SAVE UP TO $100

Heathkit®

HURRY! OFFER EXPIRES SEPT. 15, 1981

SAVE UP TO $100

SAVE 10%

on any purchase of up to $1,000 from this catalog

SAVE UP TO $100

SAVE UP TO $100

YOUR SIGNATURE _____

This coupon must accompany your order. Only one coupon per customer. Offer valid only for kit purchases from this catalog and may not be used in addition to 5% system discounts or special system/combination prices.

Clip and attach to your order

Dear Friend:

Here's the latest Heathkit Catalog, as you requested, filled with all the newest in easy-to-build, money-saving electronic kits for your home.

If you've already browsed through the catalog – you've probably seen at least one kit that you'd enjoy building. Once you re-read the description and make your final decision, we have a pleasant surprise for you...

A 10% DISCOUNT ON YOUR FIRST ORDER!

That's right! If you place your order, using the special form on the back of this wrap, before September 15, 1981, we'll be happy to save you $10.00, $20.00, $30.00 – up to $100.00 – our way of saying "thank you" for your order.

Give yourself the opportunity to experience pride and satisfaction when you build a quality Heathkit product – and enjoy the important savings, too. Satisfaction and savings...that's a combination hard to match.

STEP-BY-STEP HEATHKIT BUILDING IS EASY!

Easy-to-follow assembly manuals and over-the-phone technical assistance make kitbuilding a snap. You can be sure of a beautiful finished kit, one that you'll be proud of.

So go ahead – take your choice of the superb values your Heathkit Catalog offers. Now with your 10% discount, your choice will be an even greater value.

Sincerely,

Matt Cutter

Matt Cutter
Manager, Marketing Services

P.S. Remember, you can order more than one kit and save still more! Your 10% discount applies to your entire order up to $1000!

800-253-0570

Call toll-free and charge it

VISA MasterCard

In Michigan, Alaska & Hawaii, Call (616) 982-3411

Heathkit®

WP-281

Look what people are saying about the Heathkit experience...

"...and the thrill I had when I turned it on for the first time and it *worked*..."

— Lynn Schaefer
Montague, MI

"The components were clearly identified, the step-by-step instructions were very clear and the illustrations for the assembly were very helpful."

— Dan Belden, Jr.
Leavenworth, KS

"I am 8 years old. This is my first electronics kit. My father and I did the clock in five nights. The directions were understandable even to me. It was fun."

— Joel Sumner
Succasunna, NJ

"I have built Heath audio and amateur radio equipment since the early '50's...Your design technology, quality of components and instructions, and customer service are better than ever."

— Roger Stachour
Grundy Center, IA

"I am merely one satisfied customer who in these busy, troubled times wants to say to the big boss, 'Good job, Heath.'"

— E. C. Wilson
Indianapolis, IN

"In retrospect there have been very few things in my life that have given me more pleasure than the building of kits, not only the actual construction, but their use once completed."

— Llewellyn B. Keim
San Francisco, CA

"Thanks also to the folks who wrote up the 'idiot proof' instructions. You did a terrific job."

— Thomas Wolicki
Little Rock, AR

"My first project was the digital clock. The parts were packaged beautifully, the instructions perfect, and the results very satisfactory."

— James D. Burneff
Johnstown, PA

"I am almost 60 years of age, born Nov. 1920, and this was my first attempt to assemble an electronic kit...it has been one of the most enjoyable, most gratifying times of my life."

— Rev. R. D. Smalldridge
Brownsville, KY

"I want you to know of the fine technical assistance given to me recently...many people do not recognize the added value they get in technical consultation at no extra cost when they buy your products."

— Warren E. Smith
Colorado Springs, CO

"As an electrical engineer, I recognize the superior engineering that went into the design and preparation of this kit. The trouble-shooting section was especially useful..."

— J. Wayne Morris
St. Albans, WV

"In the past 15 years, I have bought and built more than 18 different items from Heathkit, from a complete radio outfit to my present receiver which I built 10 years ago. Without exception, each item has brought me countless hours of enjoyment."

— John J. Brems
Richmond Heights, OH

"I just must tell you how very pleased, even amazed, I am at the quality of instruction in your Automotive Electrical Course. I wish I could tell everyone."

— John J. Sullivan
Newport News, VA

For more than half a century, Heath Company has designed kits for people who want build-it-yourself quality.

Every year thousands of people buy and build Heathkit products. They buy with confidence, knowing that they are buying the best from a company who will stand behind them.

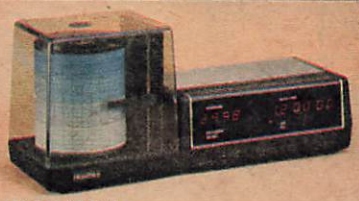
At its plant and headquarters on the shores of Lake Michigan in St. Joseph, Michigan, Heath Company today employs more than a thousand people and markets nearly 400 electronic kits. All the kits are described in your new Heathkit Catalog.

Heathkit®

FALL • 1981

NEW Satellite Earth Station with Receiver Kit, Antenna and Space Command Remote Control opens a new world of TV viewing

NEW Memory Keyer adds fun to Ham Radio



NEW Digital Barograph charts weather patterns

Use Visa, MasterCard or Heath Revolving Charge to make your purchase

TOLL-FREE 800-253-0570

MAIL ORDER CATALOG NUMBER 854

Metal Locators are your key to fun and fortune

$199.95

- **Find lost valuables, coins at the beach, park or home**
- **Search ground submerged in up to two feet of water**
- **Telescoping shaft adjusts to your height, collapses for convenient, space-saving storage**
- **Features built-in speaker; accepts optional headphones**

The excitement of treasure hunting and finding lost objects can be yours when you build a Heathkit Metal Locator.

They feature 6-inch diameter search heads and pushbutton tuning for maximum sensitivity over different kinds of conditions. Fulcrum balance and light weight add up to ease of use. Our GD-1290 Groundtrack™ features a balance circuit that detects objects even in highly metalized soils. Either unit offers a discriminate mode which discerns valuable objects from junk. The Groundtrack's fully shielded search coil sifts out the false signals so prudently, it can detect a dime buried 6" deep in the ground. You hear nothing until the valuable object enters the Locator's field. Then a tone grows louder as you approach the buried item. Our GD-1190 Cointrack™ uses an off resonance type detector to find evasive coins buried in sand or other low-metallized soils. Both Locators operate on six "AA" batteries (not included) or the optional GDA-1190-1 Nickel-Cadmium Rechargeable Battery Pack (below). You can recharge it at home or from your car's cigarette lighter socket. Locators measure 45½" extended; 22½" collapsed.

Top-of-the-line Heathkit Groundtrack Metal Detector.
Kit GD-1290, Shpg. wt. 5 lbs. 199.95

High-performance Heathkit Cointrack Metal Detector.
Kit GD-1190, Shpg. wt. 5 lbs. 129.95

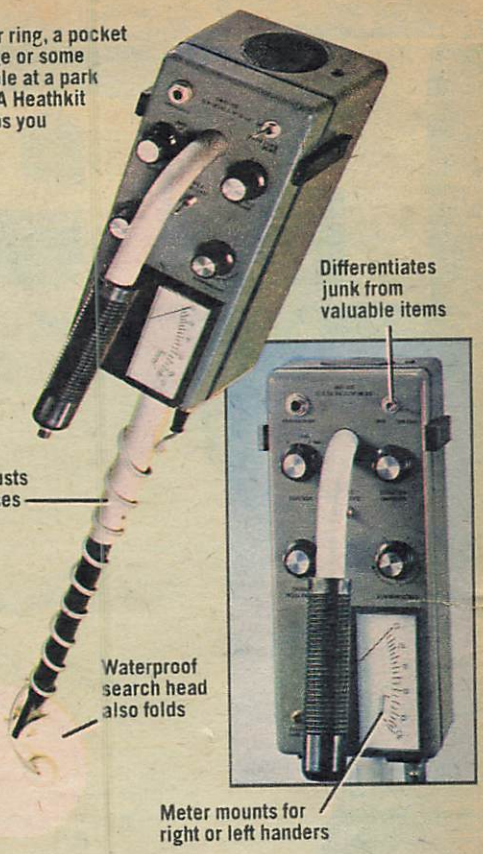
Rechargeable Battery Pack for the Heathkit GD-1190 and GD-1290 Metal Detectors.
GDA-1190-1, Shpg. wt. 2 lbs. 21.95

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

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

9 VDC Battery for Heathkit GD-348 Metal Detector.
GDA-48-1, Shpg. wt. 1 lb. 5.95

You lost your ring, a pocket full of change or some other valuable at a park or at home. A Heathkit Locator helps you find it.

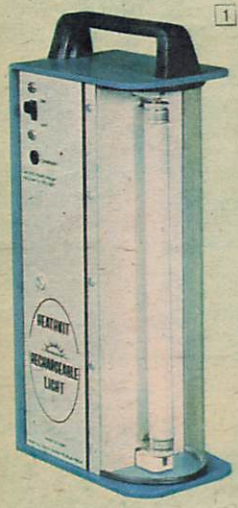


The Heathkit Pledge

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 to 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 this simple pledge: "We won't let you fail."

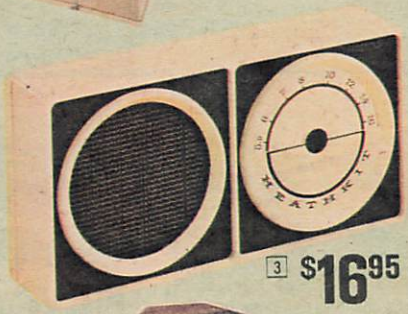
Easy one-evening kits

The kits below are practical, fun introductions to the growing world of kit-building. Average building time is just one evening.

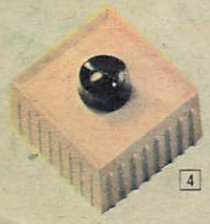


1 **$37.95**

2 **$16.95**



3 **$16.95**



4 **$9.95**

5 **$9.95**

1 Rechargeable Portable Light brightens life

Charge from 120 VAC outlet or off car's cigarette lighter with optional 12-volt adapter. Rugged metal case measures 10⅝" H x 3⅛" W x 5" D.

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

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

2 Freezer Alarm protects costly food from spoilage

Uses 2 1.5 VDC "C" cells (not included). 1¾" H x 3⅝" W x 4⅞" D.

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

3 Carry music anywhere with this AM Portable Radio

Uses 9 VDC. Plastic case measures 4" H x 3¼" W x 2" D.

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

4 Tabletop Dimmer saves electricity and bulbs

Control brightness of table, floor lamps. Plastic case. 3¼" H x 3¼" W x 3¼" D.

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

5 Home looks lived-in with Light-Sensitive Switch

Turns 150 W lamp on at dark, off at dawn. 3½" H x 2 11/16" W x 2 11/16" D.

Kit GD-600, Shpg. wt. 2 lbs. 9.95

© 1981 Heath Company. "Heath" and "Heathkit" are registered trademarks of Heath Company. "Zenith" is a registered trademark of Zenith Radio Corporation.

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

Build this Heathkit Digital Alarm Clock in an evening – it's an ideal, practical starter kit

FAST, EASY 1-EVENING KIT

$29.95

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

A practical gift idea for the first-time kitbuilder. The GC-1107 Digital Alarm Clock offers you extra convenience features – with space-age digital accuracy – while providing you or a gifted friend a practical introduction into the wonderful world of kitbuilding fun.

A four-digit blue-green fluorescent readout, mounted at an easy-to-read angle, clearly displays the correct time. If a power failure interferes with the GC-1107's accuracy, a flashing display will alert you to the electrical power interruption so you can reset it.

Digital accuracy is provided by a Metal-Oxide Semiconductor (MOS) large-scale integrated circuit, which performs all the logic functions of keeping time. Time can be displayed in either 12- or 24-hour formats, with a simple wiring change.

Ham radio operators will want to buy two – one for local, 12-hour time and one for UTC, 24-hour time...then stack one on top of the other in the station.

Alarm knows the difference between AM and PM. So you can reset the GC-1107's alarm for the next day – immediately after you get up.

A pleasant electronic tone starts your day out right with the Digital Alarm Clock. And if you're not quite ready to take on the world, push the Alarm Delay button for 9 more minutes of sleep. You can take up to an hour of catnaps with the GC-1107's convenient Alarm Delay.

Start a kitbuilding hobby today – and have the time of your life! The Digital Alarm Clock kit includes handsome simulated wood-grain cabinet, built-in speaker, complete assembly/operation manual and more than enough solder to finish the project. Operates on 120 or 240 VAC, 50/60 Hz.

Overall Dimensions, 2.25" H x 7" W x 4.75" D (5.72 x 17.78 x 12.07 cm). Net Weight, 1.75 lbs. (.79 kg).

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

Now...quartz watch accuracy in a Digital Wall Clock

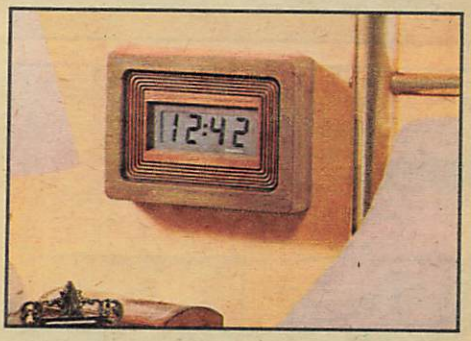
$49.95

- Quartz-controlled accuracy within ±1 minute per year
- Runs up to 2 years on a single 1.5V AA alkaline cell

See the time from across the room with quartz watch accuracy. The GC-1720 Digital Wall Clock uses a quartz crystal and a single integrated circuit to give you split-second accuracy – within one minute per year. Features cordless convenience – operates for up to two years on a single 1.5V alkaline cell, or up to a full year on one 1.5V AA penlight zinc-carbon battery.

Big LCD digital display can be seen from 30 feet away. Gives you the time in either 12- or 24-hour format. Attractive simulated oak wood grain case measures a compact 5¼" high x 7⅛" wide x 1½" deep. All parts mount on a single circuit board for easy assembly. Get in on kit-building fun now.

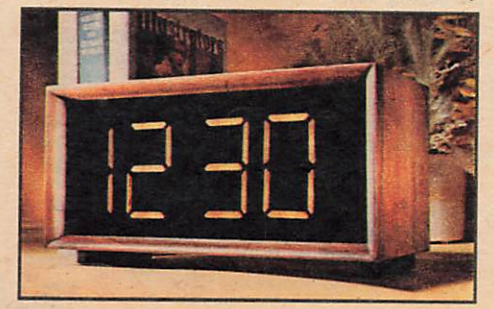
Kit GC-1720, Shpg. wt. 2 lbs. **49.95**



The Heathkit Space Age "grandfather clock" is a timely gift

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

Add a touch of space-age elegance to any home decor. The Heathkit Super-Clock is housed in a handsome cabinet, finished in simulated walnut veneer and featuring anodized aluminum corner pieces. Four ¼"-thick smoked glass shelves are great places to put books, plants or knickknacks. 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.



The Super-Clock displays hours and minutes, with the center colon pulsing once each second. Power failure indicator tells you to reset the clock. Add "Big Ben" Electronic Chimes (below) for Old World charm. Operates on 120/240 VAC, 50/60 Hz, 30 watts. 60½" H x 14" W x 9½" D. An excellent project for the first-time kitbuilder.

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

Shelf-version of the Super-Clock

Space-saver edition of the Super-Clock. Housed in an attractive walnut-veneer cabinet. Add Chimes (below). 120/240 VAC. 6½" H x 12½" W x 6¼" D. Ideal for shelf, table or desktop mounting.

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

Add "Big Ben" chimes to Super-Clock

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

KIT GCA-1195-1, Shpg. wt. 3 lbs. **84.95**

Allergies? The Heathkit Electronic Air Cleaner clears any room of 99% of all airborne pollen, 94% of all airborne particles

$229.95

- **Defend yourself against smokers in your home or office**
- **Eliminates 99% of all airborne pollen and 94% of all airborne particles in any room in your home**
- **Removable charcoal filter and easy-to-clean electrostatic filter assure you of a constant supply of fresh, pollen-free air**
- **Operates on just pennies a day, helps cut home cleaning costs**

FAST, EASY 1-EVENING KIT

If the misery of pollen and dust allergies affects you or any member of your family, the Heathkit GD-1297 Electronic Air Cleaner will bring a real breath of fresh air into your life. It's the ideal way to keep any room's air fresh and clean all year long – even in today's tighter, better-insulated homes. Not only will it maintain a clean environment for the allergy sufferer's bedroom, but when you add the optional Deluxe Casters (listed below) you can wheel your Electronic Air Cleaner into the family room to clear away smoke at a party...or into the kitchen to clean the air after a cooking disaster. Use it in any room, up to 25' x 30,' wherever you need clean air.

Cut your home cleaning and redecorating costs by using the Electronic Air Cleaner. Cleaner air reduces the need for cleaning, painting and repapering caused by airborne pollution that stains and soils your furniture, rugs, walls and draperies.

A three-speed squirrel cage fan means our GD-1297 Electronic Air Cleaner delivers enough air flow to quick-clean a room by moving 250 cubic feet of air per minute. Or it can maintain a constant supply of fresh air at as little as 100 cfm. A removable charcoal filter (below) permits periodic replacement so your Electronic Air Cleaner maintains top efficiency. And the electrostatic filter cleans easily in your dishwasher or bathtub.

Simplified kit assembly, featuring a pre-built filter, makes this a one-evening kit. No soldering is required – the power supply and variable speed fan control are fully assembled. The Heathkit Electronic Air Cleaner is an ideal, practical kit to introduce you to the fun of kitbuilding. And our step-by-step instructions assure you of success.

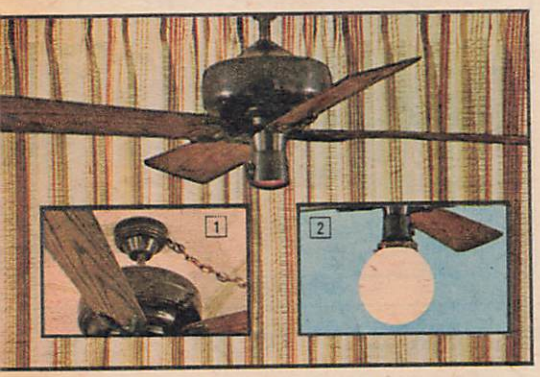
The Electronic Air Cleaner operates on 120 VAC, 60 Hz. An attractive Southern Pecan vinyl finish covers a sturdy, assembled particle board cabinet. It measures 26.5" H x 17.25" W x 13.5" D.

Kit GD-1297, Shpg. wt. 59 lbs. **229.95**

GDA-1297-1, 4 Deluxe Casters, Wt. 2 lbs. **13.95**

Replacement Charcoal Filter fits GD-1297 and former GD-1247 Cleaners.

GDA-1297-2, Wt. 2 lbs. **6.95**



Cooling/heating costs go down when Casablanca Fan is up

$129.95

- **Circulates dead air for quiet, more efficient cooling**
- **Adds a distinctive, decorative touch to any room in your home**

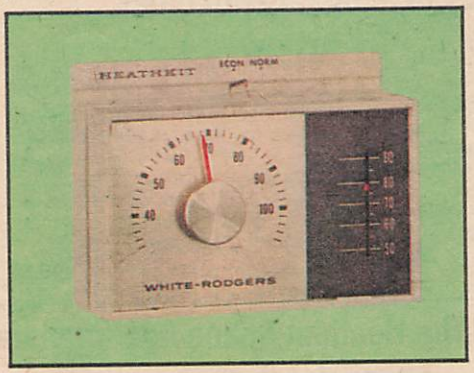
This summer let our Casablanca Fan give you whisper-quiet cooling for pennies a day. Slow speed brings heat down from ceiling in heating season. Higher speeds provide greater comfort in summer. Fan motor is baked-bronze enamel. Variable speed from 100-140 rpm. 52" blades (tip to tip). Chain-pull or wall switch operation. 120 VAC, 60 Hz. Not for ceilings under 8.' Compare at $100.00 more.

Kit GD-1238A, 24 lbs. **129.95**

Slow-Speed Accessory. 50-100 rpm. For smaller rooms. **GDA-1238-4,** 1 lb. **15.95**

[1] **Swag-Chain Kit.** 18" chain, gold electrical cord, hardware. **GDA-1238-1,** 3 lbs. **14.95**

[2] **Decorative Light Kit.** Glassware, holder, mounting accessory. **Kit GDA-1238-2,** Wt. 3 lbs. **16.95**



Fight energy inflation with the Programmable Thermostat

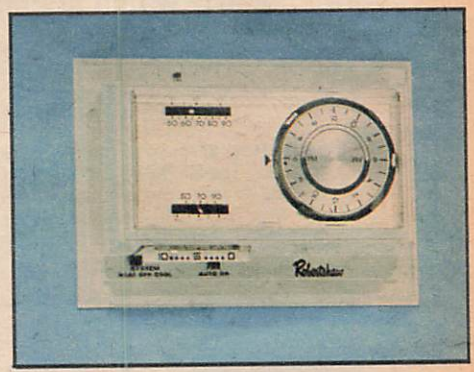
FAST, EASY 2-EVENING KIT

$39.95

- **Eligible for 15% Federal tax credit as energy-saving device**
- **Reduces room temperature up to twice a day – automatically**
- **Econ/normal switch overrides timer when needed**

Cut heating costs. Reduces temperature automatically during one or two periods each day. The temperature setback feature is adjustable, up to more than 10 degrees F, for periods of ½ hour minimum to 23½ hours maximum. When each setback period ends, the temperature is automatically increased to normal levels. And the Econ/Normal switch can override the timer for weekends. Timer is 120 VAC. NOTE: For use only with single-stage 24 VAC heating systems. Check local building codes. 3¼" H x 4½" W x 1⅝" D. Easy-to-build two-evening kit. For heating systems only.

Kit GD-1776, Shpg. wt. 5 lbs. **42.95**



Automatic Setback Thermostat lowers cooling/heating bills

$54.95

- **Eligible for 15% Federal tax credit as energy-saving device**
- **Pays for itself by saving up to 20% on heating and cooling**
- **Installs easily on most 24 VAC home heating/cooling systems**

As cooling and heating costs rise, you need the money-saving Robertshaw Automatic Setback Thermostat more than ever. Once set, it never wastes heating or cooling at night, or while you're away. Automatically increases when you need it. Choose 1 or 2 energy-saving periods in a 24-hour time span. Self-charging, battery-powered timing device changes temperature from 1 to 10 degrees F at times you select. Uses your old thermostat's wiring. Easy installation on 4 or 5-wire, 24 VAC furnace control systems. Not for heat pumps. 3.38" H x 5.5" W x 2.13" D.

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

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

Split wood quickly, easily and safely with the low-cost, easy-to-build Heathkit Log Splitter

FAST, EASY 1-EVENING KIT

Only **$539.95**

- Fight the energy crisis – split wood yourself and save
- Saves time – splits logs up to 21" long – splits logs faster than by hand and cuts worktime by hours!
- Powerful 10-ton force-driven ram and triple-angle steel wedge do the wood splitting for you
- Convenient work height – log cradle securely holds your logs at a comfortable 15" above ground
- Rugged Log Splitter features heavy-duty steel frame and tubular log cradle for years of rough use
- Portable – weight-balanced design makes it easier to wheel our Log Splitter to any work site
- Reliable 5 horsepower, 4-cycle Tecumseh engine runs on regular or unleaded gasoline
- Takes just one evening to assemble

No more time-consuming, strenuous or unsafe log splitting by hand: The GU-1810 splits and shears logs up to 21" in length, quickly and easily. High-torque, 4-cycle, 5 horsepower Tecumseh gas engine operates 4.5 gpm hydraulic pump. Engine and pump build up 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, full-cycle automatic return and easy-to-use 3-position lever.

No more standing around: 3-position, 1-hand lever features non-locking forward, neutral and detented reverse with automatic return to ready ram for next log. Common-size 21" tubular log cradle firmly holds logs 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 to take years of punishing use. Flexible high-pressure hose ensures years of long, reliable operation. The pump and cylinder use 7 quarts of readily available automatic transmission fluid (not supplied).

Weight-balanced design allows the Heathkit Log Splitter to 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 hours of splitting in remote areas – such as cottages and winter hunting cabins.

Assemble in just one evening: Kit includes complete hardware. Wedge, frame and tubular cradle are pre-welded; engine, pump and cylinder are pre-assembled to speed kitbuilding. All components mount on frame with high-strength steel bolts. Hydraulic system protected by pressure-relief valve; just 3 reinforced, high-pressure hoses to connect between pump and cylinder. The five-eighth inch steel axle for the wheels features nut and washer seating for fast and easy mounting.

Priced to fight the energy crisis: Just $539.95 – much less than other comparable units. Start splitting wood the easy, time-saving Heathkit way.

Kit GU-1810, Shpg. wt. 206 lbs., Motor Freight **539.95**

GU-1810 SPECIFICATIONS: Log Length Capacity: 21" **Log Cradle Length:** 21" **Splitting Wedge:** 6" triple-angle wedge. **Cylinder Type:** 4" diameter, 18" stroke. **Valve:** 3-position, 4-way, 1550 psi relief valve with non-locking forward, neutral and detented reverse with automatic return and shut-off. **Power Plant:** 4-cycle, 5 horsepower Tecumseh gas engine. **Fuel Type:** Regular or unleaded gasoline (not supplied). **Dimensions:** 31" H x 31.5" W x 52.75" D (78.74 x 80.01 x 133.99 cm). **Net Weight:** 196 lbs.

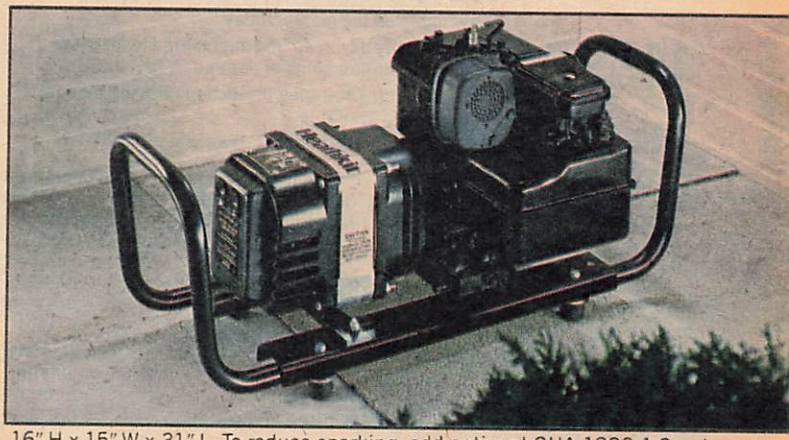
The Heathkit Portable Power System gives you emergency electricity

NEW

FAST, EASY 1-EVENING KIT

Only **$479.95**

- Emergency power for ham radio clubs, home owners, civil defense and fire departments
- On-location power for construction and logging crews, campers, hunters, wood cutters and others
- Priced lower than most comparable models
- Reliable, lightweight state-of-the-art design
- Delivers up to 2200 Watts of 120 VAC, 60 Hz power



Compact power for emergency or remote use: The Heathkit Portable Power System is a 120 VAC, 60 Hz alternator, which delivers reliable power for ham radio stations during field days, blackouts and other emergencies. It's also useful in home, farm, business, RV and other applications – when commercial AC power may not be available. Up to 2200 Watts (enough to operate a chain saw, or a refrigerator-freezer during a blackout) is available at a duplex 3-prong, 20 amp, breaker-protected outlet.

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. Field-proven spin recoil starting with compression release makes starting easy.

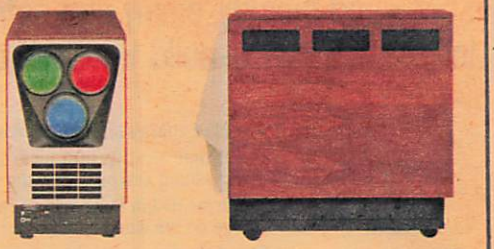
High-quality power: The GU-1820 delivers more reliable power in a lighter, smaller package than comparable generators. Voltage regulation is an excellent ±5%, frequency variation only ±4 Hz, from no load to full load at 3600 rpm. Radio-frequency interference is eliminated by a resistive spark plug. Measures 16" H x 15" W x 31" L. To reduce sparking, add optional GUA-1820-1 Spark Arresting Muffler (required in Calif.; sold below).

Kit GU-1820, Shpg. wt. 112 lbs. **479.95**

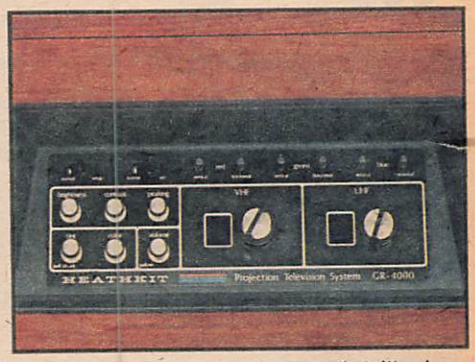
GUA-1820-1, Optional Spark-Arresting Muffler, 1 lb. **3.95**

GU-1820 SPECIFICATIONS: ALTERNATOR: Type: Single-phase 2-pole revolving field, statically excited. **Power Factor:** 100% P.F., will withstand intermittent overloads. **ENGINE: Type:** 5 horsepower Briggs and Stratton quill-shaft engine. **Governor:** Fixed speed at 3600 rpm. **GENERAL: Dimensions:** 16" H x 15" W x 31" L (40.64 x 38.1 x 78.74 cm).

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



The Screen Star Color TV Projection Unit is mounted on easy-rolling casters so you can move it from room to room to suit your personal viewing habits.



All projection controls are easy to find: illuminated indicators instantly tell you which of the 82 UHF and VHF channels you're tuned to (Simulated TV picture).

Save a big $500.00 and let your whole family enjoy the Heathkit Screen Star™ Projection TV

$1499.00

- **The lowest priced quality projection TV system available on the market today**
- **Specifically designed and engineered to meet the exacting requirements of projection TV**
- **Features full three-tube projection utilizing the finest f1.0 lenses available**
- **A crisp, bigger-than-life 6′ diagonal picture**

Now save a big $500.00 on the Heathkit Screen Star Projection TV System that brings the theatre-like realism of sporting events, movies and entertainment specials into your living room in large-as-life color. The GR-4000's picture quality rivals the definition and color of comparable units costing $3000.00 or more. This System has been specifically designed to meet the exacting requirements of projection television. It features not one, but three tubes with precision 127 mm f1.0 lenses – the finest available – for a brighter, more vivid color picture and wider viewing angle.

The Screen Star's outstanding color picture is projected on a 6-foot diagonal viewing screen designed to provide high-reflectivity and minimum color shift. Durable and washable, the screen can be mounted on any wall you choose (brackets provided), or make it free-standing and portable with the optional GRA-4000-1 Screen Stand (right).

The Screen Star's electronics will provide a lifelike image for years to come. Automatic Fine Tuning (AFT) and an exclusive Heath LC filter keep your picture in tune from channel to channel. In fact, the IF amplifier never needs realignment. Special black level clamps help reproduce each scene faithfully. These clamps maintain accurate brightness levels. Bridge-type power supplies and a ferro-resonant power transformer maintain constant brightness and picture size – even during voltage brownouts. Our easiest to build color TV, the projection tubes, yoke, lens unit, high-voltage supply and tuners are factory assembled and adjusted for easier kitbuilding.

A single antenna connection assures you of clearer reception with less interference. An internal UHF/VHF splitter and complete shielding of the tuners make the GR-4000 ideally suited for cable TV. A special video input/output panel, with auxiliary 120 VAC outlet, lets you directly connect a video cassette recorder like the Zenith Video Director (page 9). And the Screen Star's audio system produces a full 5 watts of sound – as beautiful, rich, clear and distortion-free as the picture – through the large 6" x 9" speaker. Or connect your stereo to the external speaker jack or the VCR audio output jack for even better sound reproduction.

Smooth-rolling casters let you move the projector anywhere, or store it out of the way when not in use. And when you choose the optional Screen Stand, the lightweight screen can be moved about with the same ease.

Spend less on service bills. Complete self-servicing manual shows you how to service the GR-4000. Built-in self-service features make maintenance and repair faster, simpler. Convergence controls are conveniently located on upper chassis. A built-in crosshatch generator and test meter make kitbuilding and servicing easier. Complete technical support is always available. Order the Screen Star Projection TV System today.

GR-4000, Shpg. wt. 190 lbs., Motor Freight .... **Was $1999.00, Now 1499.00**

Optional Floor Stand for GR-4000 Screen. Sturdy metal with leveler feet.
GRA-4000-1, Shpg., wt. 20 lbs., Motor Freight **79.95**

GR-4000 SPECIFICATIONS: Antenna Impedance: 75 ohms coaxial, with internal UHF/VHF splitter. **Tuning Range:** UHF Channels 14 through 83. VHF Channels 2 through 13. **AFT Pull-In Range:** 0.7 to −1.8 mHz. **Audio Output:** 5 Watts at speaker and external 8 ohm speaker jack. **Total Harmonic Distortion:** Less than 0.5%. **Video IF Bandwidth:** 4.08 mHz at 6 dB down. **Video Cassette Recorder Facilities:** 1 Volt composite video in/out at 75 ohms, 0.75 VRMS audio in/out at 600 ohms. **Projector Distance from Screen:** Approximately 98 inches (249 cm). **Power Requirement:** 120 VAC, 60 Hz, 150 watts. **Projector Dimensions:** 28" H x 16.25" W x 32" D (71.12 x 41.28 x 81.28 cm). **Screen Dimensions:** 45" H x 60" W (114.3 x 152.4 cm).

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

Program it like a computer – the state-of-the art GR-2001 25" Diagonal Color Television

Simulated TV picture

$769.95

- **Matrix picture tube gives you ultra-sharp picture**
- **Audio circuitry gives a difference you can hear in the wide-range speaker...or play it through your stereo**
- **Optional computerized programmer lets you preselect an entire evening's viewing...then really relax**

The Heathkit GR-2001 25" diagonal Color Television is an investment in magnificent color and self-serviceability. Through the use of the optional Programmer accessory, this computer-controlled set allows you to change channels and watch up to 16 different television programs in each of two 12/24 hour viewing periods. No more forgetting your favorite shows. No more rummaging through TV time and channel listings every night when you watch TV. Just select the shows you want to watch for the day, punch the channel numbers on the optional GD-1185 Programmer, and forget it. The GR-2001 will automatically change channels at the time of your next selected show.

And when you add the optional GD-1184 Antenna Rotator Control, this computerized system will even rotate your antenna for the best reception on each channel – perfect for areas where stations are in widely separated locations. The Automatic Antenna Rotor Control accepts up to 24 channels – 3 for each of 8 directions. It operates with or without the GD-1185 Programmer.

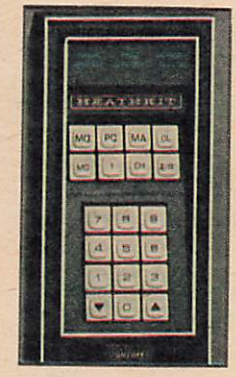
The optional GRA-601 On-Screen Digital Clock displays the time in hours, minutes and, if you desire, seconds in 12/24 hour format below the channel number on the screen. Easy-to-read white digits can be adjusted with the channel numbers to remain on the screen for up to 1½ minutes each time the channel is changed, remain on permanently, or automatically reappear at approximately 2-minute intervals.

Programming your GR-2001 Color TV is easy, too. The top bank of eight keys accesses the optional Programmer's static NMOS random access memory. That turns the on-screen clock display into a readout which lets you "see" your program as you enter it. The selected time appears in the first four digits of the clock display, the channel number in the last two. Simply enter the time at which you want the set to change channels, then enter the channel number you want. You can even program the set to return to manual operation at a preselected time, then resume automatic operation at another time.

With all this programming convenience, you also get a color television set that features an outstanding picture. The GR-2001 features PLL vertical and horizontal oscillators for a rock steady, beautiful 25" diagonal color picture that will be the envy of your neighborhood. The picture tube uses a black matrix screen, and is fully shielded to maintain outstanding color purity by reducing stray magnetic fields. The audio circuitry gives you room-filling high fidelity sound to match the richness of the color pictures. The sound signal has its own IF stage to provide a difference you can really hear – through the GR-2001's wide-range speaker, by adding a second speaker (GRA-2000-7 at right)...or even more dramatically when you use the audio output jack to connect the GR-2001 to your stereo system.

Built-in self-service features let you keep your GR-2001 in peak condition for years to come. A dot generator, centering and convergence circuits, a test meter and detailed Heathkit manual help you really save money on service.

Custom-mount your GR-2001 into a wall, in your own cabinet, or in one of the beautiful assembled cabinets on page 8. Order your GR-2001 today so you can begin enjoying the set that brought color TV into the digital age.



The GRA-601 Clock, along with the optional GD-1185 Programming Board, enables you to program the GR-2001 with up to 16 channel changes in two 12/24 hour periods.

Eight programming pushbuttons let you sequence the GR-2001 to change channels and rotate your antenna (with optional GD-1184 Rotator Control) at times you preselect. Above the buttons, backlit nomenclature indicates the current operating mode. You'll never miss a favorite show again.

Kit GR-2001, Shpg. wt. 146 lbs., Motor Freight **769.95**

GD-1185 Programmer for GR-2001. Changes up to 16 channels in each of two 12/24 hr. periods at times you pick. Requires GRA-601 to operate. 8 lbs. **174.95**

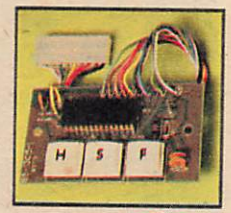
GD-1184 Automatic Antenna Rotor Control. Automatically turns antenna to station you select. Requires GDA-1184-1. Shpg. wt. 6 lbs. **69.95**

GDA-1184-1, Rotor Motor. Req. 5-wire cable (not suppld.), 11 lbs. **39.95**

GRA-2000-7, Second speaker for GR-2001, Shpg. wt. 2 lbs. **9.95**

GRA-2001-9, 8-Channel Tuning System Accessory, Adds 8 more channels programming capability to your GRA-2001. Shpg. wt. 1 lb. **14.95**

GRA-2001-6, Remote Control, Shpg. wt. 4 lbs. **99.95**



Optional On-Screen Digital Clock

Know the time and channel you're watching, instantly, without getting out of your chair. Easy-to-read 1" digits display time in 12- or 24-hour formats, plus channel number you've selected. Display can be set to show time continuously, or at intervals. For GR-2050 and GR-2001.

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

Handheld Remote for GR-2001

Lets you turn set on and off, adjust volume and tint, scan channels, even turn optional Programmer on and off – all from your easy chair.

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

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

Save more, get more by purchasing systems

Save $74.90. System includes GR-2001, GD-1185 and GRA-601. $974.85 if purchased separately. **GRS-2001,** 175 lbs., Mtr. Frt. **899.95**

Save $84.85. System includes GR-2001, GD-1185, GRA-601, and GD-1184. $1,044.80 if purchased separately. **GRS-2002,** 187 lbs., Mtr. Frt. **959.95**

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

Get a great 21" diagonal picture when you choose the lowest-priced Heathkit Color TV

$549.95

- **Uses famous Heathkit high-quality design to produce a clear, crisp, breathtaking color picture in the more compact, popular 21-inch (diagonal) size**

The Heathkit GR-2050 Color TV features a bright, sharp 21-inch (diagonal) color picture – at the lowest selling price for a Heathkit Color TV! It contains the quality technical design and excellent performance Heathkit Color TV's are famous for, in a smaller package. And for convenience, both an ultrasonic remote control and on-screen clock are available (see below).

Sixteen channels can be automatically, digitally selected with just a push of a button. Large, easy-to-read channel numbers are displayed on the screen. Automatic fine tuning and an exclusive Heathkit IF filter maintain a perfectly tuned, rock-steady picture. Complete tuner shielding and a true 75-ohm VHF antenna hookup make the GR-2050 ideal for hookup to cable TV.

The GR-2050 Color TV is easy to build. Modular circuit boards and color-coded wiring harnesses make kitbuilding and servicing easy and satisfying. Extra-value features are built-in, too – including a set-up/troubleshooting meter, dot generator, service circuit board, centering and pincushioning circuits – all designed to facilitate easier adjustment and servicing.

Kit includes chassis, picture tube and one speaker. GRA-2050-1 Space-Saver Contemporary Cabinet offered separately, below.

Kit GR-2050, Shpg. wt. 122 lbs., Motor Freight **549.95**

Space-Saver Contemporary Cabinet for the Heathkit GR-2050 Color Television. Assembled and finished. Made of wood solids and veneers. Stained in walnut. Includes black foam grille. Overall Dimensions of this cabinet are 25.63" H x 30.50" W x 22.06" D (65.10 x 77.47 x 56.03 cm), including cup.

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

Optional Ultrasonic Remote Control for GR-2050 Color Television.
Kit GRA-2000-6, Shpg. wt. 4 lbs. **99.95**

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

High-quality Heathkit TV – at a money-saving price

Simulated TV picture

Assembled wood cabinets add beauty to your Heathkit TV

Take on a Mediterranean accent

Our Mediterranean 25" Television Cabinet features a rich, dark oak finish.

Solidly constructed of wood solids and veneers, simulated wood grain trim combines with the finish to make a cabinet which looks as sharp as the picture on your Heathkit GR-2001 Color TV. This effect is accented by hardware finished in antique gold.

This cabinet accepts one or two speakers. Fully assembled and finished. Dimensions, 30.31" H x 49.94" W x 20.88" D (76.99 x 126.85 x 53.06 cm); 23.94" D (60.81 cm) with cup.

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

Second Speaker for GR-2001 Color TV.
GRA-2000-7, Shpg. wt. 2 lbs. **9.95**

Smart Contemporary Cabinet

The Heathkit Contemporary 25" Television Cabinet will make your Heathkit GR-2001 Color Television Set a sight to behold. Constructed of wood solids and veneers, this cabinet features an oiled walnut finish.

This TV cabinet has the capability to accept one or two speakers.

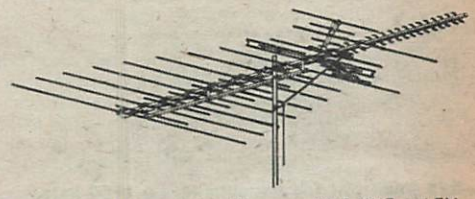
Cabinet comes completely assembled and finished, ready for you to install your GR-2001 Color TV. Dimensions, are 28.38" H x 46.82" W x 20.56" D (72.09 x 18.43 x 52.22 cm); 23.63" D (60.02 cm) with cup.

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

Second Speaker for GR-2001 Color TV.
GRA-2000-7, Shpg. wt. 2 lbs. **9.95**

Simulated TV pictures

Expanded line of



Deluxe Fringe Antenna (above) improves VHF, UHF and FM reception in fringe areas. 28 elements, 131" boom, 80" turning radius. Less mast, cable.

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

NEW! Super-Antenna. Our best – 71 elements, 163" boom, 95" turning radius. 3-way signal splitter.

GDZ-1461, 300 ohms, 17 lbs., Mtr. Frt. **149.95**
GDZ-1461-1, 75 ohms, 18 lbs., Mtr. Frt. **154.90**

NEW! 4-Bay Stacked Bowtie UHF Antenna improves reception of Channels 14-83 in suburban and near-fringe areas. Less mast and cable.

GRZ-229, 300 ohms, Shpg. wt. 4 lbs. **21.95**

NEW! 23-Element Near Fringe VHF/FM Antenna for Chs. 2-13 and the FM band. 119.5" double boom length, 108" maximum width, 78" turning radius. Removable FM blocking elements. Less mast and cable.

GRZ-202, 300 ohms, Shpg. wt. 13 lbs. **79.95**

NEW! 9-element Paralog FM Antenna features flat bandwidth, high gain, 20 dB front-back ratio. 101" boom, 63" turning radius. Less mast, cable.

GRZ-241, 300 ohms, Shpg. wt. 25 lbs. **41.95**

NEW! Complete 300 Ω Suburban Antenna Kits include 20-element antenna, mounting hardware, 50' lead-in wire. 86" length, 50" turning radius.

Kit GRZ-277-1, Roof Mount, 25 lbs. **49.95**
Kit GRZ-277-2, Chimney Mount, 25 lbs. **49.95**
Kit GRZ-277-3, Tripod Roof Mount, 25 lbs. **49.95**

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

Simulated TV picture

Simulated TV picture

NEW

Zenith System 3 Portable TV with 13" diagonal color picture

Now the best Zenith ever...is even better! This assembled 13-inch (diagonal) Portable Color TV features a Tri-Focus Picture Tube for the sharpest picture in Zenith history. Triple-Plus Chassis has modular design, few interconnections and is cooler-running for longer life. Color Sentry corrects the picture 30 times per second...automatically.

Electronic Power Sentry voltage regulation and other energy-saving features combine for 25 percent less average energy use than comparable previous model. Space Command® 800 Remote Control allows control from across the room. For 120 VAC, 60 Hz house current. Overall Dimensions, 13.75" H x 20.13" W x 14.88" D.

GRZ-1325, Assembled and tested, 44 lbs. **459.95**

Improved Zenith AC/DC/Battery Portable TV goes everywhere

New technology makes this assembled 9-inch (diagonal) black-and-white portable TV even more energy-efficient than its predecessor (GRZ-92). And UHF tuning is now easier.

This TV goes anywhere...because it plays on 120 VAC power for home viewing; 12 VDC in car, camper or RV, or an optional 12 VDC rechargeable battery pack for picnic, beach...wherever you go.

Includes 12 VDC car cord adapter, sunshield and earphone. 9.75" H x 14.63" H x 9.63" D.

GRZ-93, Shpg. wt. 17 lbs. **109.95**

GRZ-93-1, Rechargeable Battery Pack for GRZ-93 only (not for GRZ-92), 9 lbs. **44.95**

SAVE $4.95! Buy the TV and Battery Pack together.

GRZ-93-S, Shpg. wt. 26 lbs. **149.95**

antennas and accessories for higher-quality TV, FM signals

NEW! Top-of-the-line Zenith Chromatenna Indoor Antenna provides excellent metropolitan-range VHF/UHF/FM reception. VHF/UHF selector minimizes noise from unwanted signals. This high-performance antenna features a 12-position impedance tuning control knob, for fine-tuning both strong and weak signals. Large four-section VHF elements help reduce snow and fading. VHF dipole isolators minimize body capacity when adjusting elements. An adjustable rotator knob lets you adjust the UHF loop for best reception. This Chromatenna's outstanding decorator styling adds to the beauty of any TV set.

GRZ-821, Assembled, Shpg. wt. 3 lbs. **39.95**

NEW! Low-price Chromatenna features 12-position impedance tuning knob; large, four-section VHF elements to reduce snow and color fading on Channels 2-13; UHF loop for Channels 14-83. Decorator styling; foot padding is built into the base.

GRZ-819, Assembled, Shpg. wt. 2 lbs. **29.95**

NEW! UHF/VHF/FM Pre-Amplifier boosts signals 17-19 dB. Single or combined 300-ohm inputs. Has single 75-ohm downlead from antenna, one 75-ohm output to set. Easily removable FM attenuation.

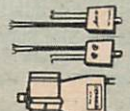
GRZ-348, Assembled, 2 lbs. ... **74.95**

VHF/UHF/FM Splitter/Transformer for all Heath and newer TVs with 75-ohm VHF antenna input. Splits one 75-ohm downlead into 75-ohm VHF, 300-ohm UHF and FM outputs. Use at TV or video cassette recorder VCR input.

GRZ-387, Assembled, 1 lb. **7.95**

Cornell-Dubli... ...na Rotator System pinpoints ant... ...each station for improved UHF, VHF and FM reception. Accepts ⅞" to 2" diameter masts. Supports antennas to 150 lbs. For 120 VAC, 60 Hz power.

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



Transformer/Splitter converts 75 Ω input into 2 separate 300 Ω outputs.

GD-298, Assembled, 1 lb. **4.95**

Matching Transformer converts 300 ohms to 75 ohms for coax.

GD-1054, Assembled, 1 lb. **3.95**

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

NEW

Watch favorite shows anytime on this VCR

- **With the assembled, programmable Zenith Video Director, you can record up to four different channels over 14 days**
- **Improved model features new frame-by-frame advance and variable-speed slow motion**

Increase your viewing pleasure with the improved, more exciting Zenith Video Director. Use this versatile Video Cassette Recorder to record your favorite television show, while you're away. You can also record a program you're watching – or record one show while viewing another.

New frame-by-frame advance and variable speed slow motion let you study every aspect of a professional's golf swing – or see how the tennis ball really came off the racket. Both features are virtually free of interference – those distracting noise bars have been eliminated. (at Beta III speed).

Use Remote Video Action Control to edit unwanted scenes while recording. Automatic indexing helps find beginning of program. Speed Search finds scenes at 10 times normal speed. Stop tape for "freeze action" effect. Reverse for "instant replay." Or view at 3 times normal speed (in Beta III mode).

You can program the Zenith Video Director to record up to 4 different shows over a 14-day period! Record or play in Beta II or Beta III modes – up to 5 hours in Beta III. With the Audio Dub feature, you can add music and/or narration later.

You can add an optional camera and monitor to the Zenith Video Director VCR for home video movies or closed circuit television surveillance.

Includes remote control, transformers, cables and an auxiliary 120 VAC, 60 Hz outlet. Runs on 120 VAC, 60 Hz house current. Draws just 55 Watts of power. 19.50" H x 6.50" W x 15.25" D.

Five free GDZ-9700-4 (L-750) Video Cassettes are included with the Zenith Video Director – enough tape to record up to 22½ hours of television entertainment in the Beta III format, or 15 hours of programs in the Beta II format. If purchased separately, these tapes would cost you $60.00.

GDZ-9750S, Assembled and tested. Shpg. wt. 59 lbs. ..... **Was $1250.00, NOW ONLY 1210.00**

SAVE at least 33% on Videotapes. GDZ-9700-5 was $20.95 in Catalog 852. GDZ-9700-4 was $17.95. GDZ-9700-3 was $14.95.

Videotapes	Beta II	Beta III	Wt.	Price
GDZ-9700-5 (L-820)	3½ hrs.	5 hrs.	1 lb.	13.50
GDZ-9700-4 (L-750)	3 hrs.	4½ hrs.	1 lb.	12.00
GDZ-9700-3 (L-500)	2 hrs.	3 hrs.	1 lb.	10.00

At last! A home earth station comes with the Heathkit trademark of quality and reliability you can trust

NEW

Here's what sets the Heathkit Earth Station apart from the rest:

- A specially-prepared Site Survey Kit helps you determine the correct location for a satellite antenna
- Easy-to-follow assembly manuals and technical assistance by telephone or mail make our Earth Station easy to assemble and install!
- Integrated Low-Noise Amplifier/Down-Converter, 3-Meter Satellite Antenna and receiver electronics are made by Scientific-Atlanta, one of the world's foremost manufacturers of satellite communications equipment
- Satellite Receiver connects directly to TV set; features drift-free reception, digital channel selection, memory, 12-hour digital clock, automatic antenna switch and built-in security circuit (alarm not included)
- A special Zenith Space Command Remote Control – a satellite TV first – puts you in complete control from your armchair

Comparable in quality with professionally-installed systems costing up to $15,000, the basic Heathkit Earth Station will cost as little as $6,995.

With the Heathkit Earth Station, you'll have a wide variety of TV entertainment at your fingertips! Many channels – most free of cuts, censorship and interruptions – are available on geosynchronous satellites. This includes movies, sports, musical specials, nightclub acts, concerts, Broadway plays and more!*

Comprehensive manuals show you how to install the Heathkit Earth Station, from selecting a site to viewing your first satellite program. And technical help is available, by mail or by phone, to answer your questions.

Based on a design used by hundreds of commercial systems, our Earth Station gives you uncommon performance and convenience in its price range. You get:

1. A Scientific-Atlanta 3-Meter Satellite Receiving Antenna: Made by one of the most experienced names in satellite communications, this adjustable-mount antenna can receive signals from different geosynchronous satellites. Its precision-contoured dish provides the high gain needed for a sharp, clear picture. This heavy-duty Antenna will give long, reliable performance.

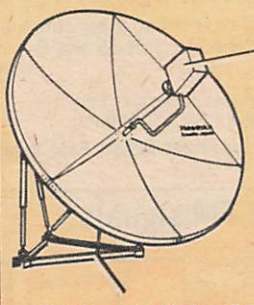
2. An Earth Foundation Kit, which enables you to anchor your 3-Meter Satellite Antenna in the ground – firmly enough to withstand winds as high as 100 mph.

3. A Rotatable Feed Assembly, which feeds the signal to the Low-Noise Amplifier (LNA)/Down Converter. It automatically rotates to the proper polarization for each channel – receive up to 24 channels from one satellite, with one feed.

4. Scientific-Atlanta's Integrated LNA/Down-Converter, which amplifies weak satellite signals while minimizing noise for a strong, clear signal. The signal is converted from 4 GHz down to the 500 MHz band – so it can be sent to the Receiver via regular coaxial cable instead of expensive heliax cable.

5. The Heathkit Satellite TV Receiver Kit, with electronic tuning of 24 channels for stable, drift-free reception. A built-in memory allows instant switching between 2 pre-selected channels. Program the Receiver to turn itself on, for viewing or recording, at times you select. A special Zenith Space Command Remote Control – a satellite TV first – lets you turn the Receiver on/off, enter channels directly, scan channels, change volume and mute sound – from your easy chair. Housed in a handsome cabinet with walnut panels, the Receiver has separate connections to your TV and VCR. A built-in security circuit allows connection of an alarm (not included) to alert you to any attempt to remove the Low-Noise Amplifier/Down-Converter.

High-performance 3-Meter Antenna



Integrated LNA/Down-Converter for better performance in less space

Antenna can be adjusted to view different satellites

Earth Foundation Kit allows 3-Meter Antenna to withstand 100 mph winds

Satellite Receiver has extra-value features

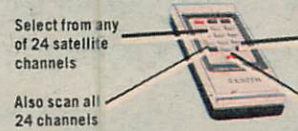
Threshold extension for clear pictures at lower signal levels

Built-in 12-hour (AM/PM) digital clock

Digital selection of 24 satellite channels

Features separate connections for TV set, VCR

Select satellite programs from easy chair



Select from any of 24 satellite channels

Turn receiver on/off without getting up

Also scan all 24 channels

Change volume or mute sound

The SRA-8100-10 Site Survey Kit (below) has full information on our Earth Station, and will help determine if your site is acceptable for installation. Or if you would like a brochure with more information on the Earth Station and Site Survey Kit, call 800-253-0570, TOLL-FREE – or write to Heath Company.

*Viewing of some satellite TV channels may require the customer to obtain permission from, or make payment(s) to, the programming company. The customer is responsible for compliance with all local, state and federal governmental laws and regulations, including but not limited to construction, placement and use. For use only in Continental U.S.

This device has not been approved by the Federal Communications Commission. It is not, and may not be, offered for sale or lease, or sold or leased until the approval of the FCC has been obtained.

The first step: our Site Survey Kit

This kit will help you determine whether a Heathkit Earth Station can be installed at your proposed site. You'll receive a computer printout which shows satellite "look angles" for your address, a compass for determining the directions of different satellites, and an inclinometer to help determine the degree of elevation between the earth's surface and the satellite(s) – to assure a clear line-of-sight path to the satellites.

You also get a manual which explains satellite TV and the Heathkit Earth Station, how to use the compass and inclinometer, how to find the right ground conditions and how to configure the Heathkit Earth Station; a copy of "Sat Guide" to show the vast selection of programming available from just one satellite, and order forms for purchasing your Earth Station.

Deduct the cost of this kit when you purchase a Heathkit Earth Station.

To order the Site Survey Kit, call 800-253-0570 TOLL-FREE – or mail the catalog order blank. Be sure to include the address, city, state and Zip Code of the specific site where you plan to locate your Earth Station.

Kit SRA-8100-10, Shpg. wt. 2 lbs. **30.00**

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

NEW The SA-5010 μMatic™ Memory Keyer — best buy in ham radio — has features so unique we've applied for a patent!

FAST, EASY 2-EVENING KIT

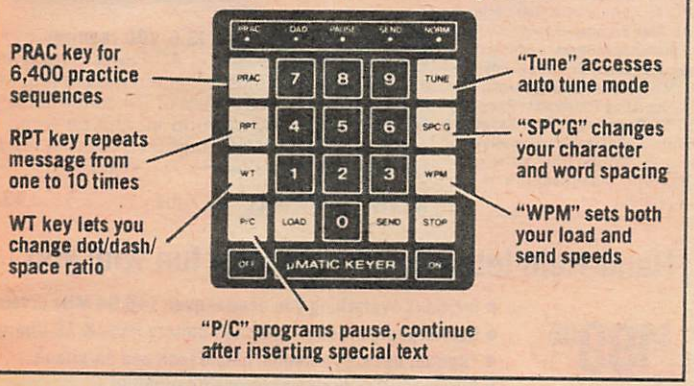
$97.95

- Includes removable capacitive touch iambic paddles
- Up to 10 buffers are available for the storage of text or "command strings"
- Features a speed range of 1 to 99 words per minute
- Four-level random practice mode allows 6,400 different, repeatable practice sessions
- Rear panel jack allows use of a mechanical paddle with the SA-510 μMatic Memory Keyer
- Easy to build and easy to use, the Heathkit SA-5010 is your best value in a memory keyer

The Hams at Heath have done it again! They proudly introduce the exciting new SA-5010 μMatic (Micro-matic) Memory Keyer – designed to bring more fun and enjoyment to your CW activities. You'll like the compact, modern styling of the SA-5010, made possible by the use of a custom microprocessor. The μMatic provides up to 10 buffers for storing up to 240 characters of text or commands. Because the buffers are of variable length, they eliminate wasted memory space. Available memory is also effectively increased by use of "command strings" that let you store text in several buffers and then string them together in whatever sequence you desire. Command strings can also select the speed, weight, spacing and auto-repeat count for each of the messages so selected. This unique feature makes the μMatic so versatile that we've applied for a patent on it. An editing feature allows easy recovery from any errors you make when loading a message buffer.

Use the SA-5010's thin, 20-position keypad to select character formation speed, character spacing, character weighting, message repeat count, buffer number and mode with ease. The sidetone "clicks" to verify keypad entries, and "warbles" to warn you of illegal entries or error conditions.

The μMatic Keyer's easy-to-learn keyboard



The SA-5010 features easy-to-use integral capacitive "touch" paddles. The paddles unplug and store in their own compartment inside the Keyer when not in use. The removable compartment cover is silk screened with the Morse Code for easy reference. A rear panel jack is provided should you prefer to use a mechanical paddle with your SA-5010.

A "practice" mode allows you to send random code groups of random length and selectable types (alpha, alphanumeric, and alphanumeric plus common or all punctuation). The 100 different random sequences are repeatable, so you can check your copy for accuracy. But all 100 sequences are altered every time you turn on the Keyer, giving you a total of 6,400 different practice sessions. Each sequence sends approximately 3,000 characters before repeating. Answers for 10 of the sequences are included in the manual. And, of course, you can choose any speed between 1 and 99 words per minute, and any of 11 weight settings for your practice session.

