler, general-purpose editor, advanced 8080 debugger, file dump/copy, system generation/relocation, file size/usage displays.

Requires: H-8/H-19, H/Z-89 or Z-90 with 48K RAM one disk drive (two recommended). H-8 systems also require HA-8-6 or HA-8-8 Cards (p. 70).

Related educational course: EC-1120 CP/M-80 Course on page 78.

HOS-8917-2, on hard-sectored 5.25" disk, Shpg. wt. 5 lbs. **150.00**

HOS-8937-2, on soft-sectored 5.25" disk, Shpg. wt. 5 lbs. **150.00**

HDOS has many functions of larger systems

- **Sophisticated system controls your H-8 or H/Z-89**
- **Designed for efficient use of memory and disk space**

Complete operating environment: Heath Disk Operating System (HDOS) 2.0 is a sophisticated system allowing program writing, editing and storage.

Built-in languages: Extended Benton Harbor BASIC 6.0 Programming Language uses simple English statements, familiar math equations to perform operations, solve problems. ASM 8080 Assembly Language with cross-reference feature assembles source programs into listings/object programs.

Built-in utilities: 17 commands manipulate files, select device drivers, debug and run programs, edit text, test disk drives/media and much more.

Requires: H-8/H-19 or H/Z-89 with 48K RAM and one disk drive (system supports all Heath/Zenith disk systems except Z-67; two drives recommended, and may be required to use some other software programs).

HOS-817-1, on hard-sectored 5.25" disk, Shpg. wt. 9 lbs. **150.00**

Modular UCSD P-System with Pascal, Version II

- **Easy-to-use system responds quickly to changing needs**
- **Runs on any microcomputer with a resident interpreter**

Complete program development/execution environment: Has Pascal compiler to produce universal P-code, P-code interpreter, screen- and character-oriented program/text editors, macro-assembler and library of frequently-used utilities. Support available from Softech Microsystems, San Diego, CA. Requires H-8/H-19 or H/Z-89 with 48K RAM (64K recommended) and two hard-sectored 5.25" disk drives.

Related educational course: EC-1111 Pascal Course on page 79.

HOS-817-3, on hard-sectored 5.25" disk, Shpg. wt. 8 lbs. **295.00**

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

PLANNING/MODELING SOFTWARE

Outstanding Multiplan 16-Bit Electronic Spreadsheet

NEW

- **Helps you do corporate budgeting, make product planning and sales decisions, plan investments, formulate a family budget...and more**

An aid for both business and personal needs: Multiplan is one of the most powerful modeling and planning tools ever invented.

Easy to learn: You'll be surprised at how quickly and efficiently you'll accomplish various tasks with Multiplan. The two-volume manual consists of a tutorial, giving an overview of the system's features – and a detailed reference guide to those features. Working together with an on-line "Help" key, they'll teach you Multiplan's concepts and uses.

Versatile capabilities: With Multiplan, you can formulate worksheets up to 63 columns wide by 255 rows deep. Cells, rows and columns can be inserted, deleted or moved to another location on the spreadsheet. Enter numbers, formulas or text – numbers from $0.1 \times 10^{(-63)}$ to $9.9999999999999 \times 10^{(+62)}$, and text up to 150 characters per cell, with the ability to concatenate and use percentages.

To help answer those "what if?" and "now what" questions, Multiplan displays proposed responses to commands and formulas you enter – you decide whether to proceed. Data can also be sorted by column or row – handy when you want to arrange figures from highest to lowest, or in alphabetical order.

You get full file management capabilities: You can even make one or several spreadsheets dependent on a master spreadsheet – perfect for corporate/departmental budgets. And with Multiplan's unique Symbolic Link File Format, you can exchange information between spreadsheets and other applications programs.

Minimum hardware and software requirements: Multiplan requires a H/Z-100 series computer, a video display and the Z-DOS (MS-DOS) Operating System (page 67).

MS-463-7, on soft-sectored 5.25" floppy disk, Shpg. wt. 6 lbs. **250.00**

Turn your computer into a versatile electronic spreadsheet with SuperCalc

- **Helps planners make better use of time and energy**
- **Easy-to-read, easy-to-use spreadsheet format**

Pencils, paper and a calculator have been replaced: Use SuperCalc to help answer those "what if" questions and "now what" questions. Examine and alter numbers and text within a 63-column by 254-row matrix. Requires H-8/H-19, H/Z-89 or Z-90 with 48K RAM or H/Z-100, one disk drive and CP/M-80 or -85 (see below). If printouts are desired, a printer is also required.

HSC-817-1, HS 5.25" disk for H-8, H/Z-89 or Z-90 with CP/M-80, 2 lbs. **295.00**

HSC-837-1, SS 5.25" disk for H-8, H/Z-89 or Z-90 with CP/M-80, 2 lbs. **295.00**

SuperCalc for H/Z-100 Computers: Uses exciting color graphics displays.

SC-463-1, on soft-sectored 5.25" disk for H/Z-100 with CP/M-85.2 lbs. **295.00**

PROGRAMMING LANGUAGES

Available on both hard-sectored and soft-sectored floppy disks, these programming languages allow you to write computer programs with surprising ease. And the easy-to-read documentation supplied with each programming language makes writing and running programs even easier.

Popular, powerful Microsoft BASIC Interpreter

- **This enhanced BASIC is one of the most versatile general-purpose programming languages available for microcomputers**

Scores of practical utility and applications program available: MBASIC features and IF-THEN-ELSE control structure, which provides highly-structured programming capabilities. Also has direct access to CPU ports and memory locations, string and numeric constants, a full range of logical and mathematical capabilities, extended commands/statements and more.

Extensive program editing facilities: EDIT command and edit mode subcommands provide for insertion, deletion, character change and more.

All models require an H-8/H-19 or H/Z-89 system with 48K RAM, one disk drive, HDOS or CP/M (as indicated below) and the Sublicense Grant on page 74.

H-8-21, Ver. 4.82 on hard-sectored 5.25" disk for HDOS, 4 lbs. . . . **150.00**
HMS-817-1, Ver. 5.21 on hard-sectored 5.25" disk for CP/M, 5 lbs. **175.00**
HMS-837-1, Ver. 5.21 on soft-sectored 5.25" disk for CP/M, 4 lbs. **175.00**

Microsoft FORTRAN for science and engineering

- **The many extended features of this system make it comparable to FORTRAN compilers used on large mainframes, minicomputers**

Write and execute powerful scientific and engineering programs: This enhanced programming system includes all features of ANSI FORTRAN X3.9-1966, except for the COMPLEX data type. Compiles up to 1200 lines per minute, in a single pass. Has routines for 32- and 64-bit floating point math, MACRO-80 Assembler to generate relocatable object modules for LINK-80, LINK-80 Linkage Editor, CREF Cross-Reference Generator for MACRO-80, LIB-80 Library Manager (CP/M versions only) to build your own libraries of relocatable modules, and two function libraries.

All models below require an H-8/H-19 or H/Z-89 system with 48K RAM, two disk drives, HDOS or CP/M (as indicated below) and the Sublicense Grant on page 74.

H-8-20, Ver. 3.35 on hard-sectored 5.25" disk for HDOS, 4 lbs. . . . **175.00**
HMS-817-2, Ver. 3.4 on hard-sectored 5.25" disk for CP/M, 5 lbs. **195.00**
HMS-837-2, Ver. 3.4 on soft-sectored 5.25" disk for CP/M, 4 lbs. . . **195.00**

MBASIC Compiler speeds general programming

Eliminate time-consuming interpretation: This single-pass compiler converts the program into machine code, the language your computer understands best – and runs fastest. Includes Microsoft BASIC's run-time library, MACRO-80 Assembler, LINK-80 Editor, CREF Cross-Reference Generator and LIB-80 Library Manager.

All models below require an H-8/H-19 or H/Z-89 system with 48K RAM, two disk drives, HDOS or CP/M (as indicated below) and the Sublicense Grant on page 74.

HMS-817-41, Ver. 5.23 on hard-sectored 5.25" disk for HDOS, 5 lbs. **250.00**
HMS-837-41, Ver. 5.23 on soft-sectored 5.25" disk for HDOS, 5 lbs. **250.00**
HMS-817-4, Ver. 5.23 on hard-sectored 5.25" disk for CP/M, 4 lbs. **250.00**
HMS-837-4, Ver. 5.23 on soft-sectored 5.25" disk for CP/M, 4 lbs. **250.00**

Program faster with MACRO-80 Assembly Language

Designed for use by sophisticated Assembly Language programmers: You get most "big computer" assembler features without sacrificing speed or memory space. Includes LINK-80 Linkage Editor, CREF Cross-Reference Generator and LIB-80 Library Manager.

All models below require an H-8/H-19 or H/Z-89 system with 48K RAM, one disk drive (two drives recommended), HDOS or CP/M and the Sublicense Grant on page 74.

HMS-817-51, on hard-sectored 5.25" disk for HDOS, 2 lbs. **65.00**
HMS-837-51, on soft-sectored 5.25" disk for HDOS, 4 lbs. **65.00**
HMS-817-52, on hard-sectored 5.25" disk for CP/M, 2 lbs. **65.00**
HMS-837-52, on soft-sectored 5.25" disk for CP/M, 3 lbs. **65.00**

Run powerful, business-oriented COBOL-80

Ideal for processing large disk files and data bases: Exceeds minimum ANSI-74 COBOL specifications, with many advanced features and modules which add power and convenience. Has specially-implemented Nucleus module – as well as Debugging, Sequential I/O, Relative I/O and Table Handling modules.

Utility programs: The MACRO-80 Relocating Assembler. LINK-80 Linkage Editor, LIB-80 Library Manager, a Microsoft COBOL Library with many special routines and useful run-time software are included.

All models below require an H-8/H-19 or H/Z-89 with 48K RAM, two disk drives, HDOS or CP/M and the Sublicense Grant on page 74. 64K RM and the H/Z-37 or commercial Z-67 Disk Systems recommended for applications involving large disk files.

HMS-817-31, Ver. 4.0 on hard-sectored 5.25" disk for HDOS, 4 lbs. **395.00**
HMS-837-31, Ver. 4.0 on soft-sectored 5.25" disk for HDOS, 4 lbs. **395.00**
HMS-817-3, Ver. 4.0 on hard-sectored 5.25" disk for CP/M, 5 lbs. **395.00**
HMS-837-3, Ver. 4.0 on soft-sectored 5.25" disk for CP/M, 4 lbs. . . **395.00**

WORD PROCESSING SOFTWARE

Word processing makes creation of documents faster and easier, in your home or at the office. Heath/Zenith offers two word processors – the popular and CP/M-compatible WordStar and Magic Wand packages. An automatic proofreader for Magic Wand is also available. All are now available in versions especially designed for use on the new H/Z-100 Series Computers!

WordStar Word Processing Software features exceptional power, CP/M compatibility

A CP/M Compatible, screen-oriented word processor with integrated printing capabilities: Supports full on-screen text formatting (with automatic margination, justification and centering available on command).

Helpful hyphenation speeds editing: WordStar's hyphen-help feature stops when a hyphen is necessary. and lets you choose the hyphenation point – or decide not to hyphenate. Hyphens entered with this feature are "soft" – if not needed in later editing, hyphens will be automatically deleted.

Advanced capabilities supported: Automatic page numbering, printing enhancements (underlining, double striking, boldfacing, strikeouts, subscripting and superscripting, 1/48" line spacing and 1/120" character pitch) and several other operator-chosen options, on capable printers.

Also features print spooling: For greater efficiency (in systems with 64K RAM), you can print one file while working on a second file.

WordStar's unique "Help" system can be used during editing: Four levels of user-selectable prompting eliminates the need to refer to a manual.

Includes two versions: A pre-installed version for immediate, hassle-free use on your Heath/Zenith computer with a Diablo 630 or 1640 printer – and a "plain vanilla" version for most computers and printers. Operating manual included.

Requires: H-8/H-19 or H/Z-89 with 48K RAM – or a Z-100 – two disk drives, CP/M or Z-DOS (see below) and printer (WH-54, page 73, recommended).

HMP-817-2, hard-sectored 5.25" disk for H-8, H/Z-89 W/CP/M-80, 2 lbs. **395.00**
HMP-837-2, soft-sectored 5.25" disk for H-8. H/Z-89 W/CP/M-80, 4 lbs. **395.00**
MP-463-7, soft-sectored 5.25" disk for H/Z-100 with Z-DOS, 5 lbs. . . **399.00**

Add mailing list and file merging capabilities to WordStar with MailMerge software

More capability: Combine a names/addresses file with a letter file, inserting text at user-specified places – to create personalized form letters. And you can use the same data file to produce both form letters and mailing labels.

Features: Merges data from one file to another – automatically reforming paragraphs, prints multiple copies of the same file, chain-prints several files on the same disk, prints a file "nesting" in another file (up to eight levels of nesting can be accommodated), and prints raw data in an easy-to-read form.

Requires: H-8/H-19 or H/Z-89 with 48K RAM – or a Z-100 – two disk drives, CP/M or Z-DOS (see below), WordStar and printer (WH-54, page 73, recommended).

HMP-817-3, HS 5.25" disk for H-8, H/Z-89 with CP/M-80. 4 lbs. . . **135.00**
HMP-837-3, SS 5.25" disk for H-8, H/Z-89 with CP/M-80, 4 lbs. . . . **135.00**
MP-463-8, soft-sectored 5.25" disk for Z-100 with Z-DOS. 4 lbs. . . **139.00**

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

Magic Wand Word Processing Software combines ease of use, versatility and power

Now even more powerful and versatile: When you team Magic Wand Word Processing Software with the Magic Spell Automatic Proofreader, you get the ultimate in word processing convenience and accuracy.

This powerful word processor has sample learning exercises: Featuring EDIT and PRINT modes, Magic Wand puts excellent versatility, ease of use, power and CP/M compatibility at your fingertips.

EDIT mode features full scrolling, insertion by character or full insertion, full deletion, search/replace commands, block moves and copying of blocks, and the ability to include all or part of any pure ASCII file into the text you're editing (without leaving EDIT or affecting any of the text).

PRINT mode features printing in background (print spooling) which lets you print one file while working on another, direct command entry or the ability to imbed commands in a text file, underscoring, boldfacing, subscripting and superscripting, automatic hyphenation, proportional spacing and mail list merging. 1/120" horizontal and 1/48" vertical spacing (on capable printers).

Minimum hardware and software requirements: Magic Wand requires and H-8/ H-19 or H/Z-89 with 48K RAM or an H/Z-100, one disk drive, CP/M-80 or Z-DOS (see below) and a printer (we recommend the WH-54 Letter-Quality Printer on page 40).

HRS-817-9, HS 5.25" disk for H-8 or H/Z-89 with CP/M-80, 3 lbs. **295.00**

HRS-837-9, soft-sectored 5.25" disk for H/Z-89 with CP/M-80, 4 lbs. **295.00**

RS-463-9, soft-sectored 5.25" disk for H/Z-100 with Z-DOS, 4 lbs. . **295.00**

Magic Spell automatically proofreads your Magic Wand-produced documents

An automated proofreading system: Magic Spell helps you isolate spelling and typographical errors in documents produced by Magic Wand. Automated proofreading verifies the correct spelling of words in a document. Magic Spell compares each word to an internal dictionary. Magic Spell takes only seconds to check each page, and inform you of any words that don't match similar words in its dictionary – or of any words not in the dictionary.

Has distinct advantages over other proofreading system: Magic Spell is easy to learn – even for the first-time user. Three self-instructional lessons, with many detailed exercises and examples, help you learn how.

Amazingly fast: A typical Heath/Zenith microcomputer system using double-density floppy disks can check 20 pages of text in under a minute.

Extensive dictionary capabilities: Magic Spell comes with a 20,000 word standard usage English dictionary, to which you may add a number of additional words. In addition, Magic Spell can contain multiple dictionaries. You can add or subtract dictionaries or customize a particular dictionary to meet special needs (data processing, engineering, foreign terms, insurance, legal, medical, proper names, scientific and others).

Minimum hardware, software requirements: An H/Z-89 with 32K RAM or an H/Z-100, one or more disk drives, CP/M-80 or Z-DOS (as listed below), Magic Wand and a printer. The H/WH-14, WH-24, H/Z-25, WH-36, WH-44 or WH-54 printers will work with Magic Spell; we recommend the letter-quality WH-54 on page 40.

HIS-837-1, soft-sectored 5.25" disk for H/Z-89 with CP/M-80, 4 lbs. **295.00**

IS-463-1, soft sectored 5.25" disk for H/Z-100 with Z-DOS, 4 lbs. . . **295.00**

Reliable, high-capacity floppy disks

HCS-70, Hard-sectored, single-sided, 100 KB 5.25" Disks for H-17-1 Drives/ H-88-1 Controller, Shpg. wt. 1 lb. . . . . **Package of ten, 40.00**

HCS-66, Soft-sectored, single-sided, double-density, 48 tpi, 160 KB 5.25" Disks for H-17-1 or H-17-4 Drives and Z-89-37 Controller, 1 lb. **Pkg. of ten, 45.00**

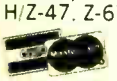
HCS-71, Soft-sectored, double-sided, double-density, 48 tpi, 320 KB 5.25" Disks for H/Z-100, or H-8, H/Z-89 with H-17-1 or H-17-4 Drives and WH-8-37 or Z-89-37 Controller, 1 lb. . . . . **Package of ten, 50.00**

HCS-68, Soft-sectored, double-sided, double-density, 96 tpi 640 KB 5.25" Disks for H/Z-100, or H-8, H/Z-89, Z-90 with H-17-1 or H-17-4 Drives and WH-8-37 or Z-89-37 Controller, 1 lb. . . . . **Package of ten, 55.00**

HCS-69, Soft-sectored, single-sided, single-density, IBM 3740 format, 250 KB 8" Disks for H/WH-27, H/Z-47, Z-67 and others, 2 lbs. **Package of ten, 55.00**

HCS-64, Soft-sectored, single-sided, double-density, 500 KB 8" Disks for H/Z-47, Z-67 and others, Shpg. wt. 2 lbs. . . . . **Package of ten, 60.00**

HCS-65, Soft-sectored, double-sided, double-density, 1 MB 8" Disks for H/Z-47, Z-67 and others, Shpg. wt. 2 lbs. . . . . **Package of ten, 70.00**



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

SOFTSTUFF Affordable Software Tools

SOFTSTUFF products are supplied on hard-sectored 5.25" floppy disk (unless otherwise indicated), and are shipped postpaid. Please specify operating system (HDOS or CP/M) when ordering.

Computerized Phone System (CPS): Allows H-8, H/Z-89 and H/Z-100 to communicate with other computers and time-sharing systems such as MicroNet or the Source. On-screen elapsed time clock, automatic MicroNet log-in file transfer, user-programmable keys for functions like mail check. Requires H-8/H-19, H/Z-89 with 48K RAM or H/Z-100 with one disk drive and HDOS, CP/M-80 or CP/M-85 (see below).

SF-9503, HS 5.25" disk for H/Z-89 with HDOS/CP/M-80 Postpaid . . . **40.00**
SFS-9103, SS 5.25" disk for H/Z-89 with CP/M-80, Postpaid **40.00**
CB-253-7, SS 5.25" disk for H/Z-100 with CP/M-85, Postpaid **40.00**

Full Screen Editor: Uses H-19 or H/Z-89 CRT as window into file. Type changes anywhere on the screen: use search, block move, scroll functions. Requires H-8/H-19 or H/Z-89 system with 48K bytes of RAM, one disk drive and either HDOS or CP/M.

SF-9200, on hard-sectored 5.25" disk for HDOS and CP/M. Postpaid . **50.00**

Text Formatter: Performs errorless fill and justification (straight right margin) functions on editor-prepared text. Requires H-8/H-19 or H/Z-89 with 48K RAM, one disk drive and HDOS or CP/M (as listed below).

SF-9001, on hard-sectored 5.25" disk for HDOS, Postpaid **55.00**
SF-9101, on hard-sectored 5.25" disk for CP/M, Postpaid **55.00**

Mailpro Package: Stores/retrieves mailing lists, other information. Random access files. Sort and retrieve on any field. Needs H-8/H-19 or H/Z-89 with 48K bytes RAM, one disk drive, HDOS or CP/M Operating System (as indicated below) and Microsoft BASIC Language Interpreter, p. 76 (SF-9109 requires 64K bytes of RAM, but not MBASIC Interpreter).

SF-9009, on hard-sectored 5.25" disk for HDOS, Postpaid **40.00**
SF-9109, on hard-sectored 5.25" disk for CP/M, Postpaid **40.00**

General Ledger II: Keeps your books up-to-date. Features custom chart of accounts, comprehensive printouts, automatic entry checking, fast and simple data entry, account verification, facility to open new accounts at any time, instantly updateable balance reporting and audit trail. Requires H-8/H-19 or H/Z-89 with 48K RAM, two disk drives, the HDOS Operating System and Microsoft BASIC Language Interpreter (see page 76).

SF-9004, on hard-sectored 5.25" disk for HDOS, Postpaid **125.00**

Small Business Inventory Package: Helps facilitate analysis of a business' inventory. Can provide up to 12 items of information on each part. Requires H-8/H-19 or H/Z-89 with 48K RAM, one disk drive, HDOS or CP/M (as listed below) and Microsoft BASIC Interpreter (see page 76).

SF-9005, on hard-sectored 5.25" disk for HDOS, Postpaid **90.00**
SF-9105, on hard-sectored 5.25" disk for CP/M, Postpaid **90.00**

Roots-89 Ancestral Genealogy Software: Helps track your roots. Computes relationships, shows anniversaries. Has genealogy course. Needs H-8/H-19 or H/Z-89 with 48K RAM, one disk drive and HDOS or CP/M (see below).

SF-9008, on hard-sectored 5.25" disk for HDOS, Postpaid **125.00**
SF-9108, on hard-sectored 5.25" disk for CP/M, Postpaid **125.00**

Periodic Table: Helps chemistry students. Teaches the 103 basic chemical elements. Two modes – study each element in detail, or take a quiz. Needs H-8/H-19 or H/Z-89 with 48K RAM and one disk drive.

SF-9021, on bootable, hard-sectored 5.25" HDOS disk, Postpaid **40.00**

Typing Tutor: Helps you learn fast, efficient touch typing – you practice on the H-19 or H/Z-89's typewriter-styled keyboard. Requires H-8/H-19 or H/Z-89 with 48K bytes of RAM and one disk drive.

SF-9018, on bootable, hard-sectored 5.25" HDOS disk, Postpaid **40.00**

Vocabulary Builder: Extensive library helps students learn English words in a fast, efficient way. Requires an H-8/H-19 or H/Z-89 system with 48K bytes of RAM and one disk drive.

SF-9019, on bootable, hard-sectored 5.25" HDOS disk, Postpaid **40.00**

Mychess Computer Chess Game: Provides hours of challenging competition. Consistently beats Sargon. Nine skill levels. Requires H-8/HA-8-6/H-19 or H/Z-89 with 48K RAM, one disk drive and HDOS or CP/M.

SF-9010, on hard-sectored 5.25" disk for HDOS, Postpaid **40.00**
SF-9110, on hard-sectored 5.25" disk for CP/M, Postpaid **40.00**

Air Traffic Controller Game: Control traffic around your own airport. Requires H-8/H-19 or H/Z-89 with 48K RAM, one disk drive and HDOS or CP/M.

SF-9014, on hard-sectored 5.25" disk for HDOS, Postpaid **30.00**
SF-9114, on hard-sectored 5.25" disk for CP/M, Postpaid **30.00**

U.S. Presidents' Game: Learn about the men who have led the U.S. Needs H-8/H-19 or H/Z-89 with 48K RAM and one disk drive.

SF-9020, on bootable, hard-sectored 5.25" HDOS disk, Postpaid **40.00**

Learn the industry-standard disk operating system – CP/M-80 – with this course

- **Use with an H-8, H/Z-89 or Z-90 – or with any 8080, 8085 or Z-80 microcomputer which runs CP/M-80**
- **Self-instructional course covers all aspects of the CP/M-80 Operating System in complete detail – no prior background or knowledge of Assembly Language is assumed or required**
- **Effective audio-visual teaching method**
- **Earn valuable Continuing Education Units**

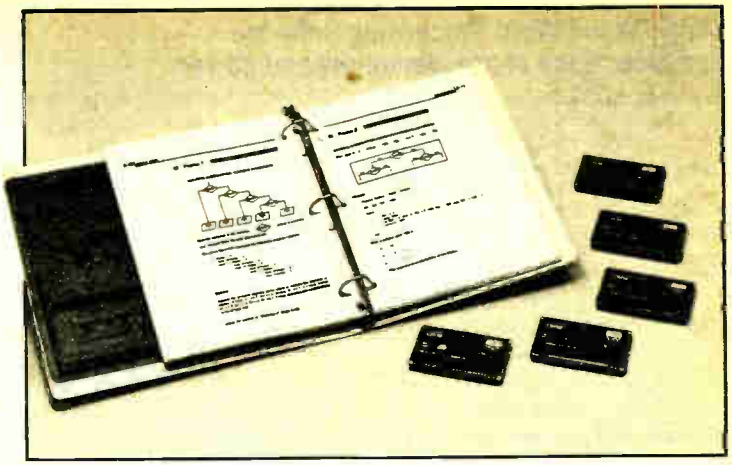
CP/M-80 is the industry standard disk operating system: And now, with the Heathkit/Zenith CP/M-80 Operating System Course, even first-time computer users can quickly and easily learn it.

With the CP/M-80 Course, you learn at your own pace: You start with the basics, and then build upon fact-after-fact until you're an expert. You'll think you have your very own tutor, right in the room with you.

The Heathkit/Zenith CP/M-80 Course consists of a 500-page self-instructional text and five audio cassettes. In ten units, it covers CP/M-80 2.2 and earlier versions, including built-in and transient commands.

You begin with an introduction to the CP/M-80 Operating System, Unit 1. In Unit 2, Typing CP/M Commands, you'll cover the writing of basic CP/M commands – including CP/M's major control functions – and diagnosing problems from CP/M's error messages. In Unit 3 you learn Built-In Commands, while Unit 4 discusses CP/M's Transient Programs. STAT and CONFIGUR Commands are covered in Unit 5. Other topics include Using PIP, an Introduction to ED, Editing Existing Files, Advanced ED Functions and Submitting Command Files.

When you're done, you'll be able to operate CP/M-80 based applications programs and use the CP/M-80 Editor to create and manipulate text files.



The course is designed for use with an H-8/H-19, H/Z-89 or Z-90 computer system with 48K bytes of RAM and the CP/M-80 Operating System. To gain full benefits from the course, we also recommend using a printer.

Earn 2.5 CEUs: Pass the optional final examination with a 70% score.

EC-1120, Shpg. wt. 6 lbs. **99.95**

MONEY-BACK GUARANTEE: If you're not satisfied with any Heathkit/Zenith Educational Systems Course, return the course materials and your proof of purchase for a refund of the purchase price.

Learn the business language – COBOL

- **Learn quickly and easily with Heathkit/Zenith's audio-tutorial method**
- **Covers both ANS-74 and ANS-68 versions of COBOL**

Cobol is the language of business today and in the future: Because of its efficiency in manipulating large structural data files and greater productivity, it's widely used in accounting, inventory and other applications.

With audio-tutorial instructional methods, you'll learn COBOL quickly. Your self-instructional text is full of diagrams, tables, programs and unit tests. A set of nine audio cassettes reinforces each concept as you learn it. You'll cover the basics of encoding, input characteristics, program hierarchy, identification, environment, data and procedure divisions. Both ANS-74 and ANS-68 versions of COBOL are presented in the course.

In addition, six practice COBOL programs are included in the workbook. You can do them at specified points in the course to help expand your understanding, or wait until you've completed the entire course.

Your COBOL Course from Heathkit/Zenith also details program variations, structure and syntax, simple arithmetic statements, comments and diagnostics, advanced arithmetic and control statements, additional data concepts, magnetic tape and disk concepts, and much more.

Learn the language of business: To receive the greatest possible benefit from the Heathkit/Zenith COBOL Course, we suggest an H-8 Computer/H-19 Video Terminal System, an H/Z-89 Computer or a Z-90 Computer – equipped with 48K RAM, two disk drives, CP/M-80 and the Microsoft COBOL Programming System.

Earn 3 CEUs: Pass the optional final examination with a 70% score.

EC-1105, Shpg. wt. 7 lbs. **149.95**

Learn BASIC – the easy-to-use language

- **Learn one of the most popular programming languages for microcomputers – BASIC**
- **Heathkit/Zenith Self-Instructional Course makes this language easy to learn**
- **Write your own programs for home or business**
- **Earn valuable Continuing Education Units**

Because it's so easy to use, BASIC is one of the most popular programming languages. Now through Heathkit/Zenith, you can learn this popular language.

As always, you proceed at your own pace, step-by-step until you're familiar with all aspects of the subject at hand. You'll learn the standardized words and commands of BASIC, along with the tools of the language – numbers, statements, functions, loops, lists, arrays and strings. Learn to define and plan a program, format and write it, and adapt programs to suit your needs. Experiments give you hands-on experience in writing and running BASIC programs – for full benefit, use of a computer is recommended.

In addition to your programmed-instruction text and workbook, you'll receive handy reference cards with Benton Harbor BASIC statements, ASCII number codes, BASIC direct command statements and a reference chart for math and Boolean algebra operations. When you're done with the course, you'll be able to write BASIC language programs.

Earn 3 CEUs: Pass the optional final examination with a 70% score.

See the classroom version of this course on page 43.

EC-1100, Shpg. wt. 7 lbs. **44.95**

College-Level Examination: See page 29 for more information.

ECC-1100, Shpg. wt. 1 lb. **25.00**

Efficient Electronic Environment Computer Furniture

Partially assembled components feature tough non-glare top, built-in wire management system, modesty panel and contemporary appearance.

[1] **Computer System Table:** Most surfaces made of leather textured steel – 50% stiffer than unembossed steel, hides fingermarks. 30" depth; 29" height for seated operators.

FP-4830, 100 lbs., Mtr. Frt. **275.00**

[2] **Stand for printer or terminal:** 27" keyboard entry height x 30" W x 24" D.

FP-3024, 62 lbs., Mtr. Frt. **195.00**

[3] **Desk Storage Module for disk systems, supplies:** Ventilated. Measures 19" H x 21" W x 18" D.

FP-4819, 27 lbs., Mtr. Frt. **75.00**

[4] **Upper Storage Shelf:** Tack board. 48" W x 12" D.

FP-4812, 47 lbs., Mtr. Frt. **150.00**

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

Microsoft BASIC Programming Course teaches how to write powerful, effective programs

- **Learn to write and modify computer programs, using this popular version of BASIC**
- **Audio-tutorial course uses experiments to give you hands-on programming experience**

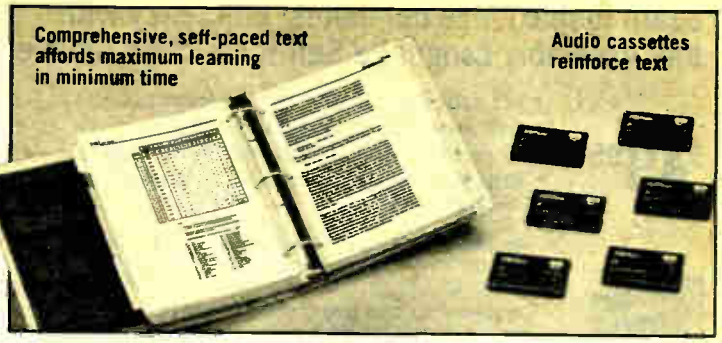
Microsoft BASIC is one of the most versatile languages available for microcomputers. If you use MBASIC on your H-8, H/Z-89, TRS-80 or Apple computer, this 800-page course will show you how to get the most from this language.

The 12-unit course covers every aspect of Microsoft BASIC programming:

Unit 1 is an Introduction to Computers and Programming – covering computers, programs, data, the computer system and programming languages. **Immediate Mode, Unit 2,** discusses arithmetic in BASIC, numeric variables, intrinsic functions and strings. Sequences, branching and loops are covered in **Unit 3, Program Structures. Unit 4 has More about Decisions and Loops** – including relational operators, counter-driven loops and nested loops.

Data Structures – including one-dimensional arrays, N-dimensional loops and strings records – are taught in **Unit 5.** User-defined functions and subroutines are covered in **Unit 6, Subprograms. Unit 7 discusses Complex Structures** – such as logical operators, multiple branching and structured programming.

The last five units cover operations and extensions available on disk versions of MBASIC. **Major Language Extensions, Unit 8,** teaches program editing; data type extensions; extended functions, operators and statements. **Sequential Disk Operations, Unit 9,** covers program storage, program retrieval and sequential data files. **Unit 10, Random Access Disk Operation,** covers random access buffers and fields – as well as storage and retrieval of numeric data. **Error Trapping and Memory Conservation** are the topics of **Unit 11. Optimization and Machine Interfacing** are covered in **the final unit.**



This audio-tutorial course utilizes a specially-written text and three audio cassettes, which work together for effective learning and greater retention. Experiments provide extensive hands-on programming practice.

Self-test reviews let you check progress at specified points in the course.

The features of the Microsoft BASIC Interpreter (described on page 76) are included, except for the TRON/TROFF debugging utility.

Upon completion, you will be able to write MBASIC programs that instruct a computer to perform specific tasks (sorting, organizing and more).

For full benefit from the course, you must have access to a computer.

To earn 5 CEUs, pass the optional final exam with a 70% or better score.