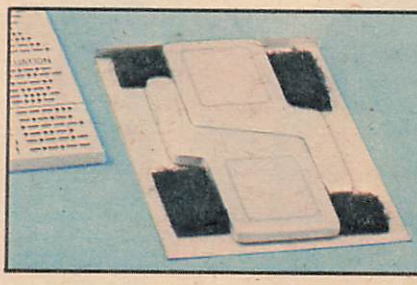
Text may be manually inserted into a buffer message being sent. You can also store a pause into text or command strings to cause the Keyer to pause automatically for manual insertion of, for example, a station's RST report. The SA-5010 lets you enter text at whatever speed and weight are comfortable for you, then send it with any other settings you desire.

CMOS memory with battery backup retains the buffer contents, as well as the 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 Keyer is turned on, and also test buffer memory whenever your μMatic Memory Keyer is reset.

The SA-5010 features built-in side tone oscillator and speaker with variable pitch and volume controls. Phone jack and ear phone are included for private listening. Five bright LEDs indicate the current mode of the Keyer. Left-handed? A special two-key function reverses the paddles. And the Keyer even remembers to turn itself off if you forget. The attractive plastic case covers a die-cast zinc base weighted to reduce movement during keying. Requires 120 VAC Power Supply below. Get your μMatic Memory Keyer now – get in on all the CW fun you've been missing.

SA-5010, Shpg. wt. 3 lbs. **97.95**

PS-5012, 120 VAC Power Supply, Shpg. wt. 1 lb. **11.95**



The removable cover of the μMatic Memory Keyer's paddle storage compartment is silk-screened with the entire Morse Code, including all punctuation, for your convenient reference.

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 1 to 10 times). **Keyer Output:** Solid state: +250 volts @ 100 mA; −200 volts @ 40 mA (separate, protected, output jacks). **Memory Backup:** 3 watch batteries (supplied) – 1 year typical life. (There's no battery drain unless the Keyer is removed from the AC power source). **Paddles:** Built-in (removable) capacitive "touch" type, with provision for external mechanical paddles. **Sidetone:** Approximately 300 to 1500 Hz, adjustable. **Power Requirement:** External pluggable transformer (optional) or 11 to 16 volts DC @ 200 mA. **Dimensions (Excluding paddles):** 1⅜" H x 4½" W x 6" D (4.13 x 10.48 x 15.24 cm).

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

The VF-7401 2-Meter FM Digital Scanning Transceiver brings fun back to 2-meter activity

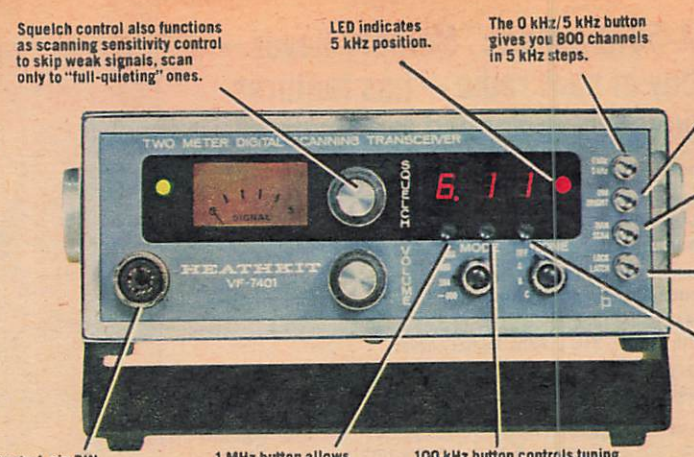
$339.95 with PTT mike

- Continuously adjustable, 10-15-watt output, 143.5 to 148.5 MHz
- Front panel selectable band scan capability – 1 MHz at a time
- Preprogrammed power-up on your favorite 2-meter frequency
- Features detachable microphone

The VF-7401 2-Meter FM Digital Scanning Transceiver finds all the activity for you, scanning the band in 1 MHz segments. Every time you turn your VF-7401 on, before it begins to scan, it powers up on your favorite simplex or repeater frequency first. In Scan/Lock mode it stays on any active channel until reset, or in Scan/Latch, scans again when transmission ends. Adjust the receiver to stop scanning for "full-quieting" signals only, or open the squelch for 2-meter "DX." Besides simplex, choose +600 kHz, −600 kHz and 1 MHz offsets. It can accommodate most 2-meter offset combinations, even MARS and CAP.

The VF-7401 is a continuously adjustable, 15-watt (10-15 nominal), solid-state, narrow-band FM transceiver. Its hot receiver has a double-tuned front end with MOSFET RF amplification, dual-conversion, 8-pole crystal IF filtering for perfect bandpass shaping and outstanding adjacent channel selectivity, IC limiting, Quad detection and excellent audio quality. Detachable microphone. Optional Micoder TM II Microphone/Auto Patch Encoder (page 20), draws power directly from the VF-7401. Includes gimbal-mount bracket for mobile installation. Requires a 13.8 V, 3 amp continuous, 4 amp intermittent, power source such as a charging auto electrical system, or VFA-7401 AC Power Supply, right.

kit VFS-7401-1, Transceiver and Micoder II, Shpg. wt. 12 lbs. **359.95**



Kit VFS-7401-2, Transceiver and PTT Microphone, Shpg. wt. 12 lbs. **339.95**

VF-7401 SPECIFICATIONS: Receiver: Sensitivity: 0.5 μV for 12 dB SINAD (or 15 dB of quieting). **Squelch Threshold:** 0.3 μV or less. **Audio Output:** 1.5 watts at less than 10% THD; 2 watts max. output (typical). **Image Rejection:** −50 dB or greater. **IF Rejection:** −80 dB or greater. **Internally Generated Spurious Signals:** Below 1 μV equivalent. **Bandwidth:** 6 dB at 15 kHz min. and 60 dB at 15 kHz min. and 60 dB at 30 kHz max. **Modulation Acceptance:** 6.0 kHz min. **Transmitter: Power Output:** 10-15 watts nominal to a 50Ω <0° (resistive) load at 25°C and 13.8 VDC. **Harmonic and Spurious Output:** −60 dB. **Modulation:** FM, 0-7 kHz, adjustable. **Duty Cycle:** 100% with VSWR of less than 10:1. **Tone Encoder:** 3 tones 70 to 200 Hz, approx. 700 Hz deviation. **Transmitter Offset:** −600 kHz, +600 kHz, +1 MHz, Aux. **General: Frequency Coverage:** Any 4 MHz segment from 143.5 to 148.5 MHz. **Frequency Increments:** 5 kHz. **Frequency Stability:** ±.0015%. **Operating Temperature Range:** +15°F to +125°F (−10°C to +50°C). **Operating Voltage Range:** 12.6 to 16 VDC (13.8 VDC, nominal). **Current Consumption: Receive Mode:** 550 mA max., squelched; 750 mA max., full rated audio. **Transmit Mode:** 4A max. at 13.8 VDC. **Dimensions:** 2¾" H × 7¼" W × 10¼" D (7.0 × 18.4 × 26.0 cm).

AC Power Supply gives you double duty from your VF-7401

$43.95

Designed to provide the 13.8 VDC required by the VF-7401, the VFA-7401-1 AC Power Supply may also be used with most other equipment requiring +13.8 VDC at a maximum of 3A continuous, 4A intermittent. Easy-to-build kit can be wired for either 120 or 240 VAC, 50/60 Hz. Output regulation within 1.5%. 3 1/16" H x 7¼" W x 9⅞" D.

Kit VFA-7401-1, Shpg. wt. 7 lbs. **43.95**

Hand-Held lets you take 2-meter fun with you

$199.95

- Includes everything you need – even 146.94 MHz crystal
- Rechargeable nickel-cadmium Battery Pack & AC Charger
- "Rubber duckie" antenna, phone jack and earphone
- Single crystal duplex or simplex capability

The Heathkit VF-2031 gives you a minimum of 2 watts out for great 2-meter fun. Single crystal transmit and receive circuitry covers 8 of your favorite channels – simplex, or duplex with a ±600 kHz split. Features separate built-in microphone and speaker, adjustable deviation, volume and squelch. Less than 0.5 μV quiets the VF-2031's hot receiver section a full 20 dB. Covers 143.5 to 148.5 MHz. Includes "rubber duckie" antenna, universal BNC connector, 146.94 crystal, built-in phone jack with earphone, rechargeable nickel-cadmium battery pack and Drop-in Charger. 9⅛" H x 3 5/16" W x 1⅞" D.

Kit VF-2031, Shpg. wt. 5 lbs. **199.95**

Fitted Holster-style Carrying Case. VFA-2031-2, Wt. 1 lb. **18.95**

Crystal Certificates. Specify frequency, send to mfr. Crystal returned postpaid. Order one for each crystal needed. VFA-2031-4. Postpaid **6.95**

SAVE $10. Auto Patch Encoder. Make phone calls through repeaters with auto-patch inputs. **VFA-2031-3,** Shpg. wt. 1 lb. ..... **Was $34.95, NOW 24.95**

SAVE 40%. Continuous Tone Encoder. Lets you access most repeaters using your VF-2031. **VFA-2031-5,** Shpg. wt. 1 lb. ..... **Was $24.95, NOW 14.95**

External Microphone. PTT Mike with coiled cord; plugs into VF-2031 so you can transmit without removing unit from holster. **Kit VFA-2031-6,** 1 lb. **39.95**

10-Watt Amplifier. (Description on next page.) **Kit HA-201A,** Wt. 2 lbs. .. **42.95**

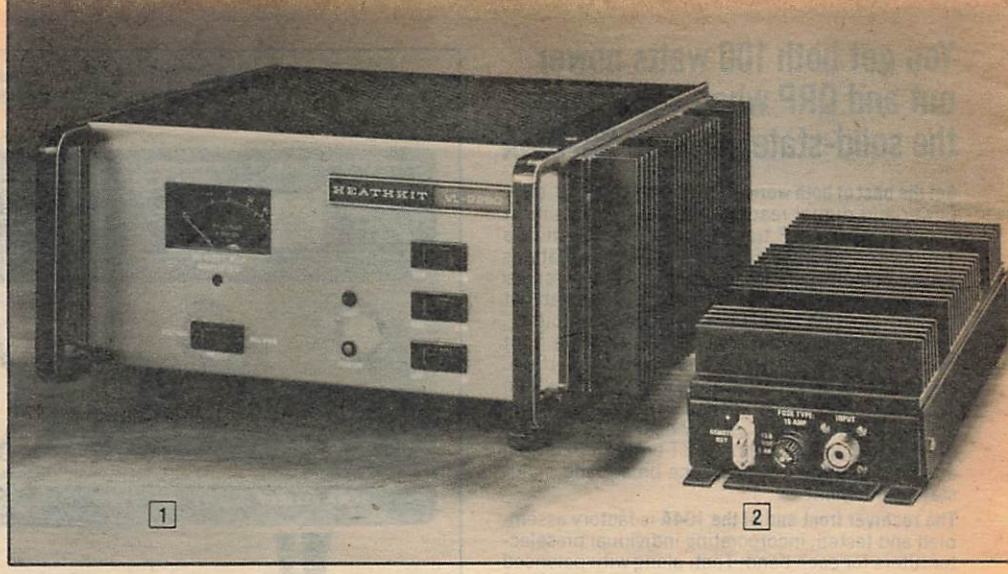
Alaska, Hawaii and Michigan Residents: Call 616-982-3411

NEW

[1] 75-Watt All-mode VHF Base Amplifier is great for use at home or for your repeater

$274.95

- Work the ones you hear – 10 watts input produces a hefty 75 watts (nominal) out
- Makes a great repeater amp
- Rugged solid-state design
- Operates FM, SSB and CW



If your 2-meter transceiver has a hot receiver like the one on the VF-7401 (opposite page), you probably hear stations who can't hear you. The new Heathkit VL-2280 All-mode Base Amplifier will solve that problem for you, giving you a hefty 75-watt (nominal) signal for just 10 watts in. The VL-2280 even has a plug in the back to power your VF-7401 or other make transceiver, so you don't need a separate power supply. And if your club needs to update its old vacuum tube amplifier and replace it with solid state reliability, the VL-2280 is an excellent choice for a repeater amplifier. It can be operated on 120 VAC, 240 VAC or even 12 VDC back-up battery power.

The Hams at Heath have engineered the new VL-2280 to operate in all modes, too – SSB, FM or CW. IMD products, incidentally, are very low when the amplifier is used on sideband. The VL-2280 operates across the entire 144 to 148 MHz amateur 2-meter band. Broad-band circuitry maintains a stable power output across the entire band, too. This big amplifier has extra-large heat sinks to provide more-than-adequate cooling, giving you a 50% duty cycle and more "on" time. And the VL-2280 has a convenient standby/on switch so the exciter can be operated barefoot!

The illuminated front-panel meter allows you to monitor drive power, power output or relative DC voltage. The VL-2280 is DC voltage regulated, by the way. This rugged amplifier features excellent harmonic rejection and RF-sensed or remote keying. To give you maximum receiver sensitivity, insertion loss has been kept to less than 0.6 dB. The extremely rugged design is housed in a military style cabinet measuring 5½" H x 13¾" W x 16½" D. Alignment is simple, requiring only an exciter such as the VF-7401, and a wattmeter that reads forward and reflected power, like the HM-2141 on page 21. Building the VL-2280 75-Watt All-mode Base Amplifier is an enjoyable three-evening project.

Kit VL-2280, Shpg. wt. 30 lbs. **274.95**
HDZ-63-3, 3 ft. Coax. w/conns., 1 lb. **4.95**

VL-2280 SPECIFICATIONS: Band coverage: 144 to 148 MHz. **Power Input:** 1 to 10 watts SSB, FM or CW. **Impedance:** 50Ω. **Input VSWR:** (@ 10 watts drive) 2.0:1 or less. **Power Output:** 75 watts @ 10 watts drive. **Duty Cycle:** 50%, 10 minutes on, 10 minutes off. **Insertion Loss:** (Antenna to Receiver) less than 0.6 dB. **IM Distortion:** –24 dB. **Power Requirement:** 120 VAC at 4 amperes; 240 VAC at 2 amperes; 12 VDC at 11 amperes. **Dimensions:** 5½" H x 4⅝" W x 10½" D (13.97 x 11.75 x 26.67 cm).

NEW

[2] VL-1180 75-watt 2-Meter Amp puts your mobile in range of more repeater fun

$137.95

- 10 watts in gives 75 watts out on FM, SSB or CW
- Features rugged, solid-state design for mobile use

You're driving down the highway and can hear a 2-meter station, but you can't work him. Then you switch on your Heathkit VL-1180 All-Mode, 75-Watt Mobile Amplifier. Your 10 watts in is transformed into 75 watts of QSO-grabbing power...and you're in business!

The new VL-1180 Mobile Amplifier, like the VL-2280 described left, has been engineered to operate in all modes – single sideband, FM or CW – across the entire 144 to 148 MHz 2-meter band. Power output is stable across the entire band, thanks to broad-band circuitry. And you get a 50% duty cycle for more "on" time because extra-large heat sinks provide more than adequate cooling. Insertion loss is less than 0.6 dB, and the VL-1180 boasts excellent harmonic rejection, plus RF sensed or remote keying. The Amplifier's rugged design means you can install it in your car's trunk or other out-of-the-way location without worry. The easy-to-build VL-1180 is a two-evening kit, and alignment is simple, too, requiring only an exciter and a dual wattmeter like the HM-2141. Get your VL-1180 today for more 2-meter mobiling fun.

Kit VL-1180, Shpg. wt. 5 lbs. **137.95**

VL-1180 SPECIFICATIONS: Band Coverage: 144 to 148 MHz. **Power Input:** 1 to 10 watts SSB, FM or CW. **Input/Output Impedance:** 50Ω. **Input VSWR:** (at 10 watts drive) 2.0:1 or less. **Power Output:** 75 watts (typical), @ 10 watts drive. **Duty Cycle:** 50%, 10 minutes on, 10 minutes off. **Insertion Loss:** (Antenna to Receiver) less than 0.6 dB. **IM Distortion:** –24 dB. **Power Requirement:** 13.6 VDC (operates 11.5 to 16 VDC) @ 11 amperes. **Dimensions:** 2½" H x 4⅝" W x 10½" D (6.3 x 11.8 x 26.7 cm).

40-Watt Amplifier increases your range on 2-Meters

$57.95

The HA-202A 40-Watt Amplifier increases 2-meter fun with a minimum 40 watts for just 10 watts in. Automatic T/R switching. Tuned input/output keeps spurs low. Special emitter ballasted configuration withstands VSWRs of up to 3:1. Internally adjustable for any 1.5 MHz portion of 143-149 MHz band. Alignment requires VTVM, wattmeter or SWR bridge. Requires 12-16 VDC power source like PS-1175 (right).

Kit HA-202A, Shpg. wt. 4 lbs. **57.95**
HDZ-63-3, 3 ft. Coax., w/conns., 1 lb. **4.95**

AC Supply for your 2-Meter transceiver/amp combo

$79.95

The PS-1175 supplies the necessary voltage and current to power the Heathkit VF-7401 Transceiver/HA-202A Amplifier combination (or most other makes) from 120/240 VAC. Output voltage internally adjustable between approx. 12 and 14.5 VDC. Output current is 10 amps, intermittent, 10 minutes max. (5 amps continuous). Darlington circuit gives exceptionally high gain for excellent regulation. Fused for overload protection. Comes with 3-wire line cord. 5$^{11}/_{16}$" H x 6$^{3}/_{16}$" W x 11" D. As with all our kits, this one even includes solder.

Kit PS-1175, Shpg. wt. 15 lbs. **84.95**

10-Watt Amplifier gives your hand-held clout!

$42.95

The HA-201A 2-Meter Amp will get your hand-held into your favorite repeater full-quieting every time, delivering up to 10 watts for a mere 1½-watt in. Or 8 watts out for just 1-watt in. Great with the VF-2031, p. 12. Fully automatic operation with solid-state T/R switching. Tuned input and output for maximum efficiency, reduced spurs. Withstands infinite VSWR. Includes dummy load, RF detector. VTVM needed for tune-up. Requires 12-16 VDC power source. 2¾" H x 5⅝" W x 5⅛" D.

Kit HA-201A, Shpg. wt. 2 lbs. **42.95**

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

You get both 100 watts power out and QRP when you choose the solid-state, no-tune SB-104A

Get the best of both worlds – 100 watts of solid-state power and digital readout, plus the world's most sophisticated QRP transceiver at the push of a button. The Heathkit SB-104A has all the features you've been looking for in a solid-state transceiver – a clean 100 watts out on all bands or one watt out in QRP position, instant QSY, digital readout ... even a display of your own call sign on the front panel. The moment you power up your SB-104A, six digits display your operating frequency to within ±200 Hz. Pushbutton select CW, upper or lower sideband transmission, opt for high or low power – plug in your key, or choose PTT or VOX operation, and you're ready to experience broadband solid-state excitement.

The receiver front end of the 104A is factory assembled and tested, incorporating individual preselector filters for each band. That, along with balanced first and second mixers, gives you sensitivity of less than 0.5 μV.

The "Sugar Baker" 104A's transmitter circuitry features quad op-amp audio processing, crystal filter sideband generation, crystal-controlled heterodyne oscillators for maximum frequency stability, and a unique ALC system to eliminate distortion-producing overdrive. Most importantly, the 104A utilizes driver and PA transistors in a broadband, no-tune push-pull configuration, diode biasing to prevent PA thermal runaway, and power regulating control circuitry to prevent damage under high SWR.

For extra performance, add 400 Hz CW selectivity with the optional SBA-104-3 Crystal Filter, or cut ignition noise by installing the SBA-104-1 Noise Blanker. The SB-104A operates from a charging 12 VDC auto electrical system or the PS-1144 Power Supply. Accessories like the SB-644A Remote VFO, SB-614 Station Monitor, and SB-634 Station Console will increase your operating pleasure even more. Move up to the digital age with the easy-to-build, fun-to-operate Heathkit SB-104A.

Kit SB-104A, Shpg. wt. 32 lbs. **694.95**

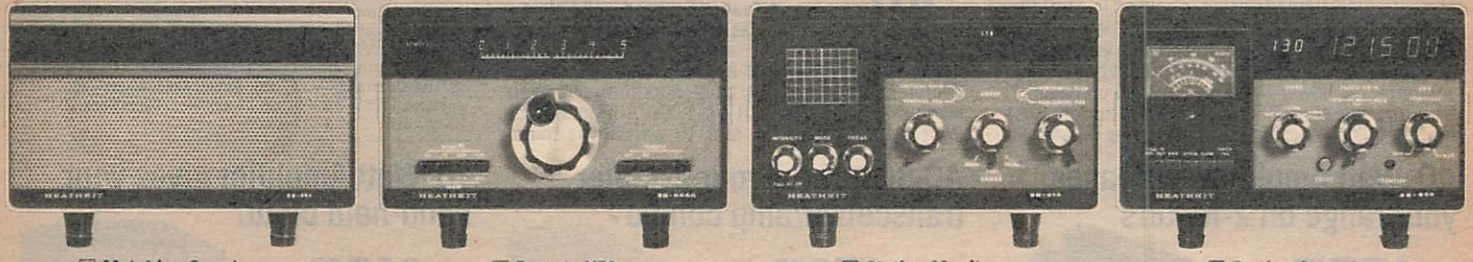
Now's the time to replace your old tube-type transceiver with the completely solid-state Heathkit SB-104A HF Transceiver.

The SB-104A lets you choose QRP (low power) or 100 watts out for barefoot operation, or is the perfect exciter for either our popular SB-221 or SB-201 linear amplifiers.

Kit SBA-104-1, Noise Blanker, Wt. 1 lb. **32.95**
Kit SBA-104-3, 400 Hz Crystal Filter, 1 lb. **44.95**

Frequency Coverage: 3.5 MHz through 29.7 MHz Amateur bands (80 through 10 meters); 15 MHz WWV receive only. **Frequency Stability:** Less than 100 Hz/30 min. drift after 30-min. warmup; less than 100 Hz drift for ±10% change in primary voltage. **Readout Accuracy:** Within ±200 Hz ±1 count. **TRANSMITTER: RF Power Output: High Power** (50-ohm non-reactive load). **SSB:** 100 watts PEP ±1 dB; **CW:** 100 watts ±1 dB. **Low Power SSB:** 1 watt PEP (minimum); **CW:** 1 watt (min.). **Output Impedance:** 50 ohms, less than 2:1 SWR. **Carrier Suppression and Unwanted Sideband Suppression:** –50 dB down from 100 watt single-tone output at 1000 Hz reference. **RECEIVER: Sensitivity:** 0.5 for 10 dB S+N/N for SSB. **Selectivity:** 2.1 kHz minimum at –6 dB, 5 kHz max. at –60 dB. (2:1 nominal shape factor.) **CW Selectivity:** (with accessory CW filter) Selectable 2.1 kHz/400 Hz. **IM Distortion:** –65 dB min.; –57 dB typ. with noise blanker. **Image Rejection:** –60 dB min. **Dimensions:** 5¾" H x 14$^{15}/_{32}$" W x 13⅞" D.

Matching SB-104A accessories give you more operating convenience



1 Matching Speaker | 2 Remote VFO | 3 Station Monitor | 4 Station Console

1 Speaker and Power Supply

SSB response-tailored 5" x 7" oval Speaker. 300-3000 Hz. Connector plug, cable included. 7⅛" H x 10⅛" W x 14" D. Houses PS-1144 Power Supply.

Kit SB-604, Shpg. wt. 8 lbs. **59.95**

120/240 VAC Power Supply (not shown) provides 13.8 VDC required by SB-104A. Full-wave bridge circuit has triple Darlington voltage regulation.

Kit PS-1144, Shpg. wt. 27 lbs. **129.95**

2 Remote VFO for added capability

Provides split transmit/receive capability for DX, net operation. Multi-mode capability allows transceiver operation with either VFO or SB-104A. Two crystal positions for fixed-frequency control. VFO reference tuning scale; SB-104A displays exact frequency. Metal cabinet. 7¼" H x 10¼" W x 15¼" D.

Kit SB-644A, Shpg. wt. 10 lbs. **134.95**

3 Station Monitor shows signals

Monitors SSB, CW & AM signals to 1 kW from 80-6 meters. Shows nonlinearity, insufficient or excessive drive, poor carrier or sideband suppression, regeneration parasitics, key clicks. Manual shows 40 CRT displays. 120/240 VAC. Metal cabinet measures 7¼" H x 10¼" W x 15¼" D.

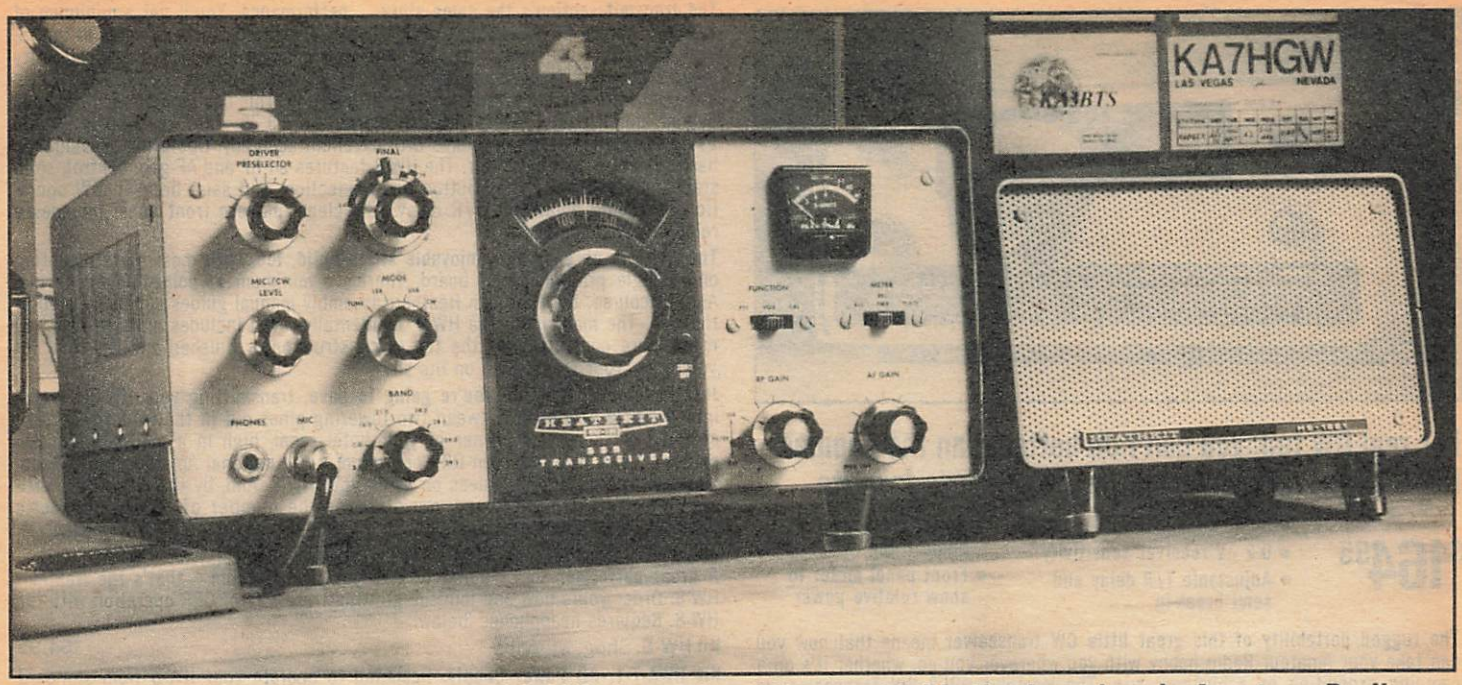
Kit SB-614, Shpg. wt. 17 lbs. **194.95**
HDZ-63-3, 3-ft. Coax. w/conns., Wt. 1 lb. **4.95**

4 Station Console adds convenience

Five-function 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. Phone patch provides at least 30 dB isolation. Input impedance is 600 ohm, 1.8 to 30 MHz. 120/240 VAC. 7¼" H x 10¼" W x 15¼" D.

Kit SB-634, Shpg. wt. 13 lbs. **194.95**
HDZ-63-3, 3-ft. Coax. w/conns., Wt. 1 lb. **4.95**

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



The Heathkit HW-101 — with over 30,000 throughout the world, it's the best buy in Amateur Radio

$439.95

- **Full 80 through 10 meter Amateur band coverage**
- **USB, LSB, CW, PTT and VOX operation on all bands**
- **0.35 μV receiver sensitivity digs out weak signals**
- **Gives you a full 180 watts PEP input, 170 watts CW**

The Heathkit HW-101 is the Transceiver to start with and stay with. You can work CW with your Novice License, and go to phone when you upgrade to General. The performance this Transceiver has to offer makes it hard to believe you're operating on a budget. Full coverage on 80 through 10 meters lets you get more enjoyment from your ham radio operation. Operate PTT or VOX on upper or lower sideband, or select CW transceiver – all the options you'd expect to find on a Transceiver that's top-notch all the way.

You get outstanding receiver performance because the HW-101's 0.35 μV sensitivity on SSB brings in weak stations loud and clear A high quality crystal IF filter keeps signals separate. Image and IF rejection of better than 50 dB help bring you world-wide receiving that's clean, clear and crisp. And when you add the optional 400 Hz CW Crystal Filter to your HW-101, your copy will be arm chair all the way.

Other features include a fast acting AGC circuit to prevent fading and blasting. And front panel metering shows you signal strength, plate current and relative power out. To make sure you're always right on frequency and inside the band, the HW-101's built-in 100 kHz calibrator is always ready for reference.

The HW-101's transmitter section is a top performer, too. Triple action level control prevents distortion-producing overdrive to keep your signal clean. And power? A rugged pair of reliable 6146 finals punch 180 watts PEP in on phone and 170 watts in on CW.

Frequency stability is better than 100 Hz per hour after 45 minutes warmup, with less than 100 Hz variation for a 10% line voltage variation. An FET VFO provides excellent thermal stability for heavy-duty operating without excessive heat buildup.

Easy-to-assemble circuit boards and color coded wiring harnesses speed assembly. And when it comes time for alignment, you'll really appreciate the wide-open layout of the HW-101's rugged chassis design. It's easy to see the Heathkit HW-101 is ham radio's best buy. Requires Heathkit Model PS-23 Power Supply and HS-1661 Speaker (below). Also be sure to see our line of Amateur Radio Accessories on page 20 for the Microphone, Wattmeter/SWR Bridge and coaxial cable to complete your HW-101 station.

Kit HW-101, Shpg. wt. 22 lbs. **439.95**
SBA-301-2, 400 Hz CW Crystal Filter, Shpg. wt. 1 lb. **47.95**
Fixed Station AC Power Supply (described below)
Kit PS-23, Shpg. wt. 17 lbs. **79.95**
Kit HS-1661, Matching Speaker, Shpg. wt. 5 lbs. **29.95**

HW-101 SPECIFICATIONS: RECEIVER: Sensitivity: <0.35 μV for 10 dB S+N/N for SSB operation. **SSB Selectivity:** 2.1 kHz min. @ 6 dB down, 7 kHz min. @ 60 dB down. **CW Selectivity:** (optional SBA-301-2 CW filter): 400 Hz. min. @ 6 dB down; 2.0 kHz max. @ 60 dB down. **Spurious Response:** Image and IF rejection >50 dB. **TRANSMITTER: DC Power Input:** SSB 180 W PEP (normal voice, cont. duty cycle). CW 170 W (50% duty cycle). **RF Power Output:** 100 W on 80 thru 15 M; 80 W on 10 M (50Ω non-reactive load). **Output Imped.:** 50 to 75Ω with <2:1 SWR. **Harmonic Radiation:** 40 dB below rated output. **Mike Input:** High impedance. **Carrier Suppression:** 45 dB down from single-tone output. **Unwanted Sideband Suppression:** 45 dB. **Third Order Distortion:** 30 dB from two-tone output. **GENERAL: Frequency Coverage:** 80-10 M amateur bands. **Frequency Stability:** <100 Hz per hour drift after 45 minutes warmup from normal ambient conditions. <100 Hz for ±10% line voltage variations. **Modes of Op:** USB, LSB, CW, tune. **Dial Calibration:** 5 kHz. **Calibration:** 100 kHz crystal. **Power Requirements:** 700 to 850 V at 250 mA with 1% maximum ripple; 300 V at 150 mA with 0.05% maximum ripple; −115 V at 10 mA with 0.5% maximum ripple; 12 V AC/DC at 5.76 amps. (See PS-23 Power Supply below.) **Dimensions:** 6⅝" H x 14⅜" W x 13⅜" D.

Here's the ideal Power Supply for your HF equipment

Provides the operating voltages for the HW-101 and other Amateur equipment. High voltage output is 700 VDC @ 250 mA; 300 VDC @ 150 mA and 250 VDC @ 100 mA low voltage taps. Also fixed bias and 12.6 filament voltage. Excellent bias supply filtering. Overload protected. 120/240 VAC, 60/50 Hz, 350 watts max. 6¾"H x 4¾"W x 9"D.

Kit PS-23, Shpg. wt. 17 lbs. **69.95**

For best performance — speaker for HW-101, HR-1680

$29.95

- **5"x 7"oval speaker is SSB and CW response-tailored**
- **Rugged, but attractive, lightweight aluminum cabinet**
- **Easy-to-build kit includes necessary cable and solder**

The Heathkit HS-1661 Speaker is designed to match the HW-101 Transceiver (above) and the HR-1680 Receiver on page 16, as well as many older Heathkit transceivers and receivers. It features a big 5" x 7" oval speaker with a 3.16 oz. magnet offering 300 to 3000 Hz frequency response for best SSB and CW reception. The green spatter-finish cabinet is constructed of rugged, light-weight aluminum, and measures 6⅝" H x 9" W x 5⅝" D.

Kit HS-1661, Shpg. wt. 5 lbs. **29.95**

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

For real CW fun, you can't do better than the popular HW-8 QRP Transceiver — the kit-builder's favorite

$164.95

- 80,40,20 and 15 meters CW
- 0.2 μV receiver sensitivity
- Adjustable T/R delay and semi break-in
- 2-Position active audio filter
- Front panel meter to show relative power

The rugged portability of this great little CW transceiver means that now you can take your Amateur Radio hobby with you wherever you go, whether it's on a camping expedition or a business trip. The Heathkit HW-8 CW Transceiver is small enough to fit in a suitcase, and not too bulky to back pack. A trail bike's battery will power it. Or join the growing number of Hams experimenting with solar-powered QRP (low power) operation. You can even run it off of your automobile's lighter socket. And, of course, you can also operate your HW-8 at home on 120 or 240 VAC power with the HWA-7-1 Power Supply (right).

No matter where you operate or how you power yours, the HW-8 is a great performer — you can be sure of that. Performance begins with a quiet, super-sensitive receiver section. Hum and noise figures are minimal, and as little as 0.2 μV in at the antenna terminal gives you a usable signal. Couple that with a tunable preselector, direct conversion with RF amplification, a balanced product detector followed by active audio processing, and you have a hot little receiver that's going to dig in and dig out the stations you're chasing.

The transmit section's the same story... performance. You'll get a minimum of 3.5 watts in on 80 meters, 3.0 watts in on 40 and 20, and 2.5 watts in on 15. Each band is individually selected, and crystal controlled heterodyne circuitry insures accurate frequency mixing. The HW-8's VFO features an MPF-105 FET in a temperature compensated Hartley configuration. This design approach provides overall stability and covers the Transceiver's 3.5-3.75, 7.0-7.25, 14.0-14.25 and 21.0-21.25 MHz operating ranges with excellent accuracy. Operating convenience hasn't been forgotten, either. The HW-8 features an RF and AF gain control, solid state band switching, pushbutton band selection, and semi break-in CW operation, including adjustable T/R delay. The clean, modern front panel includes a relative power meter.

The HW-8 is an easy and enjoyable kit to build, too, with most parts mounting on a single printed circuit board. There's a minimum of point-to-point wiring. And, of course, the thorough Heathkit assembly manual guides you every step of the way. The manual for the HW-8, incidentally, even includes hints to help you make more contacts once the fun of construction is finished and it's time for you to get your Transceiver on the air.

Just imagine all the fun you're going to have, transmitting your HW-8's signal into a dipole stretched between two towering pines out in the wilderness... or strung from corner to corner of your hotel room, high in a metropolitan skyscraper. Reading articles on QRP operation in the national Amateur Radio magazines will give you more ideas on using your HW-8. And, by the way, these articles may surprise you when you discover the number of DX and domestic contacts that Hams are making with this quality-engineered CW Transceiver, using ordinary antenna configurations you can build and erect.

A great performer that's going to give you hours of fun — that's the Heathkit HW-8. Order yours now and join the growing fraternity of QRP operation with the HW-8. Requires headphones (below).

Kit HW-8, Shpg. wt. 6 lbs. **164.95**

Kit HWA-7-1, AC Power Supply. Designed to operate your HW-8 from standard 120/240 VAC house current. Shpg. wt. 4 lbs. **22.95**

GD-396, Superex Headphones, Fully assembled, 1 lb. **7.95**

HW-8 SPECIFICATIONS: TRANSMITTER — DC Power Input: 3.5 watts (80 meters); 3.0 watts (40 meters); 3.0 watts (20 meters); 2.5 watts (15 meters). **Frequency Control:** built-in VFO. **Frequency Stability:** Less than 150 Hz/hour drift after 60 minute warm-up. **Output Impedance:** 50 Ω, unbalanced. **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 Coverage:** 3.5-3.75 MHz (80 meters); 7-7.25 MHz (40 meters); 14-14.25 MHz (20 meters); 21-21.25 MHz (15 meters). **Frequency Stability:** less than 100 Hz/hour drift after 30 minute warmup. **Power Requirement:** 12-16 VDC, 90 mA, receive; 430 mA, transmit. **Dimensions:** 4¼" H x 9¼" W x 8½" D (10.8 x 23.5 x 21.6 cm). **Net Weight:** 2 lbs.

This Receiver/Transmitter combination adds up to enjoyment and value

1 Full break-in (QSK) CW Transmitter

$199.95

- 100 watts out on 80-15, 75 watts out on 10

Whether you're a veteran brass-pounder or have just earned your Novice ticket, the HX-1681 Transmitter is ideal for use with virtually any solid-state or tube-type receiver. It's an unbeatable value, too! Full break-in capability means you can hear other stations whenever your key is up... even between individual dits and dahs of your own transmission. A pair of rugged 6146A finals combine with solid-state design to give you a clean 100 watts minimum on 80-15, and 75 watts out on 10. The HX-1681 features built-in T/R switching, adjustable sidetone output, and receiver muting. Keying is provided for adding an external power amplifier. Harmonic radiation is 50 dB down at rated output, and spurs are down 60 dB. Covers 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5 and 28.0-28.5 MHz. Requires the PS-23 Power Supply described on page 15. 6¾" H x 12¾" W x 12" D.

Kit HX-1681, Shpg. wt. 16 lbs. **199.95**

Kit PS-23, Power Supply, 17 lbs. **79.95**

2 HR-1680 Ham Bands Receiver

$224.95

- Dual conversion front end works 80 through 10 meters

Looking for your first receiver? The solid-state HR-1680 is the right choice. It combines high performance and low cost for serious Ham band listening. A perfect companion for the HX-1681 QSK CW Transmitter (described at left), the HR-1680 Receiver is both fun to build and enjoyable for Ham band operation. A hot dual-conversion front end and 0.5 μV sensitivity cover 80 through 10 meters: 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5, and 28.5-29.0 MHz. Selectivity is outstanding. With a matched 4-pole crystal filter in the IF, you can count on your 1680 to be razor sharp. A tunable preselector filters out unwanted signals. Includes built-in 100 kHz calibrator. Assembly is easy, and you can align your HR-1680 without instruments. 120/240 VAC or 11.5-15 VDC. Metal cabinet is 6¾" H x 12¾" W x 12" D.

Kit HR-1680, Shpg. wt. 14 lbs. **224.95**

Kit HS-1661, Matching Speaker, 5 lbs. **29.95**

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

The Heathkit SB-221 Linear Amplifier lets you work the big DX with a solid 20 over 9 signal

$589.95

- Paralleled Eimac 3-500Z's deliver top power
- 2 kW PEP on phone, 1 kW on CW and RTTY
- Heavy duty power supply for reliable operation
- Easily wired for either 120 or 240 VAC

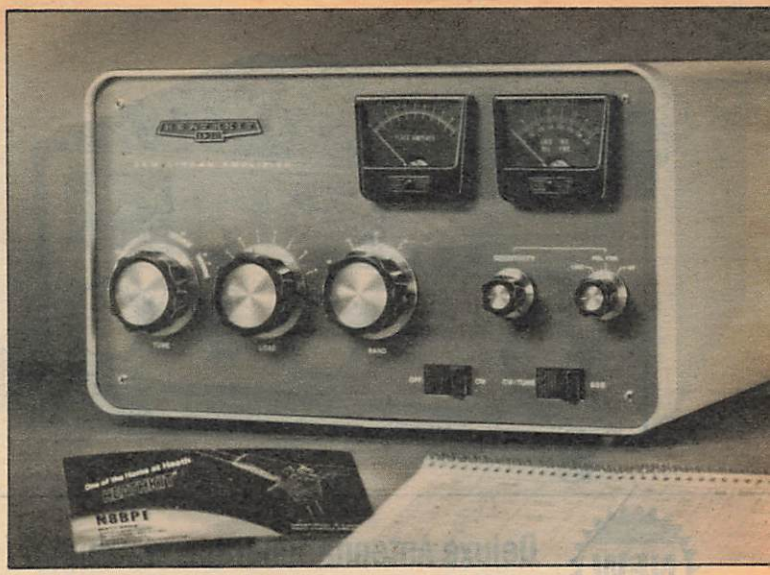
Haven't you lost enough contacts because you can't punch your signal through? The Heathkit SB-221 Linear Amplifier packs a wallop that will get you 20 over 9 reports when the others are down in the noise. And the SB-221 does it at a price that's hard to beat. Now that you're ready to move up to 2 kW power, see why this amplifier is the one for your amateur station.

A pair of rugged Eimac 3-500Z's delivers 2000 watts PEP in on phone, and can be loaded to 1 kW in on both CW and RTTY. A broad-band pre-tuned pi-input delivers maximum efficiency with extremely low distortion over the entire 80-15 meter bands. Just 100 watts of exciter drive is all that's required to drive this amplifier to full output. No alignment necessary.

With an SB-221, tune-up couldn't be easier! Just select the band you wish to operate, set the CW-tune/SSB rocker switch to the CW-tune position, adjust both tune and load controls for maximum relative power out – and you're ready to go. Ready with the kind of signal that always catches the new DX, gets your traffic through, and provides you with reliable year-after-year communications performance you can count on.

The SB-221's power supply can be easily wired for either 120 or 240 VAC operation. Zener diode-regulated operating bias reduces idling current for cooler running and extended tube life. The amplifier incorporates built-in circuit breaker protection and a large, quiet-running fan provides maximum tube cooling. Other features include ALC to prevent distortion-producing overdrive; front-panel switch-selected monitoring of grid current, relative power, and high voltage. There's also a separate meter for measuring final amplifier plate current.

A great amplifier with a great price, and it has full FCC acceptance. Get yours now, and start being heard on the bands.



Kit SB-221, Shpg. wt. 66 lbs. **589.95**
HDZ-63-3, 3-ft. RG8/U Jumper w/PL259 Connectors, Shpg. wt. 1 lb. ... **4.95**

SB-221 SPECIFICATIONS. Band coverage: 80, 40, 20 & 15 meters. **Max. power input:** SSB, 2000 W. PEP; CW, 1000 W; RTTY, 1000 W. **Driving power:** 100 W. **Duty cycle:** SSB, Continuous voice modulation. CW, Continuous (max. key-down 10 min.). RTTY, 50% (max. transmit time 10 min.). **Third order distortion:** – 30 dB or better. **Input impedance:** 52 Ω unbal. **Output impedance:** 50 Ω unbal; SWR 2:1 or less. **Front panel controls:** Tune, Load, Band, Sensitivity Meter Switch, Power, CW/Tune – SSB, Plate meter, Multi-meter (Grid mA, Rel. Power, High Voltage) **Rear panel:** Line cord, circuit breakers (two 10 A), Antenna Relay (phono), RF Input (SO-239), Ground post, RF Output (SO-239). **Tubes:** Two Eimac 3-500Z. **Power req:** 120 VAC, 50/60 Hz @ 20 amp. max. 240 VAC, 50/60 Hz @ 10 amp. maximum. **Cabinet dimensions:** 8¼" H x 14⅞" W x 14½" D (20.96 x 37.78 x 36.38 cm).

Punch your signal through the QRM with ease when you get the Heathkit SB-201 1 kW Linear

$439.95

- Rugged 572B finals need just 100-watt exciter
- Forced air cooling is ideal for contesting
- Switchable multifunctional metering
- Pre-aligned cathode-input tank circuits

Do you find yourself sitting on the sidelines during a pileup for a rare DX find because your signal doesn't measure up to the challenge? Then move up to the Heathkit SB-201 1 kW Linear Amplifier. It won't put a hole in your ham-gear budget while it's punching a hole through the QRM.

Just 100 watts is all it takes to drive the 201's heavy-duty pair of forced air-cooled 572B's to a full 1200 watts PEP in on phone, and 1000 watts in on CW. So it's ideal for use with most popular transmitters or transceivers. And you have no fear of TVI, because those finals are completely shielded to insure excellent TVI protection.

The SB-201 sports an ALC output to prevent distortion-producing overdrive. And for maximum efficiency, the 201's cathode-input tank circuits come pre-aligned and ready to go on air. No alignment necessary.

The SB-201 has a built-in solid-state power supply which features full circuit breaker protection. A switchable multi-function panel meter shows SWR, grid current, plate current, relative power and plate voltage. For extra operating convenience, an antenna relay automatically switches the antenna to the exciter input when the SB-201 is off.

The sturdy yet lightweight construction of the SB-201 is achieved by using a heavy-gauge one-piece aluminum chassis that is partitioned for extra strength and component isolation. The amplifier's clean open chassis layout assures easy assembly and provides maximum efficiency for year-after-year dependability and value.

From its front panel on back to the rear apron, the SB-201 is packed with features that make this amplifier a bargain. And, of course, it has full FCC acceptance. So order your SB-201 now and start getting your share of DX contacts and exotic QSL cards.

Kit SB-201, Shpg. wt. 47 lbs. **439.95**
HDZ-63-3, 3-ft. RG8/U Jumper w/PL259 Connectors, Shpg. wt. 1 lb. ... **4.95**

SB-201 SPECIFICATIONS: Band coverage: 80, 40, 20 & 15 meters. **Maximum power input:** 1200 watts P.E.P. SSB, 1000 watts CW. **Driving power required:** 100 watts. **Duty cycle:** SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). **Third order distortion:** – 30 dB or better at 1000 watts P.E.P. **Output impedance:** 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. **Input impedance:** 52 ohm unbalanced; broad-band pretuned input circuit requires no tuning. **Meter functions:** 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. **Front panel controls:** Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. **Tube complement:** Two 572B T-160-L (in parallel). **Power requirement:** 120 volts AC @ 16 amperes (maximum), 240 volts AC @ 8 amperes (maximum). **Cabinet dimensions:** 6⅝" H x 14⅞" W x 13⅜" D.

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

NEW

Deluxe Antenna Tuner has wattmeter/SWR Bridge, matches from 160-10

$254.95

- **Covers 160 through 10 meters with continuous tuning**
- **Built-in dual wattmeter/SWR bridge makes tuning easy**
- **Bypass switch disconnects Tuner when not required**
- **Two coax outputs allow you to use either of two antennas with just the flick of a switch**

The new Heathkit SA-2060 Deluxe Antenna Tuner has everything you could ask for in a tuner – a built-in wattmeter/SWR bridge with ±5% forward power accuracy, a bypass switch for your tri-band beam or dummy load, and two coax outputs to allow the use of either of two antennas with just the flick of a switch. This exciting new 2 kW Tuner will match your antenna to any frequency in the 160 to 10 meter HF spectrum – 1.8 through 30 MHz, including MARS frequencies and the recently approved new band allocations.

The SA-2060 Antenna Tuner will allow you to increase the operating range of your antennas by reducing the SWR your transmitter "sees" at frequencies where the antenna normally is not resonant. The SA-2060 will help you radiate more of your signal by maximizing power transfer from your transmitter to your antenna. In addition, it will help you reduce TVI and out of band emissions.

This handsome addition to your Amateur Station features a heavy-duty, continuously variable inductor to give you an infinite number of impedance settings, assuring precise antenna matching. It gives you the versatility of using a built-in 4:1 balun for balanced feedlines, or of choosing unbalanced feedlines or long wire antennas. A convenient counter on the front panel indicates inductor settings for easy retuning, and the Heathkit manual includes a chart giving typical high-, mid- and low-band settings on each HF band, plus a full page logging scale that you will find helpful in recording intermediate settings for each one of your individual antennas. The logging scale, incidentally, will be a great help for Field Day or other contest operations where speed counts and you want to save time when switching from one band to another.

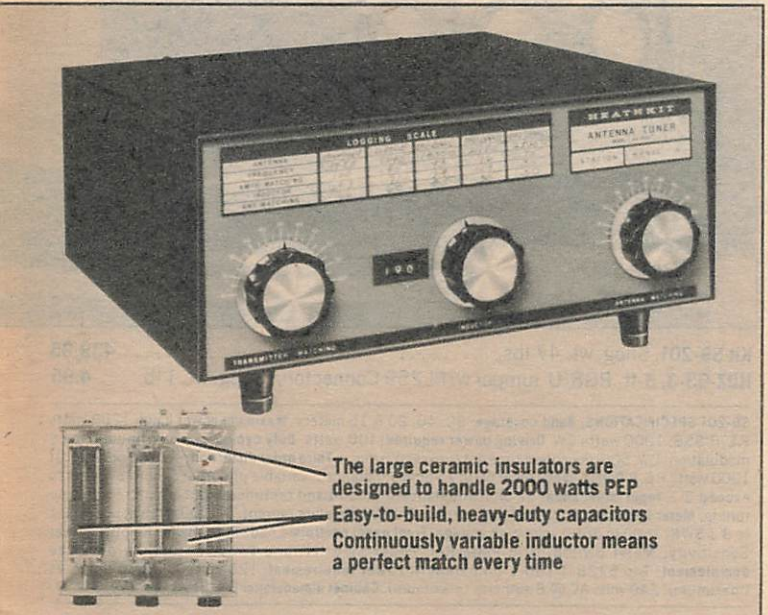
The SA-2060 features silver-plated straps and roller contact assembly for minimal RF loss under high frequency operating conditions. Its large ceramic feed-through insulators are designed to withstand high RF voltage. The heavy duty capacitors are easy to build and service. This Antenna Tuner is capable of handling power input of up to 2000 watts PEP on SSB, and 1000 watts CW. The sturdy Teflon® SO-239 connectors on the back panel allow incorporation into your 50-ohm system.

For operating ease, the dual meter wattmeter section of your SA-2060 reads both forward and reflected power to help you operate your low band station more effectively. It measures output up to 200/2000 watts in the forward direction and up to 50/500 watts reflected. It features dual meters for forward and reflected power and SWR, with ±5% forward average power accuracy for precision measurements. High and low power ranges and a factory-assembled and calibrated sensor insure accurate readings. It reads SWR directly from 1:1 to 3:1 scaled, and also indicates to infinite SWR.

It won't take long to get your SA-2060 on the air – the easy-to-build kit is a three-evening project. The copper-plated steel chassis with "military styling" black aluminum cabinet measures 5¾" H x 14½" W x 13⅞" D. Compare the great new Heathkit SA-2060 2 kW Antenna Tuner with all the competitors – match power handling capabilities, features and price. Then you'll see why the SA-2060 is your best buy for the money. This Tuner is going to add a dash of class to your Amateur Radio station...and do a great job for you, too!

SA-2060, Shpg. wt. 20 lbs. **254.95**
HDZ-63-3, 3-ft. RG8U jumper with PL259 connectors, Wt. 1 lb. **4.95**

SA-2060 SPECIFICATIONS: Frequency Coverage (Continuous Tuning): 1.8 to 30 MHz. **Power Input Capability** (Full legal limit): **SSB:** 2000 watts (peak); **CW:** 1000 watts. **Input Impedance:** 50 ohms at match. **Impedance Transformation:** 4:1 (balanced-to-unbalanced) balun. **Output Impedance:** Wide Range. **Meter Functions:** Forward and reflected average power, and SWR. **Meter Ranges:** Forward (two ranges): Low – 0-200 watts; High – 0-2000 watts. Reflected (three scales): Low – 0-50 watts; High – 0-500 watts; SWR – 1:1 to 3:1 **Wattmeter Accuracy** (full scale): 200 W and 2000 W (FWD) and 500 W (REF): ±5% (AVG); 50 W (REF): ±7.5% (AVG). **Insertion SWR:** Less than 1.1:1. **Cabinet Dimensions:** 5¾" H x 14½" W x 13⅞" D (36.8 x 14.6 x 35.2 cm).



Tied to one band? Use dipole or long wire 80 through 10 meters with the low-priced SA-2040

$154.95

- **Write in band settings on the eraseable front panel**
- **Continuously variable inductor gives you exact matching every time**

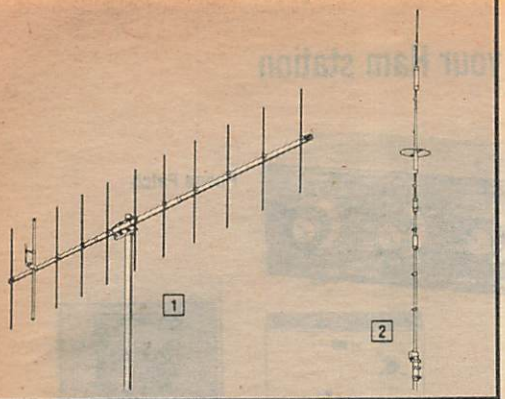
Frustrated by a dipole that lacks sufficient bandwidth? Stymied by an antenna that only covers one or two bands? Then the SA-2040 Antenna Tuner is for you. With a continuously variable inductor to give you a perfect match every time, 80 through 10 meters. That means it's ready for MARS operation or the new Amateur band allocations. The SA-2040 includes many of the features of its big brother, the SA-2060 (above), but without the 160 meters coverage or built-in wattmeters/SWR bridge. That way you get just the amount of tuner you need, without paying for station accessories you already have.

Of course, the SA-2040 handles the full legal limit, just like its big brother. This easy-to-build Tuner is a two-evening kit. And when you've tightened the cover, personalize your SA-2040 with stick-on numerals and letters that let you add your own call sign to the front panel. The rugged black metal cabinet measures 5⅝" H x 14 13/16" W x 13 15/16" D.

Kit SA-2040, Shpg. wt. 15 lbs. **154.95**
HDZ-63-3, 3-ft. RG8U jumper with PL259 connectors, Wt. 1 lb. **4.95**

SA-2040 SPECIFICATIONS: Frequency Coverage: 3.5-30 MHz. **Power Input Capability:** Full legal limit. **SSB:** 2000 watts (peak); **CW:** 1000 watts. **Input Impedance:** 50 ohm at match. **Impedance Transformation:** 4:1 (balanced-to-unbalanced) balun. **Output Impedance:** Wide Range. **Cabinet Dimensions:** 5⅝" H x 14 13/16" W x 13 15/16" D (36.8 x 14.6 x 35.2 cm).

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



1 Beam increases 2-meter range

Get 11.3 dB forward gain, 20 dB FB ratio with this Crushcraft 11-element 2-Meter Yagi. Gamma match tuning for minimum SWR. Takes 52 Ω coax. 1000 watts. Vertically polarized; cut for 146-148 MHz FM. Boom length, 144"; longest element, 40"; tuning radius, 72". Assembly required.

HDP-1470, Wt. 6 lbs. **39.95**

2 Cushcraft 5-Band Vertical DX

For more DX contacts get the Cushcraft ATV-5. Its vertical polarization and omni-directional configuration cover 80 through 10 meters CW and SSB. Specially designed high Q traps give wide bandwidth. SWR is 1.5:1 or less at resonance on each band. Full legal power. Built-in coax connector takes the PL-259 on your feed. 50 Ω Height is 28'4" on CW, 24'9" on phone. Assembly required.

HDP-1473, Shpg. wt. 10 lbs. **104.95**

3 Dual-speed Rotator for your beam

The Alliance HD73 is the right choice to turn your beam to DX success. For antennas to 10.7 sq. ft. wind area, masts 1 ⅜" to 2½" OD. 120 VAC. Uses 6-cond. cable or 8-cond. cable below. Assembled.

HDP-1295, Shpg. wt. 19 lbs. **129.95**
IDA-1290-1, 50-ft. 8-cond. cable, 2 lbs. **9.95**
IDA-1290-2, 100-ft. 8-cond. cable, 4 lbs. .. **16.95**
IDA-1290-3, 150-ft. 8-cond. cable, 6 lbs. .. **23.95**

4 "W2AU" Balun gives better match

Radiate more power, reduce TVI with this famous balun in your antenna system. It guards your antenna's feed point from the weather, too, and protects your equipment from lightning. Use with your dipoles, inverted vees, quads or yagis. Impedance ratio is 1:1. It's rated for full legal power and comes assembled. Instructions included.

HDP-3615, Shpg. wt. 1 lb. **17.95**

5 Coax Switch for antennas, shack

Switch up to four antennas or interconnecting equipment with this easy-to-build Switch. Handles 2kW PEP to 250 MHz. 50 Ω.

Kit HD-1234, Shpg. wt. 1 lb. **15.95**

6 Low-pass Filter reduces TVI

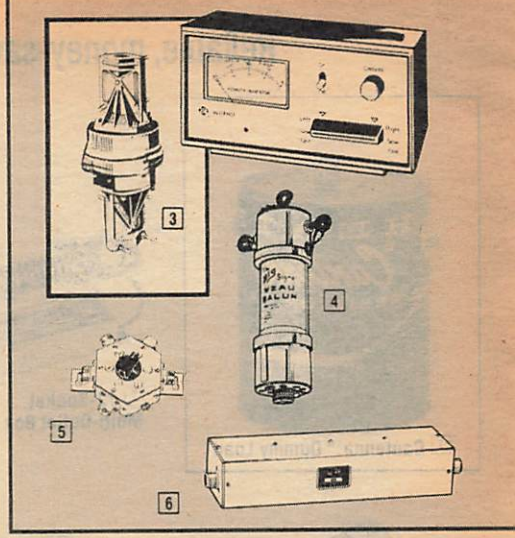
Don't worry about TVI. Get the B & W Low-Pass Filter. 70 dB attenuation. Insertion loss is less than 0.3 dB. 160-10 meters. 50 Ω. Takes full legal power. Comes fully assembled.