EC-1110, Shpg. wt. 7 lbs. **99.95**

Learn to program in Pascal Language

- **Pascal is the ideal language for both beginning and experienced program writers**
- **Our audio-tutorial format shows you how to program in this powerful, modular language**

If you've been around programming languages – or even if you're new to computers – you can learn how to write programs in popular Pascal Language.

The 11-unit self-instruction text completely covers Pascal:

The introduction shows how to identify and write **simple Pascal programs, Unit 2** covers identifying and writing **Self-Contained Procedures. Unit 3, Making Decisions,** teaches how and when to incorporate IF...THEN...ELSE and CASE statements in Pascal programs, and how to use Boolean variables. **Unit 4** covers **REPEAT...UNTIL, WHILE...DO and FOR loops.**

Unit 5 discusses Pascal Data Types and teaches you how to declare your own data types. **Unit 6, Arrays and Character Strings,** shows how to use arrays in solving problems. **More About Procedures, Unit 7,** covers the writing of complete Pascal procedures to perform desired tasks. **Records and Sets** are covered in **Unit 8, Unit 9, Pointers,** covers the difference between pointers, linked lists, stacks, queues, binary trees and statements. **The last unit covers sequential files and standard Pascal files,** showing how to store Pascal data files on floppy diskettes.

This effective audio-tutorial course uses a professionally-written, 500-page self-instruction text and five audio cassettes that work together for an integrated, effective learning experience.

When you complete this course, you'll be able to write modular Pascal programs that instruct a computer to perform specific directed tasks.

Earn 4 CEUs – pass the optional final exam with a 70% or better score.

EC-1111, Shpg. wt. 7 lbs. **99.95**

FORTRAN Course teaches science/math language

- **Interested in FORTRAN programming? Learn the economical, effective Heathkit/Zenith way**
- **Audio-tutorial presentation, hands-on programming experiments reinforce learning three ways**

FORTRAN Language simplifies complicated scientific and mathematical problem-solving. Using this Heathkit/Zenith course, you'll learn FORTRAN programming fundamentals.

The 11-unit text includes a special Introduction to Computers. Unit 1, Getting Started, shows you how to analyze a FORTRAN program, introduces you to statement types, elements and the character set. **Unit 2** covers **Arithmetic Operations. Elementary Input/Output (I/O) is discussed in Unit 3. Unit 4** covers **Library Functions. Other Control Statements** are taught in **Unit 5. Unit 6** introduces you to **Arrays. Programming Practices** are taught in **Unit 7. Unit 8** teaches other **Variables. Unit 9** teaches **Advanced Input/Output (I/O). Unit 10** covers **Subprograms. Special Input/Output (I/O)** is discussed in **Unit 11.**

This course uses the effective audio-tutorial teaching method, with a 500-page text and six cassettes working together to provide more complete learning.

Interactive hands-on experiments give you actual experience in writing FORTRAN programs – coding forms are included. The text also offers extensive practice in writing FORTRAN programs and using the character set. Self-test reviews let you check your progress at specified points throughout the course.

When you complete this course, you'll be able to write FORTRAN programs that instruct a computer to perform specific tasks.

To get the most from the course, we recommend an H-8 or H/Z-89 with 48K RAM and two disk drives. HDOS or Heath/Zenith CP/M (see page 75) and the Microsoft FORTRAN Programming System (page 76) are also recommended.

Earn 5 CEUs – pass the optional final exam with a 70% or better score.

EC-1101, Shpg. wt. 7 lbs. **99.95**

Computer Dictionary is a complete reference source of computer terminology

Need a dictionary to understand computer terms? Here's a handy reference book for hobbyists, technicians, engineers, programmers and other professionals who deal with computer-related terms. The EB-1020 Computer Dictionary, from Heathkit/Zenith Educational Systems, is a complete sourcebook of computer terms.

Thousands of definitions: This dictionary contains thousands of computer-related words and phrases, along with complete definitions. Definitions are made clear and explicit throughout the text.

Full of information: Browse through this dictionary and you can learn significant details about the products, procedures, problems and proliferating applications of the microcomputer revolution.

EB-1020, Shpg. wt. 2 lbs. **14.95**

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

Learn to maximize computing efficiency with this Assembly Language Self-Instruction Course

$49.95

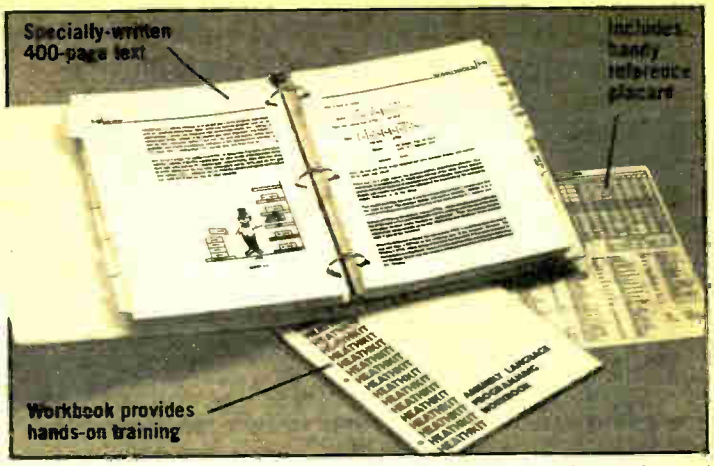
- **Self-instruction format for effective learning**
- **Programming exercises reinforce concepts**
- **Do more in less memory space than BASIC Language**
- **Write programs which execute 10 to 100 times faster than interpreted BASIC**

Assembly Language translates to greater computer efficiency! Anything you can do in any other language on a computer system, you can do with Assembly Language.

Assembly is a true programming language, not just a convenient notation for machine code. The use of labels, computed operands, comments and assembler directives allows the Assembly Language programmer to create a source code that is adaptable to the system and easily read. Assembly Language uses a mnemonic for every machine operation. There's no time wasted in interpreting – so your programs require less memory space and run much faster.

Assembly Language utilizes your computer system's memory more efficiently. Shorter, more explicit codes allow you to store more data in less space – and execute programs at speeds 10 to 100 times faster than if the same program were written in interpreted BASIC. Symbolic notation and easy-to-implement documentation methods make program listings easier to understand.

Objective: When you complete this unique self-instruction course from Heathkit/Zenith Educational Systems, you'll be able to write Assembly Language programs which instruct your computer to perform specific directed tasks. You'll learn flowcharting, device polling, code conversions, masking, subroutines, 8080 instruction set, I/O routines, precision mathematics and many more essentials.



Teaching method: The workbook reinforces the programmed-instruction text with interesting visual illustrations and hands-on programming experience.

Learning aids: The workbook provides hands-on programming experience – with optional experiments you can perform on your computer. In addition to the workbook experiments, the course includes a special reference card which lists all 244 Assembly Language instructions – as well as a complete ASCII code chart.

Hardware recommendations: Use with 8080/8085-based microcomputers which use standard Intel 8080 mnemonics (including the H-8, H/Z-89, Z-90 and H/Z-100. To perform the experiments, you must have access to a computer.

Earn 6 CEUs: Pass the optional final examination with a 70% score.

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

"Computer Concepts" aids business decisions

$49.95

- **Learn how to determine data processing requirements for your small business**
- **Uses field-proven self-instruction techniques**
- **Audio cassettes let you see and hear each concept**

Thinking of buying a computer for your small business? This course will help you select the system that fits your needs.

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. This course gives you the knowledge you need to evaluate the usefulness of a computer in your business.

Proven self-instruction methods – using an effective text and three audio cassettes – teach you how to evaluate the benefits that a computer offers your business. Three appendices to the text reinforce course material.

The course is divided into four concise, easy-to-understand parts – which present computer concepts in business terms. Part 1 introduces you to The Computer and How It Works – covering different types of memory, input/output devices, storage media and applications software.

You'll learn how to organize a data processing department in Part 2, the Data Processing Department and Personnel. The third part covers Alternatives in Computer Services – including owning your own system, time-sharing arrangements and use of a computer service bureau; the final part shows you How To Select A Computer – by defining your data processing requirements.

Earn 1 Continuing Education Unit (CEU) and a Certificate of Achievement: Pass the optional final examination with a 70% score.

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

Microcomputing Course explains computers

$39.95

- **Learn how a microcomputer can help you**
- **Explains microcomputers in everyday terms, so little technical knowledge is required**
- **Self-instruction text, cassettes for effective learning**

Here's your chance to learn the basics of microcomputers and BASIC Language programming – even if you have no prior technical background. The award-winning Heathkit/Zenith Microcomputing Course shows you how to determine if your particular problem can be solved by a computer. You'll cut through technical terminology and understand what a computer can do – in easy-to-understand terms.

No extensive math, electronics or computer background needed: The effective audio-tutorial teaching format – featuring a self-instruction text and two cassettes, lets you see and hear each concept.

Five easy-to-understand units explain different parts of the computer system: In the first unit, Computers and Data, you'll find out how to apply the capabilities of a computer to your specific problems. Unit 2, Hardware, shows you how to compare computers – by understanding how each performs.

Systems and Interfacing, the third unit, teaches how to evaluate small computer systems by understanding how different system components work together. You'll learn how to choose software programs that solve your problems in Unit 4, Software. The last unit, BASIC Language Programming, teaches you how to write short computer programs – using popular BASIC.

Earn 1 CEU: Pass the optional final examination with a 70% score.

EC-1000, Shpg. wt. 5 lbs. **39.95**

Learn faster, retain more with the ECP-3803 Variable-Speed Cassette Recorder

$199.95

NEW

Now you can truly "learn at your own pace"! Most people talk at about 150 words per minute, but you can listen and understand up to 350 words per minute! When you're trying to learn a complex subject, that can lead to boredom – you miss out on important ideas.

With the ECP-3803, you can listen to tapes at up to twice their normal speed – without pitch distortion!

Perfect for students: Since the voice you're listening to keeps up with your brain, you don't become bored. Because you pay better attention, you learn more. Your comprehension increases, as does your retention of what you've learned. Ideal for use with Heathkit/Zenith Audio-Tutorial Courses. Dimensions, 1.88" H x 6" W x 10.5" D.

ECP-3803, Shpg. wt. 4 lbs. **199.95**

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

NEW — Fast and smart — a Heathkit *Demon Dialer*™ takes the toil out of telephoning

$99.95

- Remembers phone numbers for you
- Prodigious memory can store up to 176 seven-digit numbers
- Wastes no time — redials busy and unanswered numbers with quiet, untiring ease until you get through
- Instantly dials MCI, Sprint and others

The Demon Dialer is an amazing telephonic tool with a 93-number memory that connects you faster than any other method available. Computer-controlled by an on-board CPU, it will instantly and automatically dial numbers of up to 32 digits stored under 2- to 6-digit codes you design, such as TOM, WORK, DOC, POLICE, 33, etc.

As a redial device, it has no equal. Demon will silently dial a busy number again and again, 5 times in the first minute, then once every two minutes for ten minutes. Incoming calls are not affected. A 'success signal' alerts you when the other party answers. If they're out, Demon will redial every ten minutes for up to ten hours!

The micro-computer 'directory' can be expanded quickly with one Memory Accessory to accept 176 numbers. Best of all, this Dialer has the capability to grant Demon power to all extension phones on a single line. Rotary extension phones can also make use of the tone-stored code system.

For metropolitan and business users, where long-distance systems such as MCI, Sprint or ITT are offered, the Demon will improve dialing speed and reliability by actually *detecting* access tones instead of pausing. With built-in battery backup, directory memory is good for up to a year if unplugged from AC. Constructed on a single circuit board, Demon Dialer is housed in a smoked-gray case you can set on your desk, hide in a drawer or wall-mount with its own self-stick bracket. This kit includes AC power cube, battery, two cables with modular plugs, an in-depth manual and a Dial Guide/List. To communicate faster, have your telephone take on a Demon!

Kit GT-2217, Shpg. wt. 3 lbs. **99.95**
GTA-2217-1, Memory Accessory, 1 lb. **19.95**

Two-way Telephone Amplifier speaks clearly for itself

$54.95

- Converse clearly with callers; be heard from up to 10 ft. away
- Answer without lifting the receiver, to save time and keep hands working free

Save time! Press the Power button to answer the phone; press it again to hang up. Voice activated circuitry instantly switches from talk to listen. A slide control adjusts listening volume and a sensitive microphone transmits clear-voiced responses. Listen button lets you monitor the line and talk privately. Requires external phone, and 9V battery. Includes 6-ft. of 4-conductor cable.

Kit GD-1112, Shpg. wt. 3 lbs. **54.95**
PS-2350, AC Battery Eliminator, 1 lb. **7.95**

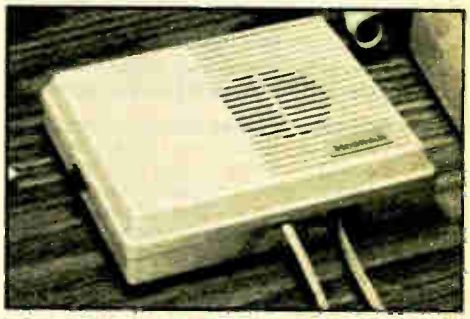
NEW — Midland Cord-Free Portable Telephone extends mobility

$149.95

- Remote works up to 600' from base unit without interference
- Excellent immunity from noise

Heath evaluation says the Midland 80-250 Portable Telephone is the best they've ever tested. Long, 600 foot duplex range makes it a ready companion, indoors and out. Features auto-redial of last number called, volume controls, off/standby/talk switches, recharge at cradle, touch-pulse operation, branch jack, status LEDs, and do-it-yourself hookup. Base unit doubles as one-way pager. Includes base unit, dial-out & receive handset, charging cradle and owner's manual. *You'll never miss an important call!* Base unit requires 120 VAC.

GD-1339, Assembled and tested, 6 lbs. .. **149.95**



NEW — Pleasant Phone Ringer puts the bell out of business

$29.95

- Two 'C' cells (not included) power it up to 1 year
- Inside variable volume control

Replace the harsh ring of your telephone with this unique little device and notice what a difference it makes to hear a tuneful call come in. The pre-programmed IC in this one-evening kit gives you four choices in place of the bell: a beeping signal, a four-note chime, 10 seconds of Beethoven's *Für Elise* or 20 seconds of *Romance*. Pushbutton switch lets you choose either the conventional telepnone bell, or signals from the Pleasant Ringer. Includes phone plug, 6-ft cord and remote speaker terminals. *Put a tune in your telephone.*

Kit GT-1218, Shpg. wt 1 lb. **29.95**

Turn on lights and small appliances with just a fingertip touch

$19.95

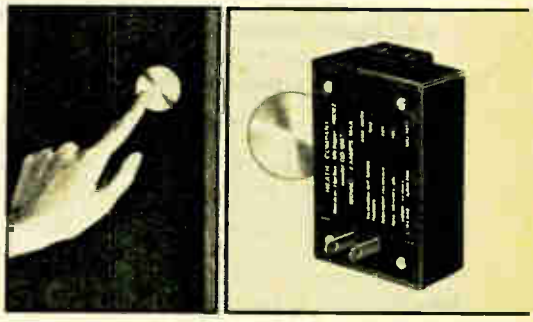
- Sensor plate mounts anywhere for instant on/off control

FAST, EASY 1-EVENING KIT

Tap the sensor plate, and our Touch Control Switch turns appliances or lights on or off instantly. Takes one evening to assemble and install. No extra wall boxes or rewiring necessary — simply plug lamp or appliance into control unit, then plug unit into an AC outlet. Touch plate mounts anywhere and connects to control by easily-concealed wire. Twenty feet of wire included, or use your own for longer runs. Two touchplates included with each kit — or use any ungrounded metal like door knobs or railing as sensor. Touch controls are the modern answer to safe, switchless electronic comfort in your home. Install them throughout your home for space-age luxury and convenience. 300 watts maximum load per unit; 150 watts per individual lamp. Convenience at your fingertips, without the expense of added wall outlets or wiring!

Touch Switch for TVs to 225W, fans to 18W, lamps, heaters, etc. to 300W max. Not for AM radios.