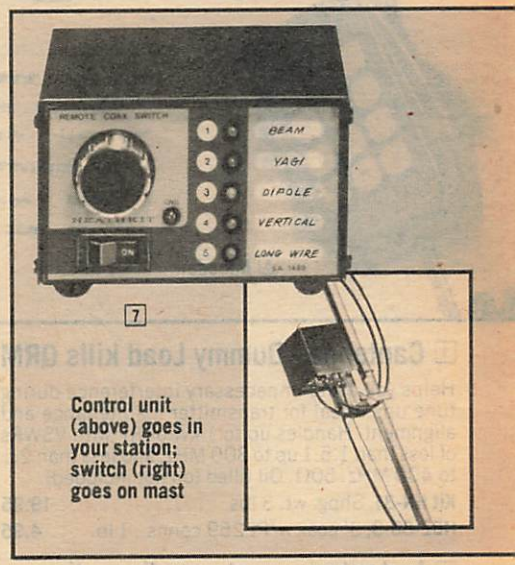
HDP-3700, Shpg. wt. 2 lbs. **29.95**
HDZ-63-3, 3-ft. Coax w/connectors, 1 lb. **4.95**

7 Remote Coax Switch saves you money, changes antennas instantly

The SA-1480 Remote Coax Switch gives money-saving convenience to your Amateur station by replacing five expensive feeds with just one. A bright LED shows which of up to five antennas you have selected. The Remote Coax Switch accepts signals up to 150 MHz, so you can use it with your 6-meter and 2-meter antennas, too. It's rated for full power. 50-70 ohm input impedance. Almost no insertion loss – less than 2 dB at 100 MHz. Special shielded, weatherproof switch housing protects switch on your mast. It also includes a grounding position for lightning protection. Includes U-bolt mounting assembly. Control Box is 3⅜" H x 5 5/16" W x 5¼" D. Remote Unit: 8¼" H x 4⅝" W x 7½" D. Uses the eight-wire cable listed below.

Kit SA-1480, Shpg. wt. 8 lbs. **97.95**
IDA-1290-3, 150-ft. 8-cond. cable, 6 lbs. .. **23.95**
IDA-1290-2, 100-ft. 8-cond. cable, 4 lbs. .. **16.95**
IDA-1290-1, 50-ft. 8-cond. cable, 2 lbs. **9.95**





Control unit (above) goes in your station; switch (right) goes on mast

Specially-selected Heathkit Instruments for the Radio Amateur

The IO-4550 is the ideal Oscilloscope to meet your Amateur Radio test bench requirements. Two vertical input channels, adjustable sensitivity and 19 digitally-controlled, calibrated time base steps give you the versatility you need. For specifications see the complete description on page 66.

Looking for a low-cost, high-accuracy digital Frequency Counter for your Amateur station? Try the IM-2410. Covering 10 Hz to 225 MHz, its big, easy-to-read LED display features automatic decimal placement. Excellent 10 mV sensitivity and two switchable ranges. For complete details see page 59.

The professional features of the IM-5228 make it the ideal VTVM for your Amateur test bench. This bench-model VTVM is loaded with the features you need. Uses PK-3A probe (p. 61) for RF measurements. All calibration controls are adjustable from the front panel. Can be wired for 120 or 240 VAC. Turn to page 64 for further information.

Cleaner FM transmissions are yours when you have the IM-4180 FM Deviation Meter on your bench. Measures peak FM deviation between 25 and 1000 MHz. Features two front jacks for convenient hookup to your oscilloscope. All jacks and controls are conveniently mounted on the front panel. See a complete description and specs on page 59.

Into 220 and 440 work? Then you need the IM-4190 Bi-Directional Wattmeter's 100-1000 MHz capability. Its low-cost design requires no costly slugs or elements. Measures up to 300 watts forward power in three ranges with ±5% accuracy. For a complete description on the IM-4190 see page 63.

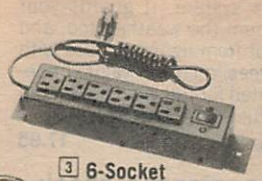
The IG-5280 RF Oscillator gives you precise alignment at a low price.

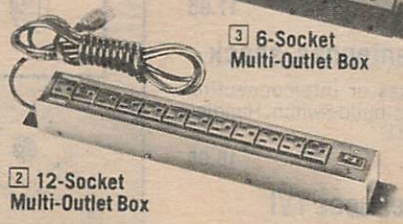
Features 5-band output from 310 kHz to 110 MHz, plus a band of calibrated harmonics from 100 to 220 MHz. See page 61 for a complete description and specifications.

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

Reliable, money-saving Amateur Radio accessories for your Ham station

1 Cantenna™ Dummy Load

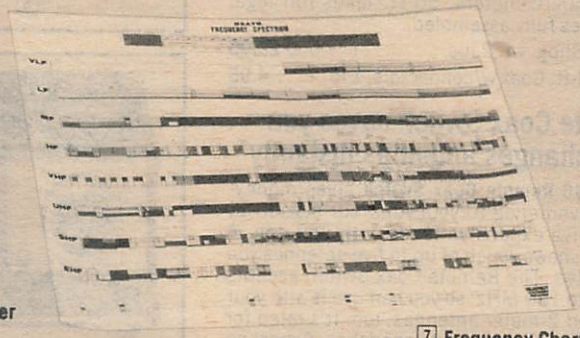

3 6-Socket Multi-Outlet Box


2 12-Socket Multi-Outlet Box

4 Phone Patch

Wattmeter/ SWR Bridge 5

6 Micoder


7 Frequency Chart

8 Relative Field Strength Meter

9 Desk Mike

1 Cantenna™ Dummy Load kills QRM

Helps you avoid unnecessary interference during tune ups. Ideal for transmitter maintenance and alignment. Handles up to 1 kW of RF with VSWRs of less than 1.5:1 up to 300 MHz, and less than 2:1 to 400 MHz. 50Ω. Oil filled (oil not included).

Kit HN-31, Shpg. wt. 3 lbs. **19.95**

HDZ-63-3, 3' coax w/PL259 conns., 1 lb. ... **4.95**

2 Instant power at your fingertips

The Twelve-Socket Multiple Outlet Box provides additional electrical outlets for your equipment. Features 11 3-hole switched outlets and 1 unswitched outlet for clock or memory-save. Includes fuse holder, fuse and 12' cord. Handles 10A maximum load. 120 VAC. 2¼" H x 2¼" W x 15⅞" L.

Kit HD-1274, Shpg. wt. 4 lbs. **19.95**

3 Get Six-Socket Multi-Outlet Box

As above, but 6 3-hole outlets – 5 switched and 1 unswitched. 10A max. 6-foot cord. 120 VAC.

Kit HD-1360, Shpg. wt. 2 lbs. **14.95**

4 Add Phone Patch to your station

The Heathkit HD-15 Phone Patch adds versatility to your station. Individual receiver/transmitter line gain controls simplify adjustment. The HD-15's VU meter continuously monitors the unit's output and lets you adjust for maximum null depth to produce maximum isolation between the telephone line and your station. Matches 3-16 Ω speakers, hi-Z or 600 Ω inputs. PTT. 2⅝" H x 9¼" W x 3⅝" D.

Kit HD-15, Shpg. wt. 3 lbs. **47.95**

5 Build HF Wattmeter/SWR Bridge

This Heathkit Combination HF Wattmeter/SWR Bridge features dual power/SWR scales, easy calibration, and an extra long interconnect cable to allow you to position the meter up to six feet from the detector/bridge, or can be mounted in the main case. The Heathkit HM-102 Combination HF Wattmeter/SWR Bridge operates over the 1.8 to 30 MHz range, including the new band allocations, with minimal insertion loss and a nominal impedance of 50 ohms. Main unit measures 5 1/16" H x 5¼" W x 6½" D.

Kit HM-102, Shpg. wt. 3 lbs. **49.95**

HM-102 SPECIFICATIONS: Frequency Range: 1.8 to 30 MHz. **Wattmeter Accuracy:** ±10% of full-scale reading using a 50-ohm noninductive load. **Power Capability:** 10 to 2000 watts. **SWR Sensitivity:** Less than 10 watts. **Impedance:** 50 ohms nominal. **SWR Bridge:** Continuous to 2000 watts PEP. **Connectors:** UHF type SO-239. **Dimensions:** 5 1/16" H x 5¼" W x 6½" D.

Kit HM-2102 (not shown), same as above, except that it covers 50-160 MHz and handles 25-250 watts. 4 lbs. **49.95**

HDZ-63-3, 3' coax w/PL259 conns., 1 lb. ... **4.95**

6 Micoder™ II dials up repeaters

Replace your old mike with the Heathkit Micoder II Microphone/Auto Patch Encoder. Its 300-3000 Hz response is tailored for clean voice transmission. Up to 30 mV rms maximum output for full modulation. Push-to-talk bar for convenient one-hand use. Accurate and stable tones for phone calls through repeaters equipped for autopatch. Operates on one 9V battery (not supplied) or power from transceiver on some units. Use with most transceivers having a high impedance input. Includes 6' coiled cord, hanger clip. 3¾" H x 2⅝" W x 1¾" D.

Kit HD-1984, Shpg. wt. 1 lb. **47.95**

7 Get Frequency Chart for your wall

This colorful addition to the wall of your Amateur station measures a big 31" W x 22¼" H. It's a full-color, graphic breakdown of the radio frequency spectrum from 3000 Hz to 300 GHz. Comes to you rolled in a mailing tube.

HDP-1495, Shpg. wt. 1 lb. **4.95**

8 Meter for tune-ups, adjustments

Did you ever call CQ, get no answer, and wonder whether you're getting out? With the Relative Field Strength Meter you know. This Meter provides you with a visual indication that the transmitter is radiating a signal. It also makes transmitter adjustments more quickly and precisely, helping you fine tune the transmitter for maximum output. It covers 1.8 to 250 MHz and works with any transmitter or transceiver. Meter sensitivity is 150 μA, full scale. The rugged plastic cabinet measures 2⅝" H x 4⅛" W x 4⅜" D.

Kit HD-1426, Shpg. wt. 2 lbs. **13.95**

9 Desk Mike upgrades your station

Fully assembled Heathkit Desk Mike with VOX and PTT. This Hi-Z Dynamic Microphone features 70-10,000 Hz response, VOX and grip-to-talk operation. Has rugged die-cast case, grey and satin chrome finish. The PTT switch can be mounted on the base or handle of the mike. Cables included. Looks good and works great!

HDP-121A, Shpg. wt. 4 lbs. **59.95**

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

Get accurate VHF readings with the Heathkit HM-2141 Dual Meter VHF Wattmeter

$89.95

- Measures average forward power with ±7.5% accuracy up to 300 watts
- Direct reading SWR

Measures forward and reflected average power and PEP from 50 MHz to 175 MHz. Simultaneous readings of transmitted output up to 30/300 watts forward and 10/100 watts reflected power make antenna tuning a snap. Reads SWR directly from 1:1 to 3:1. Factory-assembled, calibrated sensor. Uses 9V cell (not included) or 120 VAC with optional Battery Eliminator below. The HM-2141 is housed in a sturdy aluminum cabinet.

Kit HM-2141, Shpg. wt. 5 lbs. **89.95**
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.

Get more low band operating efficiency when you build the HM-2140 Dual HF Wattmeter for your Amateur station

$89.95

- ±5% Forward power accuracy
- Reads PEP or Average power for any frequency between 1.8 and 30 MHz
- Features a factory-assembled and calibrated sensor
- Measures transmissions up to 200 and 2000 watts PEP forward and up to 500 watts reflected

Building the HM-2140 Dual HF Wattmeter is going to give your Amateur station greater operating efficiency. Installed in your transmission line, this high-accuracy Meter monitors both forward and reflected power for any frequency between 1.8 and 30 MHz. While designed primarily for the Amateur Radio bands within the high-frequency ranges on the 160, 80, 40, 20, 15 and 10 meter bands, the HM-2140 also can be used for other services which may lie in between the Amateur bands.

The more than 200 Hams at Heath have designed this Wattmeter to measure transmitter output up to 200/2000 watts PEP in the forward direction, and up to 50/500 watts reflected. It features dual meters for forward and reflected power and SWR, and boasts a ±5% forward power accuracy to give you precision measurements. High and low power ranges and a factory-assembled and calibrated sensor insure accurate readings. This Dual HF Wattmeter also reads SWR directly from 1:1 to 3:1, as well as readings PEP or Average power.

For complete portability in the field, the HM-2140 Dual HF Wattmeter can be operated on a 9-volt battery (not included). A special switching circuit permits you to observe the battery condition at any moment. Where AC power is available, you can use the Battery Eliminator below. The Wattmeter is housed in a rugged aluminum cabinet styled to complement your other Amateur Radio equipment. For added convenience of operation, the remote sensor can be mounted into the cabinet, or up to four feet away from the metering cabinet and nearer to the transmitter's output cables. Spend an enjoyable evening or two building the handy HM-2140 HF Dual Wattmeter for your station. The easy-to-follow Heathkit assembly manual will guide you step-by-step from unpacking to final adjustment and operation. The manual even includes a section on operation and installation of your HM-2140 Dual HF Wattmeter, a circuit description, and a detailed schematic. Heathkit quality plus your care will assure you of an HF Wattmeter providing many years of service and value. And as with all Heathkit electronic kits, this one contains all necessary parts, and a generous supply of solder.

Kit HM-2140, Shpg. wt. 3 lbs. **89.95**
PS-2350, AC 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%. **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).

Electronic Keyer gives you selectable word speed

Your CW transmission will be 100% copy when you have the Heathkit HD-1410 Solid-state Electronic Code Keyer in your Amateur station. It makes sending code easy, whether you're operating base or portable. While you're building your Keyer, you select the speed range you want – 10 to 35 words per minute, or 10 to 60 words per minute. For ease of operation, the dot and dash paddles' travel and tension are adjustable. When the two paddles are treated as one, the HD-1410 operates as a single-paddle keyer with dot and dash memory. Iambic operations forms most characters with reduced wrist movement. Dots and dashes are self-completing and always in the proper proportion. The HD-1410 operates on either 120 VAC or 12 VDC. It features adjustable side-tone frequency, a built-in speaker, and headphone jack. A special weighted cabinet helps keep the HD-1410 stable to prevent annoying sliding during operation. The aluminum cabinet's low-profile styling and compact size won't block your access to other operating controls, either. It measures just 3" H x 5" W x 7⅖" D. And it's an easy-to-build kit.

Kit HD-1410, Shpg. wt. 4 lbs. **59.95**

Value-packed Dip Meter covers 1.6 to 250 MHz

Here's a real Heathkit Amateur Radio value – a better Dip Meter at a lower cost. The HD-1250 can be used to determine the approximate resonant or operating frequency of either energized or de-energized circuits. The Colpitts oscillator covers 1.6 to 250 MHz in fundamentals with a MOSFET paraphase amplifier and hot-carrier diodes for more sensitivity and a better dip. It uses a Q-multiplier for greater detector sensitivity and a responsive 150 μA meter movement for positive resonance indications. Your HD-1250 Dip Meter includes a phone jack for modulation monitoring. It's smaller and lighter than other Dip Meters, too. Whether you're checking resonant frequencies, adjusting traps, looking for parasitics, or using it as a signal generator, the HD-1250 is designed to go anywhere you do. It fits your hand, and thanks to its solid-state design and 9-volt battery operation (battery not included), it's always ready to use. It's easy to build, too – usually just a single evening. Once completed, the rugged aluminum-construction Meter stores handily in a custom molded gray carrying case. 2" H x 2⁵⁄₁₆" W x 5⅞" L. The manual includes section on operation.

Kit HD-1250, Shpg. wt. 4 lbs. **69.95**

What do you need to do to get started in the exciting hobby of Amateur Radio? Everything you need to know is covered in the Heathkit/Zenith Novice License Course, even information on how to apply to take your license exam. This complete Course will get you started on the right track to real Amateur Radio enjoyment.

Heathkit/Zenith Novice License Course gets you on the air fast

$39.95

- **Here's a self-instruction course that's guaranteed to help you get your Novice ticket and start talking to the world! This deluxe learning Course prepares you for the latest FCC Amateur Radio Novice exam.**

You, too, can communicate with the world via Amateur Radio, and the Heathkit Novice License Course is the most complete way to get on the air. Not only does it give you the information you need to pass the FCC Novice License exam, but this thorough Course even provides you with helpful guidelines for setting up and operating your own Amateur station once you pass the exam.

The Course includes two audio cassette tapes to aid you. The first is an introduction to Amateur Radio, an explanation of RST signal reporting, a review of circuit components, and a study of practical circuits. The second tape teaches you the Morse Code in letter groups, and then helps you bring your code speed up to five words per minute so you can pass the FCC test.

An attractive vinyl binder houses nine modules covering the material found in the FCC Novice written exam. Each subject is covered in an easy-to-understand, step-by-step manner. And, at the end of each module, a multiple choice exam checks your understanding and retention.

Following Module 9, two practice exams and a final exam styled after the new FCC exam give you test-taking experience to make the actual 20-question, multiple choice written test a breeze. And, by passing the optional final exam with a grade of 75% or better, you will earn 1.0 CEU and a Certificate of Achievement.

The Course also includes a set of Operating Aids, plus an attractive 31" x 22" Frequency Spectrum Chart and a matching U.S. Call Area Map for display on the walls of your Ham station.

We are so sure this Course will help you get your license, that if you fail to pass the new FCC Novice exam after completing the Course, we will REFUND your money. Simply return the Course materials, along with your receipt and a copy of your rejection notice from the FCC.

So...if you have been putting off getting your Novice ticket because of fear of the code test or the written exam, the Heathkit/Zenith Novice License Course is the answer. It contains everything you need.

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

Kit HD-1416, CW Oscillator (see below) Shpg. wt. 2 lbs. **14.95**

Build up your code speed with this handy kit

$14.95

Get your code speed up and pass your FCC exam with this handy Practice CW Oscillator. It features a telegraph key, phone jack and built-in speaker, plus volume and tone controls. And once you get your license, it can serve as a side tone oscillator for any transmitter using grid block keying. The cabinet measures 2⅝" H x 4⅛" W x 4⅜" D. The HD-1416 uses a 9 volt transistor battery (not included). This easy-to-build, first-time kit even includes necessary solder.

Kit HD-1416, Wt. 2 lbs. **14.95**

Get a money-saving start in Amateur Radio!

SAVE $9.95

This money-saving package gets you started in the exciting world of Amateur Radio.

We help you get started in Amateur Radio with savings on the ER-3701 Novice Course (above) and the HD-1416 Oscillator (left) when purchased together. We even include a certificate good for 10% off your first purchase of up to $100 of Heathkit Amateur equipment. Purchased separately, the Heathkit Oscillator and Novice License Course would cost $54.90.

ERS-3701, Shpg. wt. 9 lbs. **44.95**

The Heathkit/Zenith General License Course leaves nothing to chance. It's designed to help you get your license in an organized, easy way. It's so good that we guarantee it!

See other popular Heathkit/Zenith courses in Weather, Automotive, Computers, Electronics, Math and more on pages 31-42, 47, 90-92 and 100.

General License Course moves you up to voice communications

$49.95

- **Leave the Novice or CB bands behind and open new doors to the full range of Amateur Radio experiences. Earn your Technician or General Class License with the Heathkit ER-3702 General Class Amateur Radio Course.**

Note: This Course prepares you for the latest FCC examination. We guarantee it.

Move up to the General Class and get all the added privileges – more frequencies to operate on, plus voice transmission, RTTY, SSTV, satellites, and more that you're missing as a Novice or CBer.

This Course provides extra code practice to bring your code speed up to 15 words per minute. Since the FCC requires only 13 wpm to pass the General exam, the extra "two-word edge" gives you the confidence to pass the exam with flying colors.

An informative text takes you through the subjects covered on the new FCC written test. Its in-depth coverage will give you more than enough information to pass the latest FCC Technician or General Class License examination, opening up a world of voice communications to you.

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 Completion.

The General Course is arranged in 10 units:

1. **Ham Radio Operation**
2. **Direct Current**
3. **Alternating Current**
4. **Active Devices**
5. **Electronic Circuits**
6. **Measurements**
7. **Transmitters**
8. **Receivers**
9. **Antennas**
10. **Practice Exams**

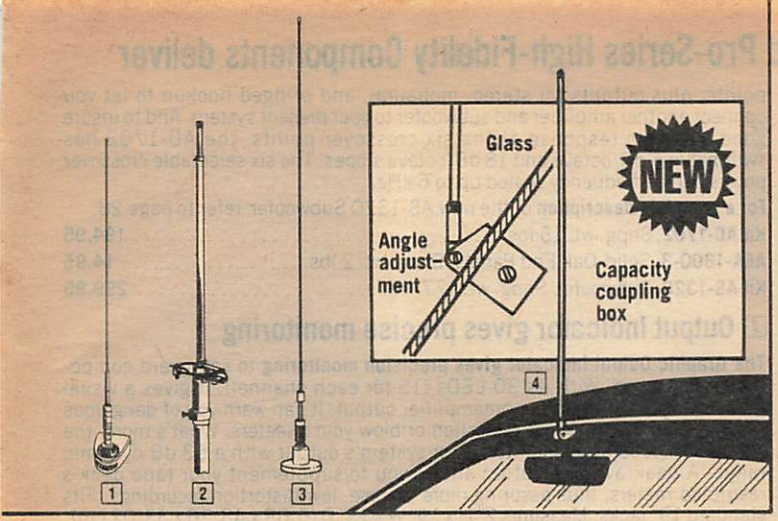
Your General License Course includes:

- **Two vinyl binders**
- **Two 90-min. code tapes**
- **New FCC Form 610**
- **4 Simulated exams**
- **Log Book**
- **T.V.I. Booklet**
- **Complete text**
- **Code workbook**
- **FCC exam schedule**
- **FCC rules and regulations**
- **World Call Map**

The General Class License Course carries the same money-back guarantee as the Heathkit/Zenith ER-3701 Novice Course above. Don't delay any longer – get your Course now and join the fun in the exciting world of Amateur Radio.

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

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



Increase your range with these 2-meter antennas

1 **This Hustler Standard Gain 2-Meter Mobile Antenna** is a ⅝ wavelength rear deck whip designed to offer 3 dB gain and 1.1:1 SWR. It will handle up to 100 watts of power, too. The radiator is 47" tall, and includes 17' of coax feed plus necessary connectors.

HWA-202-3, Shpg. wt. 2 lbs. **23.95**

2 **The Cushcraft AR-2 Ringo Standard Gain Fixed Antenna** is a popular base-station antenna covering 135-175 MHz. This antenna offers 3 dB gain (over a ¼-wave whip) in an omnidirectional pattern. It features wide operating bandwidth with low 1.1:1 SWR, and has direct grounding provisions for lightning protection. Low angle of radiation for DX. 52 Ω feed with PL-259. Coax feed line not included. Why not erect the widely-acclaimed Ringo vertical antenna at your home QTH now so you can start getting more range...and more enjoyment from your 2-meter activity.

HWA-202-11, Shpg. wt. 2 lbs. **21.95**

3 **Cushcraft 2-Meter Mobile Magnetic-Mount Antenna.** Magnet makes it easy to move from vehicle to vehicle. ⅝-wave antenna boasts 3 dB gain and covers 144 to 174 MHz. Has been wind tested in excess of 90 mph. Includes PL-259 connector, cable. Preassembled and ready to use.

HDP-1472, Shpg. wt. 3 lbs. **29.95**

4 **NEW! The Avanti AH 151.3G ½-Wave 2-Meter On-Glass Mobile Antenna** receives and transmits through your car or home window – no holes required. Attaches with special "fail-safe" epoxy adhesive, and includes instructions for removal when you sell your vehicle. The high-Q impedance coupling and tuning unit mounts inside the car window and is capacitively-coupled through the glass to the whip outside. Avanti's patented end-fed design provides 3 dB gain in true omnidirectional radiation pattern with no ground plane needed, so can be used on fiberglass body cars. SWR 1.1:1. Handles up to 150 watts. Whip length 33". Quick installation for instant drive-away. Includes 15½' coax.

HDP-2402, Shpg. wt. 2 lbs. **29.95**

Reference books to increase your enjoyment of Amateur Radio

US Callbook. Your "telephone directory" of names, addresses and licenses classes – a complete listing of the licensed Radio Amateurs in all US call areas and territories by call sign. Also contains a listing of SSTV, AMSAT and OSCAR users, Great Circle Bearings, international postal rates, time zones, and much more. More than 400,000 listings and 1070 pages of useful information. **EDP-126** **17.95**

DX Callbook. A complete listing of Amateurs in all foreign countries, including addresses, postal rate charts, call zone maps, world time conversion chart, world QSL bureaus and more. Over 300,000 listings in 900 pages. **EDP-127** **16.95**

ARRL Antenna Handbook. Antennas, transmission lines, propagation, data on specific designs for HF, VHF, UHF, mechanical construction. 336 pages. **EDP-182** **5.00**

(See page 52 for book-ordering information.)

4-Band Shortwave Receiver is your introduction to build-it-yourself shortwave enjoyment

$119.95

- **Lets you cover 550 kHz up to 30 MHz in four bands**
- **Built-in AM antenna; connection for external antenna**
- **Built-in speaker plus headphone/external speaker jack**
- **Easy to build and easy to align without instruments**

You can tune in the world...on a great low-priced shortwave receiver you build yourself – the Heathkit SW-717. It's a perfect introduction to kit building. The Heathkit SW-717 is your best buy for the money. It's an ideal introduction to the fun and fascination of electronic kit construction. And from the moment the final screw is tightened and the Receiver turned on, it will begin bringing you many exciting years of shortwave listening enjoyment.

The SW-717 offers complete coverage all the way from 550 kHz through 30 MHz in four bands. With it the shortwave listener can tune in foreign broadcasts from all over the globe – amateur and CB radio bands, local and marine weather reports, ships at sea, plus the standard AM broadcast band.

This 4-Band Receiver features a wide slide-rule tuning dial with logging scale, bandspeed tuning for easy separation of crowded stations; a variable BFO for code reception; built-in speaker, and a front panel jack for external speaker or headphone like the GD-396 Superex Phones described below. Other features include switchable automatic noise limiting; a signal-strength tuning meter, and a built-in AM rod antenna plus a connection for an SWL (shortwave listening) antenna such as the GRA-72 listed below.

Solid-state circuitry is used throughout the SW-717. Most of the components are mounted on a single printed circuit board, both for ease of assembly and for reliability of performance. The built-in power supply is transformer-operated from either 120 VAC or 240 VAC, and uses four silicon diodes in a full-wave bridge circuit. Once construction is completed, the Receiver can be aligned without the need for instruments.

The easy-to-follow SW-717 instruction manual also includes directions for operation, and a reception guide listing bands, frequencies, zones and times of best shortwave reception. If you are new to the fun of kitbuilding, be sure to see our wide selection of specially selected tools on pages 54 and 55.

Kit SW-717, Shpg. wt. 10 lbs. **119.95**

Long-wire SWL Antenna. Really helps you pull in distant stations. 75-foot copper long wire with 30-foot lead-in, all insulators and hardware.

GRA-72, Shpg. wt. 2 lbs. **7.95**

Superex Headphones. Ideal for use with the SW-717 and other shortwave receivers, as well as the HW-8 Transceiver on page 16. Shown in the photo above, the Superex Headphones feature dual coils for excellent sensitivity, and a wide headband for comfortable listening. 600 ohms impedance.

GD-396, Fully assembled, Shpg. wt. 1 lb. **7.95**

SW-717 SPECIFICATIONS: Frequency Coverage: Band A – 550 kHz-1500 kHz, Band B – 1.5-4 MHz, Band C – 4-10 MHz, Band D – 10-30 MHz. **Meter:** Indicates relative signal strength. **Headphone jack:** Accepts low impedance headphones or external speaker. **Loudspeaker:** Built-in. **Controls:** Volume with on/off switch; Mode (AM, Standby & CW); BFO; Main Tuning; Bandspread Tuning; ANL on/off. **Power Supply:** Transformer operated; full-wave bridge rectifier. **Power Requirement:** 120/240 VAC, 60/50 Hz, 8 watts. **Dimensions:** 5⅓" H x 14½" W x 8" D.

You demand more from your equipment — and Pro-Series High-Fidelity Components deliver

You're serious about your music. You want to hear every last nuance a broadcast or recording has to offer. The Pro-Series reflects your quest for excellence in sound reproduction. Pro-Series – the ultimate in stereo high fidelity.

1 B•I•C T-4M 2-Speed Metal Tape Deck — 71 dB S/N

B•I•C T-4M Two-Speed Cassette Deck records and plays metal tapes. Three-head design offers off-the-tape monitoring. Separate tach-feedback capstan motor assures steady tape speed for studio-quality recordings (see page 30).

ATP-1484, Shpg. wt. 22 lbs. **699.95**
ATA-1484-1, Rack Mount for ATP-1484, Shpg. wt. 1 lb. **24.95**

2 Get lower distortion with this Digital AM/FM Tuner

For cleaner reception, the AJ-1600 Tuner features a digital display for exact tuning, and selectable wide/narrow IF bandwidth for low-distortion reception in normal station-density areas, as well as more listenable stations in congested multi-signal areas. An antenna input attenuator reduces cross modulation, while a switchable signal-strength/multipath meter and scope outputs assure precise antenna orientation and maximum signal reception. The Dolby option (below) offers increased dynamic range and reduced noise. The Tuner is encased in an EIA rack-compatible chassis measuring 5¾" H x 19" W x 14" D (74.61 x 48.26 x 35.56 cm).

The AJ-1600's FM specifications assure better listening: Sensitivity is 1.8 μV (10.3 dBf)/3.5 μV (16.1 dBf), usable; 2.5 μV (13.2 dBf)/35 μV (36.1), @ 50 dB S/N, mono/stereo for receiving distant stations. S/N: 83/75 dB mono/stereo for dynamic range that surpasses most station transmissions. Hum and noise: 75 dB. Freq. Resp.: 20-15,000 Hz ± 0.5 dB. THD: .1% at 1 kHz for authentic reproduction. IM Dist: .5%. Capture Ratio: 1.2 dB. Selectivity: 40/80 dB. AM Sensitivity: Ext. Antenna: 30 μV; Radiated, 250 μV/meter. For 120 VAC, 60 Hz power.

AJ-1600, Shpg. wt. 25 lbs. **439.95**
AJA-1600-2, Dolby FM Noise Reduction Module, 1 lb. **49.95**
AEA-1800-2, Oak-Finish Cabinet, Shpg. wt. 6 lbs. **33.95**

3 The versatile Preamp with the great review

In Stereo Review, Julian Hirsch stated: "In sum, the Heath AP-1800 does practically everything one could want, and does it with perfection."

Versatility to meet your music reproduction requirements: One moving coil head amp, plus 2 moving magnet cartridge inputs with 3 cartridge sensitivities and capacitance selections to match any turntable cartridge. Tape monitoring for 2 decks, plus deck-to-deck dubbing with the ability to listen to any source. Separate bass and treble tone controls for each channel, with 2 turnover points (bass 250 or 500 Hz, treble 2.5 or 5 kHz) for precise tone control. Plus, tone bypass for pure listening. Continuous loudness compensation for good response at any volume level (designed with the latest psychoacoustical data). A 32-step precision attenuator for exact volume control. A unique L-R mode for system balancing, as well as L, R, L+R, stereo and stereo reversed channels. Plus an adapter loop for equalizers, noise processors, and other accessories. EIA rack-compatible chassis measures 5.22" H x 19" W x 11.25" D.

And with perfection: Frequency response: 20-20,000 Hz, ± 0.2 dB, phono; 20-20,000 Hz, +0, −.2 dB, high level. THD: <0.03% phono; A-weighted S/N: 85 dB hi-level, 75 dB M.C. phono. IHF IM: <.01%. TIM: <.02%.

Kit AP-1800, Shpg. wt. 27 lbs. **369.95**
AEA-1800-2, Oak-Finish Cabinet, Shpg. wt. 6 lbs. **33.95**

4 Ten Band Equalizer is the low-cost way to upgrade

Engineer records, tapes and FM broadcasts to your creative taste with 10 ISO-centered controls. See a complete description on page 26.

5 Active Audio Processor boosts dynamic range

Your music loses dynamic range in recording or broadcast. The AD-1706 puts it back. For a complete description turn to page 26.

6 Electronic Crossover expands bass response

Used with a subwoofer such as the new AS-1320, the Variable Electronic Crossover dramatically expands bass response. This Pro-Series Crossover allows you to multiamp your stereo system for lower distortion and smoother frequency response at crossover points. It features six selectable crossover points, plus outputs for stereo, monaural, and bridged hookup to let you connect another amplifier and subwoofer to your present system. And to insure good summed response at the six crossover points, the AD-1702 has switchable 6 dB/octave and 18 dB/octave slopes. The six selectable crossover points can be frequency scaled up to 6 kHz.

For a complete description of the new AS-1320 Subwoofer, refer to page 28.

Kit AD-1702, Shpg. wt. 15 lbs. **194.95**
AEA-1800-3, Solid-Oak End Panels, Shpg. wt. 2 lbs. **14.95**
Kit AS-1320, Subwoofer, Shpg. wt. 177 lbs. **299.95**

7 Output Indicator gives precise monitoring

The Graphic Output Indicator gives precision monitoring to safeguard components and tapes. With its 30 LEDs (15 for each channel), it gives a visual readout of your amplifier or preamplifier output. It can warn you of dangerous peak loads that can cause distortion or blow your tweeters. What's more, the AD-1701A accurately monitors your system's output with a 53 dB dynamic range. A peak/average button allows you to supplement your tape deck's restricted meters, thus assuring more precise, low-distortion recordings. Fits standard 19" racks. Measures 2" H x 19" W x 13" D (5.08 x 48.26 x 33.02 cm). For 120/240 VAC, 50/60 Hz power.

Kit AD-1701A, Shpg. wt. 15 lbs. **164.95**
AEA-1800-3, Solid-Oak Panels, Shpg. wt. 2 lbs. **14.95**

8 Pro-Series Amp has power for wide dynamic range

Even driving inefficient speakers, the AA-1800 Pro-Series Amplifier has the power and dynamic headroom to give you more from your music. A speaker-protection system and massive heat sinks add to this 250 watt Amplifier's stature as the bulwark of the Pro-Series line. See a complete description of the AA-1800 on page 26.

9 The AA-1600 Amplifier — performance on a budget

125 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN .05% TOTAL HARMONIC DISTORTION FROM 20-20,000 HERTZ

Choose a proven performer — the AA-1600. It has the power and dynamic headroom to reproduce your music at your speaker's maximum range without clipping. No matter what the source – tapes, records or broadcast – the AA-1600 amplifies your music with clarity. Transient intermodulation distortion is less than .05%, and hum and noise are a full 90 dB below 1 watt.

And with the AA-1600, your speakers are safely interfaced. It features rugged output devices and does away with dissipation limiters to eliminate tweeter-damaging pops and clicks. It also has a special 8-second turn-on delay to safeguard your speakers from thumps and pops.

Like all our Pro-Series high fidelity components, the AA-1600 is easy to assemble with our step-by-step instructions. Minimum point-to-point wiring, and a clean open chassis layout make building the AA-1600 a breeze. Looks handsome in our optional Oak-Finish Cabinet. Measures 7⅛" H x 19" W x 13" D.

Kit AA-1600, Shpg. wt. 51 lbs. **349.95**
AEA-1800-1, Oak-Finish Cabinet, Shpg. wt. 5 lbs. **33.95**

AA-1600 SPECIFICATIONS: Dynamic Headroom: 2.0 dB. **Frequency Response:** ± 1 dB, 7 Hz to 50 kHz, −3 dB, 5 Hz to 100 Hz (1 watt). **Input Sensitivity:** 135 mV. **Damping Factor:** >50. **IM Dist. (SMPTE):** <.05% from 125 mW to 125 Watts. **Stereo Separation:** 70 dB min. **Input Impedance:** 30K ohms. **Power Requirement:** 120 VAC, 60 Hz.

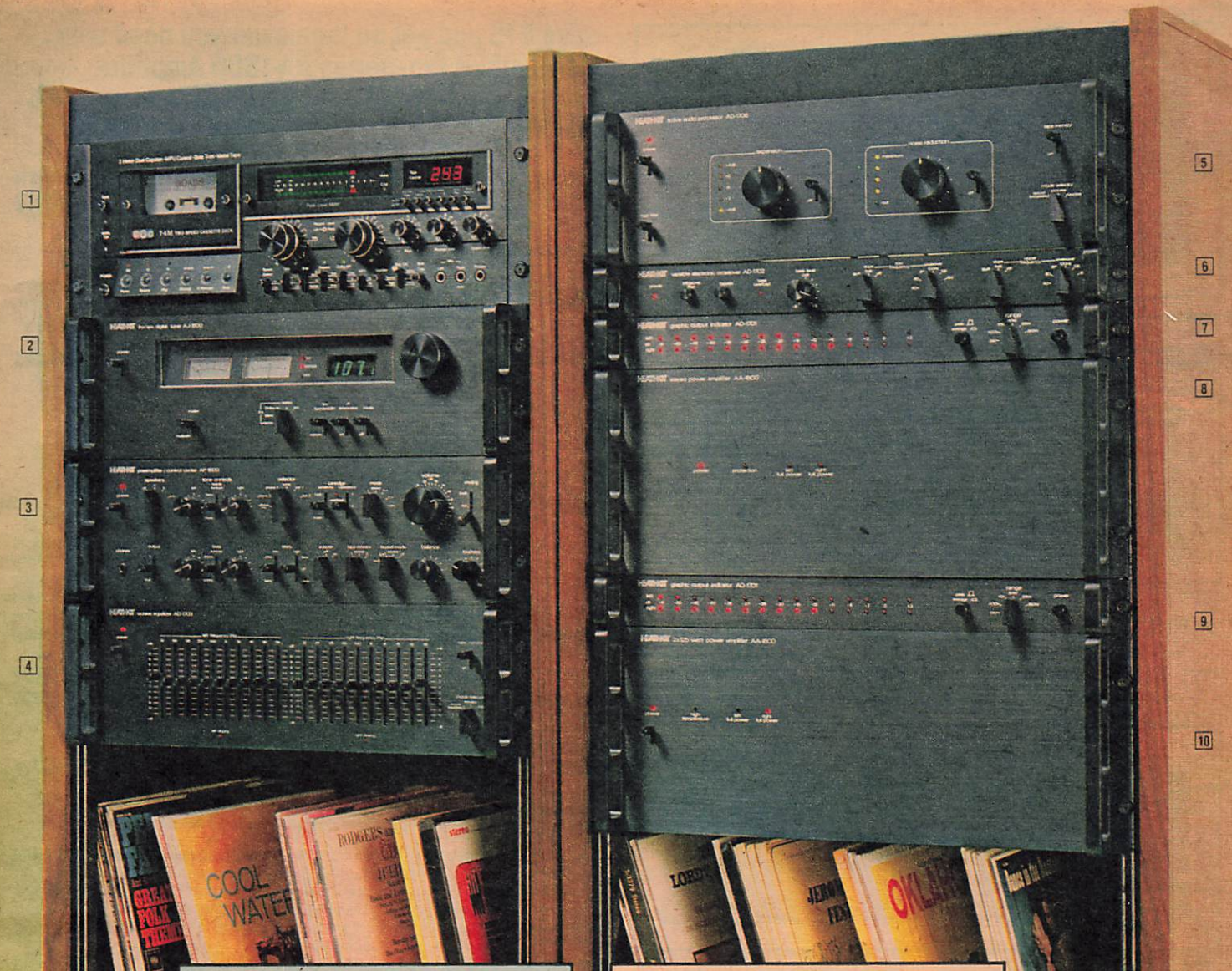
10 Unify your system with the Pro-Series Rack

Sturdy, yet portable, the Pro-Series Rack gives your system semblance. It's compatible with Standard EIA panels in any height, and comes complete with record dividers and top shelf for a turntable. Features walnut veneer side panels and locking swivel casters. Measures 43½" H x 21½" W x 18" D.

Kit AE-1705, Shpg. wt. 74 lbs. **264.95**

Optional oak-finish wood cabinets for Heathkit Pro-Series Audio Components (except AA-1800) are listed and sold separately for each Pro-Series Audio Component.

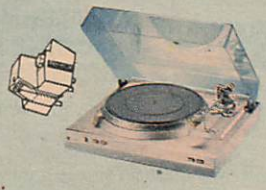
VISA MasterCard **Credit Card Orders Call TOLL-FREE: 800-253-0570**



SAVE $25.00 on state-of-the-art turntable and cartridge

$549.95

If purchased separately, $574.95



Buy these technologically-advanced audio products – and pocket the savings. System includes ACP-1608 Dual 608 Direct-Drive Semi-Automatic Turntable with ULM tonearm (described on p. 29). Also includes new Dynavector Ruby Moving Coil Cartridge – the best in our line (described at right).

ACS-1608, Assembled, 20 lbs. **549.95**

NEW

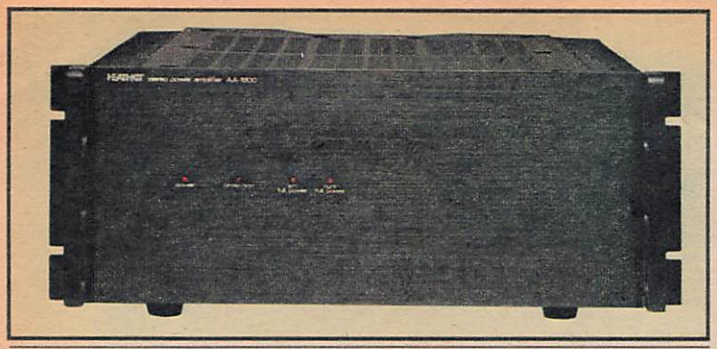
$275.00

High-technology Dynavector Ruby Moving Coil Cartridge

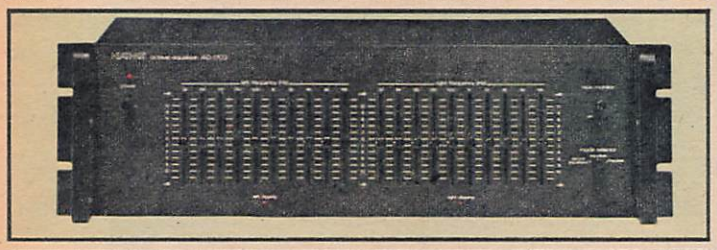
This moving coil cartridge is acknowledged as one of the world's finest. Its synthetic ruby cantilever is only 2.5 mm long for maximum rigidity and unsurpassed groove-to-coil signal transmission. Excellent tracking – even tracks Telarc's 1812 Overture. Requires step-up transformer or AP-1800 Preamp (p. 24). Save when you order this cartridge as part of our ACS-1608 System at left.

ADP-1260, Assembled, 1 lb. **275.00**

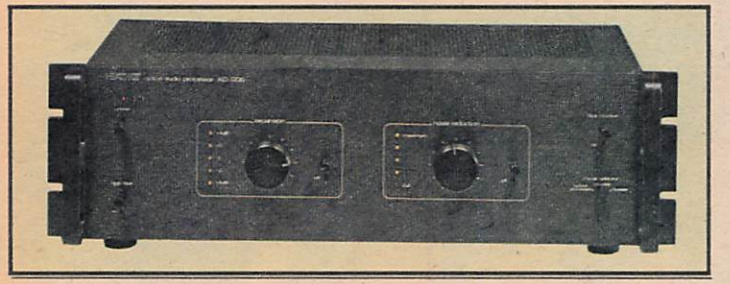
Alaska, Hawaii and Michigan Residents: Call 616-982-3411



AA-1800 SPECIFICATIONS: Hum & Noise: 85 dB. **THD:** <0.025%. **TIM (DIM 100):** <0.03%. **IM Dist.** (SMPTE): <0.02% from 250 mW to 250 Watts. **Channel Separation:** 60 dB. **Low Freq. Damping Factor:** >100. **Input Sensitivity:** 110 mV (for 1 watt at 8 ohms). **Input Impedance:** 20 kilohms, shunted by <50 pF. **Power Requirement:** 120 VAC, 60 Hz. **Dimensions:** 7⅛" H x 19" W x 17.75" D.



AD-1703 SPECIFICATIONS: Center Freqencies: 32, 64, 125, 250, 500, 1 k, 2 k, 4 k, 8 k, and 16 kHz. **Max. Boost:** +11 dB. **Max. Cut:** −11 dB. **S/N:** 90 dB A weighted below 1.5 V. **Total Harmonic Distortion:** Less than .001% from 20-20,000 Hz @ rated output. **Freq. Response:** 20-20,000 Hz. **Overload:** 8 V rms. **TIM:** Less than .03%. **Rated Output:** 1.5 V rms. **Filter Q:** 1.2 ±5%. **Clipping Indicator:** Approximately 7 volts rms. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 5.75" H x 19" W x 14" D (14.6 x 48.26 x 35.56 cm).



SPECS.: Expansion: −4 dB to +4 dB. **Freq. Resp.:** 20 Hz to 20 kHz. **THD:** <.01%. **Hum & Noise:** −70 dB. **High Filter:** −3 dB, 7 kHz, 12 dB/octave. **Input Overload:** 5 VRMs min. at 1 kHz. **Power Req.:** 120/240 VAC, 50/60 Hz. **Dimensions:** 5.75" H x 19" W x 14" D.

Save $15 and get all the power you need with the Heathkit Pro-Series AA-1800 Amplifier

$584.95

- 2.5 dB of dynamic headroom gives better dynamic range
- Features a patent-pending speaker protection circuit
- Styled to match other fine Pro-Series Components

250 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN .025% TOTAL HARMONIC DISTORTION FROM 20 HERTZ TO 20,000 HERTZ.

If you are a true audiophile who enjoys digital mastered, direct disk...or any music with a wide dynamic range, you need the full 250 watts per channel and 2.5 dB dynamic headroom of the AA-1800. This power and extra headroom allow the AA-1800 to reproduce your music scrupulously – even in a system equipped with the most inefficient speakers. In addition, the AA-1800 features a patent-pending speaker protection system to safeguard your speakers.

Kit AA-1800, Shpg. wt. 75 lbs. ..... **Was $599.95, NOW ONLY 584.95**

Upgrade your system with the easy-on-your-pocket Pro-Series Ten Band Octave Equalizer

$259.95

- Matches your system's response to the room acoustics
- Lets you make custom recordings with special effects
- Improves the performance of every system component

Octave-by-octave control of the entire 20 to 20,000 Hz frequency spectrum is yours with ten ISO-centered controls. They let you eliminate room "dead" spots and "live" spots for smooth, flat frequency response. Engineer records, tapes or FM music to your creative tastes. Improve components by enriching cartridge response and enhancing woofer, midrange and tweeter performance. Unlike some equalizers, the AD-1703 allows equalizing before or after recording without rearranging wires. Fits any 19" EIA rack.

Kit AD-1703, Shpg. wt. 17 lbs. **259.95**

AEA-1800-2, Oak-Finish Cabinet, Shpg. wt. 6 lbs. **33.95**

Get more dynamic range, less noise and tape hiss with the Pro-Series Active Audio Processor

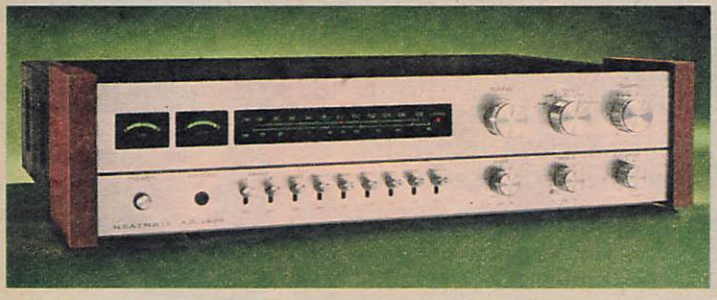
$254.95

- Increase your system's total dynamic range up to 17 dB
- Single ended design eliminates need for preprocessing

Your music loses depth in the recording and broadcasting processes. That's why you need the AD-1706 Active Audio Processor. Its expander circuit restores up to 7 dB of this loss, bringing your music to life. The AD-1706 also contains a noise reduction circuit that sifts out up to 10 dB of noise from records and tapes. The result: your music gains depth – with that first note of a song jumping out of a deep, silent background.

Kit AD-1706, Shpg. wt. 18 lbs. **254.95**

AEA-1800-2, Oak-Finish Cabinet. Shpg. wt. 6 lbs. **33.95**



AR-1429 SPECIFICATIONS: Tuner: Frequency Response: ±1 dB, from 20 to 15,000 Hz. **HD:** 0.35%. **Capture Ratio:** 1.8 dB. **Selectivity:** 80 dB. **Channel Separation:** 40 dB. **Amp: Frequency Response:** −1 dB, 5 to 45,000 Hz. **Input Sensitivity:** Phono: 2 mV. **Aux., tape, and tape monitor:** 200 mV. **Input Impedance: Phono:** 47,000 ohms. **Auxiliary tape, and tape monitor:** 50,000 ohms. **Damping Factor:** 60 to 80. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimension:** 4.75" H x 20" W x 13.5" D (12.06 x 50.8 x 34.29 cm).

This Receiver pleases your budget and your ears

$299.95

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

Here's an AM/FM Receiver your ears and pocketbook will both like. Take the tuner's FM section. It's designed with a 1.8 μV (10.3 dBf) usable sensitivity for better reception of distant stations, a S/N of 70 dB, a 65 dB hum and noise ratio, and IM distortion of less than 0.1% for clean reproduction.

You'll also find the AR-1429 has excellent versatility too. It's equipped with a set of low-level inputs for magnetic cartridge turntables, plus three high-level inputs for auxiliary components and tape decks. Also, the AR-1429 has jacks for tape monitoring, along with output jacks for two sets of low-wattage 8-ohm speakers. Put this great Receiver in your den now and see our turntables and cartridges on page 29. 4¾" H x 20" W x 13½" D.

Kit AR-1429, Shpg. wt. 32 lbs. **299.95**

Kit AD-1504, Dolby NR Module for the AR-1429, Shpg. wt. 1 lb. **49.95**

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

The AR-1650 gives you control of your music

$769.95
Silver Panel

- 1.8 μV sensitivity for clear FM reception
- Adjustable bandwidth for optimum FM selectivity
- 60 dB FM signal/noise ratio for wide dynamic range

125 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.05% TOTAL HARMONIC DISTORTION 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: The AR-1650 lets you hear your music just the way you like. You can adjust the frequency response across the 20-20,000 Hz frequency range, with the bass, midrange, and treble controls. Or if you want to listen to a tape or record with the lowest frequency distortion, just flip the tone flat switch to bypass the tone control circuits.

A receiver you can build on: The AR-1650's 125-watt power amplifier, with a −90 dB hum and noise rating, gives you more music and less noise from audio sources. You can plug in two turntables, two auxiliary sources, and two tapedecks. The tape monitor control enables you to record from deck one to deck two, while monitoring deck two.

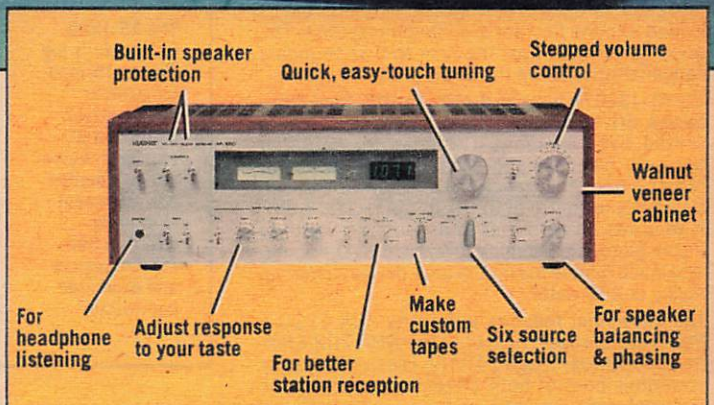
Built-in speaker protection: Fused B+ and B− power supply buses for each channel eliminate the need for dissipating limiters that can cause tweeter-damaging pops and clicks. Turn-on delay and thermal-circuit breakers further protect your speakers from damage and expensive repairs.

Choice of styles: You can choose between natural aluminum or black anodized aluminum front panel. Both feature walnut veneer cabinets.

Easy to assemble: Like all Heathkit projects, the AR-1650 comes with our famous easy-to-read, step-by-step instruction manual. To speed assembly and ensure top performance, the amplifier, tuner and IF multiplex circuit boards are factory assembled and tested. Takes about ten evenings to assemble.

Kit AR-1650S, Silver Front Panel, Shpg. wt. 66 lbs. **769.95**
Kit AR-1650B, Black Front Panel, Shpg. wt. 66 lbs. **789.95**
Kit AJA-1600-2, Optional Dolby NR Module, Shpg. wt. 1 lb. **49.95**

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



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!

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. **Freq. Resp:** 20 Hz to 20 kHz +0 to −.02 dB. **IM Distortion:** 0.05% TTM. 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).

Recommended component system

Here are two components that interface perfectly with the AR-1650 Receiver: a pair of our best-selling speakers — the AS-1373 on page 30; and the precision ACP-1608 Dual Turntable on page 29. Check them out and order one or both with your AR-1650 today!

NEW

Upgrade your system to true bass response by adding our new Subwoofer

$299.95

- **Boasts frequency range of 15 Hz to 750 Hz and frequency response of 22 Hz to 500 Hz (±3 dB)**
- **Removable panel for future expansion to full-range system**
- **Six-inch tuned vent is floor-loaded for better response**
- **Great performer, and protects your wing speakers, too**

Breakthroughs in recordings, like direct-to-disk and digital, have created the need for a more efficient subwoofer to give you every iota of sound captured on those new disks. The engineers at Heath investigated subwoofers and found that many of the smaller models have no better bass response than many good bookshelf systems. So they studied the others' limitations and designed this large, true Subwoofer – one of the largest subwoofers on the market (because you cannot have an efficient speaker like this in a small box).

While designed to add bass to an existing, small system, the AS-1320 can enhance the bass response of even 10" and 12" systems. It will extend the low frequency range of the audiophile's present system, and reduce the bass distortion that occurs when the wing speakers try to reproduce the low bass notes. A ported cabinet alignment uses computer-aided design techniques to maintain an extended low frequency response with as flat a response as possible. A six-inch tuned vent is loaded into the floor for even better response. The driver is mounted near the floor so first boundary cancellation is above the limits of the AS-1320.

The AS-1320 features an 8-ohm, 15-inch, long-throw design driver with 2", four-layer voice coil in a vented box alignment. Designed for optimum transient response and expanded bandwidth, it boasts a frequency range of 15 Hz to 750 Hz, and frequency response of 22 Hz to 500 Hz (±3 dB). It requires an amplifier of at least 30 watts to insure adequate listening levels without clipping. And it will handle maximum amp power on normal music of 250 watts.

The Subwoofer requires either the ASA-1320-1 Passive Crossover (below) or the AD-1702 Electronic Crossover (page 24). The Passive Crossover combines bass of both stereo channels so one Subwoofer can be used, and provides much improved bass response without need for a separate bass amplifier. For optimum performance, we recommend the AD-1702 Electronic Crossover to provide a nearly perfect response with virtually any wing speakers. The Electronic Crossover does not reduce the amplifier's effective damping factor, resulting in more accurate control (lower distortion). The Electronic Crossover does require a second amplifier to drive the Subwoofer.

Because subwoofers are non-directional, the AS-1320 can be placed in a convenient location – it does not have to be placed next to your mid- and high-range systems. It can even be set on its side if placed against a wall. Also because of its non-directionality, the Subwoofer can be used singly as well as in pairs (Passive Crossover should not be used in pairs). The cabinet of the AS-1320 is solidly braced and features high density cabinet materials to prevent cabinet colorations. It is finished in an attractive black finish with walnut-stained solid ash decorative accent rails. Removable acoustically transparent grills. This fun-to-build kit is an enjoyable one-evening project. To increase performance order the Electronic Crossover on page 24.

The AS-1320 Subwoofer's big 8-ohm, 15-inch long-throw design driver features a 2", four-layer voice coil in a vented box alignment to provide optimum transient response and expanded bandwidth

One of the largest subwoofers on the market, the AS-1320 measures 64.5" H x 21.5" W x 17" D, and is constructed of high-density cabinet materials.

Kit AS-1320, Wt. 177 lbs., Motor freight collect **299.95**

Kit ASA-1320-1, Passive Crossover, 6 lbs. **44.95**

AS-1320 SPECIFICATIONS: Frequency Range (– 10 dB anechoic): 15 Hz to 750 Hz. **Frequency Response:** (±3 dB): 22 Hz to 500 Hz. **Impedance:** 8Ω. **Min. Amp. Power:** 30 W. **Max. Amp. Power on Normal Music:** 250 W. **Speaker Fuse:** 2 A. **Driver:** 15" long-throw design, 2", four-layer voice coil. **Cabinet Type:** Ported box, tuned to 22 Hz. **Dimensions:** 64.5" H x 21.5" W x 17" D.

Yes, I'd like my friends to know I handcraft my kits with special care and pride. Please send me _____ solid brass plate(s) with my name engraved on them. I understand the price of $2.00 for one plate, and the price $1.60 each for two or more plates covers first-class postage and handling. I've enclosed $_____ with my regular kit order for my personalized GDP-1225 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: _____ Zip: _____

GDP-1225

Add prestige to your kit with a Name Plate

Just **$2.00** for one

$1.60 each for two or more

You will be able to take special pride in your kitbuilding skill...and your friends will show special admiration when they see your kit with your name engraved in brass upon it. This GDP-1225 Name Plate reflects the quality and care of your kitbuilding craftsmanship. The plate is solid brass, with a brushed jeweler's finish. It also features a self-adhesive backing for easy application. To order your plate(s), fill out the adjacent coupon and include it with your regular kit order form from this catalog. Your engraved brass Name Plate(s) will be sent to you by first class mail.

AA-18 Solid-State Amplifier for mono tuners, phonographs

$37.95 — **3.25 WATTS, MIN. RMS, INTO 8 OHMS WITH 1.5% THD FROM 40-20,000 HZ**

This fun kit takes a signal (at least 250 mV) from any source (such as a phonograph with ceramic cartridge, mono tape player, mono AM or FM tuner), and cleanly amplifies it. Features volume and tone controls, plus walnut-colored metal case. For 120/240 VAC, 50/60 Hz. Dimensions, 2.63" H x 7.69" W x 5.56" D.

Kit AA-18, Shpg. wt. 4 lbs. **37.95**

3

4

SAVE a big $60 on this Stereo Amplifier and AM/FM Tuner

NOW ONLY $249.90 — **15 WATTS, MIN. RMS, PER CHANNEL INTO 8Ω WITH <0.5% THD FROM 20-20,000 HZ**

Choose our budget-priced, easy-to-build amplifier/tuner combination — and save a big $60!

3 **Integrated AA-1219 Amplifier** has dual-channel bass, treble and volume controls. Balance control. Phono, tape, tuner and auxiliary inputs for music sources. Tape output jacks.

4 **Sensitive — yet selective — AJ-1219 Tuner** features a pre-assembled front end with good performance, even in metro areas. 40 dB typical, 35 dB minimum separation for full stereo sound. Built-in AM antenna, FM antenna input. Metal case, walnut veneer end panels.

120/240 VAC. Amplifier, 3.88" H x 12.75" W x 12" D; Tuner, 3.63" H x 13" W x 11" D.

Save $60 when you buy the system. AAS-1219-1, 32 lbs. ..... **Was $309.90, NOW ONLY 249.90**

Kit AA-1219, Amplifier, 15 lbs. **154.95**

Kit AJ-1219, Tuner, 12 lbs. **154.95**

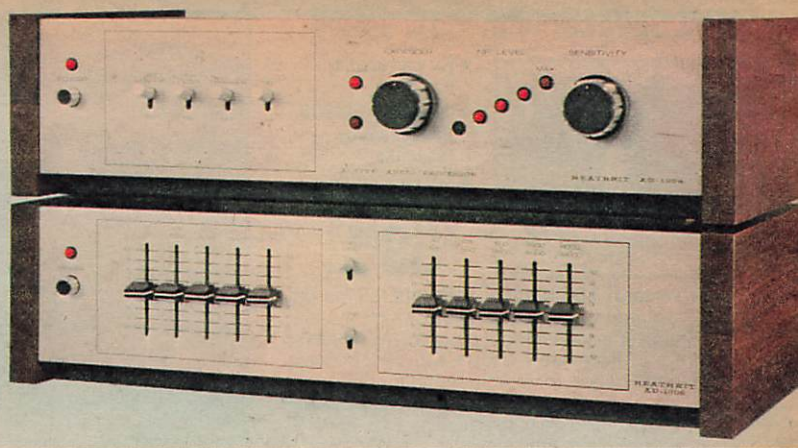
Deep clean your records

Plush brush pad with wood handle reaches into grooves for deep-cleaning action and anti-static protection. Special 10-formula solution cleans and cuts static by 98.4%.

GDZ-52, Shpg. wt. 1 lb. **15.00**

1 **Plug in this low-cost Active Audio Processor to restore the dynamic range lost in recording and broadcasting processes.**

2 **Use this 5-Band, 2-Channel Equalizer to enhance highs, adjust midranges and boost bass output of your stereo system.**



1 Customize audio output

$199.95

- **Sifts out background noise and hiss from records and tapes**
- **Restores dynamic range**

The Active Audio Processor's expander section restores up to 7 dB of the dynamic range lost in recording and broadcasting. Also has three dynamic filters to remove up to 10 dB of high-frequency noise when there's no program material playing. Front panel controls, LED indicators let you control processing. Metal case with solid walnut side panels. 120/240 VAC, 50/60 Hz. 4.5" H x 17.5" W x 8.13" D.

Kit AD-1304, Shpg. wt. 12 lbs. **199.95**

AD-1304 SPECIFICATIONS: Noise Reduction: 3 dB typical at 2 kHz, 10 dB typical between 4 kHz and 15 kHz. **Expansion Performance:** −3 dB to +4 dB. **Frequency Response:** 20 to 20,000 Hz. **Total Harmonic Distortion:** 0.1%. **Hum and Noise:** −70 dB. **Filter:** 7 kHz, 12 dB/octave.

2 Equalizer enhances response

$144.95

- **Gives you maximum performance from budget-priced systems**
- **Separate control of five bands**

Made for the budget-minded audiophile, the AD-1305 Equalizer's 5 band controls let you boost or cut frequency response by 12 dB, from 30 Hz-32 kHz. Tone flat switch allows you to record with or without equalization, without touching band controls. Comes with solid walnut side panels and a brushed aluminum front panel. For 120/240 VAC, 50/60 Hz power. Overall Dimensions, 4.5" H x 17.5" W x 8" D.

Kit AD-1305, Shpg. wt. 11 lbs. **144.95**

AD-1305 SPECIFICATIONS: Frequency Control Ranges (for each of 2 channels): 30-125 Hz, 125-500 Hz, 500-2,000 Hz, 2,000-8,000 Hz, 8,000-32,000 Hz. **S/N Ratio:** 90 dB below 1.5 Volts. **THD:** 0.05%. **Overload:** 5 Volts RMS. **AC Outlets:** One switched, one unswitched.

NEW State-of-the-art Dual 608 Turntable

$299.95 — **Integrates form and function**

ULM tonearm. Improved acoustics. 3-speed direct drive (33, 45, 78 rpm) w/pitch control. Rumble (DIN-B), −75 dB; Wow/flutter, 0.03% WRMS. Mfr.'s price, $329.95.

ACP-1608, Assembled, 20 lbs. **299.95**

B·I·C Micro 350 Changer plays 1-6 records. Mfr.'s price, $219.95.

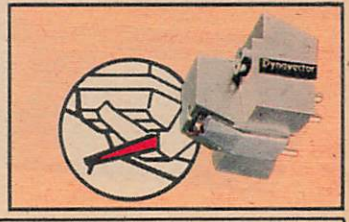
ACP-1467, Assembled, 14 lbs. **119.95**

NEW World-renowned Dynavector Cartridge

$275.00 — **One of the world's finest cartridges**

High-tech moving coil design. Tracks superbly. 2.5 mm synthetic ruby cantilever. 20-50,000 Hz. freq. response, 0.2 mV output, >20 dB separation, 1.2-2.5 gm tracking force. Needs preamp like AP-1800 (p. 24). Save — buy your Dynavector Cartridge with ACP-1608 Turntable (see p. 25).

ADP-1260, Assembled, Shpg. wt. 1 lb. **275.00**



Get the best response out of your records with these cartridges

MODEL	Response (Hz)	Output	Separation	Stylus	Tracking Force	Mfr.'s Price	Heath Price	With Turntable
Shure V-15 Type IV ADP-1259, 1 lb.	10-25,000	4.0 mV	25 dB	Hyperelliptical Nude Diamond	0.75 to 1.5 gm.	$191.00	169.95	149.95
Audio-Tech. AT-30E ADP-1294, 1 lb. (Needs preamplifier like AP-1800 on page 24)	15-25,000	0.28 mV	25 dB	Elliptical 0.3 x 0.7	1.4 to 2.0 gm.	$135.00	79.95	59.95
Shure M95HE ADP-1298, 1 lb.	20-20,000	4.7 mV	25 dB	Hyperelliptical Nude Diamond	0.75 to 1.5 gm.	$113.50	69.95	59.95
Empire 2000E/III ADP-1147, 1 lb.	20-20,000	4.5 mV	28 dB	Elliptical 0.2 x 0.7	0.5 to 1.5 gm.	$85.00	59.95	19.95

Mini Speaker with maxi sound

- For car, boat or home
- Wide 100-20,000 Hz Frequency response
- L-C type cross-over at 2500 Hz

$59.95 each

These versatile LS-ONE Mini Speakers let you put quality sound in car,-boat or home at a mini price. The 8-ohm speakers handle up to 40-watts peak, feature a 4" long throw woofer and 1" soft dome tweeter that deliver incredible sound for their size. Wide 100-20,000 Hz response and an L-C crossover at 2500 Hz contribute to the quality. 7.13"H x 4.5"W x 4.56"D. Sold in pairs only.

ASP-1442, Assembled, 12 lbs. ..... **pair 119.90**
ASA-1442-1, Mtng. brackets, 3 lbs. ... **pair 16.90**

High efficiency at a low price

- 5-watt minimum driving power
- Impressive 60-14,000 Hz frequency response

$89.95 each

High efficiency two-way speakers anyone can afford. This remarkable fused speaker features an 8" woofer, a 2"x6" horn tweeter with an output control to shape high frequencies exactly to your room acoustics. Drives with as little as 5 watts, and boasts an impressive 60-14,000 Hz frequency response. Housed in an attractive, easy-to-dust vinyl cabinet measuring 23¼"H x 12"W x 10½"D.

Kit AS-1342, Shpg. wt. 32 lbs. **89.95**
Kit AS-1342-2, Order two–save 9.95, Shpg. wt. 78 lbs. ..... **pair 169.95**

Quality and versatility mark this popular Heathkit speaker

$199.95 each

- Use it upright or horizontally
- Dual controls shape tweeter response

Compare the specs–and the price–you'll see why this is our best selling speaker. This 8-ohm speaker delivers a ±3 dB, 40 to 20,000 Hz frequency response, features a 1" dome tweeter that disperses frequencies from 3 kHz to 20 kHz a full 120° with a flat, smooth response. A 4.5" enclosed midrange driver delivers crisp, sharp midranges, and a 10" woofer reproduces a solid, well-defined bass.

Kit AS-1373, Shpg. wt. 68 lbs. **199.95**

Save $20.00! Buy two AS-1373 Speakers
Kit AS-1373-2, Shpg. wt. 141 lbs. **379.90**

AS-1373 SPECIFICATIONS: Recommended Amplifier Power: 10 watts min. to 250 watts. **Crossover Freq:** 500 and 3000 Hz (12 dB/octave). **Switches:** 3 kHz shelf/flat, 10 kHz roll off/flat. **Dimensions:** 26"H x 14.5"W x 12.125"D.

A quantum leap forward in speaker design

$399.90 each

- Phase-aligned drivers minimize transient distortion
- Curved foam construction cuts diffraction

Now you can hear sound reproduced the way it was created. A staggered driver design results in treble, midrange and base sounds reaching your ears in phase–just the way the artist created it. Unique foam construction, 1" soft dome tweeter, 5" midrange, and 10" woofer combine to deliver frequencies with wide dispersion and minimum diffraction, resulting in clean, clear sound at all frequencies. Other features are: ±3 dB, 40-25,000 Hz frequency response, fuse protection, polished Brazilian rosewood veneer cabinet. Order a pair today. Sold in matched pairs only.

Kit ASX-1383, 114 lbs., Mtr. Frt. .... **each 399.90**

ASX-1383 SPECIFICATIONS: Impedance: 8 ohms. **Recommended Amplifier Power:** 10 to 250 watts. **Crossover Frequencies:** 750 Hz and 4000 Hz (6 dB/octave). **Dimensions:** 36"H x 13½"W x 13¼"D.

For unsurpassed quality in cassette tape–the B•I•C T-4M

$699.95

- Metal tape capability
- 3 heads, dual capstan
- 2-motor/full-logic operation

For unmatched reproduction quality in cassette tapes, B•I•C provides the ultimate answer.

The T-4M (Heathkit Model No. ATP-1484) is B•I•C's most advanced 2-speed deck, for use with top-quality audio components like the Heathkit Pro-Series. (Mount the T-4M in the Pro-Series rack with optional adapter below). Even at 1⅞ ips, it produces sound comparable to units costing a thousand dollars or more. When you use high quality metal particle tape, the T-4M can attain a signal-to-noise ratio of 71 dB at 3¾ ips with Dolby noise reduction! Frequency response at 3¾ ips is a wide 20-23,00 Hz, ±3 dB. Record calibration, Microprocessor control, electronic digital readout and 45 dB peak indicating bar graph display help you maintain better control of recordings. Mic/line mixing, Dolby FM copy, three-head record/play configuration let you hear what you have just put on the tape. Rosewood vinyl case measures 6⅞"H x 17 5/16"W x 10⅛"D. 120 VAC.

ATP-1484,
Fully Assembled. Shpg. wt. 22 lbs. .. **699.95**

Optional Rack Mount Adapter to mount ATP-1484 in Pro-Series Rack.
ATA-1484-1, Shpg. wt. 1 lb. **24.95**

Now...your own private world of stereo listening

- 10-25,000 Hz frequency response
- Individual volume and tone controls
- Ear-comfort foam cushioning

$65.95

Zenith Headphones feature individual volume and tone control to let you tailor the sound to your individual taste.

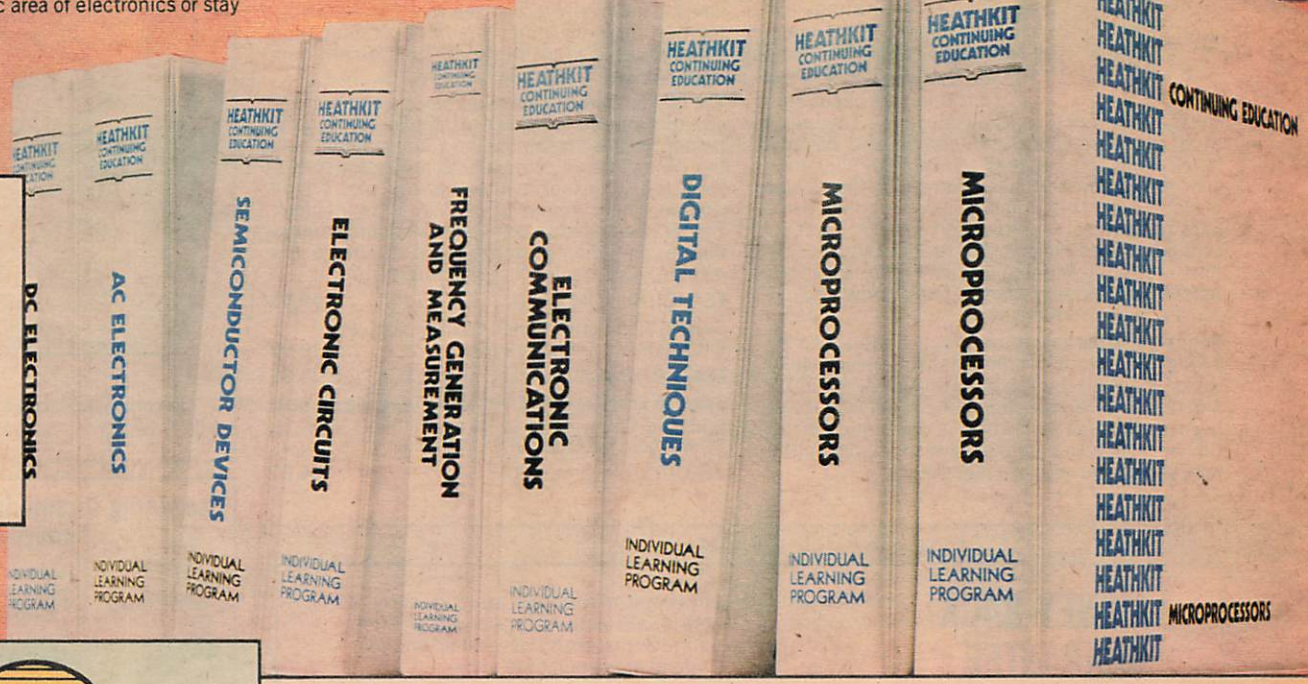
A special foam cushioning provides a feature light touch to your ears, so you hardly know you're wearing headphones. Yet, the unique 13-oz design lets you hear doorbells and telephone. Headphones come complete with an 8' cord for your complete relaxation and comfort. Sensitivity is 100 dB, ±3 dB at 200 Hz. 10-25,000 H2 response.

GRZ-56, Assembled, Shpg. wt. 1 lb. **65.95**

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

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

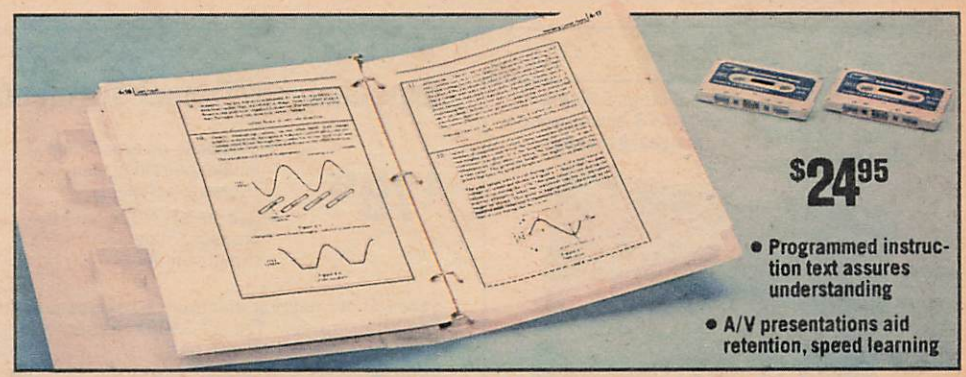
Earn College Credit for taking many Heathkit/Zenith courses

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 35 (EE-3101, -3102, -3103, -3104, -3105, -3201, -3401) or EC-1100 on page 90, 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**



$24.95

- **Programmed instruction text assures understanding**
- **A/V presentations aid retention, speed learning**

Now save $5.00 on 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, 5 lbs. .... **Was $29.95, NOW ONLY 24.95**

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

DC Electronics Course — your starting point in learning electronics

$49.95

- **Your key to the fascinating world of electronics is this proven, complete DC Electronics Course**
- **Electronic components provided for all experiments**
- **Features 20 "Hands-on" experiments in DC electronics**

This DC Electronics Self-Instruction Course will start you on your way to a complete understanding of the fascinating, expanding world of electronics knowledge.

You are introduced to the fundamentals of current, voltage, resistance, magnetism, Ohm's Law, electrical measurements, inductance and capacitance. This Course takes you through each new concept step by step to give you a solid foundation in electronics. This professionally designed course uses the specially-written self-instruction text, carefully placed programmed reviews, and records to reinforce the learning process. These advanced teaching methods mean you retain more of what you learn in the Course.

Hands-on experiments help you understand by giving you practical proof that the theory really works. You will acquire a detailed knowledge of DC electronics in a very short time. A knowledge of high school mathematics is assumed in the Course. However a math review is included in the text, should you require a refresher.

Should you choose to take the optional final examination for the Heathkit/Zenith DC Electronics Course, a passing grade of 70 percent or better will earn you 2.0 Continuing Education Units (a nationally-recognized way of acknowledging participation in non-credit adult education courses), plus a Certificate of Achievement from Heathkit/Zenith Educational Systems.

The DC Electronics Course includes a comprehensive text housed in its own attractive, sturdy vinyl binder, records containing the audio material, and the 56 electronic components necessary to perform the 20 experiments that are part of the Course. The optional ET-3100A Experimenter/Trainer is required to complete the Course experiments. Optional cassette tapes duplicate the records. VOM required to perform experiments.

EE-3101, Shpg. wt. 7 lbs. **49.95**

Save $10! EES-3101A, includes EE-3101 and ET-3100A Kit Trainer, 13 lbs. **119.90**

EEA-3101, Optional Cassettes, Shpg. wt. 1 lb. **11.95**

Spanish Language DC Electronics Learning Course. (Less EB-6101-30 Parts for experiments. See pg. 42 for more information.)

EE-3101S, Shpg. wt. 7 lbs. **54.95**

Includes 56 components for 20 experiments.

Records introduce each topic

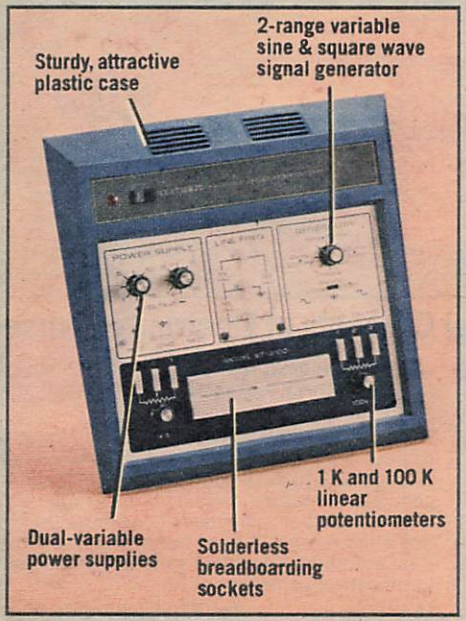
Learning Dictionary is electronics "short-course"

Includes compendium of 16 topic outlines that turns this Dictionary into a low-cost course in electronics. Put our learning Dictionary on your bookshelf today! 832 pages.

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

MONEY-BACK GUARANTEE

All Heathkit/Zenith self-instruction courses carry a complete guarantee of satisfaction. If you are dissatisfied with the course, return all materials (less trainer) and your receipt, for a full refund of the purchase price.



Experimenter/Trainer augments electronics courses

$79.95

- **Get hands-on experience building circuits, doing course experiments**
- **Use the ET-3100A later for breadboarding and experimenting**

Seven of our popular electronics courses use this versatile Trainer. **The ET-3100A** Experimenter/Trainer is designed for use with the DC, AC, Semiconductor, Electronic circuits, Electronic Communications, Electronics for Hobbyists and Test Instruments Self-Instruction Courses. You'll get maximum benefit out of each of these Courses by doing the hands-on experiments on this Trainer.

The Experimenter/Trainer features solderless breadboarding sockets for ease of component substitution, a 2-range variable sine and square wave (200 – 20,000 Hz) signal source, dual-variable power supplies for positive and negative voltages (1.2 to 16 volts, 120 mA), 1 k and 100 k linear potentiometers. A center tapped transformer provides 30 volts rms, 60 Hz for line experiments.

The Heathkit/Zenith ET-3100A Experimenter/Trainer can be wired for either 120 or 240 VAC, 50/60 Hz operation. The instrument measures a compact 3½"H x 12⅛"W x 11¾"D (8.9 x 30.8 x 29.8 cm).

The ET-3100A has been designed to give you exactly the kind of invaluable, practical experience you need. It works side-by-side with text materials to drive home important points made in the Heathkit/Zenith Educational Courses which are designed for use with this trainer.

And your Heathkit/Zenith Experimenter/Trainer will continue to give you value, even after you've completed your basic electronics courses. It's ideal for putting your newly acquired knowledge to use in breadboarding your own circuits and experiments with circuit design.

Save money by getting your Experimenter/Trainer with a course – or, for even bigger savings, as part of the basic electronics system.

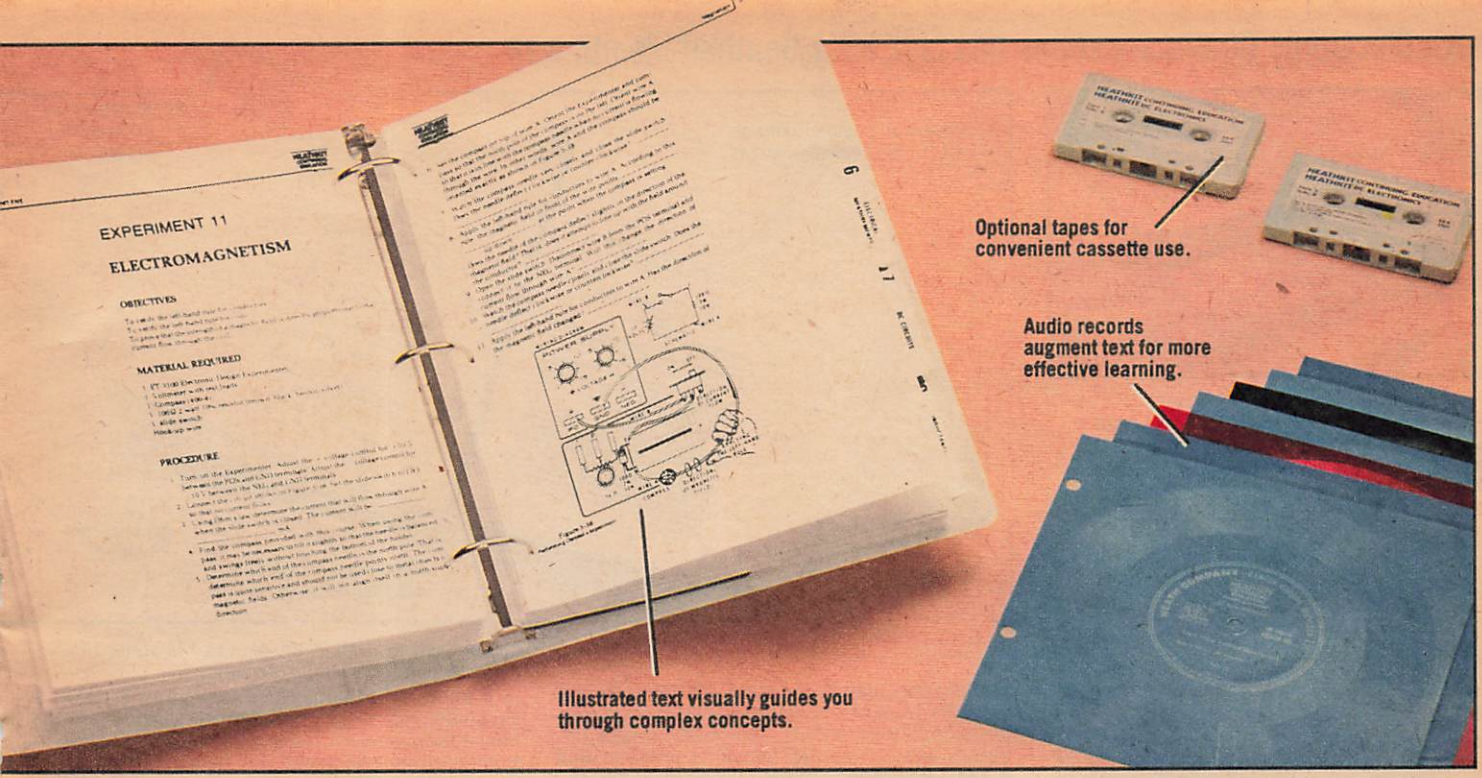
Heathkit/Zenith ET-3100A Experimenter/Trainer.

Kit ET-3100A, Shpg. wt. 6 lbs. **79.95**

Kit ET-3100AS, ET-3100 with Spanish manual, Shpg. wt. 6 lbs. **79.95**

ETW-3100A, Factory Assembled Trainer, Shpg. wt. 6 lbs. **139.95**

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



AC Electronics Course enhances understanding

$54.95

- **Logical course arrangement for effective learning experience**
- **Audio/visual materials make learning easy and fun**
- **Leads to a thorough understanding of basic AC electronics**

This outstanding, and easy to understand, course in AC electronics guides you through the theory of alternating current. The programmed learning format presents instruction a little at a time for fast, effective learning. And reviews insure that you understand the material before you continue. You'll see these principles in action when you do the hands-on experiments.

When you complete the course, you will be able to explain the difference between AC and DC; describe the operation of AC generators; determine average, peak, peak-to-peak, and effective values of an AC sine wave, and analyze its frequency, period and phase, then measure these values.

You'll learn how to measure current, voltage and power; analyze AC circuits which contain resistance; understand and describe capacitance and capacitive reactance; analyze AC circuits with capacitance or capacitance and resistance; understand mutual inductance, self-inductance and inductive reactance; analyze series and parallel resonant circuits; analyze AC circuits with inductance or inductance and resistance.

You'll also be able to determine the current, voltage and power relationships at the inputs and outputs of both ideal and practical transformer circuits; analyze and design RC, RL and LC filters.

Earn 1.5 CEUs – score 70% on optional final exam. DC Course (EE-3101) or equivalent knowledge is desirable. Optional cassettes duplicate records. ET-3100A Trainer and VOM required to perform experiments.

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

Save $10! EES-3102A, EE-3102 and ET-3100A Kit Trainer, 13 lbs. ... **124.90**

EEA-3102, Optional Cassettes, wt. 1 lb. **11.95**

Spanish Language AC Electronics Course; (less EB-6102-30 Parts for experiments. See page 42). **EE-3102-S,** Shpg. wt. 7 lbs. **54.95**

Semiconductor Devices – a solid-state course

$54.95

- **Brings you up to date on the field of solid-state electronics**
- **Teaches all about semiconductor devices, using effective teaching methods**
- **Provides you with hands-on experiments for practical experience**

Your background in electronics would not be complete without this introduction to solid-state technology.

The Semiconductor Devices Course presents the fundamentals of solid-state electronics. Audio aids help emphasize the comprehensive text material. And you get hands-on experience with the interesting experiments that are part of the Course.

This comprehensive Course covers fundamentals of diodes, zeners, bi-polar transistors, FETs, thyristors, ICs and opto-electronic devices. Eleven different experiments give valuable hands-on experience.

When you complete this Course, you will be able to describe the electrical characteristics of semiconductors; name the primary advantages of semiconductor devices over vacuum tubes; explain how semiconductor devices operate; describe how semiconductors are constructed.

You will also learn how to use semiconductor components properly; recognize semiconductor packages and their schematic symbols; design your own circuits using semiconductors; and test various semiconductor devices.

ET-3100A Trainer and VOM required for experiments. To gain full benefit from this course, the DC and DC Electronics Courses (EE-3101, –3102) – or equivalent knowledge – is recommended as a prerequisite.

Earn 3 CEUs – score 70% or better on the optional final exam. Optional cassettes duplicate the records included with the course.

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

SAVE $10! EES-3103A, EE-3103 and ET-3100A Kit Trainer. 11 lbs. ... **124.90**

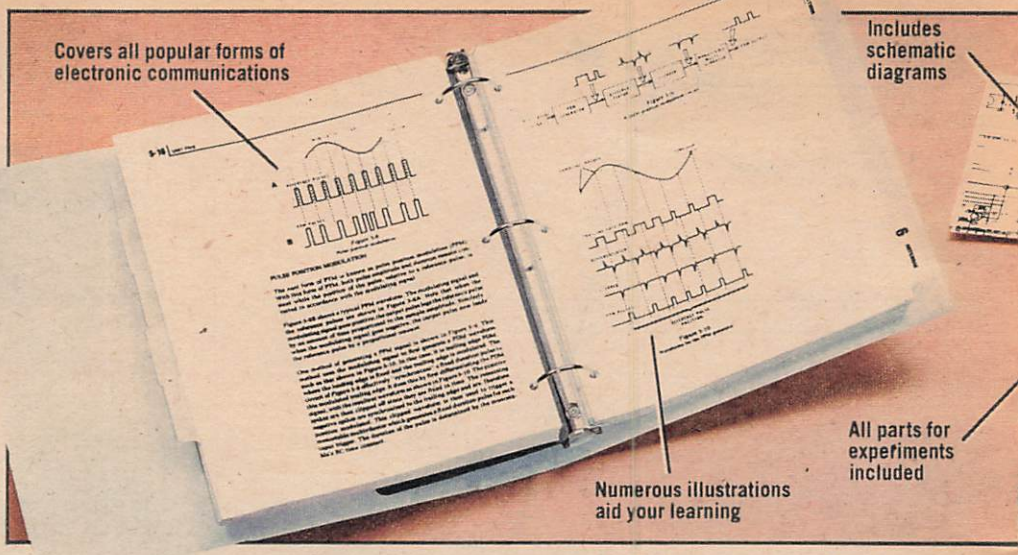
EEA-3103, Optional Cassettes, wt. 1 lb. **11.95**

Spanish Language Semiconductor Devices Course. Direct translation of this famous course. (Less EB-6103-30 Parts for experiments. See page 42).

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

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

Learn Electronic Communications this fast, easy Heathkit/Zenith way



$59.95

- **Detailed experiments provide hands-on experience**
- **Includes comprehensive 400-page textbook and all components for experiments**

Now you can learn the fascinating field of electronic communications, including recent state-of-the-art developments, the fast, easy Heathkit/Zenith way!

Unit 1, Communications Fundamentals, defines electronic communications. This unit includes discussions of time/frequency relationships, linear mixing, and modulation.

Unit 2, Amplitude Modulation, discusses single-sideband, double-sideband and suppressed carrier AM as well as collector, series and progressive series modulation.

AM Receivers, Unit 3, discusses AM detectors and tuned RF receivers – covering AM receiver characteristics like sensitivity, selectivity, image frequency, and intermediate frequency selection. **Unit 4, Angle Modulation,** studies FM demodulators, the angle modulation transmitter, phase-locked loops, and other modulator circuits.

Unit 5, Pulse Modulation, covers both analog and digital pulse modulation – including quantization and multiplexing. **Antennas are presented in Unit 6** – discussing types, uses and installation. **Communication Systems, Unit 7,** introduces FM stereo, TV and data communications systems.

In 7 hands-on experiments you'll build an AM transmitter, balanced modulator, AM detector, FM transmitter, receiver, pulse modulator, time division multiplex transmitter and data communications modem. All necessary parts included. ET-3100A Trainer (pg. 32) or equivalent required.

This course can follow up EE-3101 to – 3104.

Earn 2 CEUs – score 70% or better on final exam.

EE-3106, Shpg. wt. 7 lbs. **59.95**

Kit ET-3100A, Trainer, 6 lbs. **79.95**

Electronic Circuits ties fundamentals together

$64.95

- **Apply the electronic knowledge you've already learned**
- **Eighteen hands-on experiments**

This Heathkit/Zenith Electronic Circuits Course lets you apply theory learned in previous courses to actual circuit operation.

In this comprehensive Course, you'll learn how to identify basic amplifier circuits and describe their operation; discuss DC amplifiers, audio amplifiers, video amplifiers, IF and RF amplifiers; explain operational amplifiers, differential amplifiers, comparators, active filters; analyze and design simple inverting and noninverting amplifiers; explain power supply rectifiers, filters, and regulation circuits.

You'll also learn to identify commonly used LC, RC, and crystal oscillators; explain pulse shapers, multi-vibrators, Schmitt triggers, sawtooth generators, IC timers; the principles of AM, FM, heterodynes, modulation and detection; construct and experiment with transistor and IC circuits; how to use a voltmeter and an oscilloscope to analyze electronic circuits.

The Electronic Circuits Course includes text, and attractive vinyl binder, records and over 100 electronic components for 18 experiments. Optional tapes duplicate the material on records in easy-to-use cassette format.

You should first complete DC and AC Electronics and Semiconductor Devices, or have equivalent knowledge.

For experiments, you must have an oscilloscope like the Heathkit IO-4105 on page 67, a VOM and the ET-3100A Trainer on page 32.

Scoring 70% or better on the optional final exam will earn you a Certificate of Achievement and 4.0 CEUs.

EE-3104, Shpg. wt. 7 lbs. **64.95**

Save $10! EES-3104A, EE-3104 and ET-3100A Kit Trainer, 13 lbs. **134.90**

EEA-3104, Optional Cassettes, Shpg. wt. 1 lb. **11.95**

Test Equipment Course teaches operation

$64.95

- **This Course gives you a solid foundation in a wide variety of modern electronic test instruments**

This comprehensive course covers analog and digital meters, oscilloscopes, frequency generation and measurement, and special measuring instruments.

The Fundamentals Electronics Courses (EE-3101 through EE-3104) and Digital Techniques (EE-3201) or equivalent knowledge are the required background.

Upon completion, you will be able to use analog and digital meters to make electrical measurements; explain the operation of integrating and nonintegrating meters; use an oscilloscope in electronic testing; explain the operation of single and dual-trace scopes, including sampling and storage types; understand operation and use of most passive and active frequency meters.

You'll also learn to use a dip meter to calculate the value of an unknown inductor; operate and use electronic counters; use bridge circuits to measure resistance, capacitance, inductance and impedance; determine beta, leakage values of transistors and transconductance and leakage values of FETs; understand curve tracers, spectrum analyzers and logic probes.

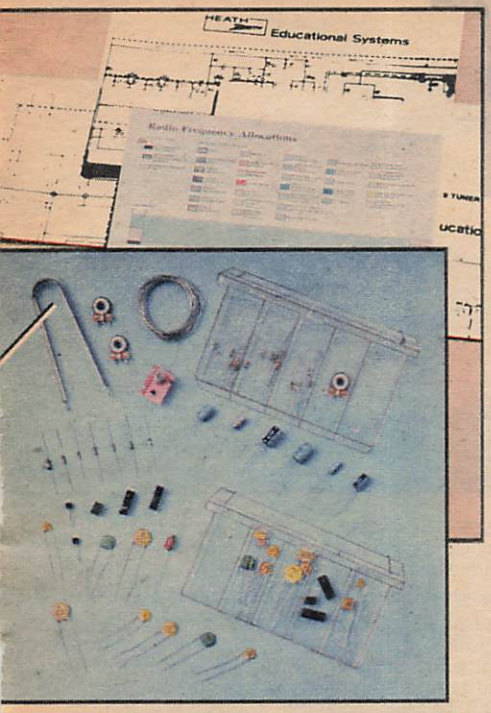
The Test Instrument Course includes four texts in attractive vinyl binders and electronic components for the experiments. A digital meter, analog meter, oscilloscope, frequency generator and frequency counter, as well as the ET-3100A Trainer are required to complete the experiments.

If you take the optional final exam, a passing grade of 70% will earn you 6.0 CEUs, plus a Certificate of Achievement.

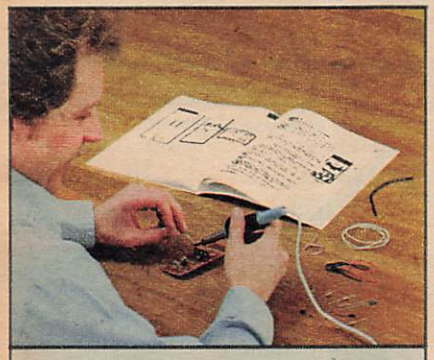
EE-3105, Shpg. wt. 18 lbs. **64.95**

Save $10!, EES-3105A, includes EE-3105 and ET-3100A Kit Trainer, Shpg. wt. 24 lbs. **134.90**

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



SAVE $50 when you buy the system!
EE-3101, EE-3102, EE-3103, EE-3104, EE-3105 and ET-3100A. $369. 70 separately. **EES-3115A,** 56 lbs. **319.70**



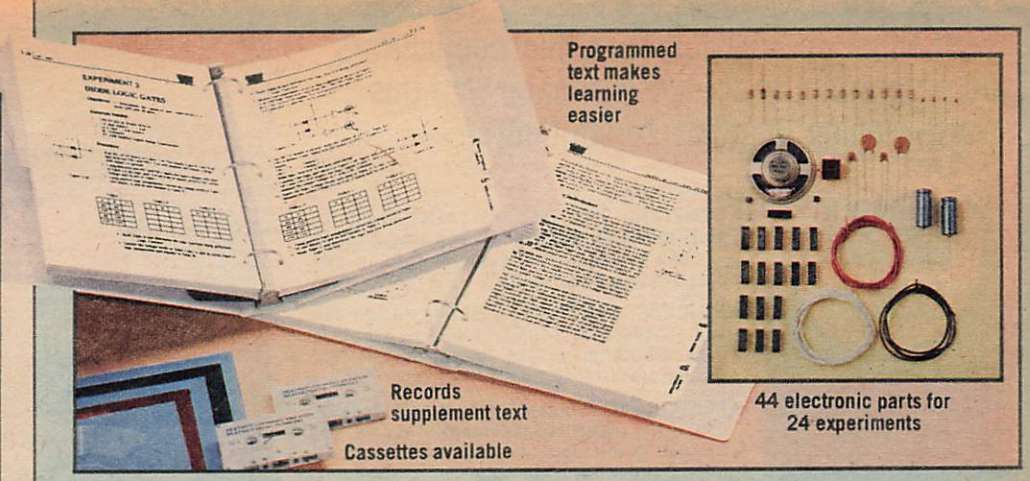
Soldering Course for novice or professional kitbuilder

$16.95

- **An outstanding soldering course, even for the professional**

This handy practice kit comes complete with circuit board, components and solder. When you complete this first kitbuilding experience, you will have a two-transistor light oscillator that you built yourself. Ideal for individuals, industry and schools. Requires a soldering iron and small hand tools (see pages 54 and 55 for our complete line of soldering aids).

EI-3133, Shpg. wt. 2 lbs. **16.95**



Digital Techniques Course helps you learn logic to ROMs

$79.95

- **Learn tomorrow's technology today with this unique Heathkit/Zenith Self-Instruction Course**

Gain a working knowledge of Digital Techniques this fast, easy Heathkit/Zenith way! This Course is an in-depth treatment of digital electronics. Beginning with fundamentals and theory, it leads you through digital logic circuits, Boolean algebra, flip-flops and registers, sequential logic circuits, combinational logic circuitry and digital design.

The course includes a comprehensive text in two vinyl binders, records (or optional cassettes), and 44 electronic components for performing the 24 experiments. The ET-3200A Trainer (below) is required to perform the experiments. Also recommended are a multimeter like the IM-5284 and a single-trace oscilloscope like the IO-4105 (see pages 61 and 67).

Earn 4 CEUs – score 70% on final exam.

EE-3201, Shpg. wt. 9 lbs. **79.95**

SAVE $15! Buy the Digital Techniques Course and the ET-3200A Trainer Kit together. ($169.90 sold separately)

EES-3201A, Shpg. wt. 14 lbs. **154.90**

EEA-3201, Optional Cassettes, Shpg. wt. 1 lb. **11.95**

Digital Trainer for Digital Techniques Course experiments

$89.95

- **Lets you perform all Digital Techniques experiments**
- **Breadboard and test your own digital circuits**
- **Three power supplies for added versatility**

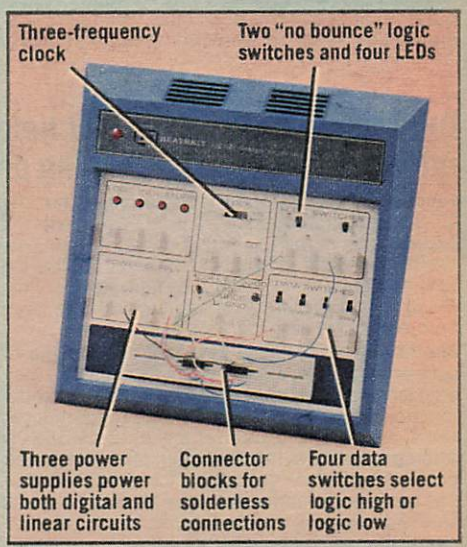
An invaluable learning aid, the Digital Trainer lets you complete all the experiments in the Digital Techniques Course.

You can also build and test prototypes, verify circuit operation and check digital integrated circuits. Solderless breadboard sockets aid experimenting and design. They take up to eight 14-pin or 16-pin dual in-line ICs; also 24, 28 and 40-pin DIPs. Has four binary data switches, two "no-bounce" switches to pulse logic circuits, three-frequency pulse clock generator and four Light-Emitting Diodes (LEDs) for visual indication of logic states.

Regulated power supplies produce + 12 VDC at 500 mA, – 12 VDC at 100 mA and + 5 VDC at 500 mA– all current-limited and overload-protected for greater safety. The ET-3200 Trainer is compatible with all commonly-used IC logic families, including RTL, TTL, CMOS, ECL, NMOS and Linear. The Trainer can be wired for either 120 VAC or 240 VAC, 50 or 60 Hz use.

Kit ET-3200A, Shpg. wt. 6 lbs. **89.95**

Factory Assembled and Tested ET-3200A Trainer. ETW-3200, Shpg. wt. 6 lbs. **159.95**



SPECIFICATIONS: DATA SWITCHES: States: + 5 V or 0 V. **Outputs:** Four terminals. **LOGIC SWITCHES: Type:** Momentary contact, spring loaded. **Circuit:** Two flip-flop latches. **Output States:** Complementary + 5 V and + 0.2 V. **CLOCK: Output Frequency:** 1 Hz, 1 kHz, 100 kHz, ± 20%. **Dimensions:** 3.5" H x 12.13" W x 11.75" D (8.90 x 30.80 x 29.80 cm).

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

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

Heathkit ZENITH Educational Systems

WINNER

International Award Society of Technical Communicators

- **COMPLETE: Covers all the basics of microprocessors, microcomputers and programming – even includes hands-on 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 Course has introduced thousands of people, just like you, to microprocessors, microcomputers, interfacing and programming**
- **ECONOMICAL: Learn effectively for less – and after completing the Microprocessor Self-Instruction Course, you can even use the Heathkit/Zenith ET-3400 Microprocessor Trainer as a low-cost microcomputer for further breadboarding and design experiments**

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

The Heathkit/Zenith Microprocessor Course's concise self-study textbooks, colorful audio-visual presentations and hardware experiments make microprocessor theory, design and application simpler for you to understand – even if you have no previous background.

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

The Heathkit/Zenith Microprocessor Course is organized into ten learning units:

The first unit, Number Systems and Codes, covers decimal, binary, octal and hexadecimal numbering systems; conversions, binary codes and positional notation. **Microcomputer Basics, the second unit,** 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 operations – AND, OR, exclusive – OR and INVERT.

The fourth unit of this Course is an Introduction to Programming. It includes branching, conditional branching, algorithms and programming instructions.

The 6800 Microprocessor is covered in Units 5 and 6 of the Course, and includes architecture, instruction set, addressing modes, stack operations, subroutines, input/output (I/O) operations and interrupts.

The seventh and eighth units teach Interfacing. You'll learn interfacing fundamentals, interfacing with

SAVE $25 Order EE-3401 Course and ET-3400 Trainer together. If purchased separately, $324.90.
ETS-3400, Shpg. wt. 19 lbs. . . . **ONLY 299.90**

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

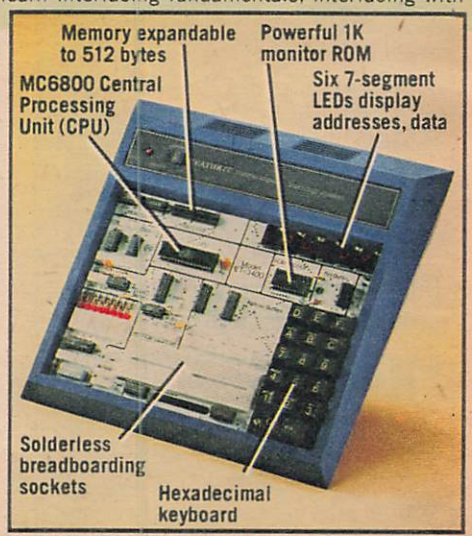
Functioning as a miniature digital computer, the ET-3400 Microprocessor Trainer is used with the experiments in the EE-3401 Course. It features a built-in 1K ROM monitor program for controlling unit operation. It also has a 6-digit hexadecimal 7-segment LED display for address and data readouts, and monitoring 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 MC6800 microprocessor's internal registers, set break points for program debugging, or reset the MPU. The flexible instruction set of the MC6800 permits five addressing modes, and uses two accumulators, an index register and stack pointer.

The ET-3400 has 256 bytes of Random Access Memory (RAM) built-in, and is expandable to 512 bytes with the RAMs supplied in EE-3401. It also features 8 buffered binary 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 buffered and terminated on the front panel for ease of connection to prototyped circuits. There's also provision for a 40-pin external connector to expand memory and I/O capacity. Built-in +5, +12 and −12 VDC power supplies provide internal power needs. The ET-3400 requires 120/240 VAC, 50/60 Hz power. Draws 30 Watts. Dimensions of the Heathkit ET-3400 Microprocessor Trainer are 3.50" H x 12.13" W x 11.75" D.

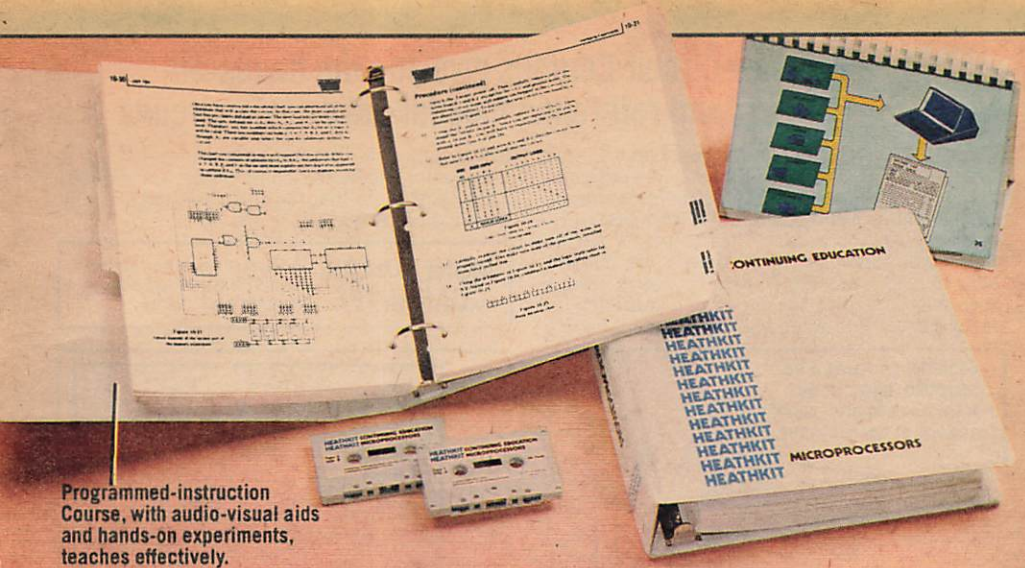
The programming and interfacing experiments supplied with the EE-3401 Microprocessor Self-Instruction Course are implemented on the ET-3400 Trainer. While designed for use with EE-3401, the Trainer is a flexible, general purpose training unit and microprocessor breadboard. Use it in other applications 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 Accessory for real computing power and versatility.



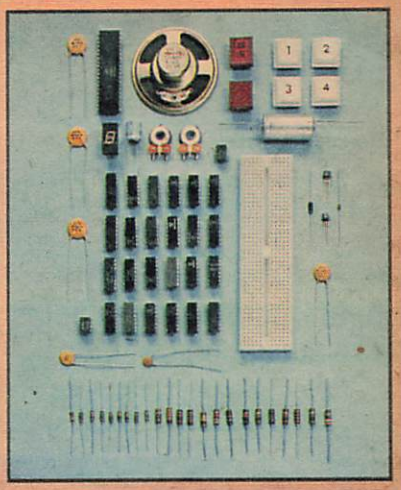
The ETA-3400 Microprocessor Trainer Accessory converts the ET-3400 into a full personal microcomputer system.

Kit ET-3400, Shpg. wt. 7 lbs. **224.95**
ETW-3400, Assembled, 6 lbs. **299.95**

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



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-3400 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 much 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-3400 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 37).

The EE-3401 Microprocessor Self-Instruction 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 Heathkit/Zenith ET-3400 Microprocessor Trainer (below, left) is required for the experiments.

If you choose to take the optional final examination, scoring a passing grade of 70 percent or better will earn you a full 8.0 Continuing Education Units (CEUs) and a Certificate of Achievement. A classroom version of this popular Course is also available – (see page 42).

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

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-3400, ETA-3400 and ETA-3400-1 together. $546.90 separately.

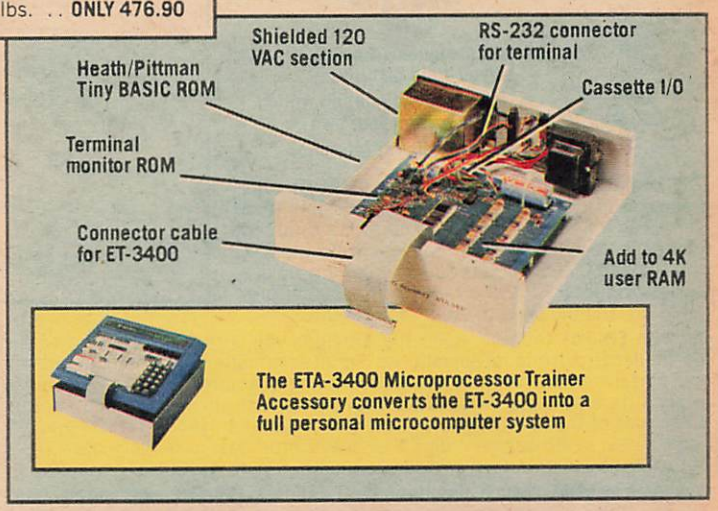
ETS-3401, Shpg. wt. 28 lbs. .. **ONLY 476.90**

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

When you add this Accessory, you turn your ET-3400 Trainer into a computer system. It provides you with more computing power – so you can run longer, more sophisticated programs through your ET-3400 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 or 20 mA loop formats in the Accessory allows you to hook up a video terminal, such as the H-9 or the H-19 (page 75), 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 Course.

The ETA-3400 connects to the Trainer by means of a 40-pin ribbon cable (supplied). Parts required to modify the Trainer are also included. Since this Modification changes the clock frequency of the Trainer, the experiments in the Microprocessor Course using timing loops will be changed. It is recommended that all of the EE-3401 experiments be completed before adding this Trainer Accessory. An H-9 or 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-3400 into a full personal microcomputer system

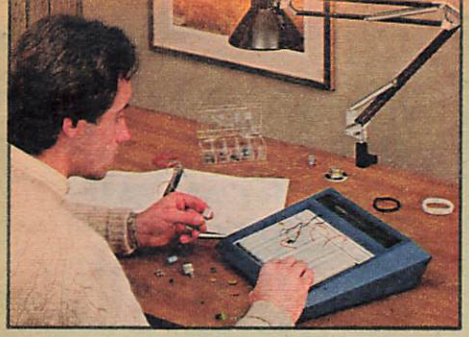
For 120/240 VAC, 50/60 Hz. The ETA-3400 measures 3" H x 11" W x 12" D.

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. **47.00**

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



NEW

Two new Circuit Courses give you the hands-on learning and reference files for solid-state circuits

These new "hardware oriented" courses – Linear Circuits and TTL and CMOS Circuits – are designed to meet the needs of the electronics student, experimenter, radio amateur or computer enthusiast. The abbreviated, "to-the-point" circuit descriptions are ideal for the person who doesn't want to read a lot. You'll learn how each circuit operates by building the circuit and observing its performance. And when you finish, you'll have a handy reference file. You save money, too. At an electronics store, the components for EH-701 would cost more than $45.00, and for EH-702, more than $70.00.

MONEY-BACK GUARANTEE If dissatisfied, return all materials (less trainer) and receipt for a full refund.

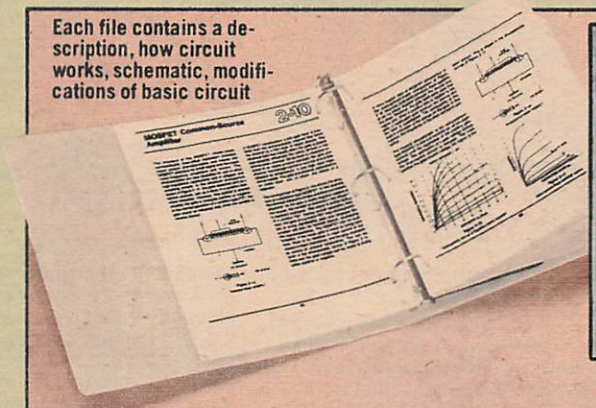
Linear Circuits Course helps you learn advanced circuits

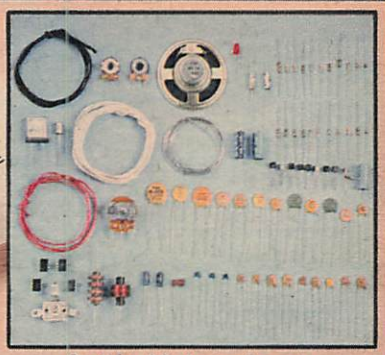
$49.95

- **First study each circuit, then build it yourself**
- **86 Components worth $45 for building 30 circuits**
- **Not repeated in other Heathkit/Zenith Courses**

The Heathkit/Zenith EH-701 Linear Circuits Course is the economical, thorough way to learn this facet of advanced electronics. This hardware-oriented Course consists of a series of circuit "files" arranged in progressive order. Each contains a brief description of a circuit, its operation, a circuit schematic, and modifications of the basic circuit. The Course emphasizes "doing" rather than reading. Circuits covered include bipolar transistors, field effect transistors, the 555 timer and 741 op-amp linear circuits. You construct various amplifiers, oscillators, astable and monostable multivibrators, pulse position and pulse width modulators, and active filters, among others, using the parts supplied. For your convenience you may wish to use the ET-3300 Trainer (page 39). However, all circuits can be constructed and tested using the "special" instructions. To observe circuit operation, you'll need a voltmeter like the IM-5218 on page 64, and an oscilloscope such as the IO-4205 on page 67. Prerequisites are DC and AC Electronics, and Semiconductor Devices (EE-3101 – EE-3103) or equivalent. The Course is housed in a sturdy vinyl binder. Passing the optional final exam with a grade of 70% or above will earn you 4 CEUs and a Certificate of Achievement.

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





Contains 86 electronic parts for building over 30 circuits

TTL and CMOS Circuits gives you knowledge, experience

$59.95

- **65 Components worth $70 let you build 50 circuits**
- **Learn how each circuit works, then construct your own**
- **Serves as handy reference**

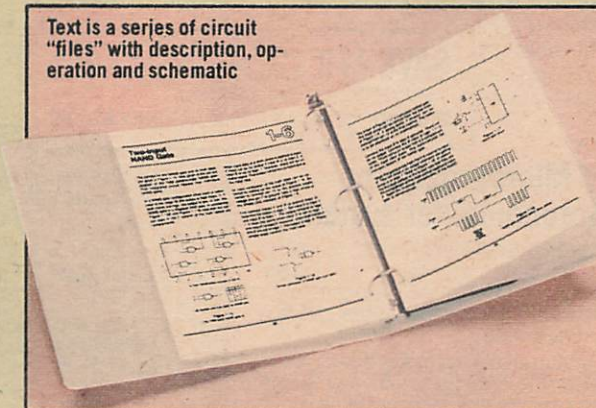
The Heathkit/Zenith EH-702 TTL and CMOS Circuits Course helps you learn this advanced design, then serves as a handy reference. A hardware-oriented course designed to give you "hands-on" experience, the TTL and CMOS Circuits Course is comprised of a series of circuit "files" arranged in a logical progression, and the parts to build each circuit.

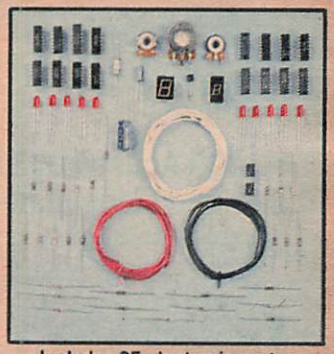
As with EH-701 (above), each file provides you with a description of the particular circuit and its operation, a circuit schematic, and modifications you can perform on the basic circuit. Little reading is required, because the Course places its emphasis on actual circuit construction. You learn by doing. Examples of the circuits you will build include And, NAND, Or, Nor and Xor logic gates, seven-segment digital displays, flip-flops, clock generators, data selectors and distributors, and comparators.

You learn by building such circuits as 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 quad bilateral switch, as well as 47 other circuits. Using the components supplied with the Course, you construct these state-of-the-art circuits on the ET-3300 Trainer (page 39) or use your own breadboard and power supplies. You will also need standard test equipment – a voltmeter like the IM-5218 on page 64, and an oscilloscope such as the IO-4205 on page 67 to observe the circuits in operation. Our DC, AC and Semiconductor Courses (EE-3101 – EE-3103) or equivalent knowledge are prerequisites for the EH-702 TTL and CMOS Circuits Course.

Housed in a sturdy vinyl binder, the CMOS Circuits Course will be a useful addition to your reference library. And by passing the optional final exam with a score of 70%, you will earn 6.0 CEUs and a Certificate of Achievement.