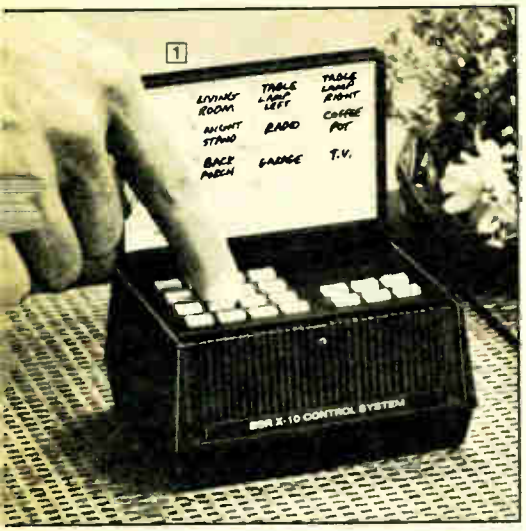
Kit GD-1287, Shpg. wt. 2 lbs. **19.95**

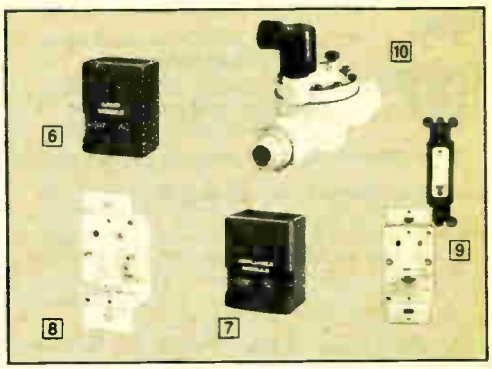


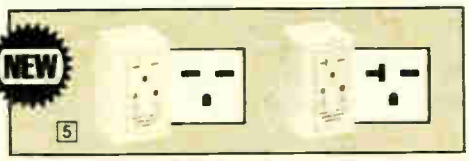
VISA

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

It's science, not fiction — pushbutton or timed control of home electronics is now a reality







- **Control 16 groups of lights or appliances**
- **It's easy to design your own system — extra modules add the household control you need**

1 **The Controller Command Console** is simply the ultimate in home convenience! With a fingertip touch, *you're in complete control by remote control,* from beside the bed or wherever you plug it in. Console signals are transmitted over existing house wiring to the module of your choice. Just plug lights and appliances into the appropriate module. Use as many modules on the same code as you wish. Dim or brighten lights. Two "all lights on" and "system off" buttons provide security and savings, respectively. Very helpful to handicapped or bedridden people, too, by automating some household functions, and making others fingertip easy!

GDP-1510, Assembled, Shpg. wt. 2 lbs. **34.95**

2 **The Ultrasonic Cordless Controller** transmits signals to the Controller Command Console from up to 30 feet away, using identical pushbuttons.

GDP-1511, Assembled, Shpg. wt. 1 lb. **19.95**

3 **Telephone Responder Console** is the remotest control of all. It lets you enjoy the freedom of calling *from anywhere* to control up to 8 groups of 120 VAC items. Includes modular phone jack.

GDP-1515, Assembled, Shpg. wt. 6 lbs. **89.95**

4 **The Timer Command Console runs everything on time.** Automatically! Used with the modules, your home can run like clockwork, setting lights and appliances to go on and off up to twice a day, according to your family's needs and lifestyle. The possibilities are virtually unlimited! Away for the weekend? The Timer is on guard. It gives 24-hour control with a lived-in look and sound when you're gone (even simulates your movement from room to room), *so nobody knows that nobody's home.* Features digital clock with two levels of display brightness; Fast and Slow keys for accurate time setting; Daily, Once, and a random Security setting; Clear to erase a setting; All Lights On and All Lights Off for immediate security and control. No dimming feature. Requires 120 VAC.

GDP-1520, Assembled. Shpg. wt. 2 lbs. **64.95**

5 **NEW! Air Conditioner Module** is sold in two different 240 VAC receptacle configurations (both line cord plug-ends pictured). Order according to your type and within conditioner wattage rating. Standard plug module (left) rated for 15 A load.

GDP-1517-A, Assembled, Shpg. wt. 1 lb. ... **29.95**

Perpendicular-pronged module rated for 20 A load.

GDP-1517-B, Assembled, Shpg. wt. 1 lb. ... **29.95**

6 **Lamp Module** receives signals to turn On, Off, Dim or Brighten incandescent lamps; 300 W total.

GDP-1512, Assembled, Shpg. wt. 1 lb. **16.95**

7 **Appliance Module** controls TV, stereo, coffee maker, fans, etc. Can operate lights, including self-starting fluorescents (no dimming feature). Max ratings: 15 amp resistive load; ⅓ HP motor; 500 watt lighting load; 400 watt TV/stereo load.

GDP-1514, Assembled, Shpg. wt. 1 lb. **16.95**

8 **Wall Switch Module** replaces existing switch. Operates inside or outside lights; dims them if operated by GDP-1510, 500 W maximum load.

GDP-1513, Assembled, Shpg. wt. 1 lb. **17.95**

9 **Three-Way Wall Switch Module and Companion** with independent on/off buttons controls 3-way up/downstairs switches. 500 W maximum load.

GDP-1516, Assembled, Shpg. wt. 1 lb. **24.95**

10 **Sprinkler Control Valve;** requires GDP-1514.

GDP-151B, Assembled, Shpg. wt. 3 lbs. **59.95**

The *Informer*™ Ultrasonic Intrusion Alarm protects a room from trespassers

$69.95

FAST, EASY 2-EVENING KIT

- **Book design conceals unit**
- **"Sees" intruders 25 feet away**
- **Built-in deactivation time delay**

Disguised to look like a fine hardcover book, this device will protect any room in your home. Ultrasonic sound waves detect intruders up to 25 feet away, activating *both a light and/or audible alarm* when the field of coverage is broken. Built-in 10-second entry/exit with 30 second triggering delay can be socket-selected to provide safety lighting only, or lighting and alarm protection. Use it for security purposes, or as an automatic light switch for garage, basement or attic. Solid-state circuitry. 120 VAC operation.

Kit GD-49, Shpg. wt. 5 lbs. **69.95**

GDA-39-2, 120 VAC Alarm Bell, Shpg. wt. 5 lbs. **34.95**

Automatic Telephone Dialer/Coder rings for help

Perfect for vacation homes, warehouse areas and remote locations left unattended.

Automatically dials *any* number you program — police, neighbors, relatives, fire, ambulance, maintenance or answering service, etc., when triggered. Can be used with intrusion alarms, panic buttons, smoke/heat detectors, or the GD-1800 Minuteman II security system. Dials any number up to 12 digits — enough for access, area code and number, anywhere in the world — *and keeps dialing until it gets through!* Programmable 3-digit location beep signal repeats for two minutes to let them know exactly where call originates. Separate microphone tied to phone line (with sensitivity control) monitors the area around Dialer for accessory information. Sliding front panel conceals coding switches. Includes four 9V batteries. Check with phone company for installation requirements, if any. 4.75" H x 11" W x 6" D.

Kit GD-1156, Shpg. wt. 7 lbs. **199.95**

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

Minuteman II Security System protects your home or business, day and night

- **Component design offers total user flexibility to match security needs**
- **This famous system – now in kit form – moves with you from home to home**

Protect yourself, your loved ones and your property effectively by using Delta's Minuteman II Ultrasonic Security System. It acts as a master control for expandable options, includes entry/exit delays, backup for interrupted line current and self-testing circuitry for ever-reliable operation.

1 **The Ultrasonic Master Control Unit/Detector** protects up to 300 square feet with a blanket of harmless ultrasonic sound waves. When an intruder disturbs the silent reception pattern, an immediate alarm signal is activated. You can add up to three Minuteman Sentinel Detectors – along with indoor/outdoor siren speakers, key-operated on/off switches, magnetic door contacts, window foil or any other closed circuit switch. Includes plug-in power transformer. Test switch checks operating status. 120 VAC, 60 Hz. Dimensions, 3.75" H x 11" W x 6" D.

Kit GD-1800, Shpg. wt. 7 lbs. **199.95**

2 **The Minuteman Remote Sentinel offers extended protection** by acting as a vigilant, ultrasonic slave to the Master Control Unit. Identical detection circuitry covers an additional 300 square feet of area. Any disruption relays the impulse instantly to Master Control for alarm activation. Doesn't require positioning near AC source. Requires GD-1800 for power and control. Order bracket below. Includes 50 feet of 4-conductor wire for connection.

Kit GDA-1800-1, Shpg. wt. 4 lbs. **69.95**

3 **Key Switch Accessory provides remote on/off control** for Minuteman II Alarm System. Includes loop-secure LED to positively indicate armed status, along with a special pick-proof key and lock set. Requires GD-1800 for power. Professional tamper-proof feature sounds alarm if intruder attempts removal of Key Switch. Includes two keys for double security.

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

4 **Indoor-Outdoor All-Weather Alarm Speaker** produces up to 108 dB of siren noise (measured at 10'). Includes 50 feet of easily-concealed wire for connection to GD-1800 Master Control Unit/Detector. 8 ohms impedance.

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

NEW FROM HEATH! Versatile Bracket Accessory for mounting the GDA-1800-1 Minuteman II Sentinel Ultrasonic Detector/Slave Unit.

GDA-1800-4, Shpg. wt. 1 lb. **14.95**

Eye-Spy™ Photobeam Alarm Relay detects all

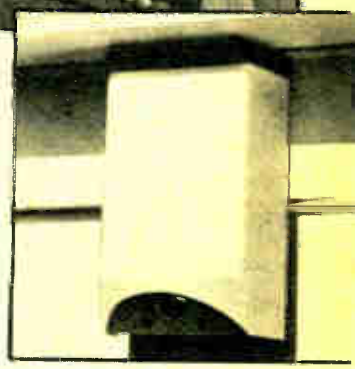
For those in search of low-priced, linear security, this is a versatile, multi-purpose system. The relay circuit activates when a reflected beam is broken, to alert all concerned. Uses a narrow, incandescent beam of light to catch intruders instantly, activating 120 VAC warning devices up to 300 watts.

The Relay's intense beam is reflected back into the cabinet by a small mirror. Unit is sensitive only to its own light source. Works up to 25 feet from reflecting mirror, so relay can be inconspicuously placed in one corner and mirror placed in the other to serve as your silent sentry. **Businessmen!** – use it to activate an intrusion alarm, signal the entrance of persons into a shop or room, or count objects passing a given point. This inexpensively convenient kit includes relay light source (shown), mirror, mounting brackets and all hardware.

Kit GD-1021, Shpg. wt. 3 lbs. **19.95**

Infra-Red Security Light Control deters criminal intruders with surprise

- **Makes homes safer at night by "seeing" invisible infra-red waves and motion**



This year, one out of twenty homes will be robbed, and even more will be invaded with intruders turned away before completing an actual crime. Now you can have peace of mind with the strongest outdoor safeguard against crime yet devised.

The faithful Security Lighting Control uses a passive infra-red sensor that will react instantly to body heat and movement – activating up to 500 watts of inside/outside lighting and/or an alarm to destroy the cover of darkness – *before an intruder gets near your home.* Six infra-red elements monitor an 875-square-foot area near your dwelling and keep it safe from dangerous intrusion.

When an illegal intruder is detected, the unit immediately shocks him with the most powerful deterrent to crime – LIGHT. The unexpected surprise will make a thief think he has been observed, and scare him to flee.

How does this revolutionary device work? Infrared light is invisible to our eyes. But its presence can be detected as heat, in the form of radiated waves of energy. The Light Control is intensely sensitive to heat energy and looks for changes in temperature with movement in a 35 foot by 25 foot field. When a warm-bodied object moves through the pattern, a relay suddenly turns on lights, or a light/alarm combination, up to 500 total watts. Lights remain on until four minutes after all movement has ceased, then go off and unit resumes silent protection. No timers, no switches, and *no expensive all-night floodlights.* A manual sensitivity control will adjust the temperature differential range so pets and small animals will not trigger accidental alarms.

A built-in phototransistor will deactivate the device during daylight hours. When surrounding light dims, it will sense darkness approaching and turn on the detection circuit again. There's no part-time protection at night!

Wire it yourself, or consult an electrician when connecting it to your 120 VAC, 60 Hz lighting system. It's a simple process for any do-it-yourselfer and a rewarding kit that offers high security value. 8.1" H x 5.25" W x 3" D. UL listed. Assembled unit advertised elsewhere for $199.

Kit GD-3510, Shpg. wt. 3 lbs. **149.95**

Night Sentry Timer puts timed lighting on the wall

Home security experts agree that a time-lit house is your best protection against predatory thieves. This amazing Timer actually *memorizes your pattern of light use* in the first 24 hours, and repeats it daily thereafter! Re-program it manually for up to 48 on/off settings per 24-hour period with built-in variability. It's also a conventional touch switch and daily use won't override a preset program. Ten minute memory for power outages. Absolutely silent – no motors or gears. Uses existing wallplate. Installs in minutes with just a screwdriver. Solid-state, microprocessor reliability, with 'soft start' feature to triple normal bulb life. 500 watt maximum load.

GDP-1236, No longer available

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

Find lost valuables buried in the ground or two feet underwater with a Heathkit Metal Locator

Heathkit Metal Locators punch through ground clutter to uncover old coins, artifacts and treasure – any metal object you want to find. Our finest model pinpoints small objects in any kind of soil. Both models can comb ground submerged in up to two feet of water! What'll you find first? Old pennies? A ring? Rare raw metal? Maybe silver or gold dollars!

- **GD-1290 detects objects even in highly mineralized soil where conventional locators are useless**
- **Has on/off volume, meter, speaker, phonejack, discrimination, ground balance, tuning controls, battery test switch, charging jack, mode switch**
- **Runs on 6 AA cells or rechargeable battery pack**
- **Our finest model, with VLF Ground Balance Mode and VLP – a very low price!**

The Groundtrack – sensitivity in any soil type

A successful treasure hunting hobby can be exciting and rewarding. No matter where you live – by the sea or mountains, near sand, soil or solid clay – the Groundtrack will provide you with hundreds of surprising discoveries! Go exploring near public parks, old towns and homesites, mines, dumps, battlefields, beaches, fields or your own backyard. The Groundtrack detects valuables in any kind of soil. Yes, even in highly metalized soils that baffle conventional locators. A fully adjustable discrimination circuit eliminates unnecessary digging and lets you look in areas where high 'junk' content makes the use of other locators all but impossible. It filters background signals, screening out pulltabs, metal foil, bottlecaps, ferrous and nonferrous items. With pushbutton tuning, only signals caused by items of value receive attention. Our finest metal locator – *priced far below the competition!* – will give you hour after hour of fun-filled excitement every time you use it.

A Ground Balance Mode with excellent sensitivity will pinpoint your treasures even in highly mineralized soil. The fully shielded search coil prevents false signals and is waterproof so you can sweep in up to 2 feet of fresh or salt water. The GD-1290 features a sophisticated, Very-Low-Frequency-moded, induction balance system – you hear nothing until that ring, coin or antique artifact enters the 6-inch diameter search head's field. A tone sounds, then grows louder as you approach vertical center over the buried valuable.

Use the Groundtrack anywhere. It's lightweight (3.4 lbs) and portable, with a telescoping shaft that collapses for storage. Runs on 6 AA cells (not included) or optional Nickel-Cadmium battery pack, which recharges from home current or in-the-field from car cigarette lighter socket. It's rewarding fun – order one!

Kit GD-1290, Shpg. wt. 5 lbs. **219.95**

GDA-1190-1, Rechargeable Battery Pack, Shpg. wt. 2 lbs. **24.95**

GDA-1190-2, Superex Headphones, Shpg. wt. 2 lbs. **14.95**

GD-1290 SPECIFICATIONS: Sensitivity: Locates dime at 4" to 6" typical, may be less depending on soil conditions, mode of operation and amount of discrimination selected. **Method of Detection:** Induction-balance circuit. **Detector Output:** Meter, speaker, phone jack. **Dimensions:** Search Coil: 6" diameter. Extended Height: 45½". Collapsed height: 22½". **Power Requirement:** Six AA dry cells or alkaline, or rechargeable Nickel-Cadmium Battery Pack (GDA-1190-1). **Net Weight:** 3.4 lbs.

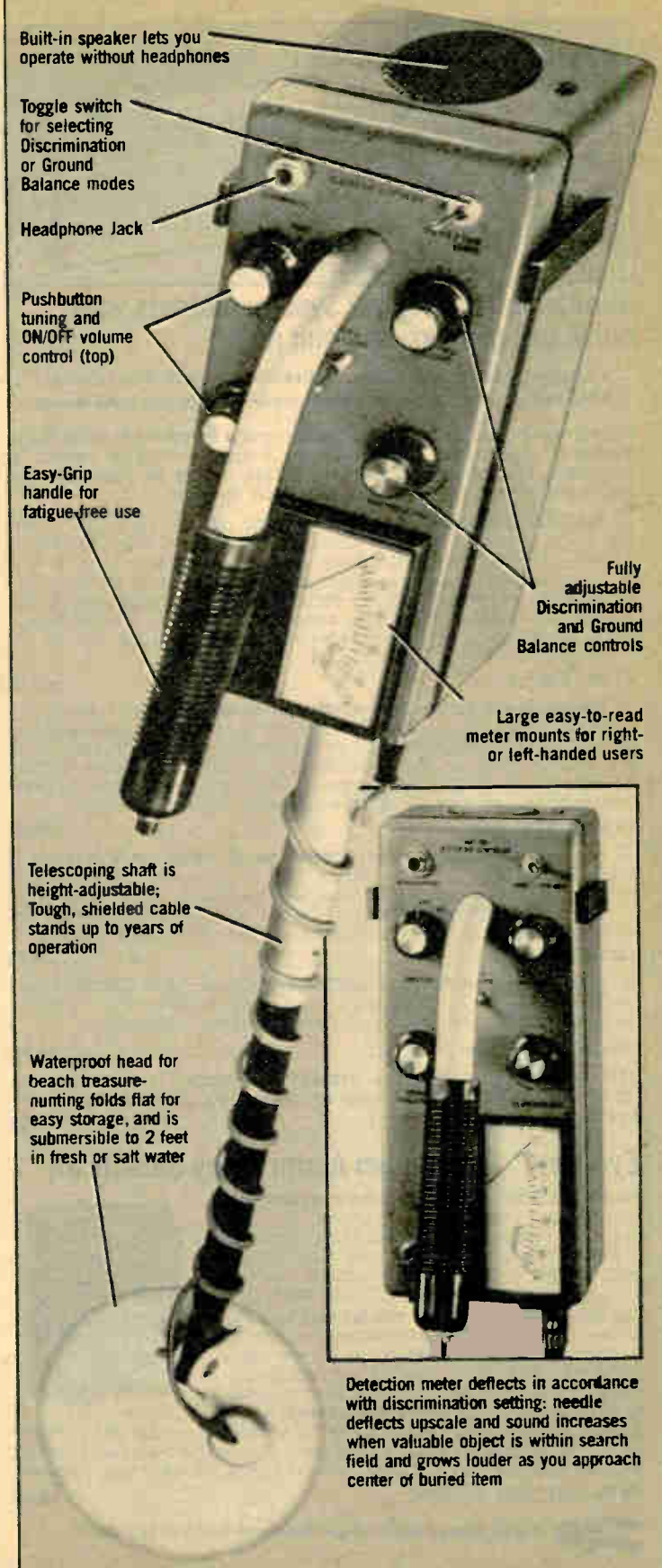
Cointrack Metal Locator highly sensitive to coins

Engineered exclusively for "coinshooting," the GD-1190 finds coins in sand and other general kinds of soil. It has the same fine features and specifications as the GD-1290 above, but no Ground Balance Mode. Rather, it has an off-resonance search coil optimized for coin detection, with adjustable discrimination to cancel out bottle caps, pulltabs, etc. A special pushbutton tuning maintains maximum sensitivity over varied conditions and 6" diameter head is waterproof, for shallow water searches. Take the Cointrack anywhere, because it's lightweight (only 3.4 lbs.), weight-balanced, has a telescoping wand that adjusts to your height and collapses to 22½" for storage and transportation.

Kit GD-1190, Shpg. wt. 5 lbs. ..... **Was $149.95, NOW ONLY 129.95**

GDA-1190-2, Superex Headphones, Shpg. wt. 2 lbs. **14.95**

GD-1190 SPECIFICATIONS: Sensitivity: Typically 4" to 6", may be less depending on coin size, amount of discrimination and soil material. **Method of Detection:** Off resonance type. **Output:** Meter, Speaker, Phone Jack. **Dimensions:** Search-Coil: 6" diameter. Overall length: Shaft extended 45½", collapsed 22½". **Power Requirement:** Six – AA Dry Cells or Alkaline, or rechargeable Nickel-Cadmium battery pack (GDA-1190-1). **Weight:** 3.4 lbs.



A 3-Way System to please the most critical ear

Surround yourself with superlative sound.

- **Careful design delivers superb source accuracy and wide dynamic range**

Compare the specs, *and price* of this outstanding floor/shelf system with any other – you'll see why this is our best-selling pair. Designed for use with the best audio components, the 10" woofer provides gutsy, well-defined bass response, with a 500 Hz woofer/midrange crossover frequency to insure smoothness and minimize IM distortion. The 4.5" midrange driver has a polyester-damped subenclosure to prevent woofer reflections. A 1" dome tweeter exhibits excellent power handling and definition, with *full 120° horizontal dispersion at 12 kHz.* Flush-mounted drivers create a sharply-focused sound image. For best stereo imaging, you can install the tweeter directly above the midrange whether you position the speakers upright or lying on their sides – a Heath exclusive! Driven to sensational sound by as little as 10 watts, a high-powered amplifier like the AA-1800 or AA-1600 (pg. 87) reveals their awesome dynamic range and three-dimensional clarity. Music takes on new meaning. Two frequency controls optimize response for your listening area. Individual driver fuses provide full overload protection. Fully assembled walnut-finish veneer cabinet.

Kit AS-1373, Shpg. wt. 68 lbs. **199.95**

Buy two! SAVE $20.00. Kit AS-1373-2, Shpg. wt. 134 lbs. ..... **pair 379.90**

AS-1373 SPECIFICATIONS: Frequency Response: ±3 dB, 40 Hz to 20 kHz. **Max. Amp. Power:** 250 W. **Crossover:** 500 Hz (12 dB/octave) and 3000 Hz (12 dB/octave). **Controls:** 3 kHz shelf/flat; 10 kHz rolloff/flat. **Dimensions:** 26" H x 14½" W x 11⅞" D.

Efficient, mid-priced 2-Way Bookshelf Speakers

Now you can get maximum stereo pleasure and uncommonly good sound reproduction at a modest price! Our 2-Way Reflex Speakers provide extremely high fidelity musical reproduction, yet require a comparatively low-powered amplifier for efficient response. They're ideal for small audio systems because as little as *five watts* of power per channel – or as much as 25 watts – will drive them to life-like clarity and sound detail. Very affordably priced, this medium-sized speaker uses an 8" woofer and 2" x 6" horn-type tweeter that can be mounted horizontally or *vertically* for position placement flexibility. A continuous tweeter level control lets you adjust the Horn output to balance listening room acoustics. A 12 dB/octave crossover at 2500 Hz minimizes distortion and insures smooth response. Includes factory assembled walnut-finish cabinet and contoured grille cloth. Buy the perfect complement to your low-power system today and let your ears discover a new, low-cost meaning to 'stereo high fidelity.'

Kit AS-1342, Shpg. wt. 32 lbs. **89.95**

SAVE $9.95 on two! Kit AS-1342-2, Shpg. wt. 78 lbs. ..... **pair 169.95**

AS-1342 SPECIFICATIONS: Frequency Response: ±3 dB, 60 Hz to 14 kHz. **Amplifier Power:** 5 watts min. to 25 watts. **Crossover:** 2500 Hz (12 dB/octave). **Dimensions:** 22¼" H x 12" W x 10½" D.

AS-1320 SPECIFICATIONS: Freq. Response (± 3 dB): 22-500 Hz. **Impedance:** 8Ω. **Min. Amp. Power:** 30 W. **Max. Amp. Power:** 250 W. **Speaker Fuse:** 2 A. **Driver:** 15" long-throw design with a 2" four-layer voice coil. **Cabinet Type:** Ported box, tuned to 22 Hz. **Dimensions:** 64½" H x 21½" W x 17" D.

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

Hear all the audio in your collection with this unparalleled Four-Way Speaker System

- **Capable of reproducing the extended dynamic range of today's best recordings; subwoofer module carries deep bass response down to 20 Hz auditory limit**
- **One of the finest systems available to the purist; complementary driver characteristics produce coloration-free audio across the spectrum**

If you want to enjoy the full impact of digitally-mastered and direct-to-disk recording breakthroughs, Heath's nerve-tingling 4-Way Speaker Combination System will give you the highest quality sound reproduction and the utmost in listening pleasure for your money. The system consists of two parts:

1 **The AS-1321 3-Way Speaker Module** features a 6.5" polypropylene midbass in a special subenclosure, a 2" soft dome Ferro-Fluid midrange and a leaf tweeter having excellent high frequency linearity. A computer-optimized 4th order crossover in the Module produces a silky smooth, natural response. Has bi-amplification provisions and automatic circuit breaker protection.

Kit AS-1321, Three-Way Speaker Module, Shpg. wt. 31 lbs. **289.95**

SAVE $20.00! Kit AS-1324, 4-Way Speaker System, 208 lbs., Mtr. Frt. **569.90**

SAVE $90.00! Purchase a pair of AS-1324 Systems. $1179.80 separately.

Kit AS-1324,-2, Shpg. wt. 416 lbs., Motor Freight Collect **1089.80**

AS-1321 SPECIFICATIONS: Frequency Response (± 3 dB): 100-20,000 Hz; with AS-1320: 22-20,000 Hz. **Impedance:** 6 ohms (4 ohms minimum). **Recommended Amplifier Power:** 30-250 Watts per channel. **Crossover Frequencies (–6 dB):** 100, 600 and 4000 Hz. **Crossover Type:** Special 4th Order.

2 **The AS-1320 Subwoofer** can be used singly or in pairs – and the cabinet can be expanded to a crowd-pleasing 4-Way System with the AS-1321 3-Way Module above. Heath's Subwoofer vastly extends the low frequency range of your system, eliminates muddy bass and kicks out a thunderous level of bone-quivering bass energy. Its big 15" long-throw driver has a 2" four-layer aluminum voice coil to maintain an extended, *ultralow* linear response. The black cabinet – with a tuned, 6" floor-loaded vent and walnut stained decorative ash rails – uses high-density materials to prevent annoying coloration of bass notes. Requires ASA-1320-1 Passive Crossover for optimum response without a separate amplifier, or AD-1702 Electronic Crossover with a separate amp (pg. 86).

Kit AS-1320, Shpg. wt. 177 lbs., Motor Freight Collect **299.95**

Kit ASA-1320-1, Passive Crossover, Shpg. wt. 6 lbs. **44.95**

Kit AD-1702, Electronic Crossover, Shpg. wt. 15 lbs. **199.95**

Pro-Series Super High-Fidelity Components. They stand at the summit of audio technology — designed for those who insist upon studio-quality sound reproduction.

The Pro-Series is Heath's finest audio line, with exceptional design features unheard of in system components at this price. Absolutely state-of-the-art electronics and our 'listening awareness' ingenuity deliver a rich, authentic sound that will turn your room into a concert hall, and reflect your quest for excellence in musical-appreciation engineering.

[1] NEW! Nikko ND-1000 Cassette Deck matches the ultimate performance of Pro-Series components

Electromagnetic properties differ from tape to tape. This is true not only for different types of tape but also for different brands of the same type. The microcomputer-based Tape Evaluation and Control System of the ND-1000 optimizes bias and sensitivity for any tape you elect to use. At the touch of a button, each recording parameter is automatically adjusted to extract the optimum level of playback performance from any tape formulation. Your new recordings will yield extended flat high-frequency response without compromising their distortion or dynamic range specifications.

Feather-touch, IC-logic tape transport controls allow direct change of operating mode with built-in delay and 'flying start' recording. The accurate 2-motor, 3-head design has off-the-tape monitor capability, memory play, auto repeat, Dolby noise reduction, two mic inputs, headphone jack and bargraph LED peak level meters. In all, a fully compatible tape recording system worthy of the audio artist hidden in all of us! Manufacturer's suggested retail: $580.

ATP-1845, Assembled and tested, Shpg. wt. 18 lbs. **499.95**
ATP-1845-1, Rack-mounting Accessory to fit AE-1705, 1 lb. **24.95**

[2] Get better reception with this Digital AM/FM Tuner

As the 'heart' of a powerfully-endowed stereo music system, the AJ-1600 AM/FM Stereo Tuner boasts a set of outstanding specifications and performance characteristics. For prime reception, it has digital frequency display and center-tune meter for the most exact tuning and a selectable wide/narrow IF bandwidth for extremely low interference distortion in normally congested station areas. An RF input attenuator reduces overload and cross modulation, while a mute switch can eliminate interstation hiss. A switchable signal strength/multipath meter assures precise antenna orientation and maximum reception of the broadcast signal.

The Tuner's significant specifications include a sensitivity of 1.8μV (mono) and 3.5μV (stereo) for clean, crisp realization of weak or distant stations; signal-to-noise ratio of 83 dB mono/75 dB stereo for purer enjoyment of noise-free music; total harmonic distortion levels below 0.1% at 1 kHz; and channel separation better than 45 dB at mid-frequencies for full, expressive stereo listening and clear spatial imaging.

Kit AJ-1600, Shpg. wt. 25 lbs. **449.95**
AJA-1600-2, Dolby FM Noise Reduction Module, Shpg. wt. 1 lb. **49.95**
AEA-1800-2, Oak-finished Cabinet, Shpg. wt. 6 lbs. **34.95**

[3] Preamplifier provides complete audio signal control

In *Stereo Review* magazine, Julian Hirsch stated: "In sum, the Heath AP-1800 does practically everything one could want, and does it with perfection."

Our infinitely versatile Deluxe Preamplifier gives you absolute mastery over a multitude of source inputs without the introduction of audible distortion or coloration. It has a built-in moving-coil preamp, plus two moving-magnet inputs with three sensitivity and capacitance selections to match any turntable cartridge; tape monitoring for two decks, plus deck-to-deck dubbing and ability to listen to any source while copying; separate bass and treble controls for each channel, with dual turnover points for precise tone adjustment and bypass. With two-level high and low filter switches, a continuously variable loudness control, 0/20/40 dB switchable muting, four speaker capability and a six-position mode selector, you're capable of tailoring raw source material with an incredible degree of artful finesse.

Kit AP-1800, Shpg. wt. 27 lbs. **399.95**
AEA-1800-2, Oak-finished Cabinet, Shpg. wt. 6 lbs. **34.95**

Handsome optional oak-finished cabinets and solid oak end panels for Heathkit Pro-Series Audio Components (except the AA-1800) are listed and sold separately for each unit.

[4] 10-Band Octave Equalizer alters tonal parameters

Engineer records, tapes and FM broadcasts to your creative taste by adding the Pro-Series Equalizer to your rack. It's the only system accessory that can dramatically enhance every other component's performance and improve your environmental acoustics (without contributing noise) for less than the cost of a good set of speakers.

Ten ISO centered frequency-band slide controls for each channel give you octave-by-octave adjustability over the entire audio spectrum. They let you eliminate 'live' and 'dead' room spots for smooth, flat-graph characteristics. You'll notice right away it can enrich cartridge response, cut harmful subsonics, boost deep bass response to the anatomical vibration level and put lively resonance back into woofer, midrange and tweeter efficiency. A sophisticated mode/monitor switching combination allows you to equalize, monitor, record or bypass without rearranging any connections. Left and right channel LED clipping indicators warn of peak overload conditions. Harmonic distortion is a phenomenally low 0.001% from 20-20,000 Hz at rated output.

Kit AO-1703, Shpg. wt. 17 lbs. **274.95**
AEA-1800-2, Oak-finished Cabinet, Shpg. wt. 6 lbs. **34.95**

[5] Active Audio Processor increases your dynamic range

Dynamic range is to music what perspective is to painting or photography. It gives music depth and feeling. Some of the dynamic range in most music is lost in the recording or broadcast process, but the expansion circuit in the AD-1706 can restore up to 8 dB of this loss. Music comes through with added realism, better definition and lower background noise while maintaining full response and ultralow distortion – even at high volume levels. A noise reduction circuit sifts out up to 10 dB of noise from records and hiss from tapes, effectively increasing your system's total dynamic range by up to 18 dB. A switchable 7 kHz linear-phase filter reduces high frequency noise.

Front panel LEDs indicate relative noise reduction and dynamic range expansion level precisely. Compatibilities between the built-in tape monitor and mode selector switch let you apply processing during or after recording, specify process insertion point or bypass the Processor completely.

Kit AO-1706, Shpg. wt. 18 lbs. **299.95**
AEA-1800-2, Shpg. wt. 6 lbs. **34.95**

[6] Variable Electronic Crossover extends bass response

Add a separate bass channel to your system! Used with a Subwoofer such as the AS-1320 (pg. 85), this component gives more accurate crossover alignments for lower distortion and clearly-improved low end response *down to as low as 20 Hz.* Crossover points at 40, 60, 80, 100, 125 and 150 Hz can be frequency scaled up to 6 kHz. Switches select 6 dB/octave or 18 dB/octave slopes for flat frequency response at crossover points and superior imaging. Outputs for stereo, monaural and bridged hookup let you connect another amplifier and subwoofer to your system. Better control of drivers is possible in bi-amp and tri-amp applications, so you can play music at live performance levels with lower distortion. Has bass level control, crossover bypass switch and a 15 Hz infrasonic filter to remove annoying record warp noise.