EH-702, Shpg. wt. 2 lbs. **59.95**

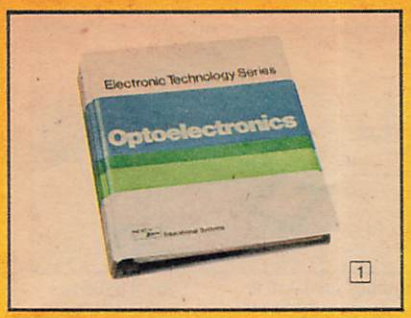




Includes 65 electronic parts for building over 50 circuits

Be sure to see our other popular Heathkit/Zenith self-instruction courses in Amateur Radio, described on page 22; Automotive, featured on page 47; Computers, presented on pages 90-92, and Weather, shown on page 100.

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



Gain state-of-the-art knowledge with our Advanced Electronics Series

Advanced Electronics Courses eliminate the legwork. They come complete with components, so you can perform tried and tested experiments – based on an easy-to-understand text. Learning is faster, more fun and more economical, too.

The ET-3300 Trainer gives you hands-on experience. Whether you're a technician or engineer looking for self-improvement, a student seeking electronics knowledge, or a hobbyist interested in new developments, these courses meet your needs. Classroom versions on p. 42.

1 Learn about Optoelectronics

Now you can learn about the latest developments in this quickly-changing field. Our Optoelectronics Course teaches basic optical terms and concepts. It covers the types of available light sources, and provides an understanding of optoelectronic displays – including driving and multiplexing.

You'll get in-depth information on light-sensitive components such as photodiodes, phototransistors, solar cells and optocouplers – including design and applications. You'll learn fiber optics theory and operation.

Includes parts for experiments. Experiments require ET-3300. Recommended: milliammeter and voltmeter – or a VTVM like the IM-5218 (p. 64), and a scope like the IO-4105 (p. 67). Prerequisites: DC and AC (EE-3101 and EE-3102, pgs. 34-35) or equivalent knowledge; some experience in electronics or optics. 3 CEUs.

EE-105, Shpg. wt. 5 lbs. **59.95**
Kit ET-3300, Breadboard, 6 lbs. **94.95**
ETW-3300, Assembled Breadboard, 6 lbs. . **159.95**
SAVE $10.00! Buy Course and Breadboard Kit
EES-105, Shpg. wt. 11 lbs. **144.90**

2 Op Amps – important ICs

A 385-page text covers measurements of common op amp parameters; basic op amp linear circuits, integrator and differential circuits; and the design and performance of op amp constant current sources, as well as current/voltage and voltage/current converters, Norton and BiFET op amps.

ET-3300 required for experiments. Components included. Recommended: an oscilloscope like the IO-4105 (p. 67), a multimeter like the IM-5225 (p. 64) and a frequency generator like the IG-1271 (p. 62). Prerequisite: Basic Electronics (EE-3101 through EE-3104, pgs. 34-36) or equivalent knowledge. 3 CEUs.

EE-101, Shpg. wt. 5 lbs. **39.95**
Kit ET-3300, Breadboard, 6 lbs. **94.95**
ETW-3300, Assembled Breadboard, 6 lbs. . **159.95**
SAVE $10.00! Buy Course and Breadboard Kit.
EES-101, Shpg. wt. 11 lbs. **124.90**

3 Learn to use Active Filters

Learn how to design active filters with op amps, to plot and predict frequency responses, to design and breadboard first-order low-pass and high-pass filters, design second-order and high-order filters, bandpass and state variable filters.

ET-3300 Breadboard or ET-3100A (p. 34) required for experiments. (NOTE: ET-3100A cannot be used with other Advanced Electronics Courses.) An oscilloscope like the IO-4105 (p. 67) and a frequency generator like the IG-1271 (p. 62) are also helpful. Prerequisite: EE-101 Op Amps, or equivalent. For 3 CEUs, score 70% on the final exam.

EE-102, Shpg. wt. 5 lbs. **34.95**
Kit ET-3300, Breadboard, 6 lbs. **94.95**
ETW-3300, Assembled Breadboard, 6 lbs. . **159.95**
SAVE $10.00! Buy Course and Breadboard Kit.
EES-102, Shpg. wt. 11 lbs. **119.90**

4 Introduces you to the IC Timer

Learn about common IC timers, how each works, what they do and where to use them – for logic functions in output drive circuits, time-delay relay circuits, wide-range pulse generators, voltage/frequency converters, freewheeling power-fail oscillators, timers, alarms.

Includes 348-page text and parts for experiments. Requires ET-3300 for experiments. Recommended: an oscilloscope like the IO-4105 (p. 67) and a multimeter like the IM-1210 (p. 64). Prerequisite: EE-3201 Digital Techniques (p. 41) or equivalent knowledge. 3 CEUs.

EE-103, Shpg. wt. 5 lbs. **39.95**
Kit ET-3300, Breadboard, 6 lbs. **94.95**
ETW-3300, Assembled Breadboard, 6 lbs. . **159.95**
SAVE $10.00! Buy Course and Breadboard Kit.
EES-103, Shpg. wt. 11 lbs. **124.90**

5 Learn Phase-Locked Loops

Used in radio and TV communications, PLLs and their building blocks – the phase detector, loop filter and voltage-controlled oscillator – are covered in a 268-page self-instruction text.

Parts are included for experiments. For experiments, use the ET-3300, a DC voltmeter like the IM-5284 (p. 64) and a single-trace oscilloscope like the IO-4105 (p. 67). To get more from the Course, use a dual-trace oscilloscope like the IO-4205 (p. 67) and an audio signal generator like the IG-5218 (p. 62). 3 CEUs.

EE-104, Shpg. wt. 5 lbs. **49.95**
Kit ET-3300, Breadboard, 6 lbs. **94.95**
ETW-3300, Assembled Breadboard, 6 lbs. . **159.95**
SAVE $10.00! Buy Course and Breadboard Kit.
EES-104, Shpg. wt. 13 lbs. **134.90**

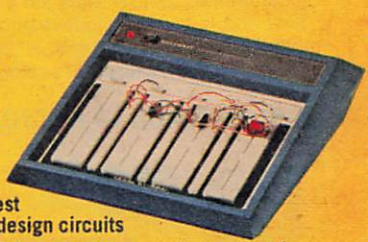
SAVE $50.00 on your education!

Order the Heathkit/Zenith Advanced Electronics Series (EE-101 Op Amps, EE-102 Active Filters, EE-103 IC Timers, EE-104 Phase-Locked Loops and EE-105 Optoelectronics) together with the Heathkit/Zenith ET-3300 Laboratory Circuit Breadboard Kit. If purchased separately, $319.70.

EES-1015, Shpg. wt. 34 lbs. **269.70**

This Lab Breadboard makes advanced electronics easier

$94.95 Kit



For Advanced Electronics Courses

Experiment, test components, design circuits

The ET-3300 is a great convenience tool for electronics learning or circuit design.

Solderless sockets make breadboarding easier and simpler. Sockets are designed to accommodate any size dual in-line integrated circuit package. Reliable built-in power supply provides +5 VDC (±4%) @ 1.5A, +12 VDC @ 100 mA or −12 VDC (±2%) @ 100 mA to Breadboard, with fixed current limiting of each supply at rated current for short-circuit protection.

Required with the following Heathkit/Zenith Advanced Electronics Courses: EE-101, EE-103, EE-104 and EE-105. Can be used with the EE-102 Active Filters Course. 120/240 VAC, 50/60 Hz. 3.5" H x 12" W x 12" D.

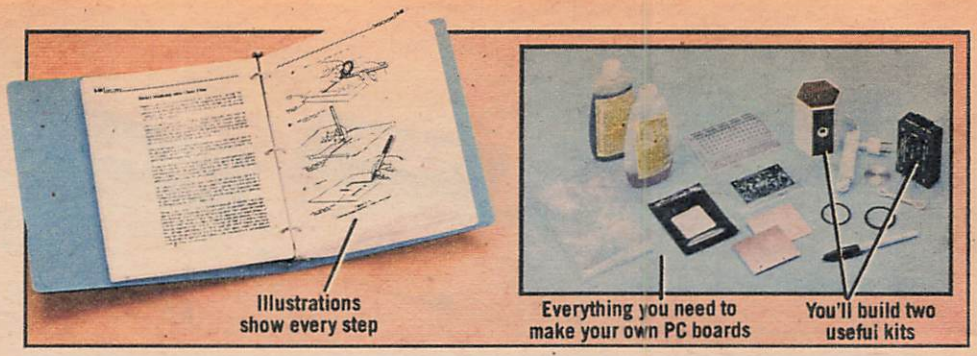
Kit ET-3300, Shpg. wt. 6 lbs. **94.95**
ETW-3300, Assembled and tested, 6 lbs. **159.95**

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

Printed Circuits Course helps you learn how to design and build your own PC boards

$64.95

- **Copy printed circuit board designs from magazines or design and build your own**
- **Includes all materials and two useful kits**



This fascinating course teaches you how to make printed circuit boards using both the direct pattern and photographic techniques. In the experiments, you'll actually design, layout and etch the circuit boards for two popular electronic kits – the GD-600 Photoelectric Lamp Switch and the GD-1287 Touch Switch – which you'll build during the course. All materials necessary to complete the kits and experiments are included. An etch-resist pen, rub-on transfers, art tape, etchant and sensitized PC boards are provided. And you get a positive pattern, clear acetate and photographic developer to make circuit boards by the photographic method.

In this Course you'll learn the properties of different types of PC board materials, the processes used in manufacturing PC boards, how to design a circuit board layout and prepare artwork. You will transfer images from artwork to the circuit board, and assemble PC boards using the manual assembly method, manual soldering and conformal coating. And you'll learn how PC boards are assembled, using automatic insertion machines and wave soldering. Expand your knowledge by starting this information-filled Course now.

Pass the optional final exam with a score of 70% or better and earn 2.0 CEUs and a Certificate of Achievement. The Printed Circuits Course is not available outside the Continental U.S.

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

Electronics for Hobbyists – made simple for you

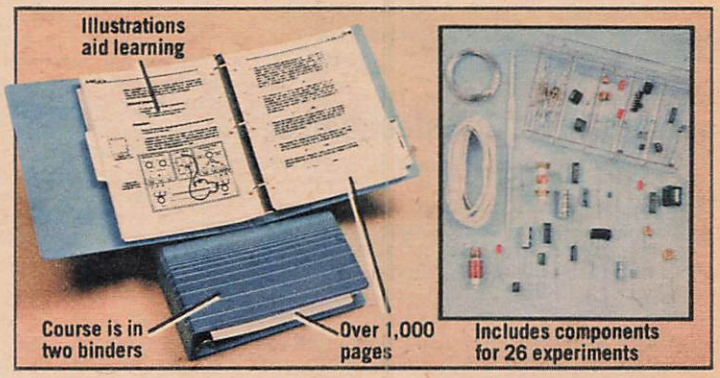
$59.95

- **Understand do-it-yourself magazine projects**
- **Experiments offer practical hands-on experience with basic electronic devices**

You'll understand those do-it-yourself electronic projects in popular magazines when you finish this course. Divided into seven units, the easy-to-understand text is backed up by 26 experiments, which provide hands-on experience.

The first unit, Direct Current, covers the basics of electronics: current, voltage, resistance, Ohm's Law, power, magnetism and basic measurement devices. Alternating Current, Unit 2, discusses AC, waveform measurement, measuring AC, oscilloscopes, inductance, capacitance and RLC circuits. Diodes, transistors, optoelectronic devices and integrated circuits (ICs) are covered in Unit 3, Active Devices. You'll learn about power supplies, amplifiers and oscillators in the fourth unit, Electronic Circuits. Unit 5, Digital Electronics, teaches number systems, logic elements, flip-flops, counters, shift resistors, clocks and one-shots. Microprocessors, computers, programming and software are discussed in Unit 6, Digital Computers. The final unit is a survey of electronic hobbies – experimentation, R/C modeling, computers, audio, shortwave and ham radio.

Included with the Course are a comprehensive text in two binders, and electronic components for 26 experiments – which use the ET-3100A Trainer (page 32), a multimeter (like the IM-5284, page 61) and an oscilloscope (like the IO-4105 on page 67).



Earn 4 CEUs by scoring 70% or better on the optional final exam.

EE-3140, Shpg. wt. 11 lbs. **59.95**

Introduction to Microprocessors, Trainer make learning operation and programming easy

$29.95

- **No knowledge or prior experience required**
- **Low cost Trainer for hands-on experience**

Microprocessors: An increasingly important part of our lives. Not only will you find microprocessors in computers – they can be found in many everyday products, from toys to typewriters. Here's your chance to learn this fascinating new technology in your spare time, at your own pace.

Here's a fast, economical way to learn how microprocessors operate and how to program common types of microprocessors. With this self-instruction course, you'll find all the information you need – without being swamped under with information you will never need. Six units and a host of programming exercises guide you through this complex subject. Units cover Number Systems and Codes, Microcomputer Basics, Computer Arithmetic, Introduction to Programming, and the 6808 Microprocessor. The programming experiments, which can be performed on the optional ET-6800 Microprocessor Trainer (described at right), give you valuable hands-on experience.

Passing the optional final exam with a score of 70% or better earns you 4.0 CEUs and a Certificate of Achievement.

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

SAVE $10.00! Buy Course and ET-6800 Kit Trainer together.

ETS-6800, Shpg. wt. 29 lbs. **119.90**

Hands-on machine-language programming

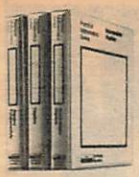
Everything you need to perform the programming experiments in the EC-6800 Course (left). A 17-key hexidecimal keyboard lets you access memory locations, enter programs, single-step through program and alter memory. The built-in 1K ROM monitor program controls Trainer operation.

Address and data readouts are a six-digit, hexadecimal 7-segment LED display. 120 VAC, 60 Hz, 12 watts. Dimensions are 3.75" H x 8" W x 10" D.

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

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

Save 30% — learn math fast with these audio/tutorial self-instruction courses



Algebra Fundamentals Course. Text and 7 cassettes cover algebra fundamentals. Pass optional final exam for 2.5 CEUs and Certificate of Achievement.

EM-3, 6 lbs. ..... **Was $49.95, NOW ONLY 34.95**

Algebra Course with text – 10 cassettes cover polynominal arithmetic, factoring, algebraic functions, exponents and radicals, linear equations, etc. 3.0 CEUs.

EM-4, Shpg. wt. 7 lbs. ..... **Was $49.95, NOW ONLY 34.95**

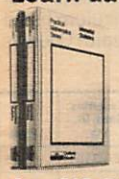
Intermediate Algebra Course with 9 cassettes, covers functions, relations and inverses, graphs and variation, linear relations, quadratic relations, systems of equations, etc. 3.5 CEUs and Certificate.

EM-5, Shpg. wt. 7 lbs. ..... **Was $49.95, NOW ONLY 34.95**

Save $10 by ordering all three Courses for a complete coverage of Algebra. $104.85 separately.

EMS-345, Shpg. wt. 20 lbs. ..... **ONLY 94.85**

Learn data analysis with these Statistics Courses



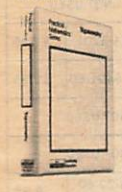
Descriptive Statistics and Probability Distributions Course with text and 7 cassettes. For the person with limited background in statistics. Precede with EM-3 or equivalent. 3.0 CEUs. **EM-7,** Shpg. wt. 6 lbs. **49.95**

Inferential Statistics Course; sampling, hypothesis testing, t, f, and chi square distribution, linear correlation and regression. 3.5 CEUs. **EM-8,** Shpg. wt. 8 lbs. **59.95**

Save $10. Order EM-7 and EM-8 Courses together. Reg. $109.90.

EMS-78, Shpg. wt. 14 lbs. **99.90**

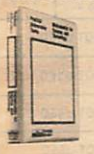
Fundamentals of Trigonometry Tutorial Course



Learn first-year trigonometry in depth. Includes text and 9 cassettes. Requires completion of EM-4 or equivalent. Covers circular functions, graphs, identities and proofs, inverse functions, conditional equations, right triangle trigonometry, solution of right triangles, polar coordinates, parametric equations, vectors and complex numbers. 4.0 CEUs.

EM-6, Shpg. wt. 7 lbs. **49.95**

Mathematics Course for Science and Technology



Course covers arithmetic and signed numbers, powers and roots, scientific notation, units and rounding, graphs, ratios and proportions, algebra, equations, triangle trig, vectors, probability and statistics. Successful completion of course, final exam earns 4 CEUs and Certificate.

EM-1, Shpg. wt. 9 lbs. **39.95**

Save 25% — learn the metric system

Think Metric, U.S.A. covers all aspects of the metric system with the aid of an audio cassette. Passing optional final exam earns 1.0 CEU and Certificate.

EM-2, Shpg. wt. 4 lbs. ..... **Was $19.95, NOW ONLY 14.95**

Cassette Recorder/Player for audio/tutorial courses

The ECP-3801A Cassette Tape Recorder/Player is recommended for use with courses containing audio cassettes. Pushbutton control play, rewind, fast forward, stop, eject and record functions. Also features a built-in condenser microphone so you can record or give dictation. Three-digit counter with reset button helps you find specific information quickly and accurately. This recorder is factory assembled and tested; not a kit.

ECP-3801A, Shpg. wt. 4 lbs. **60.00**

Heath-recommended premium-grade audio cassettes:

ECP-3802, Three 30-minute cassettes, 1 lb. ... **6.00**

SAVE 47% on these famous Berlitz courses

Berlitz Courses make learning Spanish, French or German fast and easy

$49.95

- **Each program features over six hours of expert guidance on audio cassettes**
- **Comprehensive to fill student, tourist or business needs**
- **Fifty lessons in each language from the acknowledged leader in teaching foreign languages**
- **Next to being in a foreign country, the best way to learn**

Planning a trip to a foreign country? Or want to get top grades in high school or college language classes? Here's good news. These three Berlitz self-instruction language courses make your language-learning the next best thing to being in a foreign country – so you can converse with people in foreign lands as soon as you step off the plane. Selected to be part of the Heathkit line because it meets the high standards of Heathkit/Zenith Educational Systems, Berlitz uses the techniques that have made it the leader in the field of teaching foreign languages for nearly 100 years.

To further enhance your learning experience, Berlitz Foreign Language Courses use a variety of native speakers to accustom your ear to the languages, and assure you of learning the precise pronunciation, accent and rhythm so essential to mastery of a foreign language.

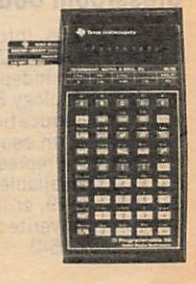
Each Course includes one 90-minute audio cassette, five 60-minute cassettes, six 50-page workbooks and a Rotary Verb Finder. The Verb Finder makes it easy to learn verb conjunction in the foreign language you are studying. Each of the three Berlitz Foreign Language Courses we offer comes attractively packaged in a handsome briefcase.

EL-201, French, 8 lbs. ..... **Was $95.00, NOW 49.95**

EL-202, German, 8 lbs. ..... **Was $95.00, NOW 49.95**

EL-203, Spanish, 8 lbs. ..... **Was $95.00, NOW 49.95**

Powerful TI-59 Programmable Calculator



The Texas Instrument TI-59 Programmable Calculator is ideal for advanced math calculations. It offers the most advanced features available in a hand-held calculator anywhere. Computer-like power and versatility with subroutines, looping, editing capabilities. Solid State Software modules expand the capability and flexibility of the Programmable 59 Calculator. Includes a master library of 25 prewritten applications programs, so you can use this calculator's power right away. This Texas Instruments Calculator is factory assembled and tested.

EMA-20, Shpg. wt. 7 lbs. **249.95**

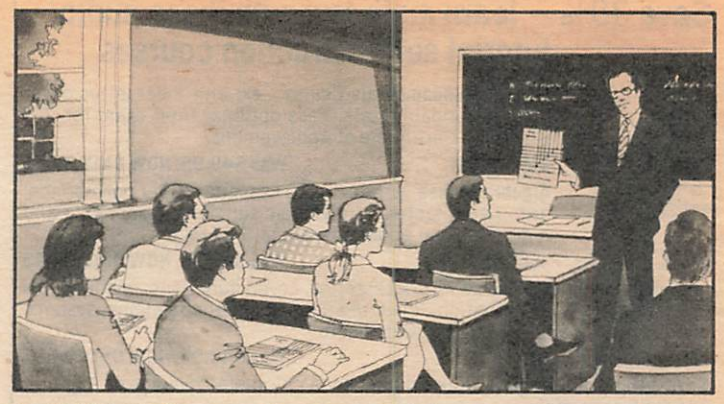
VISA MasterCard **Alaska, Hawaii and Michigan Residents: Call 616-982-3411**

Teachers, training directors: Heathkit/Zenith Classroom Courses fit 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 use, Heathkit/Zenith Classroom Courses incorporate the most up-to-date technical material available.

The courses listed below are formatted for flexible classroom use. 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 student workbook with examinations and laboratory 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 of the necessary components for implementing the workbook experiments. To complete experiments in DC and AC Electronics, Semiconductor Devices, Electronic Circuits and Test Instruments, the assembled and factory tested ETW-3100A Trainer, described on page 34, is necessary. Experiments for the Digital Techniques Course require the assembled and factory tested ETW-3200A Trainer, featured on page 37. Page 32 describes the assembled and factory tested ETW-3400 Trainer, required to complete the Microprocessor Course experiments.



Heathkit/Zenith Courses are the answer for industry, government and schools who want to cover subject matter efficiently at minimum cost. Many of these multi-media courses employ the latest techniques in programmed instruction, audio-visual presentations, self-test reviews, and hands-on experiments – for fast, thorough mastery by your students. Review the extensive curriculum listed below, and then contact us for more information on how Heathkit/Zenith Courses can serve your educational needs.

Classroom visuals available

Color Slides or 35-mm Filmstrips duplicate the flip charts included in the individual Microprocessor Course (pgs. 32-33), Auto Tune-Up and Auto Electrical Courses (p. 47). 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**

EB-20-70, Auto Tune-up Filmstrip, 1 lb. . **14.95**

EB-10-70, Auto Elect. Filmstrip, 1 lb. ... **29.95**

Classroom versions of proven courses

NEW

We've reformatted five of our popular electronics courses for classroom use – Op Amps, Active Filters, IC Timers, Phase-Locked Loops and Optoelectronics (described on page 39). Another new classroom course, EB-6140 – Concepts of Electronics, gives an overview of electronics from DC through digital. A sixth new course, EB-6134 – Printed Circuit Boards, is a thorough, hands-on program in this facet of electronic design.

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
DC Electronics	EB-6101	19.95	EB-6101-40	9.95	EB-6101-50	8.95	ETW-3100A	139.95	EB-6101-30	19.95	EEA-3101	11.95
AC Electronics	EB-6102	19.95	EB-6102-40	9.95	EB-6102-50	8.95	ETW-3100A	139.95	EB-6102-30	15.95	EEA-3102	11.95
Semiconductor Devices	EB-6103	19.95	EB-6103-40	9.95	EB-6103-50	8.95	ETW-3100A	139.95	EB-6103-30	15.95	EEA-3103	11.95
Electronic Circuits	EB-6104	19.95	EB-6104-40	9.95	EB-6104-50	8.95	ETW-3100A	139.95	EB-6104-30	29.95	EEA-3104	11.95
Test Instruments	EB-6105 (4 lbs.)	19.95	EB-6105-40	8.95	EB-6105-50	8.95	ETW-3100A	139.95	EB-6105-30	24.95	NOT USED	
Digital Techniques	EB-6201 (3 lbs.)	24.95	EB-6201-40	10.95	EB-6201-50	8.95	ETW-3200A	159.95	EB-6201-30	29.95	EEA-3201	11.95
Microprocessors*	EB-6401 (4 lbs.)	24.95	EB-6401-40 (1 lb.)	10.95	EB-6401-50	8.95	ETW-3400 (6 lbs.)	299.95	EB-6401-30	54.95	EB-6401-60	12.95
BASIC Programming	EB-6100 (4 lbs.)	15.95	EB-6100-40	8.95	EB-6100-50	8.95	NOT USED		PARTS, CASSETTES NOT USED			
Assembly Programming	EB-6108 (4 lbs.)	19.95	EB-6108-40	9.95	EB-6108-50	8.95	NOT USED		PARTS, CASSETTES NOT USED			
Auto Tune-Up	EB-20 (4 lbs.)	19.95	EB-20-40	9.95	EB-20-50	8.95	NOT USED		EB-20-30 (2 lbs.)	17.95	EB-20-60 (1 lb.)	9.95
Auto Electrical	EB-10 (3 lbs.)	17.95	EB-10-40	9.95	EB-10-50	8.95	NOT USED		EB-10-30 (2 lbs.)	17.95	EB-10-60 (1 lb.)	17.95
Operational Amplifiers	EB-601	18.95	EXPERIMENTS IN TEXT		EB-601-50	8.95	ETW-3300		EB-601-30 (1 lb.)	24.95	NOT USED	
Active Filters	EB-602	18.95	EXPERIMENTS IN TEXT		EB-602-50	8.95	ETW-3300		EB-602-30 (1 lb.)	14.95	NOT USED	
IC Timers	EB-603	18.95	EXPERIMENTS IN TEXT		EB-603-50	8.95	ETW-3300		EB-603-30 (1 lb.)	29.95	NOT USED	
Phase-Locked Loops	EB-604	18.95	EXPERIMENTS IN TEXT		EB-604-50	8.95	ETW-3300		EB-604-30 (1 lb.)	29.95	NOT USED	
Optoelectronics	EB-605	14.95	EB-605-40 (1 lb.)	9.95	EB-605-50	8.95	ETW-3300		EB-605-30 (1 lb.)	29.95	NOT USED	
Concepts of Electronics	EB-6140 (3 lbs.)	19.95	EB-6140-40 (1 lb.)	9.95	EB-6140-50	8.95	ETW-3100A		EB-6140-30 (1 lb.)	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	

You can receive more free information on Heathkit/Zenith Classroom Courses

Free brochures, information and price schedules on each Heathkit/Zenith Classroom Course are available from independent distributors representing Veritechnology Electronics Corporation to the vocational education market. They assembled Heathkit/Zenith educational products. See the list at right for the representative nearest you. Information is also available from Heath Contract Sales at 616-982-3519, or local Heathkit Electronic Centers (units of Veritechnology Electronics Corporation) – see p. 54).

Alabama	205-822-1326	Kansas	913-722-4713	North Dakota	612-533-2133
Alaska	907-456-1872	Kentucky	205-822-1326	Ohio	419-435-6517
Arizona	602-945-6605	Louisiana	205-822-1326	Oklahoma	214-361-8665
Arkansas	205-822-1326	Maine	207-397-2902	Oregon	503-635-3544
California (So.)	714-493-8040	Maryland	804-741-2580	Pennsylvania	717-533-4038
California (No.)	415-651-6720	Massachusetts	617-285-9028	Rhode Island	617-285-9028
Colorado	303-795-1450	Michigan	313-585-2300	South Carolina	919-776-8161
Connecticut	203-865-3034	Minnesota	612-533-2133	South Dakota	612-533-2133
Delaware	717-533-4038	Mississippi	205-822-1326	Tennessee	615-320-0339
Dist. of Columbia	804-741-2580	Missouri	314-837-8059	Texas	214-361-8665
Florida	305-647-5373	Montana	503-635-3544	Utah	702-358-0829
Georgia	305-647-5373	Nebraska	402-345-2797	Vermont	617-285-9028
Hawaii	808-536-6237	Nevada	702-358-0829	Virginia	804-741-2580
Idaho	503-635-3544	New Hampshire	617-285-9028	Washington	503-635-3544
Illinois (So.)	309-343-6135	New Jersey	717-533-4038	West Virginia	804-741-2580
Illinois (No.)	312-960-0363	New Mexico	602-945-6605	Wisconsin	612-533-2133
Indiana	317-293-5704	New York	516-922-6590	Wyoming	303-795-1450
Iowa	309-343-6135	North Carolina	919-776-8161		

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

1 For digital accuracy and affordable price, choose the Heathkit CM-1550 Engine Analyzer

If you need to test and adjust automotive-type internal combustion engines, you need the digital accuracy and versatility of the Heathkit CM-1550 Engine Analyzer. Now you can measure your dwell angle, engine RPM, voltage drop, current and resistance to the accuracy of a racing mechanic.

A 3½-digit LCD provides the resolution you need to adjust idle speeds and read small voltages. The CM-1550 measures dwell angle for 4, 5, 6 and 8-cylinder engines with ±0.2% accuracy; RPM with ±1% accuracy, ±10 RPM resolution; DC Voltage with ±1.5% accuracy, and resistance accurate to ±1.5 percent. With the optional Shunt Accessory (below), it can measure battery charging and discharging, plus starting current to 400 amps with ±5% accuracy.

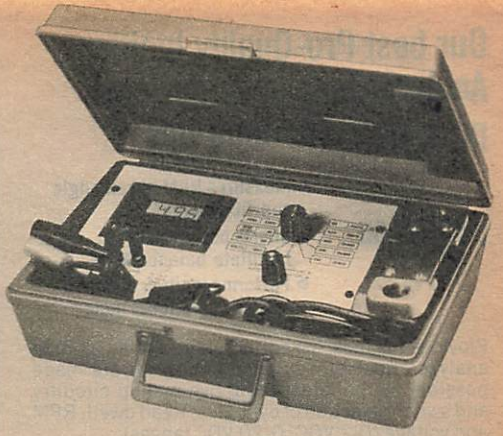
The CM-1550 is not only accurate, but also easy to use. A 9 V battery (not included) supplies power, so there are fewer wires under the hood. Thermally insulated wiring resists melting or burning. The tachometer's inductive pickup snaps on and off for quick set-ups. And a rugged plastic case makes the CM-1550 easy to store and carry. Tune up your engine with digital accuracy.

Kit CM-1550, Shpg. wt. 5 lbs. **117.95**

Shunt Accessory enables the CM-1550 to measure current up to 400 Amperes.

CMA-1550-1, Shpg. wt. 1 lb. **14.95**

CM-1550 SPECIFICATIONS: Dwell: 4 cyl., 0-90°; 5 cyl., 0-72°; 6 cyl., 0-60°; 8 cyl., 0-45° – all ±0.2%. **RPM:** 0-1999, ±10; 0-10000, ±0.1%. **Voltage:** 0-19.99 amps, and 0-199.9 VDC, ±1.5%. **Direct Current:** 0-19-99 amps, ±3%; 0-400 amps, ±5% (High range requires CMA-1550-1). **Resistance:** 0-199.9 ohms, 0-19.99 kilohms and 1.999 megohms, ±1.5%. **Operating Temperatures:** 0-140°F (−18 to +60°C). **Battery Life:** To 200 hrs. Lo-bat during last 20% of life. **Dimensions:** 3.63" H x 12.25" W x 8" D (9.22 x 31.16 x 20.32 cm).



1 **Measures battery charge, discharge starting currents**

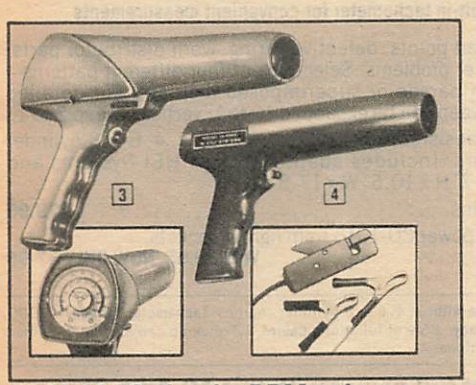
2 **Meter includes substitute capacitor and spark test**

2 The CM-1050 Engine Analyzer gives you better tune-ups for greater economy

Whether it's a 4, 6 or 8-cylinder engine that you need to test – conventional, magneto, transistorized or most capacitive-discharge ignition systems – you can do it, and do it well with the Heathkit CM-1050 Analog Engine Analyzer. You can pinpoint troubles in the ignition, alternator or generator, voltage regulator, distributor, condenser, plugs, starter, battery and auto accessories. You'll detect those problems on a large, color-coded 6-inch meter that's easy to read. Requires 3 "C" cells (not supplied). Includes all leads and accessories for complete automotive tune-ups.

Kit CM-1050, Shpg. wt. 8 lbs. **107.95**

CM-1050 SPECIFICATIONS: Dwell Ranges: 0-60°, ±3%3% of full scale. **Tachometer Ranges:** 0-1200 and 0-6000 RPM, ±3% of full scale. **Voltmeter Ranges:** 0-3.2, 0-16 and 0-32 VDC, ±3% of full scale. **Current:** 0-90 amps, ±3% of full scale. **Ohmmeter: Ranges:** R x 1 (100 center scale), R x 100 (10 kilohms center scale), ±3% arc. **Spark Output:** 0-50. **Point Resistance:** Good/Bad test. **Alternator:** Good/Bad test. **Accessories:** 0.25 ohm resistor assembly and 90 amp shunt. **Overall Dimensions:** 7.50" H x 10.50" W x 8.75" D.



3 CI-1096 checks RPM, advance

Measures mechanical, vacuum advance to 60° from 1500 to 4500 RPM. Super-bright Xenon flash is easy to see in any lighting. The Tachometer shows engine speed up to 4500 RPM. 12 VDC. Induction pickup for easy attachment.

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

4 Timing Light for easier tune-ups

Bright Xenon flash makes marks easy to read, even in sunlight. Inductive pickup attaches, detaches for fast setups. Assembles in 1 evening. 12 VDC.

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

5 Handy Tune-Up Meter saves dollars on small engine maintenance

Save on small engine repair costs by doing the maintenance yourself with the CM-2045 Tune-Up Meter. This easy-to-operate Meter works on 1-4 cylinder, 2 or 4-cycle engines.

The CM-2045 is five meters in one: a four-scale dwell meter for measuring the dwell angle; a voltmeter (0-20 VDC) for checking a battery's strength, available starting voltage and charging voltage; an ohmmeter (0-100 kilohms; 10 kilohms center scale) to test resistance of electrical wiring and components; a 0-15,000 RPM tachometer with a 0-3000 RPM range for setting idle speed; and a continuity tester for finding breaks in ignition wiring. Comes in rugged, portable case. Operates on 3 "C" cells (not included).

Kit CM-2045, Shpg. wt. 4 lbs. **57.95**

6 With the price of tune-ups today, Tune-Up Meter is a wise investment

The Heathkit CM-1073 Tune-Up Meter is a two-evening kit that will pay for itself in two uses at today's tune-up prices. It enables you to do simple dwell, engine speed and battery voltage tests you normally pay a mechanic to do. Combines dwell scales for 3, 4, 6 and 8-cylinder engines, tachometer with 0-1500 and 0-4500 RPM ranges, and a 0-20 VDC voltmeter. Unique circuit shows measurements with only 2 leads and no battery. Use with both 6 and 12-volt systems with positive or negative ground, and with solid-state and high-energy ignition systems. Rugged plastic case.

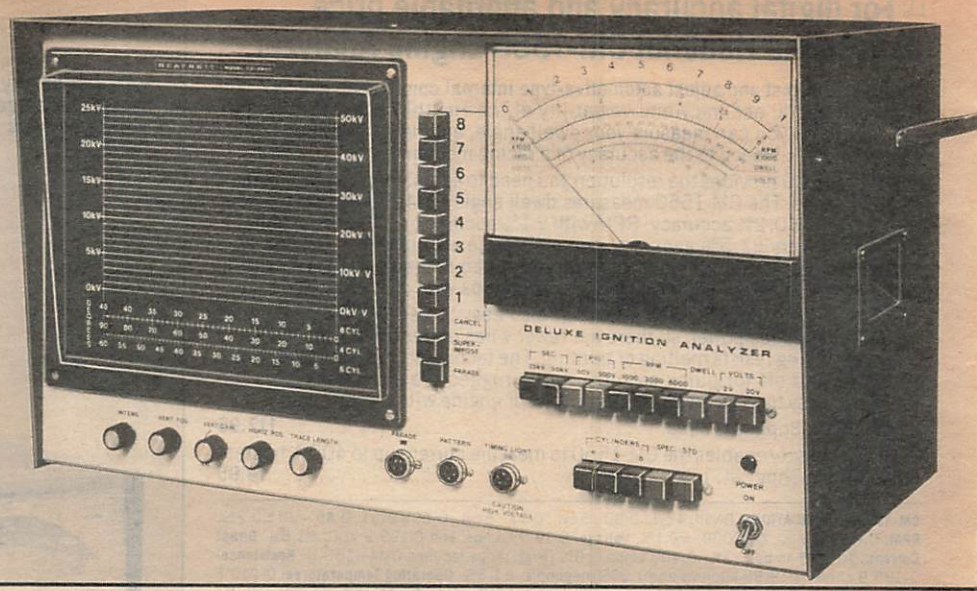
Kit CM-1073, Shpg. wt. 4 lbs. **47.95**

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

Our best Pro-Quality Ignition Analyzer helps you perform precision auto tune-ups

$514.95

- **Measures RPM, dwell angle and DC voltage**
- **Shorts out cylinders to facilitate balance tests**
- **Performs ignition advance tests with optional meter**



Provides the most asked-for features in an ignition analyzer. Rock-steady parade patterns are made possible by the latest inductive pickup circuitry and switch selection of cylinders. Read dwell, RPM and voltage (0-2 VDC, 0-20 VDC ranges).

Banks of cylinders can be shorted for carburetor balance, and one or more cylinders can be displayed for a closer examination of individual cylinder conditions. Both parade and superimposed displays of primary and secondary waveforms, at two different amplitudes, are available on the 12" diagonal CRT.

For use with 4, 6 or 8-cylinder (4-cycle), or 2-rotor Wankel engines and standard, transistorized or C-D ignitions. Includes adapter for GM HEI systems.

Kit CO-2600, Shpg. wt. 83 lbs. **514.95**

Timing Light/Advance Meter plugs directly into CO-2600, provides a bright flash that can even be seen in daylight. Built-in advance meter measures from 0-600 (0-4500 RPM). With cables.

Kit COA-2600-4, Shpg. wt. 3 lbs. **57.95**

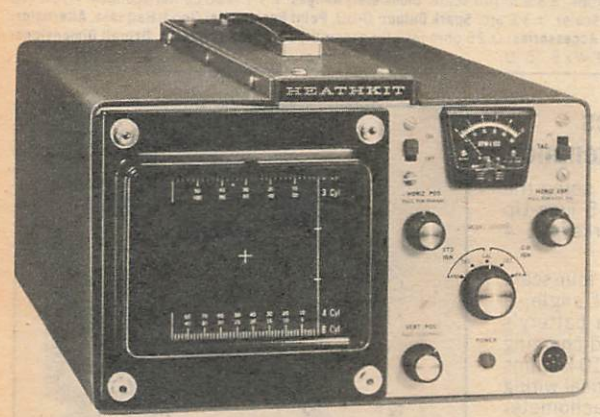
Save on Alternator Test Adapter for CO-2600.
COA-2600-2, 1 lb. .. **Was $14.95, NOW ONLY 13.95**

Save On Scope Cart

Keeps CO-2600 at the ideal viewing angle, for easy readings. Rolls from place to place on casters.

COA-2600-3, Wt. 25 lbs.
Was $49.95, NOW ONLY 44.95

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:** 12.88" H x 25.25" W x 14.3" D (32.72 x 64.14 x 35.89 cm). **Optional Accessories:** Timing Light/Advance Meter, Cart.



Budget-priced Ignition Analyzer for tune-ups

$229.95

- **Use on three, four, six or eight-cylinder engines**
- **Easier to use than meter-type analyzers**
- **Built-in tachometer for convenient measurements**

Detects shorted plugs, bad points, defective wiring, worn distributor parts, incorrect dwell angle, other problems. Select one of four different patterns – primary or secondary, in parade or superimposed displays. For detailed analysis, the horizontal sweep can be expanded 10 to 1; vertical sweep 2 to 1.

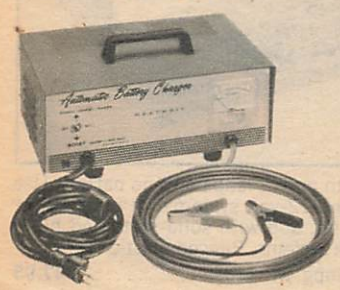
Use with any standard, transistorized or C-D ignition on 3, 4, 6 or 8-cylinder engines with distributors. Includes adapter for GM HEI Systems and handbook. 120/240 VAC. 7" H x 10.5" W x 17.5" D.

Kit CO-1015, Shpg. wt. 22 lbs. **229.95**

Save on 12 VDC Inverter to power CO-1015 from lighter sockets.
Kit COA-1015-1, 3 lbs. ..... **Was 39.95, NOW ONLY 37.95**

CO-1015 SPECIFICATIONS: For use with: 3, 4, 6 or 8-cylinder engines. **Tachometer Ranges:** 0-1000, 0-5000 RPM. **Tachometer Accuracy:** ±5% of full scale. **Cables:** 12' pick-up cable; ground, primary and secondary leads extend additional 2'.

Heathkit 50-Amp Boost Charger revives dead batteries



Gives you a 50-amp boost that quickly charges dead batteries. Also charges batteries at a continuous 15-amp rate. A convenient front panel meter indicates the charging rate, current and full charge level. Complete protection prevents damage to charger or battery. For 12 VDC, positive or negative ground batteries. Enjoyable kitbuilding experience – assembles in just two evenings. Includes all cables. 120 VAC. This rugged Charger is 6.13" H x 11.5" W x 7.75" D.

Kit GP-1044, Shpg. wt. 22 lbs. ... **79.95**

Keep your battery at full power with this 10-Amp Charger

The GP-21 Automatic Battery Charger charges 12-volt batteries at a 10-amp rate, and turns off automatically when battery is fully charged. Front panel meter indicates rate of charge and full charge. Easy to use – just connect battery cables (included with this kit) to your car's battery terminals, plug charger into AC outlet. Safety circuit prevents sparking. For 12 VDC batteries. Build in just two evenings with the easy-to-follow manual. Uses 120 VAC, 60 Hz house current. Sturdy metal case measures 5.5" H x 9" W x 6.38" D (13.97 x 22.86 x 16.20 cm).

Kit GP-21, Shpg. wt. 13 lbs. **57.95**

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

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

$99.95

- **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, Shpg. wt. 7 lbs. **99.95**

CSA-2048-1. For front-wheel-drive cars not listed below or replacement parts. Kit contains magnet pair, adhesive and filament tape, plus instructions for installation and parts replacement. Shpg. wt. 1 lb. **8.95**

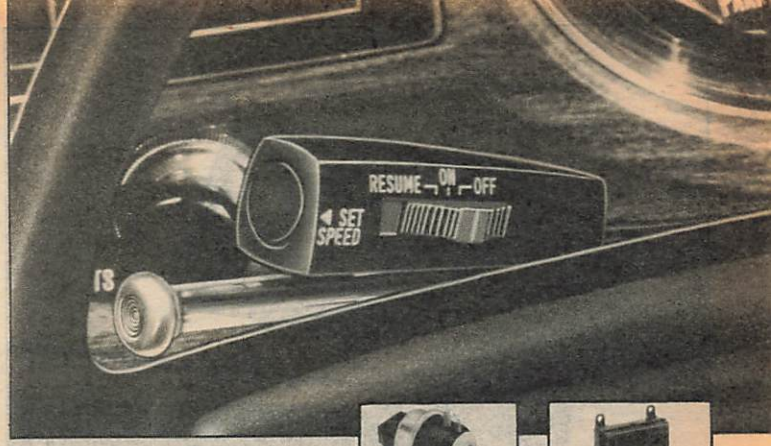
CSA-2048-2. For '73-'75 Honda Civic, '75-'81 Honda CVCC or '77-'81 Honda Accord. Shpg. wt. 2 lbs. **18.95**

CSA-2048-3. For '75-'81 Toyota Corollas. Shpg. wt. 2 lbs. **18.95**

CSA-2048-4. For '73-'81 Toyota Corona, Celica, Crown, and Mark II, '75-'78 Toyota Pickup; '75-'77 Datsun 610/710, '77-'81 Datsun 810, '75-'81 Datsun 280-Z, ZX, '81 Datsun Pickup. Shpg. wt. 1 lb. **8.95**

CSA-2048-5. For the following fuel-injected cars: '76-'81 Volkswagen Rabbit, Dasher, Scirocco; '76-'81 Audi Fox. Shpg. wt. 2 lbs. **18.95**

CSA-2048-6. For '75-'81 Datsun B-210, '77-'80 Datsun F-10/310. Shpg. wt. 2 lbs. **18.95**



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 the CS-2048.

Vacuum Servo attaches to throttle

Electronic control

Siren/PA system for emergency vehicles

Here's a budget priced, but reliable Siren and Public Address system for your community's volunteer emergency unit or rescue squad – and it's available in either kit or factory-assembled and tested form. It features a 55 watt siren with automatic or manual wail to accommodate different traffic situations in your community. A 20 watt Public Address system amplifies your voice for emergency public announcements and your radio calls for times when you're away from your vehicle. 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 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. **79.95**

WD-5130, Siren/PA amp, assembled, Shpg. wt. 6 lbs. **134.95**

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

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

Concealed grille horn

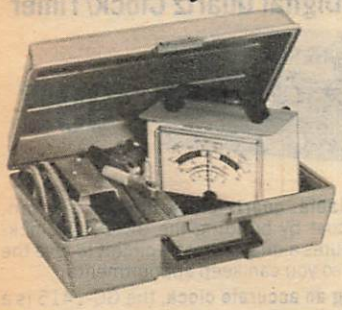
Exterior mount horn

SAVE $20.00 **On these Siren/PA systems!** If purchased separately, $179.90

GD-18A (Kit GD-18 & Exterior horn) Shpg. wt. 21 lbs. **159.90**

GD-18B (Kit GD-18 & Concealed horn) Shpg. wt. 21 lbs. **159.90**

Exhaust Analyzer checks efficiency of your car



Now you can squeeze more power and performance out of every drop of gasoline you buy with the CI-1080 Exhaust Analyzer. By analyzing your car's exhaust, the CI-1080 measures air-to-fuel ratio and combustion efficiency. An easy-to-read meter on the CI-1080 tells you instantly whether your car's air-to-fuel ratio is unnecessarily too rich or too lean for maximum efficiency and fuel economy.

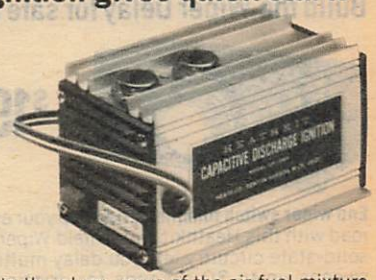
Besides measuring your automobile's air-to-fuel ratio and combustion efficiency, the CI-1080 Exhaust Analyzer also indicates the percentage of carbon monoxide in your car's exhaust. This percentage gives you a relative figure you can use to compare your exhaust emissions with the manufacturer's specifications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

Kit CI-1080, Shpg. wt. 6 lbs. **99.95**

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

Capacitive Discharge Ignition gives quick starts



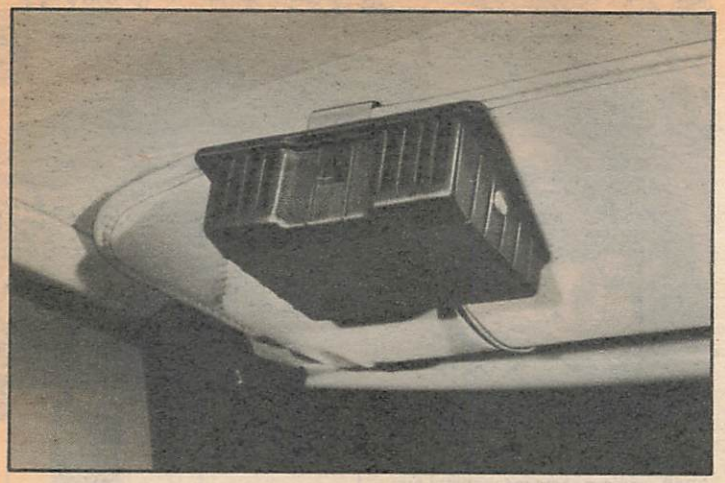
Save wear and tear on your starter motor, battery, and nerves this winter with the CP-1060 Capacitive Discharge Ignition. It gives you faster starts in colder weather because your plugs get a stronger spark. Special solid-state circuits provide more voltage to heat and ignite your air-fuel mixture on cold mornings.

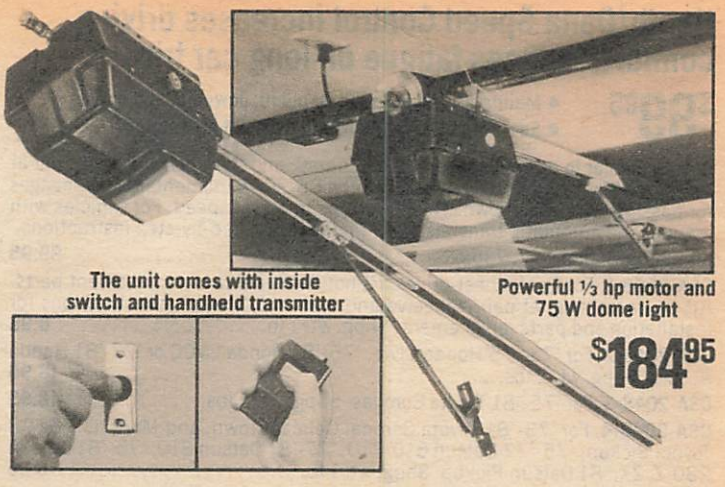
Besides giving you faster starts in cold weather, the CP-1060 helps your car's engine burn its fuel more efficiently. By increasing the voltage to the plugs, more of the air-fuel mixture explodes in the cylinder – giving you added power and better acceleration.

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. **57.95**





The unit comes with inside switch and handheld transmitter

Powerful ⅓ hp motor and 75 W dome light

$184.95

Easy-to-install Heathkit Ultrasonic Intrusion Alarm System protects your car and valuables

$57.95

- **Safeguards your valuables in your car, van, boat, or any other enclosed area**
- **Easy installation – just four wires to connect**

Car speakers, Cassette decks, CB's, FM Stereo Portable Radios. They're all on a thief's shopping list. And if you own one of these devices in your car, van, boat, or camper, chances are they can become a thief's target this spring. But, if you build the new GD-1568 Intrusion Alarm now, you can deter that thief and save yourself a lot of money, time, and auguish later on.

The GD-1568 discourages potential thieves by using invisible ultra-sonic waves to monitor the area you want secured. Any movement inside, such as a hand reaching in to steal a valuable package, or to break into the glove compartment, will trigger the alarm circuit. This, in turn, sets off your vehicle's horn or other sound device with a constant or pulsating alarm for fifty seconds, alerting neighbors and the public that something's wrong. After triggering, the GD-1568 automatically resets and resumes protection.

And what's really nice about the GD-1568, is that it installs easily. It requires no drilling, or major switch installation. All you do is hook up four wires to any 12 VDC electrical system and sound device. Optional pin switches give you extra protection for compartments with hinged doors.

Kit GD-1568, Shpg. wt. 2 lbs. **57.95**
GDA-1568-1, Trunk and hood pin switches for GD-1568. 1 lb. **6.95**
Horn relay switch (for cars without built-in horn relay).
GDA-1558-1, Shpg. wt. 1 lb. **4.95**

Provide for your spouse's safety and convenience with the Heathkit Automatic Garage Door Opener

In the dark, or in a storm, just a press of the transmitter button from the car, and the Heathkit Garage Door Opener automatically opens the door, and greets your spouse with an illuminating 75-watt dome light as the car rolls into the lighted safety and dry shelter of your garage. An inside garage switch securely closes the door and turns off the light after safe entry. And for extra security, you can program the FCC-approved transmitter with 256 codes. For doors to 7.5' H.

Transmitter, Receiver and Door-Opener Mechanism.
Kit GD-3309C, Shpg. wt. 45 lbs., Mtr. Frt. **184.95**
Two Transmitters, Receiver and Door-Opener Mechanism.
Kit GD-3309D, Shpg. wt. 46 lbs., Mtr. Frt. **199.95**
Kit GDA-3309-1, Door Opener Mechanism Only, 44 lbs., Mtr. Frt. **159.95**
Kit GDA-3209-2, Adapter for jamb and pivot doors. 3 lbs. **10.95**
GDP-3309A, Transmitter only, Shpg. wt. 1 lb. **26.95**
GDP-3319A, One Transmitter, One Receiver for 3 wire systems. 1 lb. **54.95**
GDP-3329A, Two Transmitters, One Receiver for 3 wire system. 2 lbs. .. **69.95**
Power Transformer for adapting 2-wire opener to 3 wire system.
GDA-3309-3, Shpg. wt. 1 lb. **9.95**

GD-3309 SPECIFICATIONS: Overall Size: 12" H x 9" W x 120" L. **Motor:** 117 VAC ⅓ HP. **Mounting Clearance:** 3" above highest point of door travel. **RF Frequency:** 310 MHz. **VHF Receiver:** Powered by 24 VAC from opener mechanism. Usable on any 3-wire mechanism or 2-wire with addition of GDA-3309-3. For standard NEC wiring. Includes 20' cable.

Build the Wiper Delay for safe driving

$19.95

End wiper switch fumbling and keep your eyes on the road with this Heathkit Windshield Wiper Delay. Its solid-state circuitry lets you delay multiple wiper sweeps up to 30 seconds for drizzle, or delay multiple sweeps down to 0.5 seconds for downpours.

It fits most single and 2-speed electric wiper systems on GM, AMC, Ford (except '72-'76 Montegos and Torinos, '74-'76 Cougars) and Chrysler (except those with motor reversing parking systems) vehicles. Auto wiring diagrams must be obtained from car manual or through local car dealership.

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

Handy Digital Speedometer/Tach

$59.95

Unlike conventional speedometers, the CI-1265 is more accurate and easier to read. Its bright, illuminated, digital display shows your car's speed up to 199 mph or kph. And it will record speed changes down to 1 mph. With the push of a button, the CI-1265 changes to a tachometer, registering engine RPM in multiples of 100 for easy reading.

Measures 1 13/16" H x 4 11/16" W x 3⅓" D. For 4, 6, or 8 cylinder, 4-cycle engines with spark ignitions & 12 VDC neg. gnd. Includes hardware, instructions.

Kit CI-1265-1, for cars w/o CS-2048, 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. .. **8.95**

Accurate Digital Quartz Clock/Timer

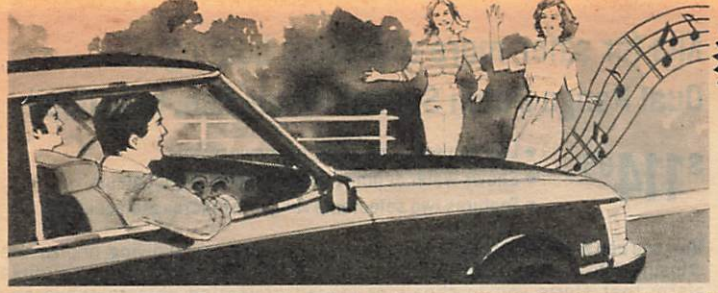
$39.95

Install a reliable, quartz clock in your car, van, camper, or boat by building the GC-1415 Clock/Timer. It features a quartz crystal circuit to give the exact time – so you can keep appointments.

Besides being an accurate clock, the GC-1415 is a Timer, too. It keeps track of hours and minutes up to 24 hours, or minutes and seconds up to 10 minutes. For convenience, you can switch back and forth from clock to timer or hold either one without affecting the other. 1.8" H x 4.71" x 3.12" D.

Kit GC-1415, Digital Clock w/Timer, 2 lbs. ... **39.95**
Digital Clock without Timer.
Kit GC-1406, Shpg. wt. 1 lb. **24.95**

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



NEW

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

$77.95

- **Choose from 16 pre-programmed tunes from our music book of 50 tunes, or add your own tunes**
- **Select songs with 3-button in-car keyboard**

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 "Swanee River."

The 3-button external keypad, which mounts at any convenient location on the steering wheel 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.

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. **77.95**

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:** 1.50" H x 7.75" W x 4.88" 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

$79.95 for EAC-1

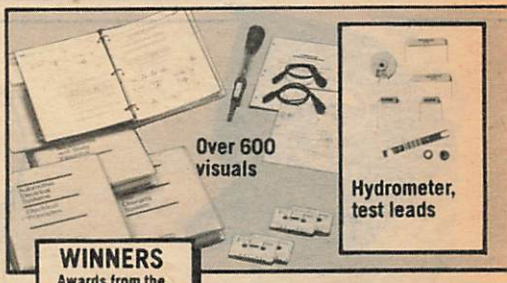
- **Covers starting, charging, accessory/body electrical systems**
- **Features hands-on experiments to show repair procedures**

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 CEUs – score 70% on final exam.

SAVE $19.85 on all Modules. EAC-1, 23 lbs. **79.95**

EA-11, Module 1/Elect. Principles, 5 lbs. **24.95**
EA-12, Mod. 2/Starting System, 5 lbs. **24.95**
EA-13, Mod. 3/Charging System, 5 lbs. **24.95**
EA-14, Mod. 4/Acc. & Body Elec. Sys., 5 lbs. **24.95**

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



Learn how to tune-up your own car – save time, money

$79.95

- **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. **79.95**

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

SAVE $25.00! Order EAC-1, EAC-2000 and EAC-2-1. $174.85 separately. **EAS-2000,** 32 lbs. **149.85**

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

1 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**

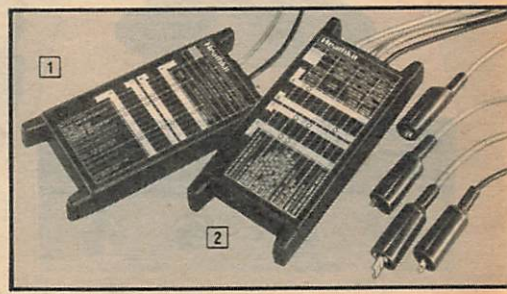
2 Charging System Tester

$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 0.75" H x 2.50" W x 5.50" L case.

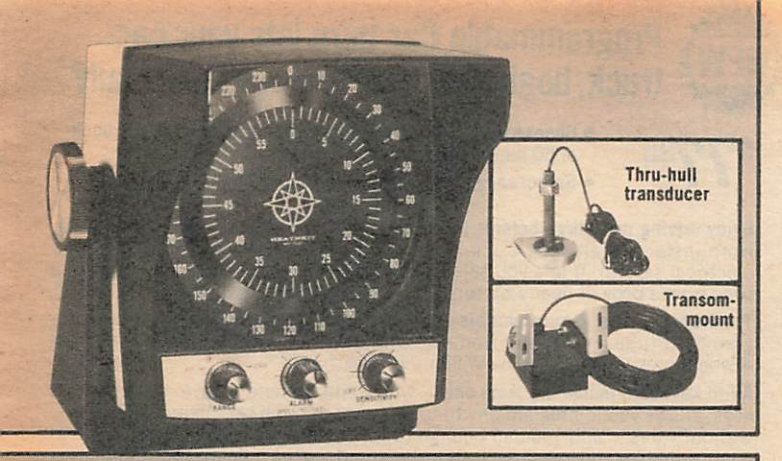
Kit CI-2065, Shpg. wt. 2 lbs. **19.95**



See our Electronics (pgs. 31-42), Computer (pgs. 90-92) and Weather (p. 100) Courses.