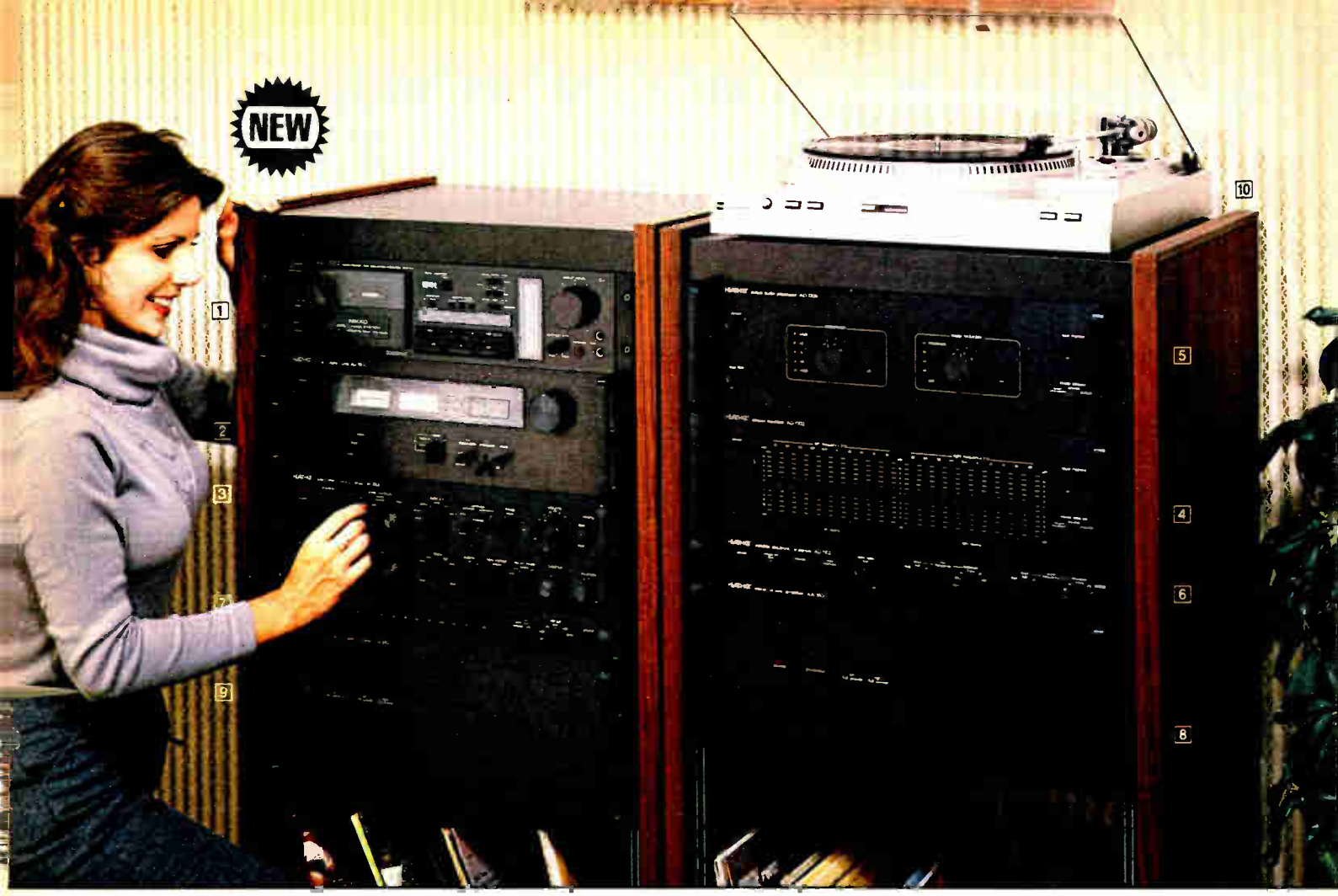
Kit AO-1702, Shpg. wt. 15 lbs. **199.95**
AEA-1800-3, Solid Oak End Panels, Shpg. wt. 2 lbs. **19.95**
Kit AS-1320, Subwoofer, 177 lbs. Motor Freight Collect **299.95**

[7] Graphic Output Indicator monitors peak power levels

Accurate monitoring of peak power output is critical to avoiding overloads and speaker damage. The AD-1701, one of the fastest output indicators on the market, gives you an instantaneous visual readout of power amplifier or preamplifier output. Two rows of 15 LEDs (one row for each channel) warn you of dangerous peak loads that could harm other components or blow your tweeters. When the range switch is set to select the 0 dB reference level for high or low level input, the Indicator exactly displays your system output with a 53 dB dynamic range, calibrated in rms values between each vertical pair of LEDs. The six-position range switch offers extremely wide sensitivity, with response time capturing transient bursts as short as one-half cycle of 20 kHz. A peak hold/average button allows you to supplement restricted meters.

Kit AO-1701A, Shpg. wt. 15 lbs. **199.95**
AEA-1800-3, Solid Oak End Panels, Shpg. wt. 2 lbs. **19.95**

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



8 High-Power Stereo Amplifier can energize the skies

250 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.025% T.H.D. FROM 20-20,000 HZ

On a clear day, you could probably hear it performing from a mile away. But indoors, it'll prove the purchase price by giving you more power and transient 3 dB dynamic 'headroom' to faithfully reproduce every cycle of the audible spectrum and prevent clipping. The AA-1800 will duplicate your music and multiply your listening pleasure with uncompromising accuracy, *without* introducing noise into the experience. Hum and noise is a full 85 dB down, with T.I.M. of less than 0.03%. A patented turn-on delay system safeguards your speakers from damaging input, and thermal circuit breakers defend against excessive heat. Peak power LEDs signal during full output.

Kit AA-1800, ***TEMPORARILY OUT OF STOCK. AVAILABLE APRIL, 1983*** **599.95**

9 125-Watt Stereo Amplifier with advanced features

125 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.05% T.H.D. FROM 20-20,000 HZ

The cool-running AA-1600 has more than adequate power for clean amplification and the safety features that smart audiophiles demand – at a wallet-pleasing price-per-watt. It packs a mighty per-channel punch with uncrowded 2.0 dB dynamic headroom to reduce transient clipping and operate your speakers at their maximum range efficiency. All sound sources are amplified with extreme clarity and inaudible distortion. Hum and noise are down 90 dB, below 1 watt, so music springs from a field of total silence.

Kit AA-1600, Shpg. wt. 51 lbs. ..... **Was $359.95, NOW ONLY 289.95**

AEA-1800-1, Oak-finished Cabinet, Shpg. wt. 6 lbs. **34.95**

One of the world's very finest audio pickup devices

Dynavector Ruby Moving-Coil Cartridge has a square 2.3 mm ruby cantilever for maximum rigidity and unsurpassed groove-to-coil signal transmission. Requires AP-1800-type Preamp (pg. 86). Engineered to match Ultra Low Mass tonearms.

ADP-1370, Shpg. wt. 1 lb. **310.00**

Pro-Series Rack combines beauty and convenience

Put your Pro-Series audio equipment together in a portable, space-saving rack, so all components are within easy reach! Comes with dividers for storing records and top shelf for turntable. Has 4 locking swivel casters for quick mobility. Handsome walnut veneer side panels will add contemporary taste to any room and a unified look to a set of components that mirror your exceptional taste. EIA standard rack is 43½" H x 21½" W x 18" D.

Kit AE-1705, Shpg. wt. 74 lbs. **274.95**

SAVE $40 ON THIS FINE SYSTEM

10 **Includes Dual 708Q Turntable** (shown) with – 78 dB rumble, ±0.025% wow and flutter PLUS Dynavector Ruby Cartridge (see above & pg. 90). Best in our line!

ACS-1708, Shpg. wt. 29 lbs. **599.95**

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

• Save $160 if you buy now

An exclusive fusion of power and performance

$609.95
Silver Panel

- 1.8 μV sensitivity for crystal-clear FM reception
- Adjustable bandwidth for optimum FM selectivity
- 80 db FM signal/noise ratio for wide dynamic range
- Rear panel power outlets handle up to 200 watts total; one switched, one unswitched for accessories

125 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.05% T.H.D. FROM 20 TO 20,000 HZ

Clean FM reception: The AR-1650's 1.8 μV 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 flywheel 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.

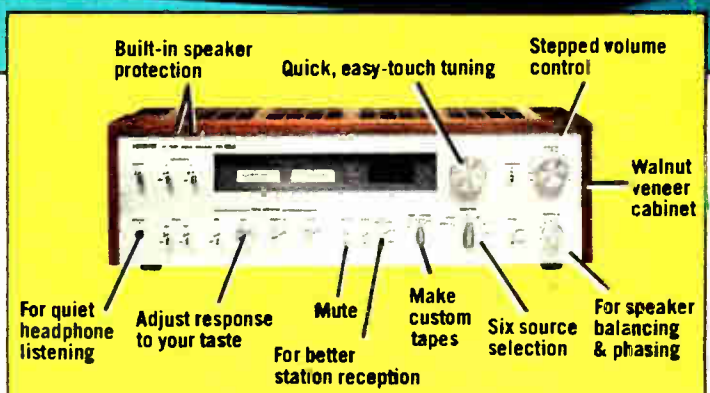
Complete control of your music: Against a background of total silence, you can adjust the sound to your specific preference. Tone controls include separate bass, midrange and treble for shaping the entire frequency range. A special tone flat switch bypasses these controls to provide ruler-flat response. High and low (maximally flat) response filter switches with 12 dB per octave rolloff let you blend out annoying turntable rumble or scratchy hiss from records and tape. Enabling the loudness switch will boost low frequency response and make up for the ear's lesser sensitivity in this bottom range. Our spare-nothing design gives you the capability to beautifully engineer any audio output.

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 tapedecks. The tape monitor control enables you to record from deck one to deck two, and closely monitor either one, or another source input.

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 replacement.

Choice of styles: You can choose between natural aluminum or black anodized aluminum front panel. Both feature walnut veneer cabinets.

Fun to assemble: The easy-to-read, step-by-step instruction manual faultlessly guides you through construction in about ten evenings. To speed building and ensure maximum performance the tuning unit, IF multiplex circuit board and two heavy-duty power amplifiers are preassembled and prealigned at the factory.



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 monitoring system for complete control during duplication!

Absolute power pleases absolutely: POWER is more than just a number of watts. Every receiver has a particular quality in the power it delivers. That's why receivers of the same power rating, played with the same source and speakers, can sound so different. The new AR-1650 not only has all the raw power you'll ever need, it also delivers a sound quality unlike any you've ever heard before; one that's vibrant, clean and natural.

The designers of the AR-1650 were striving for more than just power numbers that would impress an audiophile. They were striving for a beautiful sound from precisely-defined musical peaks, tonally solid bass and fully-detailed midrange reproduction. Controlled power infused with exceptional clarity. The resulting design is one of the most remarkable stereo receivers to be seen and heard in a long time. We recommend two components that interface perfectly with the AR-1650: the Heathkit AS-1373 Three-Way Speaker System (pg. 85) and the precision ACP-1708 Dual 708Q Turntable (pgs. 87, 90). Together, they make up a system of superior audio quality.

Kit AR-1650S, Silver Panel, 66 lbs. . . . . **Was $769.95, NOW ONLY 609.95**
Kit AR-1650B, Black Panel, 66 lbs. . . . . **Was $789.95, NOW ONLY 629.95**
Kit AJA-1600-2, Optional Dolby NR Module, Shpg. wt. 1 lb. **49.95**

AR-1650 SPECIFICATIONS: FM Section: Mono/Stereo; Usable Sensitivity 1.8 (10.3) 3.5 (16.1) μV (dBf). **50 dB Sensitivity:** 2.5 (13.2)/36 (36.1) μV (dBf). **S/N:** 80/73. **THD @ 65 dBf and 1 kHz:** .1, 1%. **Freq. Resp:** 20 Hz to 15 kHz, ± 0.5 dB. **Selectivity:** Wide, 40 dB; Narrow, 80 dB. **AM Section:** Ext. Ant./Radiated Sensitivity: 30 μV/250 μV/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. **Hum and Noise:** – 90 dB. **Freq. Resp:** 20 Hz to 20 kHz + 0 to – .02 dB. **IM Distortion:** 0.05%. **TIM:** 0.05%. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 7" H x 21.75" W x 16.88" D. (17.78 x 32.39 x 42.88 cm).

VISA MasterCard **Credit Card Orders Call TOLL-FREE: 800-253-0570**

Digital FM Stereo Receiver renders the science of sound, with convincingly "live" realism

30 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.009% T.H.D. FROM 20-20,000 HZ

$349.95

- **An array of exceptional specifications; more watts per dollar, with high 2.5 dB (53 watt) dynamic headroom**
- **The advanced technology of our separates (below) in a single slim chassis, with a multitude of versatile features**
- **A four-evening kit of uncompromising value and design**

Bring the joy of stereo music appreciation into someone's life this New Year. Introduce them to endless hours of self-enrichment with a gift of audio art in kit form from you and Heath. Like the AR-1250 FM Stereo Receiver. It offers the source fidelity, stereo control and clean power for listening ingenuity that every audio enthusiast wants for maximum musical pleasure.

Our veteran Pro-Series division designed this medium-power Receiver to include all the most-desired features which improve sound reproduction quality. Their encyclopedic background produced a sound investment to build with pride. A beauty to behold, its *performance* will impress everyone.

The action starts with a bright green digital readout, bargraph displays of instantaneous signal strength and power output level, exact LED center-tune and stereo locking indication. You have a wealth of signal control: High- and Low-cut Filters as well as Bass and Treble controls shape the sound; adjustable FM Muting silences interstation hiss; Tone Flat yields smooth response and uncolored recordings; Loudness boosts the low frequencies; Mono narrows perspective, while Volume and Balance vary with your mood. Three source switches route signal input for infinitely creative output.

What emerges is proof that our precision design has met its goal. Like excellent FM sensitivity and vast 45 dB separation. Delayed turn-on speaker protection from deadly transient 'thumps.' Tympanic bass and crisp, ethereal highs that deliver an uncanny new reality in musical presence and stereo dimensionality. Almost unlimited system potential. Plus an ultra-low distortion spec and plenty of pulse-pounding power to excite your airspace.

AR-1250 provides the versatility to expand with up to four speakers. AM and Dolby FM Noise Reduction Modules, two tape decks with full monitor capability, auxiliary sources (like TV), headphones, a turntable, power amp, equalizer, etc. You're invited to press the power switch at a nearby Heathkit Electronic Center and experience instant aural gratification. Take one home and share the exclusive pride of handcrafted achievement. With such an extraordinary Receiver value available to the kitbuilder – why settle for anything less? Get yours now!

Kit AR-1250, Shpg. wt. 23 lbs. **349.95**

Kit AJA-1200-2, AM Module, Shpg. wt. 1 lb. **39.95**

Kit AJA-1600-2, Dolby* FM Module provides reduced noise and increased dynamic range factors on Dolbyized broadcasts. Shpg. wt. 1 lb. **49.95**

SPECIFICATIONS: FM SECTION: Mono/Stereo. **Usable Sensitivity:** 1.9 (10.8)/3.5(16.1) μV (dBf). **50 dB Sensitivity:** 3.5 (16.1)/ 38 (36.8) μV (dBf). **S/N Ratio:** 70/65 dB. **Hum and Noise:** 65 dB. **Harmonic Distortion:** 0.15/0.3%. **Frequency Response:** 30 to 15 kHz @ ±1.5 dB. **PREAMPLIFIER: Frequency Response:** 20-20 kHz @ ±0.5 dB Phono, 20-20 kHz @ ±0.3 dB Aux. **THD and IMD (2 V out):** 0.009%. **Input Sensitivity (0.5 V out):** 1.25 mV Phono, 100 mV Aux. **Input Overload:** 150 mV Phono, 10 V Aux. **S/N:** 75 dB Phono, 85 dB Aux. **AMPLIFIER IMD:** 0.012%. **TIM:** 0.02%. **Frequency Response:** 20-20 kHz @ ±0.2 dB. **1 kHz Separation:** 50 dB. **A-Weighted S/N:** 95 dB. **Power:** 120 VAC, 60 Hz. **Antenna Connections:** 300 & 75 ohm. **Convenience Outlets:** 1 switched, 1 unswitched (200 W max.). **Dimensions:** 17" W x 4 5/8" H x 15.25" D *TM Dolby Labs, Inc.

Integrated Amplifier combines fidelity with ability

$249.95

30 WATTS, MIN. RMS, PER CHANNEL INTO 8 OHMS WITH < 0.009% T.H.D. FROM 20-20,000 HZ

- **The most adaptable amplifier in it's class, with design features of a high-power amp at a mid-power price**

There's no need to sacrifice important, audio-improving ingredients if you buy performance-matched 'separates' for stereo listening. This efficient amplifier has same AMP/PREAMP specifications as the AR-1250 Receiver, and many more advanced pre-amp features to please the discerning audio architect. These include a continuously variable loudness control, high and low filters with dual turnover points, switchable tone controls at 2.5 or 5 kHz treble and 250 or 500 Hz bass, LED bargraphs for left and right channel output indication, plus inputs for one tuner, two phono, two tape and two auxiliary sources. These matched separates each measure 4 3/8" H x 14 7/8" W x 13" D.

AA-1205, Shpg. wt. 18 lbs. ..... **Was $289.95, NOW ONLY 249.95**

Matching Stereo FM Tuner has far-reaching sensitivity

$199.95

- **Sharp 36.8 dBf stereo (50 dB Quieting, IHF 1975) sensitivity pulls in weak and distant stations**
- **Dual ceramic filters give 52 dB selectivity for picking out desirable signals in the crowded FM band**

Critical listeners agree that a dependable Tuner can dramatically improve your world of music. In the AJ-1200, you get the high-performance, low-cost Tuner you want. All frequencies are displayed digitally. Mute-actuated AFC makes tuning quick and crisp. Three LEDs indicate center-tune clearly, and a five-LED bargraph shows signal strength. A front panel Multipath pushbutton helps set the best antenna orientation. These elements and specifications spell outstanding separation, negligible noise and inaudible distortion. Expand your aural horizons to new heights – these kits make beautiful music better!

AJ-1200, Shpg. wt. 14 lbs. ..... **Was $239.95, NOW ONLY 199.95**

AJA-1600-2, Dolby FM Module, Shpg. wt. 1 lb. **49.95**

AJA-1200-2, AM Module, Shpg. wt. 1 lb. **39.95**

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

Versatile Mono Amplifier

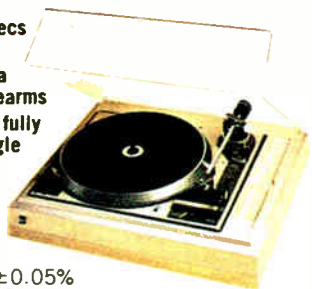
3.25 WATTS, MINIMUM RMS INTO 8 OHMS WITH 1.5% THD FROM 40-20,000 HZ

This solid-state kit takes a minimum 250 mV signal from source (ceramic phono, mono AM or FM tuner, tape player, microphone, etc.) and amplifies it cleanly for fuller sound. Features rear speaker terminals and input jack; front panel has tone, volume control and headphone jack. Fused 120/240 VAC. 2⅝" H x 7⅝" W x 5½" D.

Kit AA-18, Shpg. wt. 4 lbs. **39.95**

Dual U.L.M. turntables

- **Audiophile specs and features**
- **Exclusive Ultra Low Mass tonearms**
- **ACP-1258 has fully automatic single play/multiple play Vario-belt drive**



Dual 1258 has ±0.05% wow/flutter, >68 dB rumble with strobe, damped-spring suspension system.
ACP-1258, Assembled, Shpg. wt. 6 lbs. .. **149.95**

Dual 708Q with quartz PLL direct drive is their finest semi-automatic. Flawless with Dynavector!
ACP-1708, Assembled, Shpg. wt. 20 lbs. **329.95**

SAVE! Dual 708Q and Dynavector Cartridge (pg. 87). Buy this advanced pair together and pocket $40.00. Every record sounds better with ULM!
ACS-1708, Shpg. wt. 29 lbs. **599.95**

Highly-refined cartridges

New Dynavector Ruby moving-coil cartridge is acknowledged as one of the world's very finest with wide 20-50,000 Hz response and superior tracking ability. Has 0.2 mV output, >20 dB separation at 1 kHz. **SAVE** – buy this cartridge with Dual 708Q turntable described above and shown on page 87.

ADP-1370, Shpg. wt. 1 lb. **310.00**

NEW! Shure V-15 Type V with Dynamic Stabilizer has 10-28,000 Hz response, 3.2 mV output, >25 dB separation and 1.0-1.25 gm tracking force on a hyperelliptical diamond. Mfgr's price: $250.

ADP-1261, 1 lb. ....**199.95/with turntable 179.95**

Shure M95HE has 20-20,000 Hz response, 4.7 mV output, >25 dB separation and 0.75-1.25 gm tracking force on a hyperelliptical nude diamond. A superb cartridge. Mfgr's price: $114.

ADP-1298, 1 lb. ..... **69.95/with turntable 59.95**

Home/Remote Video Recording System makes *you* the director

Producing the professional look and feel of high-quality home movies has never been so easy. With a Color Video Sound Camera, you can personalize your TV viewing by making video tapes with audio added simultaneously. Record it all on reusable cassettes that require no processing time or money. See what you're shooting by monitoring TV or the electronic viewfinder. If you don't like what you see, rewind the tape and try it again!

This compact, easy-to-use format gives faithful color reproduction and extremely high resolution. Automatic exposure and gain controls yield stable operation over a wide lighting range. Low power consumption prolongs battery life when used with a portable VCR. Includes multi-function electronic viewfinder, lens cap, earphone, input for external mic and 15-pin cable.

GRZ-1600, 9 lbs. **WAS $975.00, NOW ONLY 799.95**

AC Power Supply Adapter provides 12 VDC to camera if not used with GDZ-9800. 33-ft. cable.
GRZ-1600-1, Shpg. wt. 8 lbs. **99.95**

Carrying Case for Camera protects the investment.
GRZ-1600-2, Shpg. wt. 7 lbs. **49.95**

Save $100 on a complete Beta system! Includes the GDZ-9800 Portable Video Director Tape Deck, Matching GDZ-9850 AC Tuner/Timer and GRZ-1600 Deluxe Color Video Camera. $1849 Separately.
GDS-9800-1, 32 lbs. **1749.85**

Dual-purpose Portable Video Director frees you to create at will

- **The most compact work of video technology we've ever created**
- **With GRZ-1600 Camera, home/remote Recorder captures your action both indoors and out**
- **Matching Tuner/Timer converts portable to full-featured, state-of-the-art home unit**
- **Infra-red Video Action Remote Control operates all record and playback functions wirelessly**

Zenith's brilliant new portable VCR system is rated 'one of the very best' by several independent testing laboratories. At 11.5 pounds, including cassette and optional battery pack, the recording deck will travel anywhere you can to deliver flawless and fatigue-free Beta performance.

CLEAR frame-by-frame and multi-speed playback features let you study every aspect of a professional golfer's swing or the nuances of acting expression, virtually inteference-free in Beta III.

Teamed with the optional Tuner/Timer, it will automatically record from TV and put a multitude of exciting special effects for playback and editing at your fingertips. A 14-day, 4-event programmer gathers your favorite shows for later viewing. Tuner/Timer powers the GDZ-9800 at home and will charge the Battery Pack, OR use the 9852 to power your 9800 and recharge the batteries.

GDZ-9800, 13 lbs. **WAS $989.95, NOW ONLY 774.95**

GDZ-9850, AC Tuner/Timer and wireless Remote, (needed if not purchasing GDZ-9852) Shpg. wt. 10 lbs. **274.95**

GDZ-9851, NiCad Battery Pack, 2 lbs. **49.95**

GDZ-9852, AC Power Supply, (needed if not purchasing GDZ-9850), Shpg. wt. 7 lbs. ... **139.95**

Zenith Video tapes

Video tapes	Beta II	Beta III	Wt.	Price
GDZ-9700-5 (L-830)	3½ hrs.	5 hrs.	1 lb.	15.50
GDZ-9700-4 (L-750)	3 hrs.	4½ hrs.	1 lb.	13.00
GDZ-9700-3 (L-500)	2 hrs.	3 hrs.	1 lb.	10.00

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

NEW

Heath 19″ dia. Color Television kit offers beautiful System 3 video realism

$499.95

- **The quality difference in TV – System 3 engineering yields a sharper color image and greatly improved convenience**
- **Astonishing, true-to-life picture fidelity and chroma detail will heighten your viewing satisfaction on every channel**

This space-saving tabletop model unites 19″ size and spectacular new System 3 technology in a meticulous kit design you'll take great pleasure in building. *And watching.* It's the perfect TV to dramatize any room where color lovers gather to watch the wide, wide world of video.

Zenith System 3 makes each scene come alive. A new, advanced Color Sentry with eight essential hue and picture sub-systems work together to deliver critically sharp and vivid reproduction every time, on every channel ... *automatically!* The detail-adding Peak Resolution Picture (PRP) comb filter circuit provides extra depth and visual presence. The Tri-Focus Picture Tube attracts your eye with an exceptionally crisp image, better highlight definition plus proper levels of color purity, tint and contrast. The cool-running, 100% modular Triple-Plus chassis guarantees outstanding reliability.

Remote unit provides full-featured function control

GR-1901 offers you 112 UHF/VHF/CATV channel capability without an external converter (except for scrambled programs). You're in touch with 42 easily-selectable cable channels.

The beautifully finished pedestal cabinet measures 17⅝″ H x 26⅝″ W x 17⅞″ D and comes with detachable telescoping dipole and clip-on bowtie antennas. Provisions for external UHF/VHF and matched CATV/MATV hookup are also provided with switchable Normal/Special AFC for cable systems and video games.

The infra-red remote unit provides direct access or up/down channel scanning, volume up/down, muted sound, recall of on-screen channel/time display, check or activation of the preset Time Control Programmer (which can turn the TV on and off automatically, once within a 24-hour period) and on-off power control from anywhere in the room.

For truly room-filling response, the television can be connected via an Audio Output jack to your high-fidelity system for richly-toned acoustic soundtracks that will enhance your enjoyment of concerts, news and film. Includes private earphone with 15′ cord for disturbance-free listening.

Put a GR-1901 together. Savor the hours of leisure achievement. *Turn it on.* Behold the overwhelming clarity and real-as-life image it shows off. *Touch the remote control.* Then settle back for *improved* visual entertainment!

Kit GR-1901, Shpg. wt. 107 lbs. **499.95**

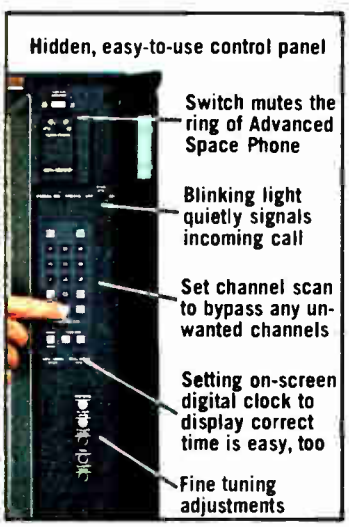
GRA-1901-1, Mobile TV Cart, Shpg. wt. 10 lbs. **24.95**

The telephone in a TV – a System 3 quality exclusive with 25″ family-sized color picture

$649.95

Custom-installable, or with your choice of three beautifully styled cabinets, page 94. Save on kit/cabinet systems, like the Large Classic at right.

- **All the amazing benefits of System 3 technology, plus an inexpensive option of Advanced Space Phone convenience, too**
- **Direct hookup to CATV and MATV systems**



A lot of your friends will buy color TV sets this year. *You can build one!* Both the outstanding value and magnificent rewards of this easy-to-build kit can be yours in as little as five fun evenings.

Your GR-2501 comes with Computer Space Command Remote Control for scanned or direct access channel selection, on/off and variable volume, display of channel with current time, plus check or activation of the preset Time Control Programmer. Like the 1901 above, an easy-to-read on-screen channel/time display appears briefly when channels change, or recalled by touch control. Expanded 112-channel tuning capability lets you select 42 cable stations as easily as VHF and UHF.

No fine tuning adjustments needed – ever! In every System 3 (including the GR-1901 above) a quartz-controlled, synthesized channel tuner provides super accurate reception every time. Access a telecast and the computer selector instantly seeks out and locks onto the exact broadcast frequency to keep the videography sharp and clear.

Advanced Space Phone is one option worth its price in convenience alone. With it, you can take or make calls anywhere in the world. Using the remote control, a dialed number is displayed on-screen, and the set itself works like a speaker phone. So the whole family may participate in conversation. If you don't want the caller to hear what's said in the room, there's even a Mute/Privacy button you can touch.

Two 9″ oval woofers and two 2½″ tweeters provide rich, four-speaker sound to every channel. Vibrant, binaural audio surrounds the picture with ambience and clarity. An output jack with tone control interfaces the TV soundtrack to your personal stereo system for the most realistic experience.

Kit GR-2501, Shpg. wt. 113 lbs. **649.95**

GRA-2501-1, Advanced Space Phone, Shpg. wt. 2 lbs. **44.95**

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

Introducing Heath's GR-3000 Deluxe 25″ dia. Television Computer System. For the age of personal

A milestone in expandable, future-thinking technology for everyday life

The GR-3000 alone is one of the finest, state-of-the-art television sets available. But it also offers several amazing features (both built-in and optional) that make it an exclusive *new kind of receiver.* A special cage on the chassis lets you mount up to eight microprocessor-controlled modules which can extend the capabilities of your GR-3000 far beyond those of any other television. In the coming months, Heath will offer modules and accessories to complete its array of computerized interfacility and put the most powerful Television in the world at your fingertips. In the end, a highly sophisticated system capable of meeting your needs for the multiple-source programming available today...as well as the advanced communications requirements of tomorrow.

The only TV that's tuned in on tomorrow: We're at the dawn of a spectacular new age of leisure and business living that promises instant access to vast information resources, goods and services. This growing universe of diverse options is led by the technologies of direct broadcast, two-way interactive cable, teletext, data retrieval networks, and the unlimited opportunities for personal potential they deliver. At the heart of this life-transforming phenomenon is the television set. Homes will become electronic environments for learning, working and finding a tremendous variety of leisure entertainment through TV, and the GR-3000 is prepared to meet the future head on. It's a flexible new tool for advancement that can be called upon to act as entertainer, tutor, telephone, modem, microcomputer monitor, graphics or information display terminal, bulletin board, and many other practical ideas.

Much more than meets the eye: At first glance your GR-3000 looks like a normal TV, but revolutionary new hardware, superior performance and upgrade planning make it the world's most talented, too. Above all, it's *user-friendly.*

The comfortable GR-3000 Remote Control uses wireless infrared telemetry to perform some never-before-possible computerized TV magic, using lite-touch buttons with positive audible feedback. You'll find it even offers complete hand-held command over color, contrast, brightness and tint. Now, total and instant picture correction control – from wherever you're seated!

A special 3-line information display can appear anywhere on the screen for a brief interval when channels change or by direct recall. It contains the tuned station (CHANNEL 2), current AM/PM time in 12 or 24-hour format (P 10:06:29), and current date (SAT 20-FEB). A fourth 'accessory' line shows a function in use (VOLUME, BLACKLEVEL, LEARN, etc.) or compass rotation and direction status (CCW, NW, etc.) when the Auto-Rotor is operating.

The GRA-3000-2 Auto-Rotor Accessory Module: Available now, it's micro-guided 'brain' will seek maximum signal when you select any of the 82 addressable channels, memorize their antenna bearing and return to each one's exact orientation whenever tuned. No ghosts will haunt this picture! You can modify the computer-selected heading by setting it to a desired vector directly, or smoothly fine-tune a jittery signal with ±2 degrees of command resolution.

Many of the GR-3000's programmable functions are made possible by an on-board real-time clock. One such feature is the Message Center, which permits you to program infinitely useful notes, instructions or reminders using up to 24 lines of 40 characters each that can be displayed on the screen at any preset time. With full cursor and line positioning control, it's ideal for urging youngsters off-to-bed, reminding you of special occasions, communicating personal surprises and creating unique character-graphic displays, with any combination of the sixteen overlay text and background colors to choose from.

NEW

Powerful, 56-key Infrared Remote Control provides full-featured command of the world's most advanced color TV and its 'smart' functions

All programmed functions are accessed by 2- and 3-digit codes via remote control. In addition to the Help screen messages, we supply a handy User's Guide.

HELP key (shown being pressed) generates six screens of usable commands for easy, armchair reference

Purity, color bar, crosshatch and dot patterns built in for testing and adjustment after the kit is assembled

Sixteen colors available for Backdrop and Text in any combination include: transparent, black, light/medium/dark green, light/dark blue, light/medium/dark red, light/dark yellow, cyan, magenta, gray and white

This device has not been approved by the Federal Communications Commission. This device is not and may not be offered for sale or lease, or sold or leased until the approval of the FCC has been obtained.

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

video — a kit with versatile, programmable power!

A "Learn" mode with eight channels of input space (94 bytes of soft memory) will let you custom-program up to eight different sequences of TV operation and repeat them with a single command. This mode is limited only by the user's imagination, and can access almost any programmable feature in the Television's repertoire. For example, it can be used to automatically turn the set on and off, alter the rotor heading and switch between channels at pre-selected times, memorize daily or even weekly schedules and repeat them for a whole season, display imaginative messages at particular times or in conjunction with broadcasts, censor-mute the audio or video, etc. You can even link two or more learn mode channels together for greater flexibility!

The GR-3000 memory circuits have battery backup. Three alkaline 'AA' cells will preserve the current channel, last set levels of volume, brightness, contrast, color and tint, the time-day-date clock, display timing parameters with on-screen position, rotor vectors, password code and all programmed Learn functions for up to a year, should AC power to the Television be interrupted.

Effective protection from young and key-curious fingers: There's never a problem with picture-tampering. An Exclusion Password function 'locks in' many of the preset parameters such as brightness, contrast, color, tint, time functions and display position, but still allows anyone to change channels, adjust volume and mute the audio or video. It requires the correct password (which you can change at any time) before these settings are operable again.