Kits for safer, more enjoyable boating

Dual Range Depth Sounder finds fish, tells depth



$114.95

- Lets you safely navigate unknown waters
- Shows water depth or depth of submerged objects
- Features two selectable ranges for increased accuracy

Now you can safely explore unknown waters for fishing, scuba diving, or pleasure cruising with this MI-1031 Depth Sounder. It features a high pitched audible alarm that alerts you to shoals or jagged projecting objects above any pre-selected depth from 5' to 240'. It also has two selectable ranges: 0-60'; and 0-24,' a noise rejection circuit to eliminate ignition interference. Comes in non-corrosive Cycolac® case with super-bright neon indicator. Case measures 6½" H x 5¾" W x 7¼" D.

Kit MI-1031-1, with thru-hull transducer & 15' coax cable, wt. 8 lbs. . . . **114.95**
Kit MI-1031-2, with transom-mount transducer & 25' coax cable, 8 lbs. . **114.95**

Heathkit Seeker™ shows where the fish are

This Heathkit Seeker gives you a graphic picture of number of fish, and the depth where they are feeding.

You'll find those fish time and time again with the Heathkit Seeker. It features an extra wide beam transducer that provides a bigger picture of what's below, allowing you to mark more fish. Three depth selections (5'-200', 200-400', or 400-600'), along with a white line control, let you accurately gauge the depth of the fish and weight your line accordingly. In addition, the Seeker gives you a permanent record of your findings on a straight-line recorder roll chart.

The Seeker features a rugged housing with a locking hinged panel for quick chart roll replacement. The front panel is water-tight, and is lighted for night reading. Comes with easy-to-install gimbal mount and includes one chart roll that lasts 13 hours. Runs off 12 VDC system. 8" H x 11" W x 7" D.

Kit MI-2910-1, with thru-hull transducer & 30' cable, Shpg. wt. 17 lbs. **314.95**
Kit MI-2910-2, with transom-mount transducer & 30' cable, wt. 17 lbs. **314.95**
MIA-2910-1, two rolls of chart paper. Shpg. wt. 2 lbs. **10.95**
MIS-2910-1, Save $15.75! 12 rolls. If purchased sep. $65.70, 12 lbs. . . **49.95**

1 Catch more fish with portable Fish Spotter™

Light-weight and battery powered, this unit audibly detects fish between the transducer and any preset depth you choose up to 240'. It features 2 selectable ranges: 0-60'; and 0-240' for increased sensitivity. Also, there's a noise rejection circuit to block out ignition interference, plus a neon indicator and sunshade for easy day or night reading. Comes with suction-type transducer and case. Requires two 6-volt lantern batteries. 7" H x 6" W x 11" D.

Kit MI-2901, Shpg. wt. 8 lbs. **119.95**
Kit MIA-2900-1, Scanning Transducer Bracket for MI-2901, 4 lbs. **34.95**

2 Locate all kinds of fish with Thermo-Spotter®

Take this on your next fishing trip. It shows water temperature down to 100' so you can find the exact swimming level of your favorite aquatic dish. Features one push-button operation and marked depth cable enclosed in a rugged take-up reel case. Includes fish temperature charts. Requires one 1.5 V AA battery. Measures 10¼" H x 5¾" W x 3¼" D.

Kit MI-104, Shpg. wt. 3 lbs. **49.95**

3 Radio Direction Finder for safer navigating

Now you can safely venture out of sight of land or go for a night cruise with the MR-1010. It gives you a fix on your position by tuning in and locating the signal direction of long wave beacons (190 to 410 kHz) or broadcast band stations (535 to 1605 kHz). It features a big Azimuth ring for loop antenna marked in 2° increments (±3° accuracy), plus a lighted null meter, sensitivity control, and telescoping sensing antenna for directional readings without 180 ambiguity. Unit measures 7¼" H x 11½" W x 12" D. and operates off your boat's 6 or 12 VDC system or 6 "D" cells. Can be aligned without instruments.

Kit MR-1010, Shpg. wt. 14 lbs. **279.95**

4 Power Invert provides boat with AC power

For boaters, campers, or emergency use. Converts 12 VDC to 120 VAC to power TV or appliances up to 175 W. Not for high-starting current motors such as refrigerator motor.

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

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

$147.95

- **Keeps track of your boat's speed and distance with ±5% accuracy**
- **Designed to be used on all types of hulls**
- **Priced 50% lower than comparable models**

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 & log 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 your 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, 1" digits. With flip of a switch, it will readout speed in mph (or knots), from .1 to 40 mph; or it will tell you distance traveled from 0 to 99 miles (or 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 the MIA-2950 thru-hull transducer or the MIA-2950-2 transom-mount transducer.

1 **MI-2958, Sailboat Speedometer/Trip Log,** Shpg. wt. 4 lbs. **147.95**

Heathkit Digital Depth Sounder prevents costly hull repairs, avoids passenger injury

$174.95

- **Detects changes in depth from 2' to 499'**
- **Alerts you to depth changes audibly & visually**
- **Built-in, automatic displacement hull offset**

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 .9 seconds. Big, easy-to-read LCD display with auto night light shows depth in .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.

MI-2916-1, Digital Depth Sounder with Thru-Hull Transducer, 8 lbs. **174.95**
MI-2916-2, Digital Depth Sounder with Transom-Mount Transducer, 7 lbs. **164.95**
MI-2916-3, Digital 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. **Dim:** 2½" H x 7.0" W x 5½" D.

3 Digital Remote provides extra repeater station

Works off the MI-2916 above. Features same display, alarm settings, keel-offset, and all-weather construction. Independent alarm settings and keel offset capability. Includes 25' connector cable. Sealed cabinet measures: 2½" H x 7.0" W x 5½" D.

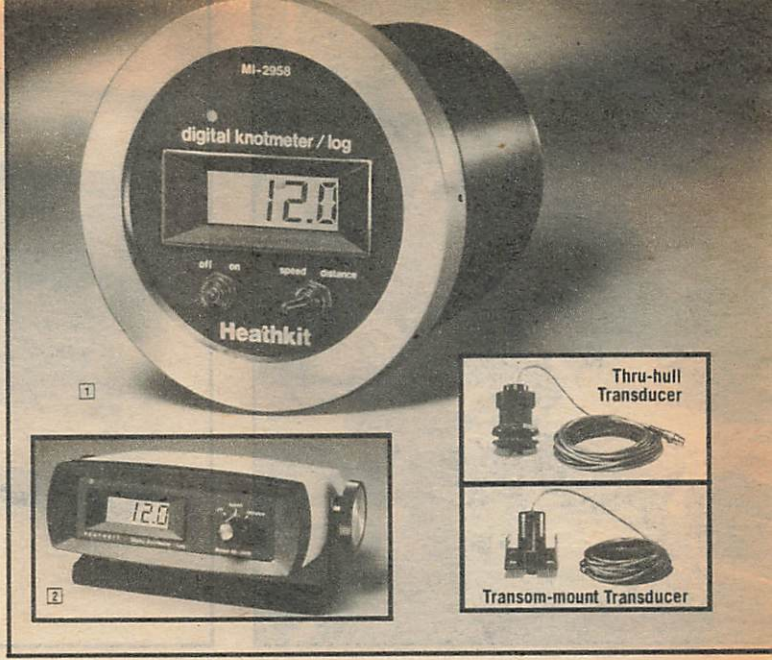
Kit MI-2917, Shpg. wt. 4 lbs. **119.95**

4 Flush-mount Digital Readout for Sailboats

Operates like MI-2917. Requires MI-2916. Dim.: 5" diam. x 4½" L.

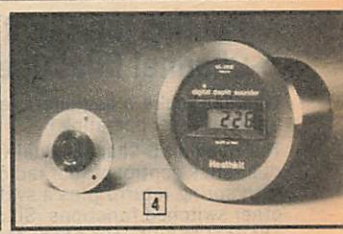
Kit MI-2918, Remote with visual warning only, wt. 4 lbs. **144.95**
Kit MIA-2918-1, Audible warning alarm for MI-2918, wt. 1 lb. **19.95**

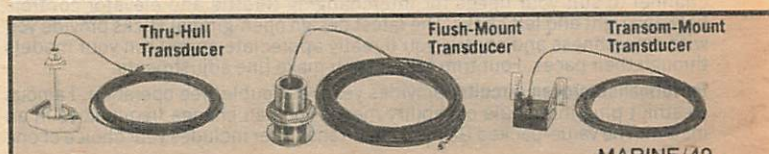
Alaska, Hawaii and Michigan Residents: Call 616-982-3411



2 **MI-2956, Powerboat Speedometer/Trip Log,** Shpg. wt. 4 lbs. **137.95**
MIA-2950-1, Thru-hull Transducer, Shpg. wt. 2 lbs. **37.95**
MIA-2950-2, Transom-Mount Transducer, Shpg. wt. 2 lbs. **27.95**

MI-2958 & MI-2956 SPEC: 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.





Versatile Heathkit Pack-17™ R/C system grows along with your Radio Control hobby

The Heathkit Pack-17 R/C is a system you can live with – and grow with – as your interest and ability in radio control modeling grow. The unique, patented Heathkit Pack-17 Radio Control System gives you a choice of 17 different transmit and receive frequency modules. With this capability of instant frequency change, you don't have to wait when someone else is on your channel.

You get the performance and reliability every RC'er wants, plus build-it-yourself kit value. Heathkit Pack-17 Transmitters, Receivers and Servos have the quality and reliability you need for serious R/C competition. The easy-to-handle transmitters are compact and comfortable. The positive-action open-gimbal control sticks are smooth and responsive.

Leading the way in innovations, Heathkit Pack-17 was the first system of its kind to use ceramic filters to eliminate drift – and the first system to put eight channels in a single, convenient unit for added versatility.

With Heathkit Pack-17 R/C, you don't throw away expensive batteries after just a few hours. Rechargeable nickel-cadmium batteries are included with each transmitter to save you money. And Pack-17 R/C can be used with every kind of R/C model plane, boat, car or other application.

So if you are just getting started – or are upgrading – in the fascinating and exciting world of radio control modeling, you would be wise to put your money on a system that offers you real versatility and added value. That system, of course, is Heathkit Pack-17 R/C. It's a system loaded with convenience, and one that you can adapt to fit your expanding knowledge and requirements.

Start right, by starting with the system you can grow with – the Heathkit Pack-17 R/C! You'll be glad you did.

1 Put this top-flight value on the air – Heathkit 5-Channel Dual Open-Gimbal Stick Transmitter

Whether you're a beginner, weekender or experienced pro, here's an ideal transmitter for operating R/C planes, cars or boats.

The Heathkit 5-Channel Dual Open-Gimbal Stick R/C Transmitter gives you dual-stick control of four radio control channels (one with ratchet and three with spring return) plus a switch-activated auxiliary channel for retracts or other switched functions. Since you build it yourself, you can tailor stick to channel to suit your needs for interchanging throttle and elevator controls between right and left sticks. The latest design open-gimbal sticks provide you with smoothness and control you'll really appreciate as you run your models through their paces. Four trim tabs let you make fine adjustments.

Performance-proven circuitry provides years of trouble-free operation. Famous Heathkit plug-in module capability means you can change frequencies in an instant. The value-packed GDA-1919-1 Transmitter includes your choice of one plug-in frequency module – specify the frequency you want from the list on the opposite page (no model number needed). Nickel-cadmium batteries and a battery charger (to charge both transmitter and receiver batteries at the same time) are included to save you money.

The comprehensive, step-by-step Heathkit instruction manual assures easy kitbuilding and do-it-yourself service, to save you more. For even greater savings, order your GDA-1919-1 Transmitter as part of a complete Heathkit R/C system from the next page. Transmitter dimensions, 6½" H x 7" W x 2" D (16.51 x 17.78 x 5.08 cm).

Kit GDA-1919-1, Shpg. wt. 4 lbs. **134.95**

2 Get top versatility when you choose our top-of-the-line 8-Channel Dual Open-Gimbal Transmitter

Here are enough channels for all your flying, landing gear and auxiliary functions – plus open gimbal stick precision – all in our top-of-the-line Heathkit 8-Channel Radio Control Transmitter. Two control sticks and a retractable landing gear switch provide control of five servos. Three auxiliary controls allow control of three more servos. Four trim tabs allow you to make fine adjustments to the first four channels, without changing stick position.

When you buy the GDA-1205-0G Radio Control Transmitter, indicate your choice of one plug-in transmit frequency module (at no extra charge) from the 17 available transmit frequencies listed on the opposite page (specify transmit frequency desired when ordering – no model number needed).

This kit includes a money-saving rechargeable 9.6 VDC nickel-cadmium battery pack and a recharger. To save even more, order your 8-Channel R/C Transmitter as part of a complete system package from the opposite page. This easy-to-build kit comes with a complete Heathkit instruction manual and all the solder you need. This is the one to order for real versatility. Transmitter dimensions: 7" H x 7" W x 2" D (17.78 x 17.78 x 5.08 cm).

Kit GDA-1205-0G, Shpg. wt. 5 lbs. **154.95**

GDA-1919-1 AND GDA-1205-0G TRANSMITTER SPECIFICATIONS: RF Frequency: Crystal-controlled on all bands. **Frequency Stability:** Within 0.005% on 27 MHz band; within 0.002% on 53 MHz and 72 MHz bands. **RF Output Circuit:** Pi Network. **RF Input Power:** 500 milliwatts. **Modulation:** On/off carrier keying. **Controls:** GDA-1205, 8 channels (four with trim), on/off switch and trainer button; GDA-1919-1, 5 channels (four with trim) and on/off switch. **Operating Temperature Range:** 0 to 160°F (−17.77 to +71.11°C). **Power Requirement:** internal 9.6 VDC, 500 mAH nickel-cadmium battery pack (included). Rechargeable simultaneously with receiver battery, at 120 VAC, 60 Hz, 35-40 mA from recharger (included). Overall Dimensions: GDA-1919-1: 6½" H x 7" W x 2" D (16.51 x 17.78 x 5.08 cm); GDA-1205-0G: 7" H x 7" W x 2" D (17.78 x 17.78 x 5.08 cm). **Net Weight:** 2.75 lbs., with battery.

GDA-1205-2 RECEIVER SPECIFICATIONS: Local Oscillator Operating Frequency: Crystal-controlled on all bands. **Sensitivity:** 5 microvolts or better. **Selectivity:** 6 dB down at ±4 kHz; 30 dB down at ±9kHz. **Intermediate Frequency:** 453 kHz. **Power Requirement:** Internal 4.8 VDC nickel-cadmium battery pack (GDA-1205-3, included). 10 mA drain. **Controls:** On/off switch. **Operating Temperature Range:** 0 to 160°F (−17.77 to +71.11°C). **Overall Dimensions:** 0.63" H x 1.75" W x 1.75" D (1.60 x 4.45 x 4.45 cm). **Net Weight:** 2 ounces.

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

Savings...value...performance — the Heathkit Pack-17™

The Heathkit Pack-17 lets you save where it counts...in the pocketbook, not in performance. Heathkit Pack-17 R/C outperforms many top-of-the-line assembled systems on the market today. And, when you select a Pack-17 R/C system, you save twice...first when you buy, and again when you have the fun of building it yourself with the help of world-famous easy-step-at-a-time Heathkit assembly manuals. Don't miss this outstanding R/C value!

No need for a new transmitter or receiver — Pack-17 lets you change frequencies in seconds.

Heathkit Pack-17 R/C gives you unmatchable flexibility in the field. If you encounter interference, you can change frequencies in seconds – with plug-in module convenience. Fifteen different Heathkit Pack-17 transmit/receive frequency modules are available, in three different bands.

NOTE: Amateur Radio License required for operation on 53 MHz band. Class C License required for operation on 27 MHz and 72 MHz bands. When ordering, specify the exact frequency desired (see list of available frequencies below).

Transmit Module, 1 lb. ..... **24.95** **Receive Module,** 1 lb. **19.95**

FREQUENCIES AVAILABLE (MHz): 27 MHz band – 26.995, 27.045, 27.095, 27.145, 27.195 MHz; 53 MHz band – 53.100, 53.200, 53.300, 53.400, 53.500 MHz; 72 MHz band – 72.080, 72.160, 72.240, 72.320, 72.400, 72.960, 75.640 MHz. (When ordering, specify transmit or receive module. No model number needed.)

SPECIAL OFFER-SAVE $34.75

Buy 3 Transmit and 3 Receive Modules of your choice and save $134.70 separately.

Shpg. wt. 2 lbs. ..... **ONLY 99.95**

High-quality Heathkit Servos, Receivers and Batteries

SERVO COMPARISON CHART	Miniature GDA 1205-4	Subminiature GDA-1205-5	High-Torque GDA-1205-8
Idle Current (max.)	20 mA	12 mA	20 mA
No Load Current	80 mA	80 mA	150 mA
Stall Current (nom.)	450 mA	450 mA	1000 mA
Thrust	3 lbs.	3 lbs.	38 in. oz.
Travel Time	0.6 sec.	0.6 sec.	0.4 sec.
Rotary Travel	90°	90°	90° or 180°
Dimensions (HxWxL)*	$1\frac{5}{8}$x$\frac{15}{16}$x$\frac{9}{32}$"	$1\frac{11}{16}$x$\frac{3}{4}$x$2\frac{5}{32}$"	$1\frac{5}{8}$x$\frac{15}{16}$x$2\frac{9}{32}$"
Net Weight	1.75 oz.	1.25 oz.	1.75 oz.

ALL SERVOS: Position Accuracy: 1%. **Backlash:** Less than 0.002". **Input Signal:** Pulse. 1-2 mS, 4V P.P. **Output:** 1 rotary arm or 1 rotary wheel. **Temperature Range:** 0-160°F. **Power Requirement:** 4.8VDC. H includes outputs, L includes mounting ears.

Kit GDA-1205-5, Subminiature Servo, Shpg. wt. 1 lb. **29.95**
Kit GDA-1205-4, Miniature Servo, Shpg. wt. 1 lb. **29.95**
Kit GDA-1205-8, High-Torque Servo, Shpg. wt. 1 lb. **34.95**
Pack-17 R/C Receiver, Includes one Frequency Module (specify frequency).
Kit GDA-1205-2, Shpg. wt. 1 lb. **59.95**
Kit GDA-1205-3, Receiver Battery Pack, Shpg. wt. 1 lb. **14.95**

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

You get more, pay less, with a complete Heathkit Pack-17 R/C System!

SAVE $89.70 when you buy this Heathkit Pack-17 5-Channel Open Gimbal Stick R/C System

5-Channel Open Gimbal Stick System includes the GDA-1919-1 Open Gimbal Stick Transmitter (on opposite page). This transmitter provides dual-stick control of four R/C channels (one channel with ratchet), plus a switch-activated auxiliary channel for retracts or other switched functions. Open gimbal sticks provide smoothness and control.

Also included are a plug-in frequency module, receiver and one plug-in receive frequency module, receiver battery pack and four servos (choose miniature, subminiature or both). Specify frequency modules from left – no model number needed.

If you purchased all the components separately, this Heathkit Pack-17 R/C System would cost you up to $329.65.

GDS-1919, Shpg. wt. 9 lbs. **239.95**

SAVE $69.70 by ordering this Heathkit 8-Channel Dual Open Gimbal Stick R/C System

8-Channel Dual Open Gimbal Stick R/C System includes the GDA-1205-0G Open Gimbal Stick Transmitter (on opposite page) – the top-of-the-line Heathkit R/C transmitter. One of the most versatile R/C transmitters you'll find anywhere, its two control sticks and retractable landing gear switch control five servos, while three auxiliary controls allow you to control three more servos. You also get one plug-in transmit frequency module, receiver and one plug-in receive frequency module, receiver battery pack and four servos (miniature, subminiature or both). Specify frequency modules from left – no model number needed.

GDS-1205-0G, Shpg. wt. 11 lbs. **279.95**

Be power-sure with R/C Battery Monitor

Checks capacity of batteries under load with expanded scale voltmeter. Includes meter, connector for all Heathkit battery packs, clips and case.

Kit GD-1188, Shpg. wt. 1 lb. **15.95**

Radio Control Handbook

Explains the basics of radio control technology, covering most conventional control systems. (Book ordering information on page 52.)

EDP-159 ..... **11.95**

EASY ORDERING INFORMATION

BY PHONE: NOW YOU CAN CALL *TOLL-FREE!* 800-253-0570

NOW ORDER TOLL-FREE: 800-253-0570 using your Heathkit Revolving Charge or Visa or MasterCard credit cards. Call toll-free between 8:00 A.M. and 8:00 P.M. Eastern Time Monday through Friday. Alaska, Hawaii and Michigan orders, or after 8:00 P.M. and weekends, call 616-982-3411. For quick handling and prompt service, please fill out the order form at right before calling. Have credit card handy. **For parts orders, please call Customer Service, 616-982-3571.** For technical service consult the phone directory on page 53.

BY MAIL:

Please follow these simple steps so we can handle your order quickly.

- Use the handy order form at right.
- Write your name exactly the same way, each time you order.
- Give your complete address with full details. Include your ZIP Code and daytime phone number in case we have to call you.
- For UPS deliveries to rural route or P.O. Box addresses, please give complete delivery information.
- When you fill out the form, include: 1) quantity, 2) model number, 3) description, 4) price, and 5) shipping weight. Figure out and write down the shipping and handling charges for each item from the rate chart at right.
- Please use separate sheet to order parts, manuals or for any correspondence.

TERMS:

Here are some credit options for your order

- Heath Revolving Charge Plan. No money down. Up to two years to pay. Two convenient monthly payment plans available. We encourage down payments to reduce monthly payments and finance charges. Follow the instructions on reverse side of order form. Be sure to sign charge agreement.
- MasterCard and Visa plans. Now you can use your MasterCard or Visa credit cards to charge Heathkit products. Just fill in your credit card number in the spaces provided on the order form. Include card expiration date. Sorry, we cannot accept credit cards for replacement parts orders.
- Commercial Accounts. Net 30-day terms available to companies with rated credit.
- Educational Accounts. Net 30-day terms available to Patterson-listed educational institutions. Authorized purchase order is required.
- Note: All credit orders subject to Heath Credit Department approval.

Commercial, Educational, and Industrial Sales:

- For quotations or quantity discount information on any Heath product, kit or wired, write or call Marketing Services Department, 616-982-3454. For quantities of 250 or more of any Heath product, kit or wired, write or call Contract Sales Department, 616-982-3519. Private labeling, custom packaging, or design modifications can be made to meet your specific needs.
- Note: Quantity discounts apply to single models only, not combination orders, special offers, or systems.

SPECIAL SHIPPING AND HANDLING:

- MOTOR FREIGHT ITEMS — Items indicated Motor Freight exceed weight or size limitations of UPS or Parcel Post. Examples are TV's, organs, some speaker systems, garage door mechanisms, antennas, etc. They are shipped with freight charges collect. If one item on your order is Motor Freight, all items will be shipped Motor Freight. Consult your local motor freight carrier for charges and type of service available in your area before ordering.
- APO/FPO Shipments — Use the following Zones to estimate costs: West Coast — Zone 8; East Coast — Zone 5; Miami — Zone 6. PAL (Airlift Military) carries packages by air transport for a fee of $1.00 per package plus postage. Parcel must weigh less than 30 lbs. and not exceed 60" in length and girth.
- SAM — Parcel must weigh less than 15 lbs. and not exceed 60" in length and girth. Be sure to check with your local postmaster for exceptions to certain APO or FPO numbers.

HOW TO FIGURE SHIPPING AND HANDLING CHARGES

Find your zone number using Zone Chart below. Locate shipping weight of item in the first column of Rate Chart. Determine the shipping charge for the corresponding area. Enter the shipping charge on order form.

RATE CHART

Heath Shipping and Handling Charges, mailable items only. See special shipping and handling information for Motor Freight items.

Your shipping and handling charges are indicated in the zone column across from the shipping weight.

NOTE: Blue Label Service Area Zone A covers: AR, CT, LA, MA, ME, MS, NH, NJ, ND, OK, RI, SD, VT, PA (Philadelphia area only), NY (New York City and Long Island). 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	$2.38	$4.15	$4.22
2	1.55	1.61	1.70	1.83	1.99	2.15	2.48	3.35	5.32	5.35
3	1.63	1.73	1.86	2.06	2.30	2.55	3.05	4.32	6.49	6.48
4	1.71	1.84	2.02	2.29	2.61	2.94	3.60	5.29	7.67	7.62
5	1.79	1.96	2.18	2.52	2.92	3.32	4.07	6.26	8.84	8.75
6	1.87	2.07	2.33	2.74	3.14	3.64	4.54	7.23	10.02	9.88
7	1.95	2.18	2.49	2.89	3.38	3.95	5.02	8.20	11.19	11.02
8	2.03	2.30	2.64	3.06	3.63	4.27	5.55	9.17	12.36	12.15
9	2.11	2.41	2.75	3.25	3.93	4.63	6.08	10.14	13.54	13.28
10	2.19	2.52	2.87	3.46	4.22	5.00	6.62	11.11	14.71	14.42
11	2.28	2.60	3.00	3.68	4.51	5.38	7.15	12.09	15.90	15.55
12	2.36	2.66	3.10	3.89	4.80	5.75	7.69	13.06	17.07	16.68
13	2.41	2.72	3.19	4.02	4.96	5.95	7.97	14.03	18.25	17.82
14	2.46	2.78	3.28	4.13	5.12	6.14	8.24	15.00	19.42	18.95
15	2.51	2.87	3.39	4.25	5.26	6.32	8.48	15.97	20.59	20.08
16	2.58	2.99	3.54	4.35	5.40	6.49	8.72	16.94	21.77	21.22
17	2.68	3.11	3.70	4.45	5.53	6.65	8.94	17.91	22.94	22.35
18	2.77	3.23	3.85	4.55	5.65	6.80	9.15	18.88	24.12	23.48
19	2.86	3.35	4.00	4.73	5.77	6.94	9.35	19.85	25.29	24.62
20	2.95	3.46	4.16	4.91	6.01	7.20	9.55	20.82	26.46	25.75
21	3.05	3.58	4.31	5.11	6.27	7.50	9.73	21.80	27.65	26.88
22	3.14	3.71	4.46	5.30	6.51	7.81	9.91	22.77	28.82	28.02
23	3.24	3.82	4.61	5.49	6.76	8.12	10.08	23.74	30.00	29.15
24	3.33	3.94	4.77	5.68	7.00	8.42	10.24	24.71	31.17	30.28
25	3.42	4.05	4.92	5.87	7.25	8.73	10.41	25.68	32.35	31.42
26	3.51	4.18	5.07	6.06	7.49	9.04	10.78	26.65	33.52	32.55
27	3.60	4.30	5.23	6.25	7.74	9.34	11.16	27.62	34.69	33.68
28	3.70	4.41	5.38	6.44	7.98	9.65	11.53	28.59	35.87	34.82
29	3.79	4.53	5.53	6.64	8.23	9.95	11.90	29.56	37.04	35.95
30	3.88	4.65	5.69	6.82	8.47	10.25	12.27	30.53	38.22	37.08
31	3.98	4.77	5.84	7.01	8.73	10.56	12.65	31.51	39.40	38.22
32	4.07	4.89	5.99	7.21	8.97	10.86	13.02	32.48	40.57	39.35
33	4.17	5.00	6.15	7.40	9.22	11.17	13.40	33.45	41.75	40.48
34	4.26	5.13	6.30	7.59	9.46	11.48	13.76	34.42	42.92	41.62
35	4.35	5.24	6.45	7.78	9.71	11.78	14.14	35.39	44.10	42.75
36	4.44	5.36	6.61	7.97	9.95	12.09	14.51	36.36	45.27	43.88
37	4.53	5.48	6.76	8.16	10.20	12.39	14.89	37.33	46.45	45.02
38	4.63	5.60	6.91	8.35	10.44	12.70	15.25	38.30	47.62	46.15
39	4.72	5.72	7.07	8.55	10.69	13.01	15.63	39.27	48.79	47.28
40	4.81	5.83	7.22	8.73	10.93	13.30	16.00	40.24	49.97	48.42
41	4.91	5.95	7.37	8.92	11.19	13.61	16.38	41.22	51.15	49.55
42	5.00	6.07	7.52	9.12	11.44	13.92	16.74	42.19	52.33	50.68
43	5.09	6.19	7.68	9.31	11.68	14.22	17.12	43.16	53.50	51.82
44	5.19	6.31	7.83	9.50	11.93	14.53	17.49	44.13	54.67	52.95
45	5.28	6.42	7.98	9.69	12.17	14.84	17.87	45.10	55.85	54.08
46	5.37	6.54	8.14	9.88	12.42	15.14	18.24	46.07	57.02	55.22
47	5.46	6.67	8.29	10.07	12.66	15.45	18.61	47.04	58.20	56.35
48	5.55	6.78	8.44	10.26	12.91	15.75	18.98	48.01	59.37	57.48
49	5.65	6.90	8.60	10.46	13.15	16.06	19.36	48.98	60.55	58.62
50	5.74	7.01	8.75	10.64	13.40	16.36	19.73	49.95	61.72	59.75
Add'l lbs.	.09 lb.	.12 lb.	.15 lb.	.18 lb.	.25 lb.	.30 lb.	.37 lb.	.97 lb.	1.17 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	Zip Code Prefixes	Zone
006-009	8	260-261	3	363-369	5	476-477	4	598-599	7	820-822	5
010-069	5	262-278	4	370-386	4	478	3	600-609	2	823-826	6
070-089	4	279	5	387	5	479-489	2	610-619	3	827	5
090-099	5	280-283	4	388	4	490-491	1	620-623	4	828-832	6
		284-285	5	389-397	5	492	2	624-628	3	833	7
100-108	5	286-293	4			493-495	1	629-668	4	834	6
109	4	294-295	5	400-406	3	496-499	3	669-679	5	835-838	7
110-119	5	296-297	4	407-409	4			680-687	4	840-847	6
120-123	4	298-299	5	410-412	3	500-516	4	688-693	5	850-864	7
124-126	5			413-422	4	520-524	3	700-722	5	865-884	6
127-128	4	300-303	4	423	3	525	4	723-727	4	890-898	7
129	5	304	5	424-426	4	526-528	3	728-768	5	900-921	8
130-152	4	305-307	4	427-432	3	530-534	2	769	6	922-926	7
153	3	308-329	5	433-436	2	535-539	3	770-778	5	930-934	8
154-160	4	330-334	6	437-457	3	540	4	779-789	6	935	7
161	3	335-338	5	458	2	541-546	3	790-792	5	936-960	8
162-163	4	339	6	460-462	3	547-548	4	793-799	6	961	7
164-165	3	340	6	463-464	2	549	3			962-976	8
166-199	4	350-352	4	465-466	1	550-566	4	800-803	5	977-979	7
		354	5	467-469	2	567	5	804-805	6	980-987	8
200-232	4	355-359	4	470-472	3	570-572	4	806-807	5	988-994	7
233-237	5	360-361	5	473	2	573-588	5	808-816	6	995-999	8
238-259	4	362	4	474-475	3	590-597	6				

BOOK ORDERING INFORMATION — There is a $10 MINIMUM for a book-only purchase. No minimum if books are ordered with kits. Do not calculate shipping on books, simply add 50¢ for each book to the shipping charges column on the order blank.

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, AR-1515, AA-1515, AJ-1600, AP-1800, AR-1650, SB-104A, SB-614, IG-1275, IG-5257, WH-17, SO-4105, 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-88/89. Manuals not available for Educational Courses. Add 10% shipping/handling for each manual you order. Write Heath Company, 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	**616-982-3860**

8:00 A.M.-Noon and 1:00-4:30 P.M., Eastern Time, Weekdays only.

HEATH CAREER OPPORTUNITIES: We have positions available for qualified engineers, technicians, technical customer service representatives and technical writers. If your expertise is in computer hardware or software, instrumentation or communications and you're interested in a career with Heath, 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 Heathkit warranty for any other consumer product in this catalog costing more than $15 may be obtained free of charge by writing the Manager of Marketing Services, Heath Company, Benton Harbor, MI 49022.

The President's Corner

Dear friend,

You continue to amaze us.

Back in 1956 we introduced a revolutionary new kit product – an analog computer – which sold for $995.00. It was a large, complicated, vacuum tube device that created a lot of interest, but very few sales. We quietly discontinued it after the first production run. You weren't ready for computers.

Little did we realize that the year 1980 would close with our sales of computer products totalling more than $40 million. Or to put it a different way, that you would buy more Heath computer products in 1980 than the entire volume of the company in 1956. How exciting this field of electronics!

Your company passed another milestone in 1980 – the $100 million sales mark. It happened because of your interest, your support, your continued acceptance of Heath products. And hopefully, because we have listened, maintained rigid quality standards (in the face of all kinds of reasons to compromise) and held steadfast to our charter of offering you innovative products with superior designs, value, features and service.

Today, we have more engineers at work on more new products than ever before. Significant development projects are underway in amateur radio, TV, instrumentation, education, audio, marine, weather, general consumer products, furniture...and yes, computers. Interesting days ahead!

So this is an appropriate time for me to sincerely thank you, and to invite you to share in the anticipation of exciting new products around the corner – products made possible by your past confidence and support.

William F. Johnson

President, Heath Company

The Heathkit Pledge

We want your kitbuilding experience to be enjoyable. Our world-famous step-by-step manuals, and technical consultation by mail or telephone, assure you of success. We make this pledge: "We won't let you fail."

Free Plant Tour when you visit our Factory Store in Michigan

A Heath Customer Center at our production facility in St. Joseph, MI, offers MAIL ORDER PRICES, IMMEDIATE DELIVERY and expert SERVICE. Store hours are 9:00 AM to 5:00 PM Eastern Time Monday thru Friday and 9:00 AM to 4:00 PM Saturdays. **Free Plant Tours** Monday thru Friday at 10 AM and 1:30 PM thru August 28 (group tours arranged upon written request). From Interstate 94, take Exit 23 (Business Loop 94, Red Arrow Highway) North past Hilltop Road ¼ mile to store. For plant tours – turn right at Hilltop Rd. and go ¼ mile East. Tours start in Heath Company's main lobby.

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.

Order one of these handy kitbuilder helpers to make your next project more enjoyable

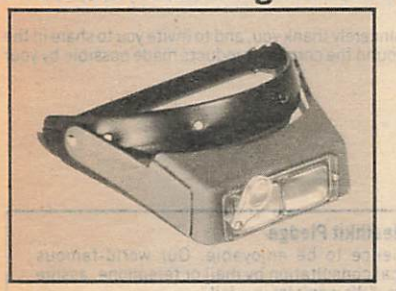
- **3 Dioptor magnifying lens**
- **Includes fluorescent tube!**

The GDP-200 Magnifier/Lamp is now a better value than ever! It features a professional-looking black plastic housing, a safety diffuser for full bulb protection, plus a quiet-running transformer. And the fluorescent tube is even included in the price.

What's more, the GDP-200 has a glass 5" diameter, 3 dioptor lens magnifying lens for no-strain viewing. The 45" extension steel arm & gimbal mount swing 180° for easy positioning. 120 VAC.

GDP-200, Assembled, wt. 7 lbs. **79.95**

3-D Binocular Magnifiers for close work



A real visual aid when doing intricate circuit work! Magnifiers enlarge small detailed circuits 2½ times for easy viewing, keeping hands free for positioning or soldering components.

Magnifiers feature three, finely ground glass lenses for clear magnification. The headband adjusts to fit all hat sizes, and has a cushioned foreband for hours of comfortable viewing. Focus viewing point: normally 8" or 21.59 cm. All parts of this assembled kitbuilder's helper are American made. The ground glass lenses are inserted in durable, washable plastic headframe.

GDP-201, Assembled, Shpg. wt. 1 lb. **18.95**

Save 26% on low-cost Extension Lamp

Don't let eye strain slow down your kitbuilding fun! Get this eye-saving GDP-202 Extension Lamp. It features a conical shade that directs light right where you need it. The steel extension arm, with spring suspension, spans a full 45" and swings 360° to accommodate any work angle. Uses incandescent bulb (not included).

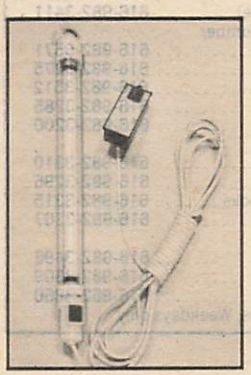
GDP-202, 4 lbs. **Was $26.95, NOW 19.95**

[1] **Zenith One-step Tuner Cleaner** cleans contacts quickly and easily by blowing away dust and dirt. Spray leaves a thin film of lubricant that prevents contact corrosion.

GDZ-1019, Shpg. wt. 1 lb. **1.95**

[2] **Zenith Super Freeze Spray** lets you instantly identify intermittent components. When you zap the faulty component with the −60°F spray, you immediately notice a change in symptoms. 15 oz. can.

GDZ-1020, Shpg. wt. 2 lbs. ... **3.59**



Handy plug-in Trouble Light

Our GDP-206 gives you some definite advantages over the incandescent extension lights.

First, the GDP-206 allows you to see more. Unlike incandescent lights, the GDP's 25W fluorescent tube throws a more illuminating light – without the usual eye-straining shadows.

Second, the GRP-206 lets you move around more freely. It comes with a long-reaching 25' line cord, opposed to the restricting 10' or 15' cords of conventional extension lights.

And finally, the GDP-206 is less bulky. The housing measures 26" L x 2.5" W x 2.5" D, 120 VAC.

GDP-206, Assembled, wt. 4 lbs. **19.95**

[3] **Get rid of tangling cords** on your bench with this Six-Socket Multiple Box Outlet. It features 5 switched grounded outlets, plus an unswitched grounded outlet. Fused power line provides full protection. 10 amp. maximum load. 6' cord. 120 VAC.

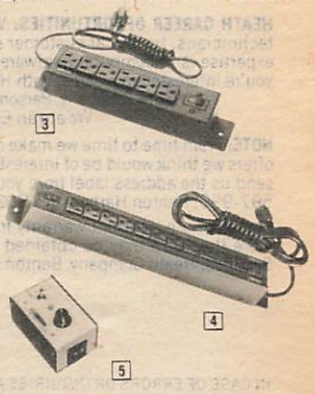
Kit HD-1360, Shpg. wt. 2 lbs. **14.95**

[4] **Twelve-Socket Multiple Outlet Box.** Same protection and convenience as one above, only 11 switched, 1 unswitched outlets. 12' cord.

Kit HD-1274, Shpg. wt. 4 lbs. **19.95**

[5] **Save bits, and blades on power tools** with this universal Motor Speed Control. For motor 15 amps or less. Not for Dremel tools.

Kit GD-973A, Shpg. wt. 2 lbs. **29.95**



See all the kits at your local Heathkit Electronic Center*

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

ARIZONA – Phoenix, 85017
2727 W. Indian School Rd. 602-279-6247

CALIFORNIA – Anaheim, 92805
330 E. Ball Rd. 714-776-9420
El Cerrito, 94530
6000 Potrero Ave. 415-236-8870
Los Angeles, 90007
2309 S. Flower St. 213-749-0261
Pomona, 91767
1555 N. Orange Grove Ave. 714-623-3543
Redwood City, 94063
2001 Middlefield Rd. 415-365-8155
Sacramento, 95825
1860 Fulton Ave. 916-486-1575
San Diego (La Mesa, 92041)
8363 Center Dr. 714-461-0110
San Jose (Campbell, 95008)
2350 S. Bascom Ave. 408-377-8920
Woodland Hills, 91364
22504 Ventura Blvd. 213-883-0531

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

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

FLORIDA – Miami (Hialeah, 33012)
4705 W. 16th Ave. 305-823-2280
Plantation (Ft. Lauderdale), 33317
7173 West Broward Blvd. 305-791-7300
Tampa, 33614
4019 West Hillsborough Ave. 813-886-2541

GEORGIA – Atlanta, 30342
5285 Roswell Rd. 401-252-4341

ILLINOIS – Chicago, 60645
3462-66 W. Devon Ave. 312-583-3920
Chicago (Downers Grove, 60515)
224 Ogden Ave. 312-852-1304

INDIANA – Indianapolis, 46220
2112 E. 62nd St. 317-257-4321

KANSAS – Kansas City (Mission, 66202)
5960 Lamar Ave. 913-362-4486

KENTUCKY – Louisville, 40243
12401 Shelbyville Rd. 502-245-7811

LOUISIANA – New Orleans (Kenner, 70062)
1900 Veterans Memorial Hwy. 504-467-6321

MARYLAND – Baltimore, 21234
1713 E. Joppa Rd. 301-661-4446
Rockville, 20852
5542 Nicholson Lane 301-881-5420

MASSACHUSETTS – Boston (Peabody, 01960)
242 Andover St. 617-531-9330
Boston (Wellesley, 02181)
165 Worcester Ave.
(Rt. 9 just west of Rt. 128) 617-237-1510

MICHIGAN – Detroit, 48219
18645 W. Eight Mile Rd. 313-535-6480
E. Detroit, 48021
18149 E. Eight Mile Rd. 313-772-0416

MINNESOTA – Minneapolis (Hopkins, 55343)
101 Shady Oak Rd. 612-938-6371
St. Paul, 55106
1646 White Bear Ave. 612-778-1211

MISSOURI – St. Louis (Bridgeton, 63044)
3794 McKelvey Rd. 314-291-1850

NEBRASKA – Omaha, 68134
9207 Maple St. 402-391-2071

NEW JERSEY – Fair Lawn, 07410
35-07 Broadway (Rte. 4) 201-791-6935
Ocean (Asbury Park), 07712
1013 State Hwy. 35. 201-775-1231

NEW YORK – Buffalo (Amherst, 14226)
3476 Sheridan Dr. 716-835-3090
Jericho, Long Island, 11753
15 Jericho Turnpike 516-334-8181
Rochester, 14623
937 Jefferson Rd. 716-424-2560
White Plains
(North White Plains, 10603)
7 Reservoir Rd. 914-761-7690

OHIO – Cincinnati (Woodlawn, 45215)
10133 Springfield Pike 513-771-8850
Cleveland, 44122
28100 Chagrin Blvd. 216-292-7553
Columbus, 43229
2500 Morse Rd. 614-475-7200
Toledo, 43615
48 S. Byrne Rd. 419-537-1887

OKLAHOMA – Oklahoma City, 73112
2727 Northwest Expressway. 405-848-7593

PENNSYLVANIA – Philadelphia, 19149
6318 Roosevelt Blvd. 215-288-0180
Frazer (Chester Co.), 19355
630 Lancaster Pike (Rt. 30) 215-647-5555
Pittsburgh, 15235
3482 Wm. Penn Hwy. 412-824-3564

RHODE ISLAND – Providence (Warwick, 02886)
558 Greenwich Ave. 401-738-5150

TEXAS – Dallas, 75201
2715 Ross Ave. 214-826-4053
Houston, 77008
1704 West Loop North 713-869-5263
San Antonio, 78216
7111 Blanco Rd. 512-341-8876

UTAH – Salt Lake City (Midvale, 84047)
58 East 7200 South 801-566-4626

VIRGINIA – Alexandria, 22303
6201 Richmond Hwy. 703-765-5515
Norfolk (Virginia Beach, 23455)
1055 Independence Blvd. 804-460-0997

WASHINGTON – Seattle, 98109
505 8th Ave., N. 206-682-2172
Tukwila, 98188
15439 53rd Ave., S. 206-246-5358

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

*Units of Veritechnology Electronics Corporation

Nine-piece Tool Kit has the tools kitbuilders need

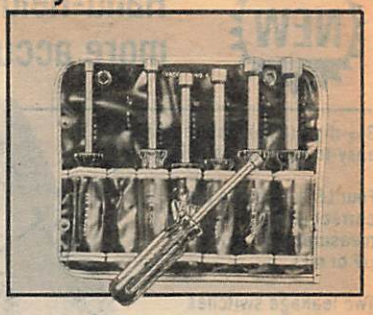
Tool kit features a Weller 25 W Soldering Iron with two tips, wire strippers, a pair of diagonal cutters, 4-inch long-nose pliers, a ⅛-inch blade screwdriver, a Phillips screwdriver, a ¼-inch nut driver, a soldering aid tool and a spool of high-quality electronic solder.

Each tool fits neatly inside a moulded carrying case. Case is constructed of durable, high-impact plastic. Overall Dimensions, 3" H x 10.75" W x 10" D.

Kit GHP-1270, Wt. 3 lbs. **37.95**

Fold-up Nut Driver Kit is easy to store

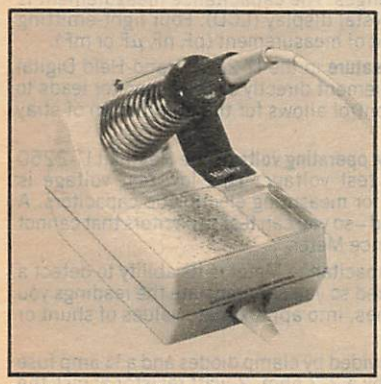
- **Special fold-up case holds 7 popularly-sized nut drivers; makes kitbuilding easier**



Set features 7 popular-sized nut drivers to ease kitbuilding. All drivers feature easy-to-grip handles with chrome-plated sockets. Sizes include S6 (3/16"), S8 (¼"), S10 (5/16"), S11 (12/32"), S12 (⅜"), S14 (7/16") and S16 (½"). All seven drivers slip into a flexible holding case for compact, rolled-up storage in workbench drawer or tool box.

GDZ-1016, Shpg. wt. 2 lbs. ... **24.95**

Temperature-Controlled Soldering Station



Features transformer-powered, closed-loop control to keep 1/16" tip consistently hot. Heat shield to store iron between kitbuilding steps. Temperature-controlled to 700 deg. F (351 deg. C). Includes sponge and safety indicator light. Unit is assembled and tested.

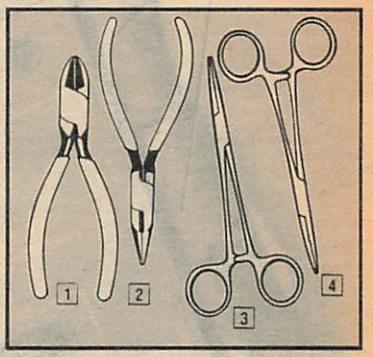
GDP-1108, Shpg. wt. 5 lbs. .. **69.95**

Full Set of Replacement Tips for the GDP-1108 above. All tips rated at 700 deg. F (351 deg. C). Set includes 1/16" chisel tip, 5/64" chisel tip, ⅛" chisel tip and a 1/32" conical tip for soldering convenience.

GDP-1109, Shpg. wt. 1 lb. ... **15.95**

Kitbuilder's aids — handy gripping tools

- **These tools help make handling small jumper wires and other components easier**



1 **All-Purpose Diagonal Pliers.**
GDZ-1018, Shpg. wt. 1 lb. **11.95**

2 **5" Long-Nose Pliers for fine work.**
GDZ-1017, Shpg. wt. 1 lb. **11.95**

3 **Straight Forceps.** Serrated jaws.
GDZ-1014, Shpg. wt. 1 lb. **11.95**

4 **Curved Forceps with serrated jaws.**
GDZ-1015, Shpg. wt. 1 lb. **11.95**

Micro-Cutter for clipping leads.
GDZ-1013, Shpg. wt. 1 lb. **7.95**

5 Versatile Three-Heat Soldering Iron

Features 3 heat settings (low, medium and high) for most soldering requirements. Iron has 25-Watt element. Includes one tip, stand, heat shield. 5.13" H x 3.50" W x 5.50" D.

Kit GH-17A, Shpg. wt. 5 lbs. **39.95**

6 Weller 25-Watt Soldering Iron

Our best-selling iron has slim ⅛" tip for close point-to-point wiring. 860 deg. F heat.

GDP-207, Assembled, 1 lb. **14.95**

See Heathkit/Zenith Soldering Course on p. 40.

7 Weller Soldering/De-Soldering Set

GDP-207 25-Watt Soldering Iron plus de-soldering bulb for removal of solder.

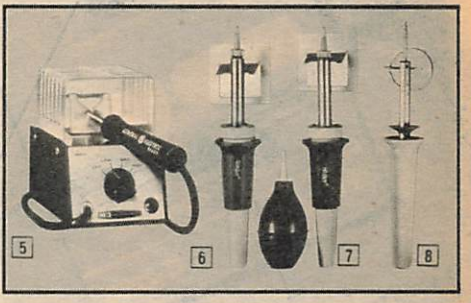
GDP-1009, Assembled, 1 lb. **18.95**

8 Wahl 25-Watt Pencil Soldering Iron

Designed for high-density circuit boards.
GDP-1231, Assembled, 1 lb. **7.95**

8 oz. of Solder. 60/40, .049-in. rosin-core solder.
GDZ-1011, Shpg. wt. 1 lb. **5.95**

1 lb. of Solder. Same as above — only more of it!
GDZ-1012, Shpg. wt. 2 lbs. **11.95**



Handy, information-filled books

The TTL Data Book. This 832-page reference book includes design and specification data on transistor-transistor logic circuits.

EDP-220 ..... **7.50**

The TTL Cookbook. This text explains the basics of transistor-transistor logic circuits in its 336 pages.

EDP-183 ..... **9.50**

Building and Installing Electronic Intrusion Alarms. 128 pages.

EDP-135 ..... **4.50**

(Book ordering information on page 52).

PanaVise aids free hands during kitbuilding

9 **PanaVise Circuit Board Holder.** This PanaVise head tilts up to a full 220 degrees to hold circuit boards steady, in any position, during soldering.

GDP-1254, Shpg. wt. 2 lbs. **19.95**

10 **PanaVise Vacuum Base.** Mounts firmly, temporarily on most smooth surfaces. Use this PanaVise accessory with GDP-1253, GDP-1254 and GDP-1255 PanaVise heads.

GDP-1252, Shpg. wt. 2 lbs. **19.95**

11 **PanaVise Vertical Jaw Vise Head.** This tool's nylon jaws open up to 2.25 inches to grip parts without marring.

GDP-1253, Shpg. wt. 2 lbs. **16.95**

12 **PanaVise Standard Height Base.** For use with GDP-1253, GDP-1254 and GDP-1255 PanaVise heads.

GDP-1251, Shpg. wt. 2 lbs. **13.95**

13 **PanaVise Vertical Vise Head.** Especially designed to firmly hold bulkier items. This tool's padded jaws open up to 6.50 inches wide. It won't scratch or dig into mounted objects.

GDP-1255, Shpg. wt. 2 lbs. **15.95**

NEW Hand-Held Capacitance Meter uses advanced design for faster, more accurate digital readings — even detects leakage

Optional Leather Carrying Case (IMA-2215-1, order above right) protects meter during outdoor use

$157.95

- **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**
- **3½ digit Liquid Crystal Display (LCD)**
- **Hand-held meter uses standard 9 VDC battery**

The compact Heathkit IT-2250 Hand-Held Digital Capacitance Meter automatically measures any capacitor from 0 pF to 199.9 mF (0.1999 Farad). The IT-2250's 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 liquid crystal display (LCD). Four light-emitting diodes (LEDs) indicate the correct unit of measurement (pF, nF, μF or mF).

"Kelvin" terminal design is a big plus feature in the IT-2250 Hand-Held Digital Capacitance Meter. It 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 capacitors that have a low operating voltage, the Heathkit IT-2250 Capacitance Meter supplies a low test voltage. This low test voltage is superimposed on a low bias voltage, for measuring electrolytic capacitors. A remote extension cable is also provided – so you can test capacitors that cannot be connected directly to the Capacitance Meter.

Another key feature of the Heathkit Capacitance Meter is its ability to detect a leaky capacitor. A nomogram is provided so you can translate the readings you obtain, using the two 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.

A set of standard capacitors, supplied with this kit, enables you to calibrate the Capacitance Meter to the accuracies listed in the Specifications below.

A typical 9 VDC (NEDA 1604) alkaline battery (not supplied) provides four to ten hours of continuous operation. Battery condition is continuously monitored, and a LO-BAT warning is displayed whenever the battery voltage drops to approximately 5 VDC. You can also operate the Heathkit IT-2250 Capacitance Meter continuously from line voltage, using one of the optional Heathkit Outlet Cords (Model PS-2350 for 120 VAC operation, PS-2450 for 240 VAC operation), listed below.

Buildable in three evenings with the complete, step-by-step Heathkit manual, the electronic components of the IT-2250 are contained on three circuit boards. Housed in a compact and lightweight plastic case, the meter is supported at a convenient viewing angle by a built-in pivoting stand. Overall dimensions of the meter are 2" H x 3.25" W x 7.5" L (5.08 x 8.26 x 19.05 cm). Weighs just one pound, including battery.

Kit IT-2250, Shpg. wt. 3 lbs. **157.95**
IMA-2215-1, Leather Carrying Case for IT-2250, Shpg. wt. 1 lb. **14.95**
PS-2350, Optional 120 VAC Battery Eliminator, 1 lb. **7.95**
PS-2450, Optional 240 VAC Battery Eliminator, 1 lb. **14.95**

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, ±(0.5% 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). 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). **Power Requirements:** One 9 VDC (NEDA 1604) battery (not included) or 120/240 VAC, using optional Heathkit Outlet Cords (Model PS-2350 for 120 VAC operation, PS-2450 for 240 VAC operation – both listed above). **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 (5.08 x 8.26 x 19.05 cm). **Net Weight:** 16 ounces (450 grams), including battery.

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

For the designer's or experimenter's workbench – the Heathkit DC Tri-Output Power Supply

$99.95

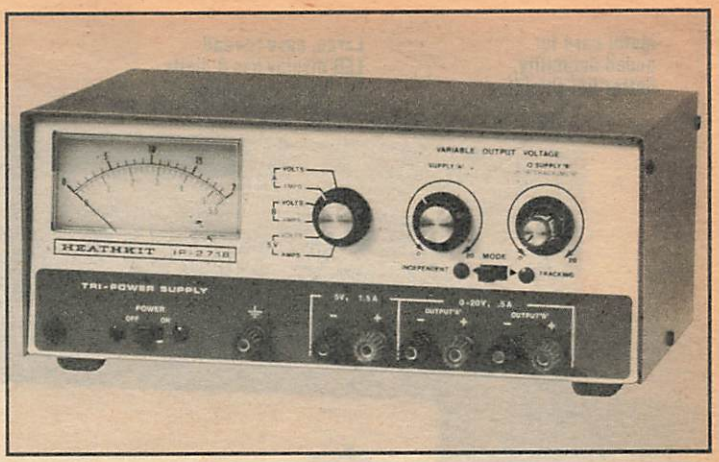
- **Versatile – use it for designing digital circuits**
- **One fixed 5 VDC output, and two variable VDC outputs**
- **3 floating outputs can be connected in any combination for a variety of output voltage currents**

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.

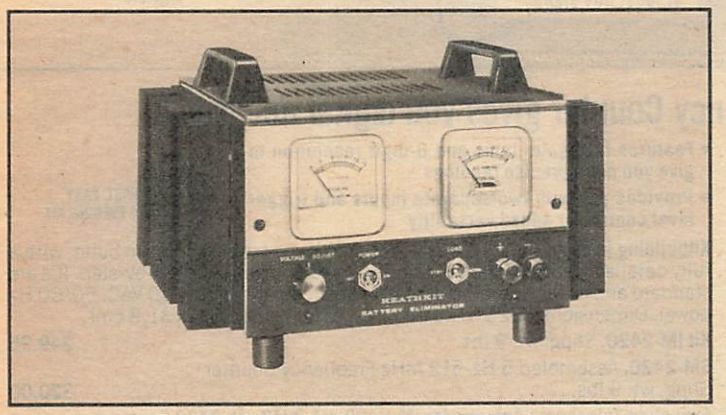
The voltage outputs are short-circuit proof, with automatic current limiting for added protection. Each output's voltage and current can be monitored easily through the switchable front-panel meter. All the outputs and controls are readily accessible on the front panel, and clearly marked for easy operation. The housing is constructed of durable metal, and painted in instrument blue with beige trim.



Kit IP-2718, Shpg. wt. 12 lbs. **99.95**

Factory assembled and tested IP-2718.
SP-2718, Shpg. wt. 12 lbs. **195.00**

IP/SP-2718 SPECIFICATIONS: Outputs: 5 VDC 2 1.5A; A & B; 0-20 VDC @ 0.5 A. **Regulation: Load:** Less than 0.1% variation from no load to full load on 20 V supplies; less than 3% variation from no load to full load on 5 V supply. **Line:** Less than 0.2% variation for line voltage change of 10 V on 20 V supplies; less than 0.15% variation for line voltage change of 10 V on 5 V supply. **Power Requirement:** 120/240 VAC, 60/50 Hz, 100 W full load. **Dimensions:** 4½" H x 10¾" W x 9" D.



Heavy-Duty Power Supply/Battery Eliminator

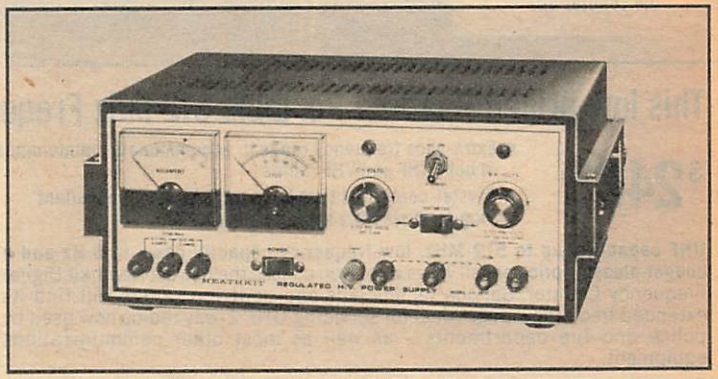
$154.95

- **Provides variable 9-15 VDC capable of 12 amps continuous, 20 amps intermittent**
- **Extra-large transformer for low ripple operation**

For VDC applications where high-current capability is necessary. Provides continuous variable voltage from 9-15 V with fixed output regardless of load. 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. **154.95**

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).



Low-cost Heathkit 0-400 VDC Power Supply

$164.95

- **Insulated binding posts for positive and negative high voltage & bias operation**

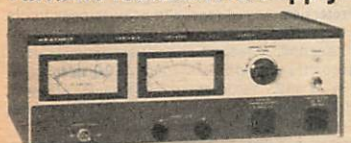
Budget priced Power Supply provides 0-400 VDC output at 0-100 mA continuous, 125 mA intermittent. Line and load regulation is less than 1% from no load to full load. Ripple is less than 10 mV from DC to 1 MHz. Features two meters: two scale voltmeter measures from 0-400 or 0-150 volts; and an ammeter that measures from 0-150 mA.

Kit IP-2717, Shpg. wt. 19 lbs. **164.95**

Factory assembled and tested IP-2717.
SP-2717, Shpg. wt. 19 lbs. **230.00**

IP/SP-2717 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.

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. **144.95**

SP-5220, Assembled, 26 lbs. **190.00**

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, 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. **32.95**

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

This low-priced Heathkit Portable 512 MHz Frequency Counter gives you digital accuracy!

$249.95 Kit

- **Extra-wide frequency range to accommodate maintenance of both UHF and VHF radios**
- **Crystal-controlled time base assures you of excellent long-term stability and accuracy**
- **Features four gate items and 8-digit resolution to give you more precise readings**
- **Provides you with two separate inputs and trigger level control for added versatility**

FAST, EASY 4-EVENING KIT

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

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

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

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

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

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

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

Kitbuilding is easy: the IM-2420 takes as little as four evenings to build, with a fully detailed Heathkit manual to guide you along the way, step-by-step. ICs are standard and easily available, for faster servicing. For 120/240 VAC, 50/60 Hz power. Dimensions, 4.25"H x 10"W x 12.5"D (10.8 x 25.4 x 31.8 cm).

Kit IM-2420, Shpg. wt. 9 lbs. **249.95**

SM-2420, Assembled 5 Hz-512 MHz Frequency Counter, Shpg. wt. 9 lbs. **320.00**

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

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

IM/SM-2400 SPECIFICATIONS: Inputs: Frequency Ranges: 5 Hz to 50 MHz, and 40 MHz to 512 MHz. **Sensitivity:** 25 mV RMS guaranteed, 4 to 15 mV RMS typical. **Input Impedance:** 5 Hz to 50 MHz range – 1 megohm shunted by less than 25 pF; 40 MHz to 512 MHz range – 50 ohms nominal. **Input Protection:** 5 Hz to 50 MHz range – 250 VRMS to 100 kHz, derating to 25 VRMS at 50 MHz; 40 MHz to 512 MHz range – 5 VRMS. **Period Measurement Mode: Input:** 5 Hz to 50 MHz only. **Range:** 5 Hz to 10 MHz. **Sensitivity:** 25 mV RMS guaranteed, 4 to 15 mV RMS typical. **Display Resolution (Least Significant Digit):** 100 nS to 0.1 mS, in decade steps. **Ratio B/A Measurement Mode: Input Frequency Limits:** 5 Hz to 25 MHz, and 40 MHz to 512 MHz. **Effective Measurement Range:** From 1.6 to 1.024 x 10(8), guaranteed. **Sensitivity:** 25 mV RMS guaranteed, 4 to 15 mV RMS typical. **Time Base: Frequency:** 10 MHz. **Setability:** To within 0.2 part per million (ppm). **Temperature Stability:** 0.2 ppm, from 32 deg. F to 104 deg. F (0 deg. C to 40 deg. C). **Crystal Aging Rate:** Less than 1 ppm per year. **Oven Operating Temperature:** 167 deg. F. ± 9 deg. F (75 deg. C. ± deg. C). **Warm-Up Time From Cold Oven (unplugged) Start:** 10 minutes to within 1.0 ppm; 20 minutes to within 0.1 ppm. **External Input:** TTL or 2.5 volts RMS from 50 ohm source (10 megahertz). **Input Protection:** Any voltage with peak-to-peak limits between – 3.5 volts and + volts. **Output:** Will drive 2 standard TTL (i.e., 7400) loads. Short circuit protected. **General Gate Times:** 0.01 second, 0.1 second, 1 second and 10 seconds (switch-selectable). **Sampling Rate:** Every 0.1 second, 0.33 second, 1 second or 10 seconds. **LED Display:** Eight digits. **Power Requirement:** 120/240 VAC, 50/60 Hz; 6 watts maximum in STBY mode, 40 watts maximum in ON mode. **Overall Dimensions:** 4.25" H x 10" W x 12.5" D (10.8 x 25.4 x 31.8 cm). **Net Weight:** 6.5 pounds (2.8 kg).

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

Test and align anywhere with the IM-2400 Hand-Held Counter!

$144.95 Kit

- **Battery operated for in-field frequency testing**
- **Rechargeable batteries for low-cost operation**
- **Two frequency ranges and time bases**

Now you can accurately test and align mobile radio equipment in cars, trucks, aircraft, boats – anywhere you want, with the portable IM-2400 Digital Frequency Counter. This compact Counter's take-along measurements are a mere 1.63" H x 3.38" W x 8.38" D, and it runs off rechargeable batteries.

It features a 10 MHz crystal-oscillator that insures stable and accurate frequency monitoring through both 50 Hz-50 MHz and 40 MHz-512 MHz ranges. With a typical sensitivity of 10 millivolts, RMS, and a guaranteed sensitivity of 25 millivolts, RMS, the IM-2400 lets you measure all types of signals.

The IM-2400 is completely portable. It has rechargeable, nickel-cadmium batteries for hours of readings on one charge. The batteries are located inside the housing to eliminate awkward external battery packs. For bench operation, you can get one of the optional Battery Eliminator/Chargers (next column) to operate the IM-2400 Hand-Held Counter directly off line current.

Kit IM-2400, Shpg. wt. 3 lbs. **144.95**

Assembled and tested IM-2400.
SM-2400, Shpg. wt. 2 lbs. **190.00**

Swiveling Telescopic Antenna for the IM-2400. Also can be used on 2-meter transceivers. This chrome-plated brass antenna, with its right-angle and telescoping capability, gives you improved performance and better sensitivity. Antenna includes BNC connector.

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

120 VAC Battery Eliminator/Charger for IM-2400.
PS-2404, Shpg. wt. 1 lb. **7.95**

240 VAC Battery Eliminator/Charger for IM-2400.
PS-2405, Shpg. wt. 1 lb. **12.95**

IM-2400 SPECIFICATIONS: Input Impedance: 50 Hz to 50 MHz–1 megohm shunted by less than 20 pF; 40 MHz to 512 MHz range–50 ohms. **Input Protection:** 50 Hz to 50 MHz range–150 volts RMS to 100 kHz, derating to 10 volts RMS at 50 MHz; 40 MHz to 512 MHz range – 5 volts RMS. **Setability:** +1 ppm. **Temperature Stability:** +10 parts ppm from 0°C to 40°C. **Gate Time:** 1.0 or 0.1 seconds, switchable. **Resolution:** 50 Hz to 50 MHz range–± 10 Hz at time base set at 0.1 second; ± 100 Hz at time base set at 0.1 second; 40 MHz to 512 MHz range–± 100Hz at time base set at 1.0 second, 1 kHz at time base set at 0.1 seconds. **Power Requirement:** Five 1.5 VDC, rechargeable nickel cadmium cells (included), or 120 VAC with optional PS-2404, or 240 VAC with optional PS-2405. **Dimensions:** 1.63" H x 3.38" W x 8.38" D.

FAST, EASY
2-EVENING KIT

Here's a low-cost, high-accuracy Digital Frequency Counter

$124.95 Kit

- **Switchable ranges for high-resolution readouts**
- **Excellent 10 mV sensitivity**
- **Big, easy-to-read, 8-digit LED display with automatic decimal placement**

If you're looking for an inexpensive, but highly accurate frequency counter for your bench, then check out this IM-2410 Digital Frequency Counter.

Accuracy and stability unmatched for its low-price. The IM-2410 features two frequency ranges – from 10 Hz to 50 MHz, and from 20 MHz to 225 MHz – for increased accuracy and better resolution. A two-position time gate lets you choose either 0.1 sec or 1.0 seconds for even better resolution. And the crystal-controlled time base gives you good long-term stability and accuracy you would expect to find on more expensive counters: ± 1 ppm.

Front-panel operation for easy bench use. The IM-2410 has one BNC input for fast, direct frequency countings. For non-direct counts, you can attach the optional SMA-2400-1 Swivel Antenna (described above). In addition, all the IM-2410's operation switches are on the front panel for easy reach. The 8-digit display is easy-to-read, and shows all frequencies in MHz for higher resolution (as fine as 1 Hz at 50 MHz, 10 Hz at 225 MHz). A cabinet stand props the IM-2410 so that the display is positioned at a comfortable viewing angle.

Interference-free cabinet construction. The IM-2410's housing is made of metal for greater durability and better RFI (Radio Frequency Interference) shielding. All in all, the IM-2410's money-saving price, accuracy, and simplified operation make it a valuable instrument buy for engineer, technician, and hobbyist alike. Dimensions: 3.38" H x 7.25" W x 9.5" D.

Kit IM-2410, Shpg. wt. 6 lbs. **124.95**

Factory assembled and tested IM-2410.
SM-2410, shpg. wt. 6 lbs. **170.00**

IM-2410 SPECS: Max. Sensitivity: 25 mV, RMS. **Input impedance:** 1 MΩ shunted by less than 24 pF. **Input Protection:** 150 VAC, up to 100 kHz–derating to 5 VAC from 160 MHz to 225 MHz. **Time Base Frequency:** 3.58 MHz. **Temperature Stability:** + 10 ppm, from 0° to 40° C. **Power Req:** 120/240 VAC, 50/60 Hz. **Dimensions:** 3.38" H x 7.25" W x 9.5" D (8.59 x 18.42 x 24.13 cm).

Heathkit FM Deviation Meter helps check transmitter performance

$149.95

- **Measures FM transmitters and signal generators**
- **Two front jacks for fast oscilloscope hookup**

The IM-4180 lets you check transmitter and signal generator performance by measuring the peak FM deviation between 25 and 1000 megahertz. A BNC jack allows external and direct-line monitoring. An 8-ohm jack allows you to listen to deviation through a speaker or a pair of headphones.

All the jacks and controls of the IM-4180 are easily accessible from the front panel. The controls include: four push button switches for selecting deviation modulation ranges from 2 to 75 Hz; course and fine-tuning controls for locking in difficult UHF FM signals; a level control to adjust the meter sensitivity, and an audio output adjustment control.

The IM-4180 features a blue and white 5" H x 10.31" W x 7.19" D cabinet, and runs on 10 AA batteries (carbon-zinc, alkaline or nickel-cadmium – not included) for remote-location monitoring. The optional 120/240 VAC IMA-4180-1 Battery/Eliminator lets you use the IM-4180 without draining the batteries.

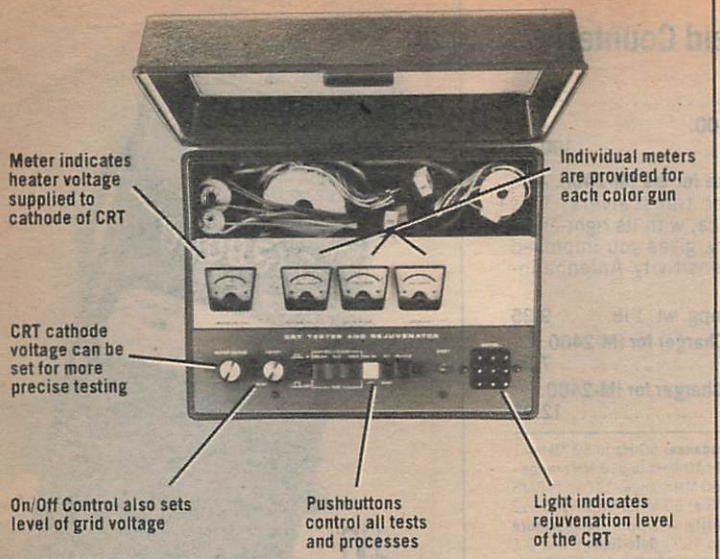
Kit IM-4180, Shpg. wt. 7 lbs. **149.95**

Battery Charger/Eliminator for the IM-4180.
Kit IMA-4180-1, Shpg. wt. 2 lbs. **29.95**

Swiveling Telescoping Antenna for use with IM-4180. For monitoring transmitter and generator performance without connecting IM-4180 to equipment.

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

IM-4180 SPECS: 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.:** 50 Ω. **Max. Input:** 5 V. **Scope Output:** 13 mV/kHz peak.



Give your old, worn TV picture tubes new life with this low-cost Heathkit CRT Checker/Rejuvenator

$124.95 Kit

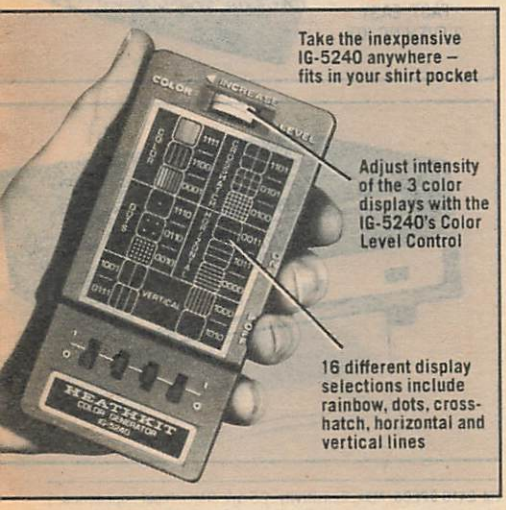
- **Use on almost all CRTs, including in-line-gun tubes**
- **Works on color and black-and-white picture tubes**
- **Separate testing, cleaning and rejuvenation**

Test, clean and rejuvenate almost all current CRTs: Positive-action pushbuttons control all tests and processes for easier operation. Individual guns can be cleaned, tested and rejuvenated by using the front panel pushbuttons. And separate meters for each gun allow easy tracking of the individual grid 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. Molded plastic case. With 4-foot heavy-duty test cable. 120/240 VAC.

Kit IT-5230, Shpg. wt. 9 lbs. **124.95**
ST-5230, Assembled and tested, For 120 VAC only, 9 lbs. **170.00**

IT/ST-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. **Test Cable:** 4 feet long, heavy-duty cable. **Dimensions:** 5.12" H x 13.5" W x 10" D.



Hand-Held Color Alignment Generator for TV field servicing

$72.95 Kit

- **Outstanding performance, shirt-pocket size**
- **16 different displays, including 3 in color**

Real precision, accuracy and stability: The IG-5240 features a crystal-controlled carrier and color oscillator. Its size makes it convenient to take along for in-the-field service. It's a versatile, low-cost service tool for hobbyists, too.

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 displays available. A color level control adjusts the color intensity of the three color displays. A battery saver circuit turns the displays off automatically after a minimum of five minutes on. This feature conserves battery power, and lets you get the most efficient operation from your batteries.

Two 9 VDC batteries (not included) provide 8 or more hours of continuous operation. Housing made of strong molded plastic. The pocket-sized IG-5240 Color Alignment Generator measures 5.4" H x 2.75" W x 1.15" D.

Kit IG-5240, Shpg. wt. 2 lbs. **72.95**
SG-5240, Assembled and tested, 1 lb. **100.00**

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 kHz, ±0.005%, crystal-controlled. **Master Timer:** 377.616 Hz, ±0.005%, crystal-controlled. **RF Carrier:** NTSC Channels 3 or 4, ±0.005%, crystal-controlled. **RF Output:** 5000 µV minimum, into 300 ohms. **Video Modulation:** Approximately 50%. **On-Time Interval:** 5 minutes minimum. OFF pushbutton can override timed shutoff. **Power Requirement:** Two 9 VDC (NEDA 1604) batteries, with 180 mA/hour capacity. **Dimensions:** 5.4" H x 2.75" W x 1.15" D (13.72 x 6.99 x 2.91 cm).

High-accuracy Heathkit Yoke/Flyback Tester for TV service technicians

$94.95 Kit

- **Portable unit checks yokes, flybacks, coils with ring test**

Checks windings of yokes, flybacks, coils and general mid-frequency (10 to 100 kHz) coils. Measure drive signals, focus and anode voltage with IMA-100-10 below. With test leads. 120/240 VAC.

Kit IT-5235, Shpg. wt. 8 lbs. **94.95**
ST-5235, Assembled, 7 lbs. **140.00**
Kit IMA-100-10, 30 kV Probe, 1 lb. **12.95**
SMA-100-10, Assembled Probe, 1 lb. **19.95**

IT/ST-5235 SPECIFICATIONS: Yoke/Flyback Test: Applies exciting pulse to coil, detects # of rings at preset amplitude or higher. **Amplitude:** 25% of initial ring; adjustable from 10-50%. **Scale:** Bad, <9 rings; Good, >11 rings. **Accuracy:** ±1 ring at 10 mark on highest range. **Drive Voltage Scales:** 0-30, 0-300 VAC, p-p. **Accuracy:** ±5% of full scale, 100 Hz-200 kHz. **High-Voltage Scales:** 0-10, 0-40 kVDC. **Accuracy:** ±3% of full scale (with optional IMA-100-11 Probe). **Dimensions:** 6.88" H x 5.75" W x 10.75" D (17.48 x 14.61 x 27.31 cm).

Color Bar/Dot Pattern Generator

12 patterns, clear raster for purity adjustment. Heath 3 x 3 or familiar 9 x 9, displays. RF output, Chs. 2-6; variable +, – going video; front panel sync output; 4.5 mHz sound carrier oscillator. 2# 500 W AC outlets. Metal case. 120/240 VAC. 5.25" H x 13.5" W x 8" D.

Kit IG-5228, Shpg. wt. 8 lbs. **147.95**

Post Marker/Sweep Generator

Helps align TV, FM receivers. Mixes 1 or more marker signals with demodulated signal from test circuit. 15 markers, carrier markers for NTSC Chs. 4 and 10, diode modulator for video sweep modulation, 400 Hz tone for FM alignment. Metal case. 120 VAC. 5.5" H x 13.38" W x 12" D.

Kit IG-5257, Shpg. wt. 16 lbs. **254.95**

Lightweight 40 kV Probe Meter

±3% accuracy. On-off switch protects meter. Build in 1 evening. Overall Dimensions, 1.5" H x 1.88" W x 15" D.

Kit IM-5210, Shpg. wt. 2 lbs. **24.95**

How to Use Color TV Instruments. Book contains helpful information on servicing color TV sets.

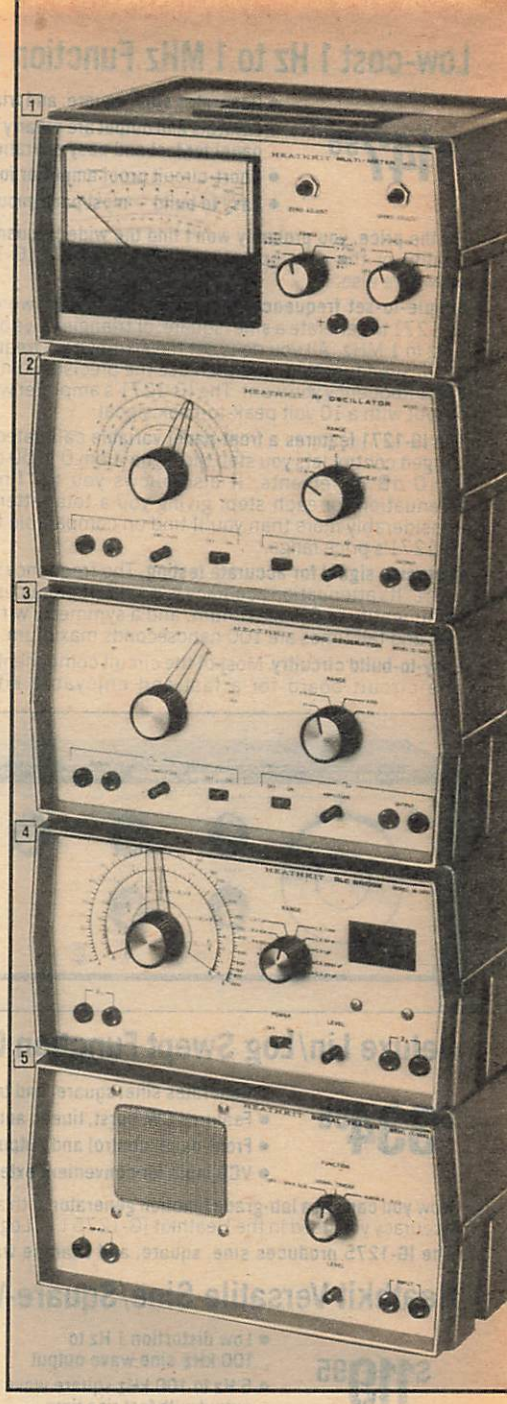
EDP-138 ..... **5.95**
(See page 52 for complete book ordering information.)

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

The 5280 Series — a low-cost way to build a test bench

Whether you're a beginning hobbyist, student, or service technician, our 5280 Series offers you a money-saving way to assemble a versatile test bench for your electronic needs.

Each instrument in the series is described below and is priced at just $47.95. And for that kind of money, we don't think you'll find a better value on quality-engineered test instruments.



1 Four-function Multimeter

This multimeter lets you measure four functions on a large, easy-to-read panel meter. The meter measures AC and DC voltages up to 1000 volts and DC current up to 1000 milliamps. The ohm function has four ranges: X 1 ohm, X 100 ohm, X 10 kilohm, X 1 megohms. Requires one "C" cell plus two 9 VDC batteries or the IPA-5280-1 Power Supply described in lower right column. This budget-priced Heathkit instrument includes test probes.

Kit IM-5284, Shpg. wt. 5 lbs. **47.95**

IM-5284 SPECIFICATIONS: Ranges: DC Voltmeter: 0-1, 0-10, 0-100, 0-1000 volts, full scale. **Accuracy:** ±3%, full scale. **AC Voltmeter:** 0-1, 0-10, 0-100, 0-1000 volts, full scale. **Accuracy:** ±5%, full scale. **DC Miliammeter:** 0-1, 0-10, 0-100, 0-1000 mA, full scale. **Accuracy:** ±4%, full scale. **Input Resistance: DC:** 10 megohms. **AC:** 1 megohm. **Dimensions:** 5.75" x 11" W x 7.75" D (14.61 x 27.94 x 19.69 cm).

2 RF Oscillator for precise alignments

For aligning tuned stages of AM, FM and television receivers. Features 5 band output, plus a band for calibrated harmonics, and a 1 kHz output jack for tracing circuit defects. Housed in high-impact molded case. Requires two 9 VDC batteries or IPA-5280 Power Supply for operation. This easy-to-build Heathkit instrument includes both probes and test leads.

Kit IG-5280, Shpg. wt. 5 lbs. **47.95**

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

3 Sine/Square Wave Oscillator

Here's an instrument that you'll find useful in troubleshooting and testing audio circuits. The IG-5282 features four output frequency ranges, from 10 Hz to 100 kHz, with both sine and square wave modes. The IG-5282 can be used as audio signal source for signal tracing. And, with the right equipment, the sine mode of the IG-5282 can be used for analyzing audio stage gain and distortion. The sine square wave mode, again with the right associated equipment, can be used for determining frequency response. Features rugged case construction.

Kit IG-5282, Shpg. wt. 5 lbs. **47.95**

IG-5282 SPECIFICATIONS: Frequency Output: 10 Hz to 100 kHz, in four ranges. **Sine Wave Output Voltage:** 0-3 Volts RMS. **Square Wave Output Voltage:** 0-3 Volts peak. **Power Requirement:** Two 9-volt batteries or the optional IPA-5280-1 Power Supply. **Dimensions:** 5.75" H x 11" W x 7.75" D (14.61 x 27.94 x 19.69 cm).

4 RCL Bridge — for design work

Features solid-state circuitry that lets you find unknown values of resistance, inductance, and capacitance. This easy-to-build Heathkit instrument features one circuit board assembly, and comes in a molded cabinet. Kit includes clips.

Kit IB-5281, Shpg. wt. 5 lbs. **47.95**

IB-5281 SPECIFICATIONS: Ranges: Resistance: 10 ohms to 10 megohms, in 3 ranges. **Inductance:** 10 microhenries to 10 Henries, in 3 ranges. **Capacitance:** 10 picofarads to 10 microfarads, in 3 ranges. **Oscillator Frequencies:** 1 kHz, 10 kHz, 100 kHz. **External Standard Range:** 1/1 to 10/1. **Power Req:** Two 9 VDC batteries or IPA-5281-1 Power Supply. **Dimensions:** 5.75" H x 11" W x 7.75" D.

5 Signal Tracer for audio circuits

The IT-5283 Signal Tracer is the test instrument you need to trouble-shoot audio circuits. It comes with a diode-equipped RF probe that lets you quickly trace radio and television receiver and transmitter circuits and pin-point failing components and stages. A straight-through (DC) position allows you to identify defective audio components and systems instantly. The IT-5283 also features an audible tone that changes frequency depending on the test point voltage or resistance. This lets you easily trace signal flow through logic circuits and isolate problems.

Kit IT-5283, Shpg. wt. 5 lbs. **47.95**

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

120/240 VAC Power Supply

(Not shown) This handy power supply can simultaneously power all five 5280 Series Instruments without rewiring. Full wave rectification, capacitor, filtering and dual integrated circuit regulators to insure correct voltage output. Comes in a molded cabinet. Measures: 6" H x 3.75" W x 3" D.

Kit IPA-5280-1, Shpg. wt. 3 lbs. **26.95**

Heathkit Test Lead Set

For 2000 V rms, 20 amp maximum. Includes 1.5 meter black and red cables, each terminated by two 4mm shielded plugs, red sprung hook, red prod, and black shrouded croc clip.

PKW-200, Shpg. wt. 1 lb. **15.95**

RF Probe for DC Voltmeter

Designed for any 10 or 11 megohm DC input voltmeter. Linear response: 1 kHz to 100 MHz. Includes 10 megohm banana & 11 megohm phone plugs. Features grounded probe body housing.

Kit PK-3A, Shpg. wt. 1 lb. **9.95**

PKW-3A, Assembled and tested, wt. 1 lb. ... **14.95**

High quality instrument Test Probes

30 kV DC Probe multiplies 10 megohm, meter range by 100, 1000 megohm input.

Kit IMA-100-10, w/banana plug, 1 lb. **12.95**

SMA-100-10, Assembled 30 kV DC Probe w/phone plug, Shpg. wt. 1 lb. **19.95**

30 kV HV Probe, x 100 measurement for meters with 11 megohm input (including probe resistance).

Kit IMA-100-11, 1 lb. **12.95**

Low-cost 1 Hz to 1 MHz Function Generator

$147.95

- Generates sine, square, and triangle waveforms
- Controls and output are clearly marked and located on front panel for fast and easy operation
- Short-circuit proof amplifier for full instrument protection
- Easy to build – most parts mount on a single circuit board

For the price, you probably won't find the wide frequency range, the engineering quality, or the easy operation of the Heathkit IG-1271 Function Generator anywhere else.

Simple-to-set frequency generation. With just two controls, you can set the IG-1271 to generate a sine, square, or triangle wave over a frequency range from 1 Hz to 1 MHz. All you do is set the six-position frequency multiplier control to the desired function, and then use the precision tuning control to generate the exact frequency you want. The IG-1271's amplifier will supply the 50 ohm BNC output with a 10 volt peak-to-peak signal.

The IG-1271 features a front-panel variable calibrated attenuation control. This ganged control lets you step the signal from 0 to 50 dB (10 V p-p to 30 mV p-p) in 10 dB increments. It also allows you to "fine-tune" up to 20 dB of attenuation for each step, giving you a total attenuation of 70 dB! This is considerably more than you'll find on comparable function generators in the IG-1271's price range.

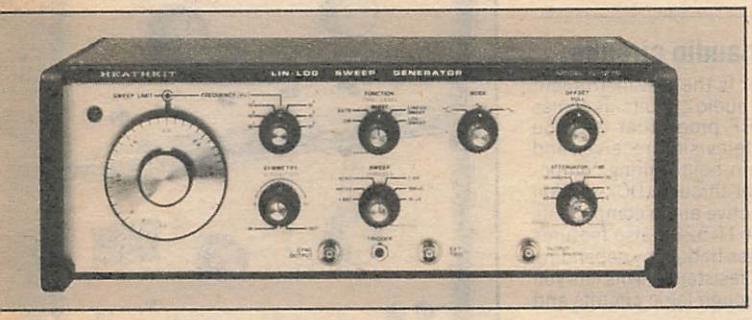
A precise signal for accurate testing. The frequency accuracy of the IG-1271 is ±3%. Its attenuation accuracy is ±1 dB. It produces a triangle waveform with a nonlinearity of 5% maximum, and a symmetry within 10%. The square wave rise and fall times are 100 nanoseconds maximum.

Easy-to-build circuitry. Most of the circuit components of the IG-1271 mount on one circuit board for a fast and enjoyable kitbuilding experience. A chassis-mounted switch lets you run the IG-1271 on 120 VAC or 240 VAC. For accurate calibration, a triggered oscilloscope is necessary. (See the complete line of Heathkit Oscilloscopes on pages 65-67.)

Kit IG-1271, Shpg. wt. 7 lbs. **147.95**

Factory assembled and calibrated IG-1271 Function Generator.
SG-1271, Shpg. wt. 7 lbs. **195.00**

IG/SG-1271 SPECIFICATIONS: Functions: Triangle Waveform: Nonlinearity, 5% maximum. Symmetry within 10% of 50% duty cycle. **Square Waveform:** 100 nanosecond maximum rise or fall time: Symmetry within 10% of 50% duty cycle. **Sine wave: Harmonic Distortion:** 3% maximum. **Power Requirement:** 120/240 VAC, 50/60 H. 15 watts maximum. **Dimensions:** 3" H x 7.25" W x 8.88" D. (7.62 x 18.42 x 22.56 cm), with handle removed. **Net weight:** 4.2 lbs.



Deluxe Lin/Log Swept Function Generator

$334.95

- Generates sine, square, and triangle waveforms
- Features CW, burst, linear, and log sweeps
- Front-panel control and output for simple operation
- VCG input for convenient external system control

Now you can get a lab-grade function generator with all the testing capability and accuracy you need in the Heathkit IG-1275 Lin/Log Swept Function Generator.

The IG-1275 produces sine, square, and triangle waveforms, as well as swept-function waveforms for all types of frequency response tests. Two frequency controls and a six-position operational mode switch give you the test versatility of similar units costing much, much more. The six operational modes include Continuous Output (CW), gated CW, a burst mode that completes a variable integral number of output cycles, plus linear and log sweeps for wide 1000/1 sweep range.

For complete control, the start and stop frequencies of the IG-1275 can be set independently, and the sweep modes can be triggered one at a time from the front panel – or externally – and stopped at any given integral number of cycles. Other convenient features include: a 50 dB stepped attenuator with a variable ganged control for precise attenuation; a control that adjusts symmetry from 5% to 95%; a variable offset; a sync output for time-saving system control; and a VCG input for outside control of the main generator.

Besides these controls, the IG-1275 is also equipped with a pen lift and chart control signals that enable you to use a chart recorder, like the Heathkit IR-5207 X-Y Chart Recorder or the IR-5204 Strip Chart Recorder.

Kit IG-1275, Shpg. wt. 15 lbs. **334.95**

IG-1275 SPECIFICATIONS: Output: 50-ohm source, short-circuit protected and ±10 V open circuit protected. ±10 V open circuit, ±5 V into 50 ohms. **Output Flatness:** ±0.1 dB to 300 kHz, 0.5 dB-3 MHz. **Frequency Range:** 0.003 Hz-3 MHz in 6 steps on each primary decade. **Sine Distortion:** Less than 1% (x10), less than 0.5% ($x10^2$, $x10^3$, $x10^4$), less than 0.75% ($x10^5$). Harmonics, 30 dB down ($x10^6$). **Triangle Linearity:** No greater than 1% deviation to 300 kHz. (top decade for each range only). **Square Wave Rise/Fall:** Less than 60 nS. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 5.38" H x 15" W x 11.88" D.

Heathkit Versatile Sine/Square-Wave Audio Generator

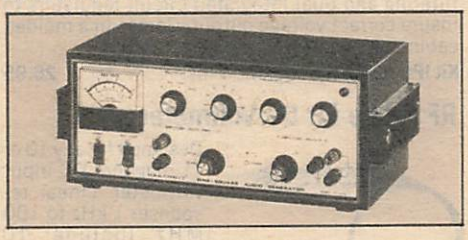
$119.95

- Low distortion 1 Hz to 100 kHz sine wave output
- 5 Hz to 100 kHz square wave output with fast rise time – great for response testing

A must for any audio test bench. Provides you with a clean signal source for gain, frequency response, and harmonic distortion measurements; also acts as an external modulator for RF generators.

Has front panel meter for convenient monitoring of sine waves in volts and dB. Also features repeatable selection of any frequency, switchable internal and external load, and operation on either 120 or 240 VAC power.

Kit IG-5218, Shpg. wt. 10 lbs. **119.95**
SG-5218, Assembled, 10 lbs. **195.00**



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

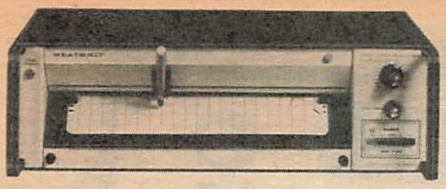
Sine-Wave Audio Generator

The Heathkit IG-1272 Sine-Wave Generator yields a low-distortion sine wave output over a frequency range from less than 5 Hz to 100 kHz.

It features push-button selection of the first 3 significant digits of desired frequency, plus a switch-controlled frequency multiplier. In addition, the IG-1272 can be operated in a continuously-variable frequency mode. The front panel meter allows accurate monitoring of signal output. Also has low-noise BNC output, plus a buffered BNC output for oscilloscope use. The IG-1272 measures 5½" H x 11" W x 12½" D.

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

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



10 mV-100 V Strip Chart Recorder

120/240 VAC. 5.34" H x 17.41" W x 12.31" D.

Kit IR-5204, Shpg. wt. 22 lbs. **329.95**

SR-204, Assembled, Shpg. wt. 22 lbs. ... **495.00**

Dual-Pen Lab-Quality Strip Chart Recorder. Uses ONLY pens listed with IR-5207 Recorder (at right).

SR-206, Assembled, Shpg. wt. 39 lbs. ... **1495.00**

Pens for IR-5204/SR-204 Recorder. Nylon tip.

SU-406-92, Red Pen, Shpg. wt. 1 lb. **3.95**

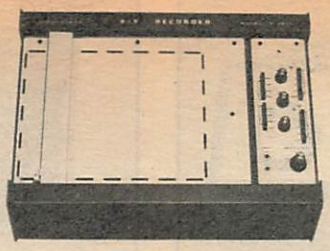
SU-406-93, Blue Pen, Shpg. wt. 1 lb. **3.95**

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

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

Centimeter-calibrated, offset 4 cm on R, 0-100 R-L.

SU-445-18, Shpg. wt. 2 lbs. **5.95**



1 mV-10 V X-Y Chart Recorder

120/240 VAC. 5.63" H x 17.63" W x 12.25" D.

Kit IR-5207, Shpg. wt. 28 lbs. **489.95**

SR-207, Assembled, Shpg. wt. 30 lbs. ... **795.00**

Disposable Nylon Pens for IR-5207/SR-207/SR-206. Pens for chart recording speeds under 1 inch/minute.

SU-205-3, Long Red Pen, Shpg. wt. 1 lb. **3.95**

SU-205-4, Long Blue Pen, Shpg. wt. 1 lb. ... **3.95**

SU-205-6, Short Red Pen, Shpg. wt. 1 lb. ... **3.95**

Pens for chart recording speeds over 1 inch/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**

Pro-Quality Distortion Analyzer

Featuring outstanding sensitivity and bandwidth, the Heathkit IM-5258 Harmonic Distortion Analyzer measures total harmonic distortion (THD) down to 0.03%, from 5 Hz-100 kHz, with ±5 percent full scale accuracy. Six ranges cover 0.03 to 100 percent harmonic distortion.

The IM-5258 can also function as an AC voltmeter, with full-scale capability from 1 mV to 300 V. AC voltmeter accuracy is also ±5% of full scale. Maximum input impedance, 1 megohm shunted by 70 pF. Not for use in strong RF fields. For 120/240 VAC, 50/60 Hz. Dimensions: 5.38" H x 15" W x 11.5" D (13.67 x 72.81 x 29.21 cm). Net Weight, 12 lbs. (5.41 kg). Not for RF field use.

Kit IM-5258, Shpg. wt. 17 lbs. **234.95**

Rugged Bi-Directional Wattmeter

Aids in servicing communications equipment. Measures forward and reflected power in transmission lines, between 100-1000 MHz, measures 30/75/300 Watts forward and 3/7.5/30 Watts reflected without slugs or elements. ±5% forward accuracy. N-type coaxial connectors, N to PL-259 adapters. Requires 9 VDC battery (not included).

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

SM-4190, Assembled, Shpg. wt. 3 lbs. ... **120.00**

Test with low-cost Tube Checker

Tests tubes on basis of total emission – for shorts, leakage, open elements and filament continuity. Also has good/bad indicator to show relative quality, and a neon bulb indicator for filament continuity and leakage or shorts between elements. Metal cabinet. For 120 VAC, 60 Hz. Dimensions, 5.5" H x 13.88" W x 12" D.

Kit IT-3117, Shpg. wt. 12 lbs. **179.95**

High-accuracy FET/Transistor Tester

Tests conventional (bi-polar) transistors, diodes, FETs, SCRs, triacs and unijunction transistors. Test in-circuit with color-coded leads supplied, or out-of-circuit with built-in sockets. Shows gain (DC beta), trans-conductance (Gm), leakage current on easy-to-read meter. Sturdy metal case. Uses 2# 1.5 VDC "D" cells (not supplied). 5" H x 9.44" W x 8.13" D.

Kit IT-3120, Shpg. wt. 5 lbs. **74.95**

Curve Tracer tests semiconductors

Extensive manual tells how to interpret displays. Extra leads included. Requires DC-20 MHz oscilloscope for proper operation. For 120/240 VAC power. Dimensions: 4.5" H x 11.25" W x 10" D.

Kit IT-3121, Shpg. wt. 10 lbs. **124.95**

Portable Transistor/Diode Checker

Take this lightweight instrument with you anywhere for field checks. Checks high-and low-power transistors (NPN and PNP) for shorts, opens, leakage, current gain; diodes for forward and reverse current. Also tests continuity. Easy-to-read calibrated meter. Metal cabinet. Powered by two 1.5 VDC "C" size cells (not included). 3.13" H x 3.13" W x 3.75" D.

Kit IT-3127, Shpg. wt. 2 lbs. **13.95**

Logic Probe for TTL, CMOS circuits

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, detachable HF ground. 0.75" H x 1" H x 9.25 L.

Kit IT-7410, 1 lb. ... **Was $42.95, NOW ONLY 39.95**

Capacitor Substitution Box cut 25%

Switch-select capacitance from 100 pF to 0.22 μF. 600 V ratings, except 3 lowest (500 V) and 2 highest (400 V) values. 5% accuracy, 0.0001-0.00047 μF; and 10% for 0.01 to 0.22 μF. 3" H x 3" W x 6" D.

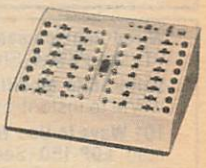
Kit IN-3147,
2 lbs. . .**Was $19.95, NOW ONLY 14.95**

Save over 30% on Capacitance Box

Decade Capacitance Box makes calculations easier. Covers 100 pF to 0.111 μF, in 100 pF increments. 400 VDC rating. Metal case measures 4" H x 7.13 W x 5" D.

Kit IN-3127, 2 lbs.
Was $28.95 .... NOW 19.95

Digital IC Tester saves time



Test 14- or 16-pin ICs. Ideal for Digital Techniques Course (p. 41). Input-output jacks for each pin. Metal case. Dimensions, 4.63" H x 11.38" W x 9.25" D. 120/240 VAC, 50/60 Hz.

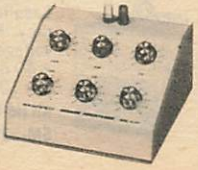
Kit IT-7400, 6 lbs. .. **89.95**

Useful Resistor Substitution Box

Switch-select any of 36 EIA standard 10% tolerance, 1-watt resistors from 15 ohms to 1 megohm. Shorting-type switches with make-before-break action for smooth selection. Metal case. 5.38" H x 3.13" W x 3" D.

Kit IN-3137, 2 lbs. **19.95**

Lab-type Decade Resistance Box



Covers 1-999,999 ohms in 1-ohm steps. Use with IN-3127 above to solve complex network problems. 0.5% tolerance, 1 Watt resistors. Metal case. 5" H x 7.5" W x 6.63" D.

Kit IN-3117, 3 lbs. ... **52.95**

RF Fuse in UHF BNC-BNC Connector. DC-500 MHz; 50 ohms; 1.2:1 max. SWR; 1.8 dB max insertion loss at 500 MHz.

SU-512-50, 1 lb. **60.00**

SAVE 30% on 50Ω Termination. DC-1 GHz; 1 W. VSWR at 250 MHz, 1.2:1.

SU-511-50, 1 lb. . .**Was $21.50, NOW 14.95**

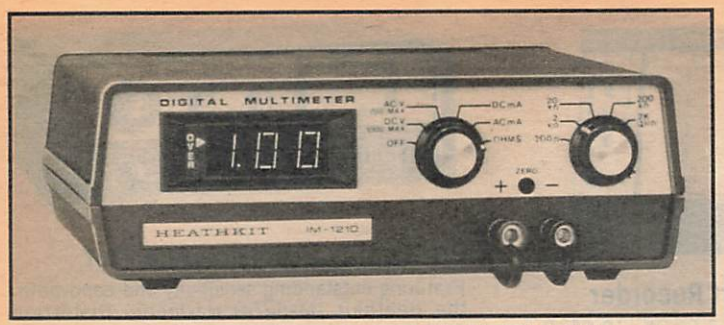
Assembled 3' 50Ω BNC/BNC Cable.

SU-501-3, 1 lb. **10.00**

Assembled 3' 50Ω BNC/Banana Cable.

SU-503-3, 1 lb. **10.00**

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



Low-cost, high-performance Digital Multimeter

$79.95 Kit

- **Measures DC voltage to 1000 Volts, AC voltage to 700 Volts, with overload protection**
- **Rugged unit also measures current, resistance**

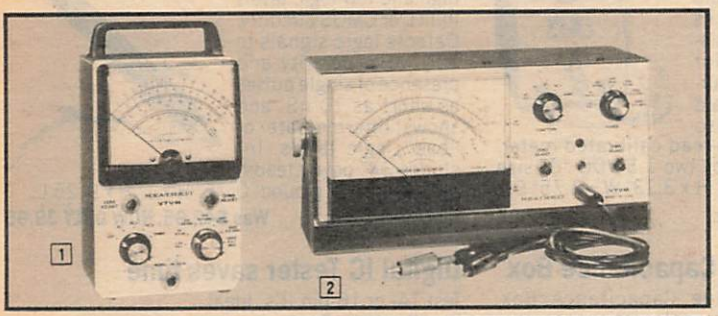
Here's a low-cost, high-performance digital multimeter for hams, hobbyists and service techs. Its full-function capability includes AC voltage measurements to 700 Volts. Has four overlapping AC/DC voltage and current ranges. The IM-1210's five resistance ranges cover 0 to 2 megohms. Full scale accuracy (±1 digit) is ±1% for DC voltage measurements; ±1.5% for AC voltage, DC current and resistance measurements; and ±2% for AC current measurements.

Overload protection on all ranges includes an isolated floating ground which guards against dangerous voltages, and fuse protection from excessive current. Attractive heavy-duty case withstands rugged use. Kit includes universal banana jack inputs for easy testing of electronic equipment. For 120/240 VAC, 50/60 Hz. Dimensions: 3" H x 8.69" W x 10.54" D (7.62 x 22.07 x 26.77 cm).

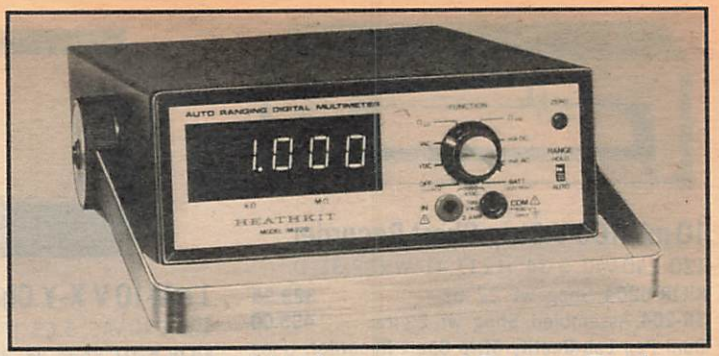
Kit IM-1210, Shpg. wt. 5 lbs. **79.95**
SM-1210, Assembled and tested, Shpg. wt. 5 lbs. **130.00**

IM/SM-1210 SPECIFICATIONS: Voltage Ranges: 0-1000 VDC, 0-700 VAC. **Current Range:** 0-2000 mA. **Resistance Range:** 0-2 megohms. **Overrange:** 25% on all functions (within maximum input limits). **Maximum Input:** 700 VDC (except 350 VDC on 2 V range), 1000 VAC, or 3 Amps. **Input Impedance:** 1 megohm. NOTE: Specifications based on 30-minute warmup.

Versatile Test Lead Set. 2000 VRMS, 20 A max. With 1.5 meter black, red cables terminated by two 4 mm shielded plugs: red sprung hook; red prod; black shrouded croc clip. **PKW-200,** Shpg. wt. 1 lb. **15.95**



Wired Replacement Probe for the Heathkit IM-5218 or IM/SM-5228 VTVMs. **PKW-4,** Shpg. wt. 1 lb. **10.95**
Solid-State Modification Kit converts your IM-5218 or IM/SM-5228 VTVM to instant-on solid-state operation. **IMA-18-1,** 1 lb. **19.95**
101 Ways to Use Your VOM/VTVM/DVM. Practical applications. Easy to read. **EDP-150** (See page 52 for book ordering information) **9.95**



Save $34.95 on Multimeter and Battery Pack

$294.95

- **Automatically selects proper voltage, current and resistance ranges for accurate measurements**
- **Built-in feature protects against overloads**

The IM-2212 Portable Digital Multimeter is a laboratory-grade instrument featuring automatic range selection, along with exceptionally high accuracy. It features five AC and DC voltage ranges up to 1000 Volts; five AC and DC current ranges to 2000 mA; and ten resistance ranges (low and high voltage) to 20 megohms. DC accuracy, ±0.2%; AC accuracy, ±0.4%, when calibrated to laboratory standards. Normal mode rejection of 80 dB assures highly stable DC readings. Automatic polarity indication; automatic decimal point placement; automatic kilohms or megohms indication. Hold switch inhibits the auto-ranging function when measuring one range. Compact low-profile cabinet with detent positions to hold the IM-2212 at the best viewing angle. Operates on 120/240 VAC, 50/60 Hz power, or with optional Rechargeable Battery Pack (order below). Dimensions of the IM-2212 are 3.1" H x 7.5" W x 11" D.

Kit IM-2212, Shpg. wt. 10 lbs. **294.95**
Optional Rechargeable Battery Pack for in-field use.
IMA-2212-1, Shpg. wt. 4 lbs. **19.95**
Save $34.95 when you buy the system – Multimeter and Battery Pack. If purchased separately, $314.90. **IMS-2212,** 14 lbs. **279.95**

IM-2212 SPECIFICATIONS: Voltage Ranges: 0-1000 VDC, 0-700 VAC. **Maximum Input:** 1000 VDC, 700 VAC (1000 Volts peak) on any range. **Input Impedance:** 10 megohms (shunted by 90 pF during AC measurements). **Current Range:** 0-2000 mA. **Resistance Ranges:** Low Voltage, 0-2 megohms; High Voltage, 0-20 megohms. **Display:** 3½-digit, 0.5" high LED display. **Polarity Indication:** Automatic + or – on VDC and DC mA ranges only. **Net Weight:** 6 lbs. (8 lbs. with optional battery pack).

1 Measure accurately with this low-cost Heathkit VTVM

For solid state, digital equipment. Single probe for all measurements. Separate 1.5 and 5 V ranges make measuring low voltages easy. 1 MHz response. The IM-5218 measures 7.38" H x 4.69" W x 4.25" D.

Kit IM-5218, Shpg. wt. 5 lbs. **77.95**

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

2 Use this VTVM loaded with professional features

Bench-type version of IM-5218 VTVM. All calibration controls are conveniently adjustable from the front panel. Dimensions, 5" H x 12.69" W x 4.75" D.

Kit IM-5228, Shpg. wt. 6 lbs. **72.95**
SM-5228, Assembled and tested, Shpg. wt. 7 lbs. **130.00**

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

AC/DC Multimeter for field or bench

Auto-polarity. Check semi-conductors both in- and out-of-circuit. 120/240 VAC. Multimeter measures 6.88" H x 5.75" W x 11.25" D.

Kit IM-5225, 8 lbs. **139.95**
SM-5225, Assembled, 8 lbs. **185.00**

AC Voltmeter measures voltage, dBs

Excellent response, sensitivity and accuracy. Features linear scales for both voltage and dBs. 1 mV-300 VAC, –70 to +40 dB. 120/240 VAC. 6.75" H x 5.63" W x 10.88" D.

Kit IM-5238, 8 lbs. **104.95**
SM-5238, Assembled, 8 lbs. **170.00**

Portable VOM for fast checks

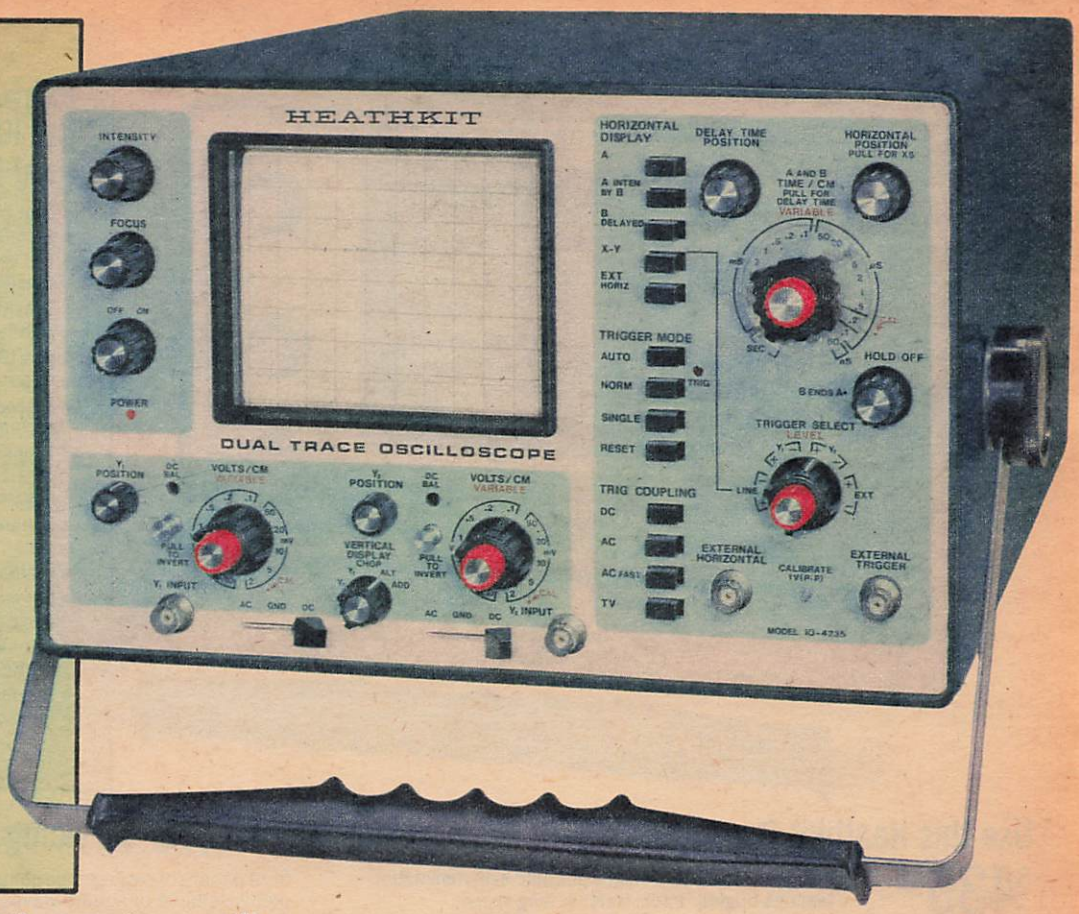
No changing connections to read AC, DC. 1.5 V ohmmeter. Build in just one evening. Needs two 9 VDC cells, one "C" cell (not included). Dimensions, 5.38" H x 9.38" W x 9" D.

Kit IM-5217, 4 lbs. **39.95**

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

The finest Heathkit Scope — with wide range, dual-trace capability, low price

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



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

$969.95 Kit

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

The IO-4235, with its DC-35 MHz range, is the most advanced oscilloscope our engineers have ever developed! Compare the top-of-the-line Heathkit oscilloscope with others in its price range: you'll find that the IO-4235 is unmatched in performance, features and quality. Compare the sophistication and versatility of the IO-4235 with other oscilloscopes that cost hundreds of dollars more.

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

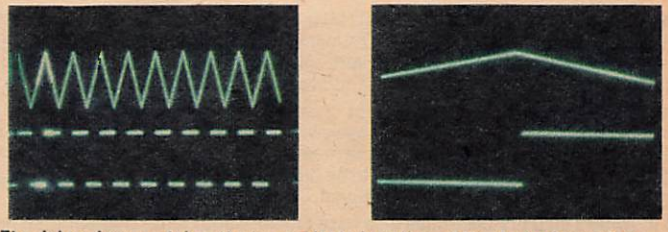
The IO-4235's delayed-sweep circuit uses a separate time base to separate a faster sweep, which displays a selected portion of the normal waveform. The start and length of the delayed sweep are user-controlled, so any given portion of the normal waveform can be displayed at a much higher rate.

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

Also features fully regulated power supplies, capabilities to operate on lower line voltages, a front panel 1 Volt square wave output, a variable hold off control, a Z axis and an easy-to-grip carrying handle. Calibration requires a precise source of square waves, like the IG-4505 (p. 66), and a DC voltmeter.

Kit IO-4235, Shpg. wt. 52 lbs. **969.95**

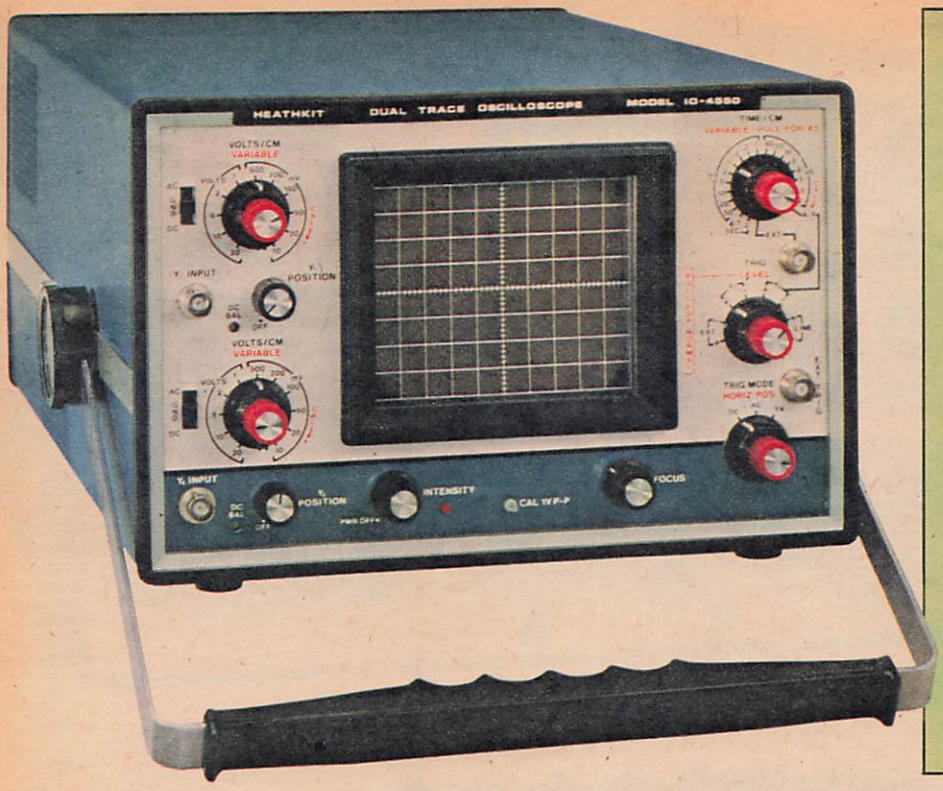
Factory assembled and tested version of above.
SO-4235, Shpg. wt. 38 lbs. **1295.00**



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

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

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



Extra-value features make the IO-4550 an excellent dual-trace oscilloscope value

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

Use this Heathkit Dual-Trace DC-10 MHz Oscilloscope for your servicing and design work

$439.95 • **Designed for TV servicing, electronic experimentation — features brighter trace, faster writing speed**

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

To maximize ease of operation, input channels are displayed, chopped or alternated, as selected by the time base switch — automatically! Exacting X-Y operation assures you of precise phase measurements. A trigger select switch and level control allow the time base to be precisely triggered at any point along the positive or negative slope of the signal.

The 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 provide precise triggering, at any point on the positive or negative slopes of the trigger signal. Facilities are also included to help determine the frequency of a waveform.

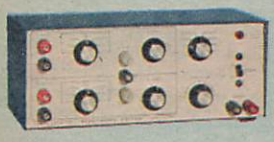
Improved circuitry and just four printed circuit boards make kit assembly easy. The IO-4550 can be wired for either 120 or 240 VAC. To add to this Scope's versatility, see the assembled X1/X10 Scope Probe (PKW-105) available on page 67. 1 Volt peak-to-peak square wave signal is available at the IO-4550's front panel, for easier scope compensation. Calibration of the IO-4550 requires precise source of square waves, such as the IG-4505 or IOA-4510-1 Scope Calibrators (both below). The IO-4550 will be a welcome addition to your test bench. Order it for your service work, experimentation or design today.

Kit IO-4550, Shpg. wt. 27 lbs. **439.95**

SO-4550, Assembled and calibrated, Shpg. wt. 25 lbs. **670.00**

IO-SO-4550 SPECIFICATIONS: VERTICAL: Deflection Factor: Sensitivity: 10-20 mV/cm, 11 steps in 1-2-5 sequence. **Variable:** Continuous between steps to approximately 60 V/cm. **Accuracy:** 3%. **Vertical Response: DC Coupling:** DC-10 MHz. **AC Coupling:** 2 Hz-10 MHz. **Rise Time:** 35 nS. **Overshoot:** Less than 5%. **VERTICAL: Sensitivity:** 10-20 mV/cm. **Attenuator: Vertical Input: Impedance:** 1 megohm shunted by 38 pF. **Maximum Input:** 400 V. **HORIZONTAL: Time Base: Ramp:** 200 nS/cm to 0.2 S/cm, 19 steps in 1-2-5 sequence. **Variable:** Continuous between steps to approximately 0.6 S/cm. **Accuracy:** 3%. **Magnifier:** X5 (adds additional 2% to sweep accuracy). **EXTERNAL: Sensitivity:** Approximately 0.1 V/cm. **Impedance:** Approximately 100 kilohms. **Frequency Response:** DC to 1 MHz. **Connector:** BNC. **TRIGGER: Internal: Automatic:** Adjustable over 10 divisions. **Normal:** Adjustable over 10 divisions. Slope Selection: + or −. **Impedance:** 1 megohm, shunted by 40 pF. **Connector:** BNC. **X-Y: Y Channel:** Same as vertical. **X Channel:** Same as vertical, except response is limited to 1 MHz. **Operating Temperature Range:** 50 to 104 degrees F (10 to 40 degrees C). **Power Requirement:** 120/240 VAC, 50/60 Hz. Internal power supplies are fully regulated. **Dimensions:** 6.93" H x 12.88" W x 19.25" D (17.60 x 32.71 x 48.89 cm), without handle. **Net Weight:** 22 lbs. (10 kg).