Rear panel auxiliary connections and controls. Slots will accept I/O ports used with future accessories.

Four ways to choose a telecast: Direct Channel Selection tunes instantly with crystal-controlled PLL frequency-synthesis accuracy. Standard Scan uses the Up and Down keys to skim through all received channels. Valid Scan pauses only on channels where a signal is present. Set Channel Scan lets you bypass any unwanted valid channels while scanning the range.

Channel Transposition gives you the freedom to assign any of the 42 cable channels that are not normally tuned (midband, superband and hyperband) to convenient UHF positions, so their pushbutton fine-tuning is possible.

The GR-3000 has a multi-level video display: Think of it as five different, overlapping screens that can eclipse each other electronically. First is the standard Video Screen, containing whatever has been selected for typical family viewing. Second is the Backdrop Screen, which can be set to any of 16 colors including transparent, the only color which will not opaque the Video Screen. Third is the Pattern/Text Screen which displays the numerous graphic patterns built into the TV for alignment and test purposes, or the built-in Help messages and any messages you may create. Next is the 40-character Display Screen which functions with the Pattern Mode to configure the on-screen information display and your own messages. The fifth, Computer-Generated Screen (not represented) will display text and graphics that are created on an external computer when tied to the forthcoming Serial Interface Module.

A separate Monitor Mode can be entered to provide a rock-stable display when the TV screen is used for text display or as a computer and graphics terminal.

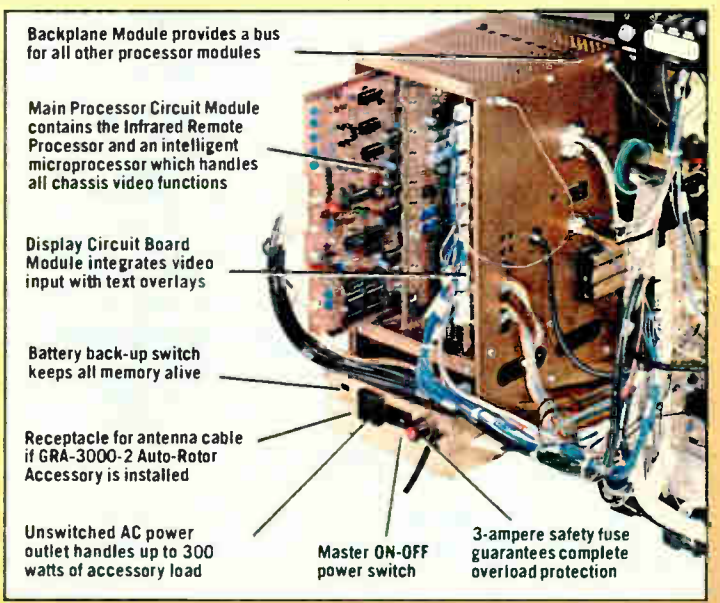
As your needs expand, so can your GR-3000 TV system: Three new modules in the 3000 series are currently under development:

Serial Interface Module – Indispensable to computerists, it will provide immediate access and use of services like The Source, CompuServe, MicroNet Dow Jones or Lockheed's Dialog using its accessory plug-in ASCII lap keyboard. It also allows the TV to be used as a high-resolution color graphics terminal and monitor which can be directly interfaced (indirectly, via modem) to yours, or any compatible computer in the world.

Directory Dialer & Modem Phone Interface Module – Enables the TV to act as a two-way speaker phone with multi-number memory capacity using the GR-3000 Remote Control. It provides auto-dial of frequently called numbers, plus auto-dial and modem connection for the Serial Interface.

Programmer Module – Extensive memory stores data to activate repeatable weekly viewing schedules, special events up to a year away, and exclusion scheduling to inhibit viewing for a specific interval of time. It also provides protocol to control an external computer, device or modular accessory.

Other modules are being planned to take full advantage of emerging life-service technologies which carry the greatest promise of future benefit.



Trouble-saving hookups: The GR-3000 is cable-ready for immediate installation in equipped areas. Direct audio and video input and output jacks on the rear panel permit you to connect and switch between a video recorder/disc player or standard channel reception. A separate input labeled Channel 1 Audio lets you pre-empt program sound (during a commercial, for example) with that from an external source like FM radio, which can be enabled by selecting channel 1 on the remote as usual.

Two pair of 6" x 9" mid-bass and 2" tweeter speakers in the kit deliver dynamic, full range sound to every program source and create an astonishing aural experience when connected in parallel to your home music system.

Teleplexing is the technetronic key to keeping pace with progress. Who knows? Within a very short time, you'll probably be able to turn on your GR-3000 and view the On-Line Heathkit Catalog! *It wouldn't surprise us.*

Kit GR-3000, Shpg. wt. 143 lbs Mtr. Frt. **1099.95**

Kit GRA-3000-2, Auto-Rotor Accessory Module, Shpg. wt. 1 lb. **19.95**

GDA-1184-1, Cornell-Dublier Electronics Rotor Assembly Model AR-40, required for proper Auto-Rotor operation, Shpg. wt. 11 lbs. **89.95**

The GR-3000 can be custom-installed with recommendations found in the Heathkit Assembly Manual, or you may order one of two cabinets on page 94.

The portable *Explorer*™ 5″ B & W TV kit with AM/FM radio-alarm clock is your all-season playmate

Indoors or out, this mini-marvel of modern design can provide fun for one and all – because it operates on 4 types of power: AC house current, 12-volt DC negative ground battery systems, six alkaline "D" batteries or an optional rechargeable battery pack. Have TV, will travel!

If you're the active type, you'll appreciate the compact convenience and all-in-one capability of the *Explorer.* After two or three nights of kitbuilding fun, the GR-5005 will prove itself a versatile investment by entertaining on camp-outs, cartrips and in every room of the house.

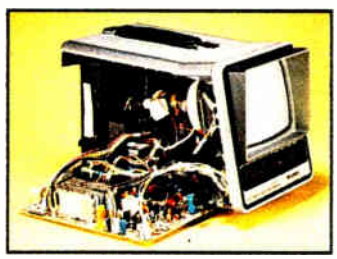
This go-anywhere, do-anything portable offers everything you need to stay thoroughly entertained and informed. The solid-state MICROMAX™ chassis provides high performance with extremely low energy usage, and consistent picture quality on every station. You get performance *and* portability.

All 82 VHF and UHF TV channels are at your fingertips, plus the entire AM and FM (with AFC) radio spectrum. A no-wear, electronic tuner and calibrated cylinder dial permit easy selection without annoying drift. The quick-on Sunshine Picture Tube brings you a full, bright picture with sharp detail in seconds without a continuous energy drain to trickle away battery power.

A telescopic UHF/VHF/FM swivel antenna and internal *Wavemagnet*™ AM rod antenna pull in primary signals for clear audio and video reception.

The LCD quartz digital clock on the front panel is your 24-hour wake-up call. Switches set the correct AM or PM time and preset the automatic alarm so you can wake to pleasant electronic tone, auto-on TV or music. One alkaline AA battery (not supplied) powers the clock for up to two years.

A Sleep Switch/Auto-off control programs the *Explorer* to turn itself off after up to 59 minutes of operation. When you awake to the 12-minute alarm, a front panel Snooze button will delay each reminder by 10 minutes for any number of naps. Accessories include a detachable AC adapter unit, private earphone and a DC Car Cord for use in any vehicle with a 12-volt battery system.



Pre-aligned modular circuit boards reduce assembly time and effort

Other features include a dial light, 3½" hi-fidelity speaker, provision for 300-ohm external antenna, a built-in carrying handle and durable, dent-resistant cabinet with satin finish. The 7¼" H x 6" W x 11" D case weighs just 6 pounds without the optional batteries – small enough to carry almost anywhere, yet you can enjoy its crisp, brilliant picture from several feet away. Traveling? Take along the *Explorer* and catch the action you'd otherwise miss!

Kit GR-5005, Shpg. wt. 12 lbs. **149.95**

GRZ-5005, Assembled and tested, Shpg. wt. 9 lbs. **179.95**

Rechargeable Nickel Cadmium Battery Pack, for up to 4 hrs. of TV or 40 hrs. of radio; rechargeable on AC in 18 hours. Built-in overcharge safety circuit.

GRZ-5005-1, Assembled, Shpg. wt. 3 lbs. **19.95**

This device has not been approved by the Federal Communications Commission. This device is not and may not be offered for sale or lease, or sold or leased until the approval of the FCC has been obtained.

NEW

Heath Home Video Organizer kit switches multi-source RF

$69.95

- **It's the versatile 'control center' for your home video system**
- **Now switch from one program source to another without ever changing cable connections**

Tired of wrestling with a tangled maze of cables behind your TV set? *Don't touch that connection* – the new Heathkit Video Organizer ends the messy cable-juggling forever! Separate input and output jacks allow complete interconnection of your TV and UHF/VHF antenna, Cable, subscription TV decoder, VCR, videodisc player, game unit and home computer, or other auxiliary video equipment such as a satellite receiver.

Ten front panel buttons permit instant selection of any one of six different program sources for immediate viewing, and any one of three sources for simultaneous recording. *You can even view one source while recording any other.* The Organizer has better than 60 dB isolation and 3.5 dB maximum insertion loss, excellent RF shielding to eliminate electromagnetic interference and maintain picture clarity plus pewter color side panels and walnut-grain metal top. This one-evening kit includes three 75Ω 48" coax cables with F-connectors and AC Power Adapter. Order it for more hours of uninterrupted video enjoyment!

Kit GS-4500, Shpg. wt. 7 lbs. **69.95**

GSZ-4500, Assembled, Shpg. wt. 8 lbs. .. **89.95**

Transitional Corner/Wall Cabinet

For the GR-2501 TV (page 91). New corner concept fits in where others cannot. Oak veneer top and edges. Beautiful grain detail. Basket weave pattern over speaker grilles. Antique oak distress finish. 31" H x 48" W x 17.5" D. Full, solid oak base conceals casters.

GRA-702-25, 114 lbs., Mtr. Frt. **189.95**

SAVE $100.00 on Cabinet with GR-2501 TV Kit!

GRS-2501-3, 227 lbs. **739.90**

Captivating, Large Classic Cabinet

For the GR-2501 TV (pg. 91) **or new GR-3000 TV** (pgs. 92-3). Oak veneer parquet top with brass-finished metal hinges, door pulls and lattice-work. Lustrous antique oak finish. 32¼" H x 50½" W x 20" D including casters and cap.

GRA-715-25, 136 lbs., Mtr. Frt. **199.95**

SAVE $100.00 on Cabinet with GR-2501 TV Kit!

GRS-2501-5, 249 lbs., Mtr. Frt. **749.90**

Compact Classic Cabinet is a value

For the GR-2501 TV (pg. 91) **or new GR-3000 TV** (pgs. 92-3). Maximum efficiency in size and price. Antiqued brass-finish metal lattice-work, door pulls and hinges accent the beautiful antique oak finish. Oak veneer top. 33" H x 43" W x 20" D including casters and cap.

GRA-705-25, 112 lbs., Mtr. Frt. **149.95**

SAVE $100.00 on Cabinet with GR-2501 TV Kit!

GRS-2501-4, 225 lbs., Mtr. Frt. **699.90**

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

Reach for the stars — at big savings — with the Heathkit Satellite Earth Station

NOW ONLY
$3500.00

Comparable in quality and reliability to professionally-installed earth station systems costing up to $15,000, the complete Heathkit SRS-8100 Earth Station System costs less than a third of that much!

Here's what sets our earth station apart from the rest:

- **Put a wide variety of TV entertainment at your fingertips! Many channels — most free of cuts, censorship and interruptions — are available on geo-synchronous satellites. This includes movies, sports, news, specials, nightclub acts, concerts, plays and more!***
- **A specially-prepared Site Survey Kit helps you determine the correct location for a satellite antenna; easy-to-follow assembly manuals and technical assistance makes our earth station easy to install**
- **Integrated Low-Noise Amplifier/Down-Converter, Three-Meter Satellite Antenna and receiver electronics are made by Scientific-Atlanta, one of the foremost manufacturers of satellite communications equipment**
- **Satellite Receiver features drift-free reception, special Zenith Space Command Remote Control (a satellite TV first) and built-in LNA/Down-Converter security circuit (alarm not included)**

Based on a design used by commercial systems: The SRS-8100 Earth Station includes:

1 **The SRA-8100-1 Three-Meter Antenna by Scientific-Atlanta:** This precision-contoured, adjustable dish antenna provides sharp, clear pictures — while giving long, reliable service. Receives 24 channels from one satellite, with one feed.

2 **The SRA-8100-6 Earth Foundation Kit:** Allows the antenna to withstand 100 mph winds.

3 **The SRA-8100-2 Integrated Low-Noise Amplifier (LNA)/Down-Converter by Scientific-Atlanta:** This sophisticated, high-performance device amplifies satellite signals — while minimizing noise — to provide a strong, clear picture. The satellite signal is converted from 4 GHz down to 500 MHz band — so it can be delivered to the Heathkit SRA-8100-3 Satellite Receiver via standard, inexpensive coaxial cable.

4 **The Heathkit SRA-8100-3 Satellite Receiver Kit:** This attractively-styled device has 24-channel electronic tuning for drift-free reception, a built-in memory, the ability to turn itself on for viewing or recording at times you select, and a built-in security circuit which allows connection of an alarm (not included) to alert you to any attempt to remove the LNA/Down-Converter.

The Site Survey Kit will help you determine if your site is acceptable for installation of an earth station. Or for more infirmation, call 800-253-0570 TOLL-FREE — or write Heath Co.

SAVE $3495.00! SRS-8100, 120° Earth Station for most U.S. areas. 866 lbs., Motor Freight. **Was $6995.00, NOW 3500.00**

SAVE $4145.00! SRS-8200, 90° Earth Station for fringe reception areas (has SRA-8100-4 90° LNA/Down-Converter). 866 lbs., Motor Freight. **Was $7995.00, NOW 3850.00**

SAVE $395! SRA-8100-5, Extender Panels for improved reception in fringe areas. 188 lbs., Motor Freight. **Was $495.00, NOW ONLY 100.00**

12-hour (AM/PM) digital clock — **Gives clear pictures at low signal levels**

Use special remote control — **Digitally receives 24 satellite channels**

Fits your home's decor

The first step — Site Survey Kit: Helps determine if an earth station can be installed at your site. Look angles for your address, compass, inclinometer, satellite TV manual. Call 800-258-0570 to order; deduct cost when ordering our Earth Station. Send address, city, state, Zip Code or your site with order.

SAVE 50%! Kit SRA-8100-10, 3 lbs. ..... **Was $30.00, NOW ONLY 14.95**

Due to customer response, satellite TV products may not be available when this catalog is distributed. Please contact Heath Company before ordering.

*Federal Communications Commission equipment authorization relating to the Heathkit Earth Station requires the following disclosure: "Use of this device may violate Section 605 of the Communications Act of 1934, as amended, through the unauthorized interception and divulgence of radio communications; or, the use of radio communications for one's own benefit when there is no entitlement to its receipt." Viewing of some satellite TV channels may require the customer to obtain permission from, or make payments to, the programming company. Some programmers may not grant permission. Some local, state and foreign laws may now or in the future limit the use of this device. The customer is responsible for compliance with all applicable laws and regulations.

System 3 quality in a Portable 13" (diagonal) Color TV

Now the best Zenith ever is portable! Sharp Tri-Focus picture tube. Modular chassis runs cooler for longer life. No-wear electronic tuner with automatic fine tuning assures clearer pictures on each channel. Conserves 25% more energy than previous model. Includes remote control, VHF and UHF antennas. Walnut finish cabinet with carrying handle. 120 VAC. 13¾" H x 20⅛" W x 14⅞" D.

GRZ-1325, Assembled and tested. Shpg. wt. 44 lbs. **399.95**

Portable 9" (diagonal) B/W TV plays on AC/DC/battery

SAVE $10! New technology provides energy savings, versatility. Uses just 28 Watts. Watch it indoors or out using AC line, 12 VDC car battery or optional Battery Pack below. Quick-on picture tube provides bright image in seconds without constant energy drain. Has 12 VDC car adapter cord, earphone and detachable sunshield. 9¾" H x 14⅝" W x 9⅝" D. Was $109.95.

GRZ-93, Assembled. 14 lbs. **99.95**

GRZ-93-1, Rechargeable Battery Pack, Assembled, 9 lbs. **39.95**

SAVE $4.95! GRZ-93-S, TV and Battery Pack, Shpg. wt. 32 lbs. **134.95**

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Assembly manuals, like the famous Heathkit electronics manuals, are clearly written and illustrated for easy-to-follow, step-by-step construction. And friendly assistance is always available, either over the phone or at any Heathkit Electronic Center* in the U.S. and Canada.

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*In the U.S., units of Veritechnology Electronics Corporation

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