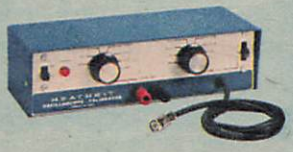
Scope Switch adds dual-tracing



Simultaneous display of two separate input signals for comparison, observing phase relationships, other uses. Use as impedance coupler, preamp or square wave generator. Sync output on each channel locks the sweep to either signal. DC coupling.

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

Deluxe Oscilloscope Calibrator



A practical oscilloscope calibrator at a sensible price. Provides all of the waveforms necessary to adjust sweep speeds, vertical calibration, delay line terminations, high-frequency compensation and attenuator compensation to 35 MHz.

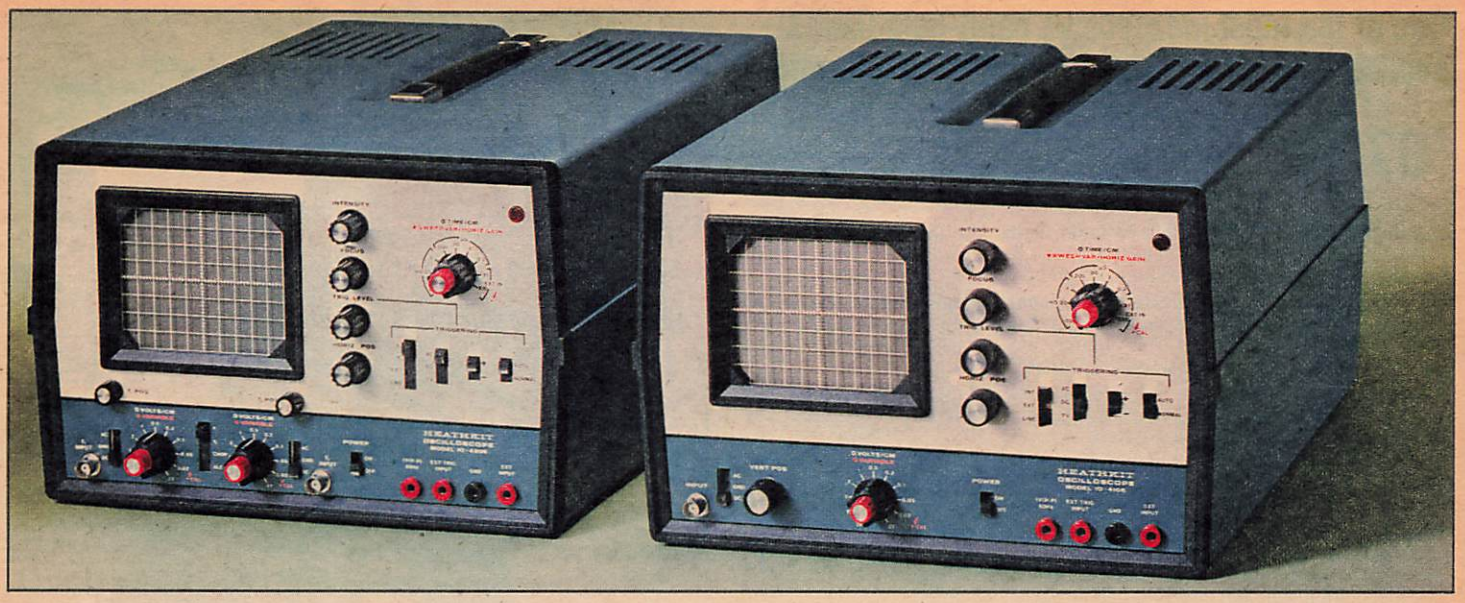
Kit IG-4505, Shpg. wt. 4 lbs. **52.95**

Low-Priced Oscilloscope Calibrator

The low-priced Heathkit IOA-4510-1 Oscilloscope Calibrator provides everything you need, including a crystal-controlled time base, to accurately calibrate your scope to 15 MHz. Draws operating power from IO-4510 or external 6 VDC source. Easy-to-build, easy-to-operate calibrator for use with IO-4105, IO-4205 and IO-4550 Oscilloscopes.

Kit IOA-4510-1, Shpg. wt. 1 lb. **17.95**

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



Get dual-trace versatility at a single trace price with the Heathkit IO-4205 DC-5 MHz Scope

$329.95 Kit

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

The dual-trace IO-4205 is ideal for the sophisticated servicing required by many modern electronic devices. It lets you compare two signals simultaneously for input-output comparisons, checking phase relationships and other timing requirements you might have.

Stable triggering circuit for solid waveform displays. Special trigger selector allows easy triggering on the vertical component of a complex TV signal. Select external or one of 7 calibrated internal time bases.

Accurate measurements can be easily made on the 8 x 10 cm CRT screen. Fully-regulated power supply provides accurate voltage and current. Partial mu-metal shielding helps eliminate possible display errors. Requires IG-4505 or IOA-4510-1 (p. 66) for calibration. For 120/240 VAC, 50/60 Hz power. The IO-4205 measures 8" H x 13" W x 17" D.

Kit IO-4205, Shpg. wt. 29 lbs. **329.95**

SO-4205, Assembled and tested, Shpg. wt. 20 lbs. **480.00**

IO/SO-4205 SPECIFICATIONS: VERTICAL: Bandwidth: DC to 5 MHz, ±3 dB. **Sensitivity:** 10 mV/cm. **Attenuator:** 1-2-5 sequence, calibrated and variable. **Rise Time:** 70 nS. **Overshoot:** Less than or equal to 5% at 1 kHz. **Impedance:** 1 megohm, shunted by 38 pF. **Sweep: Type:** Triggered. **Range:** 200 mS to 0.2 μS in 7 steps, plus variable. **Trigger Source:** Y1, Y2, External, Line. **Trigger Modes:** AC, DC, or TV; + or − slope; Automatic or Normal. **HORIZONTAL: Sensitivity:** 0.1 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.

Here's a Heathkit Professional DC-5 MHz Oscilloscope priced right for the hobbyist!

$249.95 Kit

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

Put a professional single-trace scope on your test bench – at an affordable price. The IO-4105's stable triggering circuit is used for solid waveform displays. And it can trigger on the vertical component of a television signal, thanks to a special feature of the trigger selector control, which allows low frequencies to pass, while high frequencies are rejected.

Internal time bases can either be variable, or in one of seven steps ranging from 0.2 μS/cm to 200 mS/cm. External inputs from DC to 1 MHz are accepted by the horizontal amplifier. Vertical input sensitivity is an excellent 10 mV/cm. Partial mu-metal shielding reduces interference. 120/240 VAC. Calibration required for IO-4105; use IG-4505 or IOA-4510-1 (p. 66). Get the performance you need – order this professional-quality DC-5 MHz Oscilloscope for your test bench now.

Kit IO-4105, Shpg. wt. 31 lbs. **249.95**

SO-4105, Assembled and tested, Shpg. wt. 19 lbs. **395.00**

IO/SO-4105 SPECIFICATIONS: VERTICAL: Bandwidth: DC to 5 MHz, ±3 dB. **Sensitivity:** 10 mV/cm, adjustable to 20 mV/cm in 11 ranges. **Attenuator:** 1-2-5 sequence, calibrated and variable. **Rise Time:** 70 nS. **Overshoot:** Less than or equal to 5% at 1 kHz. **Impedance:** 1 megohm, shunted by 38 pF. **SWEEP: Trigger Source:** INT, Ext and Line. **Trigger Modes:** AC, DC or TV; + or − slope; Automatic or Normal. **HORIZONTAL: Sensitivity:** 0.1 V/cm. **Bandwidth:** DC to 1 MHz. **Impedance:** 1 megohm, shunted by 50 pF. **External Horizontal Input:** X1 and X10 attenuator and variable. **Dimensions:** 8" H x 13" W x 17" D (20.32 x 33.02 x 43.18 cm).

Get more with instrument books

Understanding and Using Oscilloscopes is a helpful guide which covers functions, circuits, inputs, waveforms and more.

EDP-139 ..... **7.95**

101 Ways to Use Your Oscilloscope. Practical applications in troubleshooting and design.

EDP-149 ..... **6.95**

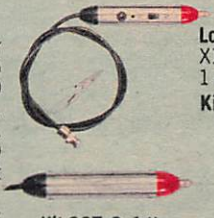
(Book ordering info. on pg. 52.)

X1/X10 Scope Probe increases utility

Has two-position multiplier for X1 and X10 probe tip. DC to 15 megahertz (X1) and DC to 80 megahertz (X10) bandwidths. X10 rise time, 4.0 nanoseconds. Compensation range of 15 to 50 picofarads. Includes 4.5-foot cable and probe with three-position slide switch.

PKW-105, Assembled and tested, 1 lb. **29.95**

Useful accessories for your scope



Low-Capacitance Probe for direct, X10 operation. Options for 3.3 or 1 megohm input resistance.

Kit PK-1, Shpg. wt. 1 lb. .. **11.95**

Demodulator Probe for checking distortion, RF, IF display 500 VDC max. Banana plug/BNC wiring.

Kit 337-C, 1 lb. **8.95**

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

One of the most inexpensive hand-held DMM's available — top performance and easy operation

$97.95

- Measures AC and DC voltage, current and resistance
- Built-in references for easy, in-field calibration
- Big, easy-to-read Liquid Crystal Display
- Low-drain circuitry for longer battery life

The Heathkit IM-2215 Hand-Held Portable Digital Multimeter brings you the features you need in a hand-held DMM, at a great low price. Measurement functions include AC and DC voltage, AC and DC current, and resistance.

The IM-2215's highly-sophisticated dual-slope, analog-to-digital conversion circuitry is contained in one MOS/LSI (metal-oxide semiconductor/large-scale integration) integrated circuit. This circuitry provides extremely accurate and stable performance in all measurement modes.

All measurement functions are protected by fuse and diode against overloads and transients. Voltage and current inputs are separated to protect the IM-2215 and the circuitry being tested.

Special full-scale alternating high-to-low resistance test voltage, available through all six ranges, makes the IM-2215 ideal for testing semiconductors and in-circuit resistance.

Easy one-hand operation (featuring pushbutton switching) and built-in calibration references make the IM-2215 ideal for in-the-field use. The 3½-digit liquid crystal display features large, easy-to-read digits, automatic decimal point placement and automatic polarity indication.

This lightweight DMM operates on just one 9 VDC battery. The special low current drain circuit provides long battery life – a typical 9 VDC alkaline battery provides up to 200 hours of operation. Battery condition is continuously monitored and the liquid crystal display shows you a "Lo-Bat" warning during the last 20% of battery life.

Pushbutton switches permit easy one-hand operation, leaving your other hand free to place probes. A pivoting stand is included to place the display at a convenient angle for bench use. Easy one-evening kit assembly. Operates on one NEDA 1604 VDC battery (not supplied) or 120/240 VAC, 50/60 Hz power (with optional AC Battery Eliminators below). Overall Dimensions, 2.00" H x 3.50" W x 7.50" L (5.08 x 8.89 x 19.05 cm). Weighs just 14 ounces (including battery). With its low price, top performance, portability and easy operation, the Heathkit IM-2215 Hand-Held Digital Multimeter is the ideal choice for all your testing needs – both on the bench and in the field. Order yours now and put its state-of-the-art features to work for you.

Kit IM-2215, Shpg. wt. 2 lbs. **97.95**

SM-2215, Assembled and tested Hand-Held Multimeter, 2 lbs. **129.95**

Rugged Leather Carrying Case with belt loop.
IMA-2215-1, Shpg. wt. 1 lb. **14.95**

120 VAC Battery Eliminator.
PS-2350, Shpg. wt. 1 lb. **7.95**

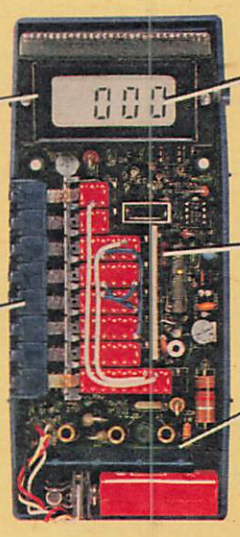
240 VAC Battery Eliminator.
PS-2450, Shpg. wt. 1 lb. **14.95**

IM-2215 SPECIFICATIONS: DC VOLTAGE: Ranges: ± 200 mV, ± 2 V, ± 20 V, ± 200 V, ± 1000 V. **Accuracy:** Lab standards ± (.25% of reading + 1 count). Built-in standards: ± (.35% of reading + 1 count). **Input Impedance:** 10 megohms on all DC voltage ranges. **Overvoltage Protection:** 1000 VDC, 750 VAC on all DC ranges. **AC VOLTAGE: Ranges:** 200 mV, 2 V, 20 V, 200 V, 750 Vrms. **Accuracy:** (50 and 60 Hz): Laboratory standards: ± (.5% of reading + 3 counts). Built-in standards: ± (.6% of reading + 3 counts). **Frequency Response:** (25°C ± 10°C): 200 mV, 2 V, 20 V, 200 V ranges ± (1% of reading + 3 counts) 40 Hz to 1 kHz. 750 V range, ± (1% of reading + 3 counts), 40 to 450 Hz. **Input Impedance:** 10 megohm shunted by approx. 100 pF on all AC ranges. **Overvoltage Protection:** 2 V, 20 V, 200 V, 750 V ranges, 1000 VDC, 750 VAC, 200 mV range, 1000 VDC, 15 seconds maximum over 300 VAC. **DC CURRENT: Ranges:** ± 2 mA, ± 20 mA, ± 200 mA, ± 2000 mA. **Accuracy:** ± (.75% of reading + 1 count) on all DC ranges. **Voltage Drop:** 2 mA, 20 mA, 200 mA ranges, .25 VDC maximum at maximum display. 2000 mA range: .7 VDC at maximum display. **Overcurrent Protection:** 2000 mA maximum on all ranges in circuits with open circuit voltage less than 250 volts. **AC CURRENT: Ranges:** 2 mA, 20 mA, 200 mA, 2000 mA. **Accuracy:** 20 mA, 200 mA, 2000 mA ranges, ± (1.5% of reading + 3 counts), 40 to 1 kHz. 2 mA range: ± (1.5% of reading + 3 counts), 40 to 200 Hz. **Voltage Drop:** 2 mA, 20 mA, 200 mA ranges: .25 VAC maximum at maximum display. 2000 mA range: .7 VAC maximum at maximum display. **Overcurrent Protection:** 2000 mA maximum on all ranges in circuits with open circuit voltage less than 250 volts. **RESISTANCE:** 200 ohms, 2 kilohms, 20,000 ohms, 200 kilohms, 2 megohms, 20 megohms. **Accuracy:** 200 ohm range, ± (.3% of reading + 3 counts), 2 kilohm, 20 kilohm, 200 kilohm, 2000 kilohm ranges, ± (.25% of reading + 1 count), 20 megohms range, ± (2% of reading + 1 count). **Voltage at max. display:** 200 ohms, 20 kilohms, 2000 kilohms ranges, less than .25% VDC (low-test voltage). 2 kilohm, 200 kilohm and 2000 kilohm ranges, greater than .7 VDC (high-test voltage). **Overvoltage Protection:** 300 volts DC or AC on all ranges. **GENERAL: Operating Temperature Range:** 0°C to 50°C (32°F to 122°F). **Storage Temperature:** – 20°C to 60°C. **Temperature Coefficient:** ± (.1 x applicable accuracy)/°C. **Power Requirement: Ranges:** 9 VDC battery (NEDA 1604); 120 or 240 VAC with Battery Eliminators above). **Overall Dimensions:** 2.00" H x 3.50" W x 7.50" L (5.08 x 8.89 x 19.05 cm). **Net Weight:** 14 ounces (including battery).

Use built-in or external reference to maintain high accuracy

Lightweight – just 14 ounces with battery

Look at all these value-packed features:



All measuring circuitry is located on a single IC for simplicity and stability

The IM-2215's 3½-digit liquid crystal display is easy to read in any light

A single printed circuit board makes kit assembly of the IM-2215 easier and faster

Pushbutton range and function switches allow easy one-hand operation

Separate voltage and current inputs provide protection for the units under test

Loaded with useful features for added accuracy and convenience, the easy-to-build Heathkit IM-2215 is your best buy in a hand-held, solid-state digital multimeter

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

Pick a strong partner — make Heath your computer partner

More than a slogan: It's Heath's total commitment to give you extra value for your computer dollar. Now with more software, more peripherals, more accessories – Heath offers one of the most complete and innovative computer lines anywhere. You get more versatility and flexibility – at affordable prices.

On selecting a computer: Do you want built-in peripherals for convenience, or the flexibility to design your own system? Can you expand memory power as your skills grow? How good is the software? Is it compatible with existing software? Will the manufacturer stand behind the computer? You can be sure of the answers when you select Heath.

Choose from three very different computers for different people:

For convenience — the All-In-One H-89. If you're more interested in running software than in hardware and software development, the H-89 gives you a complete, balanced computer system in one package. It's powerful and very cost-competitive, with a personality that a first-time computer user will find comfortable. 100K of floppy disk capability is built-in. And you can expand to 64K RAM and over 2.8 megabytes of on-line storage. Two optional anti-glare CRTs are now available for the All-In-One. More on page 70.

For flexibility — the H-8. If you're interested in developing hardware or writing physical I/O routines in Assembly language, the H-8 is for you. Its versatile bus-oriented architecture, 64K RAM capacity, expandability and hardware front panel position it as the right choice. And an optional Z-80 CPU Board is now available. See page 72 for the full story.

For DEC compatibility — the 16-bit H-11A. If you need a computer for scientific uses, real-time systems or similar applications, and DEC PDP-11V03 hardware/software capability is significant, the H-11A is your choice. See p. 77.

The full line of Heath software meets your growing needs:

Operating systems let you fully utilize Heath's capabilities. Take advantage of all the programs written for the industry standard CP/M Operating System. Much of the 500-program HUG (Heath Users' Group) software library is based on HDOS (Heath Disk Operating System). The P-System with UCSD Pascal features clear readability, fast adaptability. See page 83 for complete information on these operating systems.

Programming languages are available to fit most any application. Assembly is the language best understood by your computer. BASIC is an easy-to-learn programming language. FORTRAN is perfect for complicated math and science programs. COBOL lends itself to business and accounting applications. All are compatible with thousands of existing programs. See pgs. 84-85.

Utility and applications programs include new WordStar Word Processing Software and other new Micropro utilities. Zenith Electronic Typing Word Processing Software (now on both 5.25" and 8" disks), office aids and other programs are also available. Turn to pages 86-87. And Heath's SOFTSTUFF line offers software tools at affordable prices. See page 89.

HUG (Heath Users' Group) shares an extensive program library and informs you of the latest Heath computer developments. See page 81 for details.

Expand to over 2.5 megabytes of on-line storage with the H-47 8-Inch Floppy Disk System. See page 75.

Heath Accessories – including memory, interfacing, wire wrapping products and others – make your computer more useful. See pages 71, 76, 77 and 82.

Commercial computer products – including the assembled Z-89 Computer, Z-19 Video Terminal, Z-47 and Z-87 Floppy Disk Systems, dot matrix and letter-quality printers – are available. See pgs. 78-79.

You get complete, accurate documentation. Assembly, operating and instruction manuals are fully detailed.

You get the convenience of one-stop shopping. Our complete computer line is available here in the Heathkit Catalog.

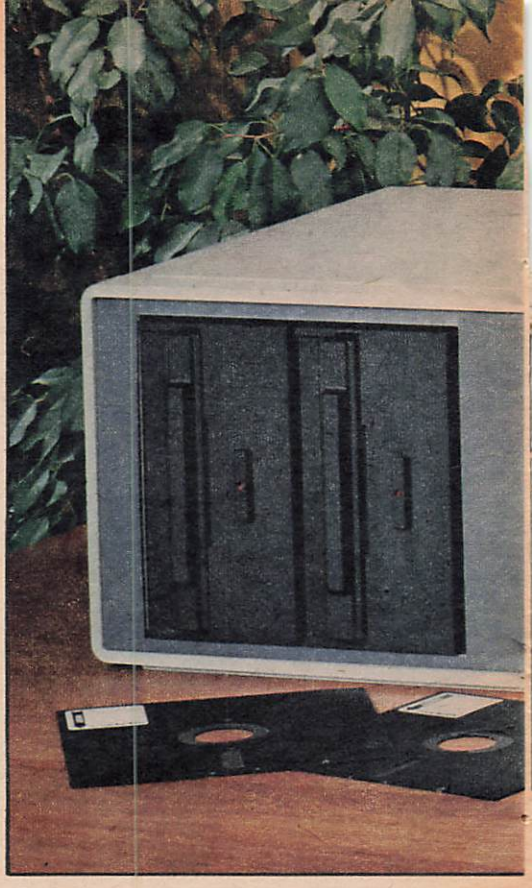
And we won't leave you out in the cold. Expert technical advice is always available by phone, letter or in person. And our service specialists help keep your Heath Computer System working right.

5% Discount on complete Heath Computer Systems: Buy any Heath Computer, one major peripheral and any amount of accessories on the same order form. Then, deduct 5% from the total price (excluding shipping and handling; one discount per customer; not combinable with other discounts).

[1] All-In-One Computer: extra convenience in a compact unit — 64K RAM capacity, built-in video terminal, floppy disk drive, expanding software selection — all at an affordable price

Only $1695.00 for H-89 with standard CRT

- 16K RAM standard, expandable to 64K
- Two Z-80 microprocessors for high-speed operation
- Built-in disk storage
- Professional-style keyboard, 12-key numeric keypad
- Easy-to-read, 12-inch CRT displays up to 2000 characters
- Runs all Heath H-8 disk software



Are you looking for all the computer power and built-in peripherals you need – but your budget doesn't allow for extravagance? The Heathkit All-In-One Computer has the power, peripherals and convenience you need, for little more than "bare-bones" models.

This easy-to-operate 8-bit computer features separate Z-80 microprocessors for the computer and video terminal. Computer never has to share processing power with terminal, so the All-In-One can perform a variety of high-speed tasks.

Includes professional video terminal: Now with a choice of standard or non-glare CRTs, the All-In-One has all display functions of our H-19 (p. 74). CRT displays twenty-five 80-character lines.

The typewriter-format professional keyboard controls all terminal functions. The keyboard prints the entire ASCII set, upper and lower cases – along with 33 graphics symbols for extra flexibility.

Direct cursor addressing lets you insert or delete characters anywhere on the screen. Control all 32 terminal functions from keyboard or computer. Reverse video lets you emphasize any portion of the screen by reversing white on black.

Designed in calculator format, the 12-key numeric keypad makes entering arithmetic programs faster and easier than before. Shifted functions give you control to make insertions or deletions.

You get more memory power. 16K bytes of random access memory (RAM) is supplied. Built-in diagnostics make memory checks faster and easier.

You can expand memory capacity, first up to 32K or 48K bytes of RAM (using one or two H-88-2 16K Chip Sets, p. 71) – and then up to 64K bytes of RAM (under CP/M – 56K using HDOS) with the WH-88-16 64K RAM Expansion Set on p. 71, to meet your advanced computing needs.

The All-In-One's built-in 5.25" floppy disk drive gives you up to 100K bytes of on-line data storage capacity. You get fast, accurate access to data.

If you need more storage, buy the H-77 5.25" Floppy Disk System and get up to 300K bytes.

For maximum data storage – over 2.5 megabytes on-line – select the H-47 8" Floppy Disk System. (Requires WH-88-47 Interface on page 75, H-88-7 ROM Kit on page 71, HDOS 2.0 or CP/M 2.2 on page 83.)

You get H-8 compatibility. All H-8 disk software runs on All-In-Ones with floppy disk storage.

Choose from our expanding software selection. New WordStar Word Processing Software – new MicroPro utilities – HDOS 2.0,CP/M 2.2, UCSD P-System with Pascal – SOFTSTUFF tools – other utility and applications programs – and the Heath Users' Group's over 500 programs (pgs. 81-89).

Enjoy more flexibility. A 3-Port RS-232C Serial Interface (HA-88-3, p. 71) lets you use many peripherals (with appropriate software). Cassette interfacing is standard with kit versions.

Requires 32K bytes of RAM and HDOS, CP/M or similar operating software for normal operation.

HKS-89 All-In-One Computer Kits. H-88A with 5.25" floppy disk drive (100 KB on-line storage).

Kit HKS-89-1, Computer with non-glare white CRT, Shpg. wt. 81 lbs. **1725.00**

Kit HKS-89-2, Computer with non-glare green CRT, Shpg. wt. 81 lbs. **1725.00**

Kit HKS-89-3, Computer with standard white CRT, Shpg.wt. 81 lbs. **1695.00**

An assembled commercial product of this type is available. See the Z-89 on page 78.

H-88A All-In-One Computer Kits, w/o disk drive.

Kit HS-88-1, non-glare white CRT, 58 lbs. . . **1325.00**

Kit HS-88-2, non-glare green CRT, 58 lbs. . . **1325.00**

Kit HS-88-3, std. white CRT, 58 lbs. **1295.00**

H-88-A SPECIFICATIONS: Clock: 2.048 mHz. **Video Terminal:** High-resolution CRT with P4 phosphor. **Keyboard:** 80 keys. **Cursor:** Blinking, non-destructive underline or block. **Cursor Controls:** Up, down, left, right, home, CR, LF, back space and tab. **Cursor Addressing:** Relative and direct. **Tab:** Standard eight-column tab. **Refresh Rate:** Same as AC line frequency. **Edit Functions:** Insert and delete character or line. **Erase Functions:** Erase from beginning of line, erase to end of line, erase from beginning of page, erase to end of page, erase line, erase page. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Overall Dimensions:** 13" H x 17" W x 20" D.

The H-89 All-In-One — more computer than the competition

BRAND	TWO MICRO-PROCESSORS?	PROFESSIONAL SCREEN SIZE?	COMPLETE KEYBOARD?	BUILT-IN VIDEO DISPLAY?	ALL-IN-ONE CONSTRUC-TION?	BASIC, OTHER LANGUAGES?	BUILT-IN FLOPPY?	STANDARD CP/M AVAILABLE?	64K MEMORY CAPACITY?	PRICE*
Heath H-89	YES (Two Z-80s)	YES (25 lines x 80 char.)	YES (80 keys, upper and lower cases; includes 12-key numeric pad)	YES (High-resolution CRT)	YES	YES (6)	YES (100KB capacity)	YES	YES (16K standard)	$1923 (Kit, with standard CRT)
Apple II	NO (Single 6502)	NO (24 lines x 40 char.)	NO (48 keys, N-key rollover)	NO (External monitor)	NO (3 pieces)	YES (5)	NO (Extra)	NO	YES (with $500 language card)	$2200
Apple III	NO (Single 6502A)	YES (24 lines x 80 char.)	YES (74 keys, upper and lower cases; includes 13-key numeric pad)	NO (External monitor)	NO (2 pieces)	YES (3)	YES (140KB capacity)	NO	YES (128K)	$4190**
TRS-80 Model III	NO (Single Z-80)	NO (16 lines x 64 char.)	NO (65 keys, upper and lower cases; includes 12-key numeric pad; no control key)	YES (Medium-resolution CRT)	YES	YES (6)	YES (178KB capacity)	NO	NO (48K)	$3034

*For systems with B/W video display, one 5.25" floppy disk drive, 48K RAM (except 96K in Apple III), standard DOS, BASIC – as of 3/20/81.
**Apple III system (A3P0001) includes 96K RAM and $250 Visicalc software in minimum configuration

Design an All-In-One Computer System for your needs

First, select the operating, utility and applications software you need (see pages 81-89). Computer, memory, peripheral and software requirements are listed in each software presentation.

Then, select memory, peripherals and accessories for your All-In-One from this chart, based on the maximum requirements of your software programs.

Memory:
- 16K Chip Set H-88-2 (can expand memory to 48K RAM – standard with WH-89 models)
- 64K (CP/M), 56K (HDOS) Expansion Set WH-88-16 (requires 48K RAM, H-88-7 ROM Kit)

Mass Storage:
- Cassette ECP-3801A
- Floppy H-47 (8" – requires WH-88-47 Interface, H-88-7 ROM Kit)
- H-77 (5.25" – requires H-88-6 (models without external brightness control))

Interfacing:
- ROM Set for H-47, CP/M, WH-88-16 H-88-7 (standard with WH-89-FA)
- H-47 Interface WH-88-47
- Serial 3-port HA-88-3
- Serial/Cassette for WH-89, WH-89-CA, HA-88-5 (Not for WH-89-FA)

Peripherals: (require HA-88-3 Interface)
- Printers H/WH-14, WH-24, WH-34, WH-44K, WH-54
- Modems WH-23, WH-33

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

1 H-89 All-In-One Computer

2 H-77 Floppy Disk System

2 The H-77 adds even more versatility to your All-In-One

$625.00 Kit with one drive

- **Additional data storage, easier copying of programs**
- **Each drive installs vertically to take up less space**
- **Build in 2 evenings**

Designed especially for the All-In-One Computer, the H-77 Floppy Disk System gives you all the storage and programming capacity you need for most applications. When you use the H-77 with your All-In-One, you have room for up to three disk drives. You can mount operating system and program disks at the same time, for rapid access to programs and data. And because the H-77 Floppy Disk System is designed to work with the Heath All-In-One Computer, you'll have a harmonious computer system.

The storage media for the H-77 is the standard, hard-sectored 40-track diskette. Measuring just 5.25 inches in diameter, each floppy disk offers access to 100K bytes of program and data storage.

Disk drives install vertically, so the H-77 takes up less space. And each drive is factory assembled and tested, for easier kitbuilding.

You get the flexibility to add as much data storage capability as you need. You can add the H-77 to your H/Z-89, or to your H-88 (with the optional H-88-4 Disk Drive) for two-drive capability and 200K bytes of on-line data storage. The H-77 comes with a diskette storage box which fits into the second drive housing, so your system looks neat and efficient.

Or, for 3-drive capability and 300K bytes of on-line storage, add the H-17-1 Second Drive to your H-77. (Three-drive systems require HDOS, Ver. 1.6, HDOS, Ver. 2.0 (HOS-817-1) or CP/M (HOS-817-2) Operating Systems – see page 83.)

For maximum data storage capacity – over 2.8 megabytes on-line – use the H/Z-89 and H-77 with the H/Z-47 8" Floppy Disk System (p. 75).

Expand the capabilities of your All-In-One Computer today. 120/240 VAC, 50/60 Hz. 8.63" H x 8.88" W x 15" D (21.92 x 22.56 x 38.10 cm).

No modifications are required to connect the H-77 to All-In-One Computers with external brightness control. H-88-6 Modification Kit (below) is required for All-In-One Computers without an external brightness control.

Kit H-77, with one drive, 25 lbs. **625.00**

Kit H-87, with two drives, 30 lbs. **895.00**

An assembled commercial product of this type is also available. Look for the Z-87 on page 78.

Backplate Modification Kit. Required to use H/Z-47, H-77, Z-87 Floppy Disk Systems with All-In-Ones which do not have an external brightness control.

H-88-6, Shpg. wt. 2 lbs. **50.00**

H-77/Z-87 SPECIFICATIONS: Diskette Size: 5.25 inches. **Diskette Type:** Single-sided, single-density. **Number of Tracks per Diskette:** 40. **Number of Sectors per Track:** 10. **Formatted Bytes per Sector:** 256. (Diskettes not included.) **Spindle Motor Speed:** 300 revolutions per minute (rpm), ±1 percent. **Data Transfer Rate:** 128 kilohertz. **Motor Start Time:** 1 second. **Operating Temperature Range:** 32 to 104 degrees F (0 to 40 degrees C). **Power Requirement:** 120/240 VAC, 50/60 Hz. **Overall Dimensions:** 8.625" H x 8.875" W x 15" D (21.9 x 22.5 x 38.1 cm). **Net Weight:** 22.5 lbs. (10.2 kilograms).

All-In-One Accessories

SAVE 35% on 16K RAM Expansion Set. Expand your H-88 or H-89 to as much as 48K RAM with one or two of these memory expansion sets.
H-88-2, Shpg. wt. 1 lb. **Was $60.00, NOW $39.00**

64K Wired Memory Expansion Kit expands RAM capacity of the All-In-One to 64K. Requires 48K of memory, H-88-7 ROM Kit (sold below).
WH-88-16, Shpg. wt. 1 lb. **150.00**

Replacement ROM Kit to use All-In-One Computer with H/Z-47, CP/M and WH-88-16 Memory Expansion. Facilitates ORG-0 operation.
H-88-7, Shpg. wt. 1 lb. **55.00**

Three-Port EIA RS-232S Serial Interface lets All-In-One communicate with printers, time-share systems and other peripherals.
HA-88-3, Shpg. wt. 2 lbs. **120.00**

Floppy Disk Drive and Controller for H-88.
H-88-4, Shpg. wt. 17 lbs. **450.00**

Cassette Interface for WH-89-CA Computer.
H-88-5, Shpg. wt. 2 lbs. **100.00**

Wire Wrapping Board with bus connectors. Design custom circuits. Accepts forty-eight 16-pin sockets (also 54 14-pin, other combinations). Uses HCA-6, HCA-7 (p. 76).
H-88-10, Shpg. wt. 1 lb. **30.00**

Second Drive for the H-77/Z-87.
H-17-1, Shpg. wt. 5 lbs. **325.00**

Plastic Anti-Glare Filter. Clear.
HCA-3, Shpg. wt. 1 lb. **12.95**

Fabric Anti-Glare CRT Filter. Black.
HCA-4, Shpg. wt. 1 lb. **19.95**

Dust Cover for All-In-One Computer and H/Z-19.
HCA-5-89, Shpg. wt. 1 lb. **14.00**

Dust Cover for the H-77/Z-87.
HCA-5-77, Shpg. wt. 1 lb. **14.00**

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

1 Get immediate programming versatility, plug-in flexibility with the popular, budget-pleasing Heath H-8 Computer

ONLY $350.00

- **8080A CPU standard – Z-80 CPU available separately**
- **Buffered bus has 7 plug-in memory, I/O positions**
- **Expanding software library**

The Heath H-8 Computer – the computer that grows as you grow. With its seven positions for plug-in boards, you can put together almost any combination of memory, interfacing and accessories. And our expanding selection of peripherals, accessories and software gives your H-8 Computer unmatched flexibility and versatility.

Novices can use the H-8 as a computer trainer. The 16-key front panel keyboard provides octal data entry, direct access to registers and memory, one-button program load and dump, and input/output keys to communicate directly with any port. And you can directly monitor program activity with the 8-digit front panel octal readout.

The H-8's features add extra value. Random Access Memory (RAM) capacity – including interfacing – is 64K bytes.

The CPU board, including the 8080A chip, clock, systems controller and ROM monitor, is fully assembled, wired and tested for easier kit assembly and faster system setup.

An exclusive Heath 50-pin fully-buffered bus gives you ample room for memory and interfacing. The built-in speaker gives you audible feedback and special effects. Front panel lights keep you up to date on status. With all these features and more, the H-8 is an excellent choice to be the heart of your computer system.

Now you can equip your Heath H-8 Computer with the powerful Z-80 microprocessor – the same CPU used in the popular Heath H-89 All-In-One Computer! Learn more about the Heath HA-8-6 Z-80 CPU Board at right.

Heath floppy disk systems, sold separately, provide greater flexibility. The H-17, 5.25-Inch Floppy Disk System (sold on page 73) provides 100K bytes of on-line data storage. Add a second drive to expand data storage capacity to 200K bytes. And with the H-17-3 Modification Kit, you can expand the on-line and program data storage capacity of the H-17 to 300K bytes.

Expand to over 2.5 megabytes on-line! The H-47 Floppy Disk System, our 8-inch, dual-sided, double-density system, provides maximum data storage capacity for the H-8 Computer. See page 75 for more information on the H-47.

Design an H-8 system that meets your specific needs – and save a big 20%! Choose from an expanding selection of peripherals and accessories – including additional memory and data storage, a video terminal, color graphics, printers, a music synthesizer system and two modems.

Choose from an expanding software library. We support the H-8 with the Heath Disk Operating System (HDOS), CP/M and the UCSD P-System with Pascal. Languages include a BASIC Interpreter, BASIC Compiler, FORTRAN and COBOL. See pages 83-85 for more information.

Many new applications programs are being introduced – including problem-solvers for home, hobby and business. And the Heath Users' Group maintains over 500 programs – from business accounting and personal budgeting to computer-aided instruction, exciting games – even weather forecasting! Turn to pages 81-89 for the full story.

NEW! SPECIAL 20% SAVINGS ON COMPLETE H-8 SYSTEMS! Just buy these products on the same order form:

1. **An H-8 Computer with at least 2 WH-8-16 Memory Boards (32K RAM);**
2. **Either the H-8-4 RS-232C Serial Interface, the H-8-2 Parallel Interface or the H-8-5 Serial/Cassette Interface**
3. **For mass storage, either the H-17 Floppy Disk System or the H-8-5 Interface;**
4. **Your choice of the H-19 Video Terminal, WH-34 DECwriter IV Teleprinter or the WH-44K/Diablo 1640 Printer/Terminal;**
5. **And any one of these operating systems: (HDOS, CP/M, UCSD P-System with Pascal or Cassette – see p. 83 and check memory requirements).**

Then, deduct 20% – up to $500 savings on a $2,500 order (excluding shipping/handling charges; one discount per customer; not combinable with other discounts).

Get added flexibility – at a budget-pleasing price. The Heath H-8 Computer requires at least 16K bytes of Random Access Memory (RAM – see page 76) and operating software (HDOS, Heath Standard CP/M, UCSD P-System with Pascal, H-8-18 Cassette Software or similar operating system – see p. 83 and check minimum memory requirements of each system) for normal operation.

Kit H-8, Shpg. wt. 30 lbs. **350.00**

PAMGO ROM. Boot up with 1 or 3 keystrokes – not 11. Not for use with HA-8-8 or HA-8-6.

H-8-9, Shpg. wt. 1 lb. **20.00**

NEW! Z-80 CPU Card for H-8. Includes a powerful Z-80 CPU, plus all features of HA-8-8 Extended Configuration Option below (at no extra cost). Available in mid August.

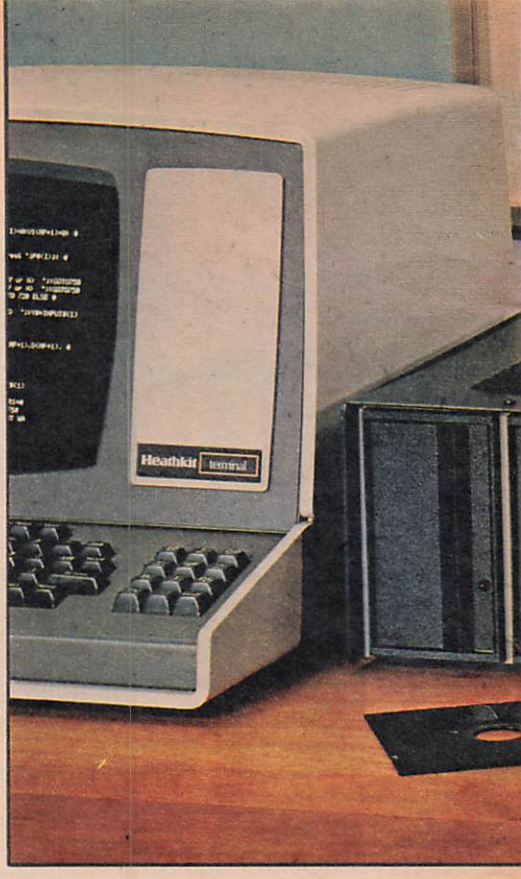
HA-8-6, Assembled, Shpg. wt. 5 lbs. **199.00**

Extended Configuration Option. Required to run H-47 or CP/M in H-8s without HA-8-6 Z-80 CPU Card above. Includes new front panel ROM with single-button boot-up.

HA-8-8, Shpg. wt. 1 lb. **65.00**

Dust Cover for H-8. HCA-5-8, 1 lb. **14.00**

Look at the Manuals – with no risk. Manuals for H-8 Computer, H-8-4 Four-Port Serial Interface, H-14 Dot Matrix Line Printer, WH-8-16 Wired 16K RAM Memory Board and H-19 Professional Video Terminal. When you order the H-8 Computer, deduct



$30.00 from the purchase price (excluding shipping and handling charges).

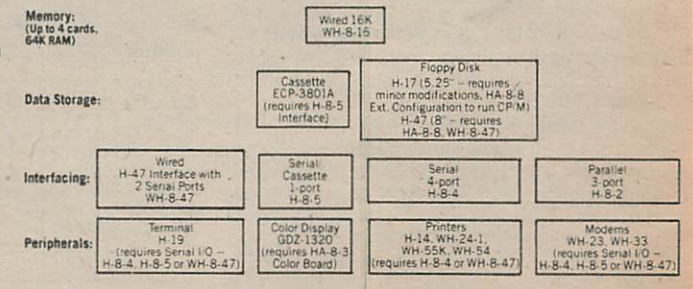
HM-800, Shpg. wt. 11 lbs. **30.00**

NOTE: Product manual included with each kit.

H-8 SPECIFICATIONS: Microprocessor: 8080A. **Monitor:** In on-board 1K x 8 ROM. Octal addresses, data input and display from the front panel. **Monitor Functions:** Memory display and alter, register display and alter, memory load and dump, single instruction execution, program execution, port input and output. **Clock:** 2.048 mHz. **Interrupts:** Seven, priority vectored. **Power Supplies:** +8 VDC at 10 amperes maximum, regulated to +5 VDC on each circuit board; +18 VDC at 500 milliamps, regulated to +12 VDC and −5 VDC on the CPU circuit board. **Chassis Capacity:** Seven locations on the mother circuit board for memory or interfacing cards. Four memory cards maximum. One bus expansion maximum. **Operating Temperature Range:** 32 to 104 degrees F (0 to 40 degrees C). **Power Requirement:** 120/240 VAC, 50/60 Hz, 150 Watts. **Dimensions:** 6.50" H x 16.25" W x 17" D (16.51 x 41.28 x 43.18 cm). **Net Weight:** 21 lbs. (9.5 kg).

How to configure a Heath H-8 Computer System

With 7 plug-in positions for memory and I/O, your H-8 Computer System can grow as your needs grow. You can expand to 64K of memory, and up to over 2 megabytes of on-line data storage. You'll find that the tremendous benefits provided by these H-8 accessories is well worth your hard-earned computer dollar.



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

2 Instant access and increased capacity — yours with the H-17 Floppy Disk System

$625.00 Kit

- **Up to 300K bytes of on-line data storage (using accessories)**
- **Build in just 2 evenings**
- **Take advantage of the hundreds of disk-based H-8 software programs**
- **Assembled and tested drive system**

Make your H-8 Computer System a total versatility system – with the H-17 Floppy Disk System. With the H-17, you get the data storage capacity you need to load programs quickly. Store dozens of programs on a single disk and have rapid access to any one of them, anytime you need it.

The H-17 provides up to 100K bytes of on-line data storage (up to 300K bytes with additional drives – order at right). Data is stored on standard, hard-sectored 40-track diskettes – just 5.25 inches in diameter. Disks are easier to handle – and load – than paper tape or cassettes.

The H-17 includes a single disk drive, a disk interface/controller circuit board which plugs directly into the H-8's mainframe, and a built-in power supply. Because the H-17 Floppy Disk System is especially designed for the H-8 Computer, you get a harmonious computer system that interfaces properly and runs smoothly.

See the expanding line of systems and applications software for the Heath H-8 Computer – including the complete line of SOFTSTUFF™ software tools, utility programs and the Heath Users' Group software library, with more than 500 useful programs. Turn to pages 81-89 for complete details on software.

The H-17 uses the famous Siemens 82 single-drive system, a performance-proven 5.25-inch floppy disk drive which provides accurate high-speed access to data. The assembled Siemens drive performs better than most equivalent systems.

For more data storage area, add the optional H-17-1 Second Drive and make your H-17 a more versatile dual-drive floppy disk system. With two drives, you'll have up to 200K bytes of program and data storage area. You'll be able to run operating system and program disks at the same time.

If you need even more on-line data storage capacity, buy the new H-17-3 Three-Drive Modification Kit and another H-17-1 Drive. Add this kit to your H-17 to get up to 300K bytes of on-line storage – 50% more than on previous versions. With the H-17-3, your H-17 can provide even more versatility.

To use the H-17 Floppy Disk System effectively, you need an H-8 Computer with at least 32K of Random Access Memory (RAM), as well as a Heath disk-based operating system (sold on page 83).

Your choice of operating systems includes the Heath Disk Operating System, which many of the 500 utility and applications programs in the Heath Users' Group software library (p. 81) are based on; Heath CP/M, with hundreds of existing programs available; and the UCSD P-System with Pascal, a modular system with a large library of utility and applications programs.

Kit includes one blank 5.25-inch floppy diskette.

Kit H-17, with one drive, 28 lbs. **625.00**

Factory Assembled and Tested H-17 Floppy Disk System. Comes with the same extra-value features found on the kit version above. With one drive.

WH-17, Shpg. wt. 28 lbs. **695.00**

Three-Drive Modification Kit for H-17 Floppy Disk. Increases capacity of the H-17 to three 5.25-inch floppy disk drives, instead of two. Enjoy even more programming flexibility and versatility. Includes new sheet metal, fan and power supply components, 3-drive cable. Easy kit assembly – takes as little as one evening. Requires H-17 or WH-17. Drive not included; order H-17-1 Drive separately (below) to take advantage of additional data storage capability.

Kit H-17-3, Shpg. wt. 8 lbs. **85.00**

Optional Second or Third Drive adds versatility to your H-17. Run operating system and program disks simultaneously. 100K on-line bytes per drive.

H-17-1, Assembled, Shpg. wt. 5 lbs. **325.00**

Dust Cover for H-17 Floppy Disk System.

HCA-5-17, 1 lb. **14.00**

H-17/WH-17 SPECIFICATIONS: Storage Media: 5.25-inch, hard-sectored diskette. **Number of Tracks per Diskette:** 40. **Number of Sectors per Track:** 10. **Formatted Bytes per Sector:** 256. **Drive Type:** Siemens Model 82. **Track Seek Time:** 30 milliseconds. **Random Sector Access Time:** Less than 250 milliseconds. **Operating Temperature Range:** 32-104°F (0-40°C). **Power Requirement:** 120/240 VAC, 50/60 Hz, 75 watts. **Dimensions:** 6.25"H x 13.5"W x 13.5"D (15.89 x 34.29 x 34.29 cm).

The Heath H-19A Professional Video Terminal features two new optional anti-glare CRTs

- Z-80 microprocessor-based for fast, efficient data handling
- Heavy-duty typewriter-format keyboard with separate 12-key numeric keypad
- Eight user-definable function keys
- DEC VT-52 software-compatible
- Expandable to an All-In-One Computer

As low as **$695.00** Kit with standard white CRT

CHOOSE FROM ANTI-GLARE WHITE, ANTI-GLARE GREEN OR STANDARD WHITE CRTS

The Heath H-19A Professional Video Terminal features exceptional capabilities in its price range. It's designed for the H-8 or H-11A Computers – or with any device using an RS-232C Serial Interface.

The H-19A's professional keyboard, laid out in typewriter format, lets you begin entering data right away. The terminal's 32 functions can be controlled from the keyboard, or a computer. A separate 12-key numeric keypad, in calculator format, makes the entry of mathematical programs faster and easier.

Baud rates ranging from 110 to 9600 are keyboard-selectable for easier changes. Eight separate user-function keys give extra flexibility.

The H-19A displays the entire ASCII character set, including upper and lower case letters. The terminal can also display thirty-three graphics characters, which can be arranged for a variety of graphic displays and effects.

The video display screen can show up to twenty-four 80-character lines (with a software-controlled 25th line). Using the H-19A's direct or relative cursor addressing capabilities, you can make corrections or edit text – anywhere on the video display screen.

The 12" (30.48 cm) diagonal cathode-ray tube (CRT) features an extremely wide bandwidth for outstanding resolution and bright, clear, easy-to-read video displays. A reverse video capability allows you to emphasize any portion of the video screen by reversing white on black.

Now you have a choice of two anti-glare screens (green or white) to make the H-19A easier on your eyes – as well as the standard white CRT.

You'll be able to change your H-19A into an H-88A All-In-One Computer, with the H-19-3 Conversion Kit (available 4th quarter 1981). And the H-19's ROM listing is available (also below) to help you understand how this powerful, versatile video terminal operates – or to allow you to alter its personality and cursor control protocols to match those of other terminals. For 120/240 VAC, 50/60 Hz power. Draws just 45 Watts. Overall Dimensions of the H-19 Video Terminal are 13" H x 17" W x 20" D (33.02 x 43.18 x 50.80 cm).

H-19A Professional Video Terminal Kit with Anti-Glare White CRT.
Kit HS-19-1, Shpg. wt. 52 lbs. **725.00**

H-19A Professional Video Terminal Kit with Anti-Glare Green CRT.
Kit HS-19-2, Shpg. wt. 52 lbs. **725.00**

H-19A Professional Video Terminal Kit with Standard White CRT.
Kit HS-19-3, Shpg. wt. 52 lbs. **695.00**

An assembled commercial product of this type is also available. Please see the Z-19 Professional Video Terminal on page 78.

H-19-1, Source Listings for ROM of H-19 Video Terminal, 1 lb. **25.00**

Black Fabric Anti-Glare CRT Filter for the H-19 or H-19A Video Terminals. Sun-Flex nylon cover makes video displays stand out, cuts eye strain.
HCA-4, Shpg. wt. 1 lb. **19.95**

Clear Plastic Anti-Glare CRT Filter for the H-19 or H-19A Video Terminals. Pannelgraphix cover makes video displays easier to see.
HCA-3, Shpg. wt. 1 lb. **12.95**

Dust Cover for the Heath H-19 or H-19A Professional Video Terminals.
HCA-5-89, Shpg. wt. 1 lb. **14.00**

Convert the Heath H-19 Professional Video Terminal (not H-19A) into an H-88 All-In-One Computer! Featuring easy kit assembly, this conversion kit includes a detailed, step-by-step assembly manual and all necessary parts. When finished, you'll have an H-88 All-In-One Computer with 16K bytes of Random Access Memory (RAM) – without giving up any of the features of your powerful video terminal. Add an H-88-4 5.25" Floppy Disk Drive with Controller (sold on page 71), and you can expand to a full-fledged H-89! Not for H-19A Video Terminal; a version of this kit, designed for use with the H-19A, will be available in the fourth quarter of 1981.
Kit H-19-2, Shpg. wt. 19 lbs. **695.00**

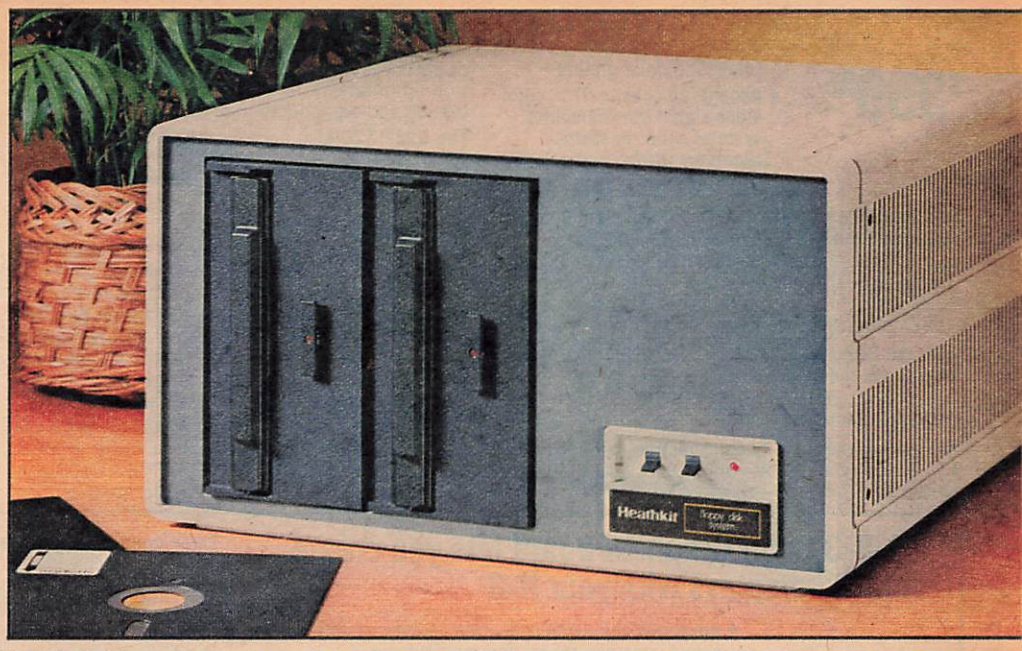
H-19A SPECIFICATIONS: CRT: 12" (30.48 cm) diagonal. **Display Format:** 25 lines x 80 characters (25th line software-controlled). **Display Size:** 6.5" H x 8.5" W (16.51 x 21.59 cm). **Character Size:** Approximately 0.2" H x 0.1" W (0.508 x 0.254 cm). **Character Set:** 128 (95 ASCII, 33 graphic). **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:** Blinking nondestructive underline or block. **Cursor Controls:** Up, down, left, right, home, CR, LF, back space and tab. **Cursor Addressing:** Relative and direct. **Tab:** Standard 8-column tab. **Refresh Rate:** 60 Hz at 60 Hz line frequency and 50 Hz at 50 Hz line frequency. **Edit Functions:** Insert and delete character or line. **Erase:** Erase page, erase to end of line, erase to end of page, erase to beginning of line, erase to beginning of page and erase line. **Scroll:** Automatic scrolling, line/page freeze. **Bell:** On receipt of control G. **Video:** Normal and reverse (using escape sequence), by character. **Communications: Interfacing:** Standard EIA RS-232 Serial Interfacing. **Baud Rates:** 110 to 9600. **Mode:** Full or half-duplex. **Parity:** Even, odd, stick and none. **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. **Operating Temperature Range:** 32-104 degrees F (0-40 degrees C). **Power Requirement:** 120/240 VAC, 50/60 Hz, 45 Watts. **Overall Dimensions:** 13" H x 17" W x 20" D (33.02 x 43.18 x 50.80 cm). **Net Weight:** 45 lbs. (20.4 kg).

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

Add over 2 megabytes of on-line storage capacity with the H-47 Dual-Drive 8" Floppy Disk System

$2595.00 Kit

- **Supplied with two disk drives for over 2 million bytes of on-line data and program storage area**
- **Stores over 1.26 million bytes on each 8-inch disk – more than 12 times the capacity of a 5.25" disk**
- **Fully compatible with Heath and Zenith 5.25" disk systems**
- **Runs HDOS and CPM/Operating Systems**



With the Heath H-47 Dual-Drive 8-Inch Floppy Disk System, you can add over 2 megabytes of on-line data and program storage to Heath H-8 Computer Systems – as well as Heath H-89 and Zenith Z-89 All-In-One Computer Systems.

The digital information is stored on 8-inch, soft-sectored floppy diskettes using the standard IBM 3740 format with FM or MFM encoding. Each diskette has 77 tracks per side – which permits a maximum storage capacity of 1.261 megabytes (depending upon format) per double-sided, double-density diskette. Because the Heath H-47 Floppy Disk System is supplied with two pre-assembled 8-inch floppy disk drives, this means you can have 2,522,000 bytes of data on-line at any one time (based on twenty-six 256-byte sectors per track) – more than 12 times the capacity of a 5.25-inch dual-drive system. This amount of on-line storage capacity was available only to mini and larger computer systems a short time ago!

With this additional on-line data storage capacity, even extended accounting, inventory and mathematical applications software programs are now within range of your H-8, H-89 or Z-89 Computer.

The 8-inch floppy diskettes load quickly and easily through the vertical drive doors in the H-47's front panel. An activity light on each drive shows when that drive is in use. A door lock solenoid prevents inadvertent damage to the diskettes, by not allowing the door to be opened during activity.

Compatible with Heath 5.25" floppy disk systems, you can use up to three 5.25-inch floppy disk drives with the two 8-inch floppy disk drives in the H-47, for maximum data and program storage capacity – over 2.8 million on-line bytes! And you can transfer data between 8" and 5.25" disks at any time.

Enjoy maximum software capabilities: With the H-47, you can run both HDOS and Heath Standard CP/M Operating Systems. Hundreds of useful languages, utility and applications software programs are available.

Less than half the access time: The H-47 accesses data in a fast 191 milliseconds – compared to the 490 millisecond time of currently available 5.25-inch floppy disk systems for the H-8, H-89 and Z-89 Computers.

Extremely accurate access to data: Designed to extremely close tolerances, the band actuator head stepping mechanism of the H-47 is engineered to deliver extremely accurate data access. The H-47 meets a 1×10^9 bits soft error rate, and a 1×10^{12} hard error rate.

Special read/write protection: Each recording head in the disk drives of the H-47 Floppy Disk System is a read/write gap-type head. A photosensor in the drive unit detects the presence or absence of a notch in the diskette to insure write protection. If the write-protect notch is not detached, a signal is transmitted to the controller to indicate that both read and write operations are allowed. If the write-protect notch is detected, the signal indicates that only read operations are permitted.

In addition, front panel switches allow you to write-protect each drive.

Designed of steel and rugged structural foam for superior strength and durability, the H-47's case is attractively styled for desktop use. The H-47 can also be optionally rack-mounted.

The Heath H-47 Floppy Disk System includes a 40-conductor flat cable, which connects it to the Heath H-8, Heath H-89 or Zenith Z-89 Computers. The H-47 is self-contained and requires no power from the host system.

To run with the H-47, H-8 Computer Systems require the WH-8-47 H-8 to H-47 Interface with two RS-232C Serial Ports, and the HA-8-8 Extended Configuration Option. Heath H-89, WH-89 and WH-89-CA Computers – as well as Zenith Z-89 Computers – require the WH-88-47 All-In-One to H-47 Interface and the H-88-7 Replacement ROM Set. WH-89-FA and Z-89-FA Computers require the WH-88-47 Interface. H-89 and Z-89 Computers without an external brightness control also require the H-88-6 Backplate Modification Kit (not required for current models). For 120/240 VAC, 50/60 Hz. Draws 204 watts of power. Dimensions, 10.2" H x 18.9" W x 18" D (25.91 x 48.00 x 45.72 cm).

Heath H-47 8-Inch Dual-Drive Floppy Disk System. Includes two drives.
Kit H-47, Shpg. wt. 87 lbs., Motor Freight **2595.00**

An assembled commercial product of this type is also available. See the Zenith Z-47-BA Floppy Disk System on page 78.

Wired H-8 to H-47 Interface, with two RS-232C Serial Ports. Has the features of the WH-88-47 below – and an EIA Standard RS-232C Serial Interface.
WH-8-47, Assembled and tested, Shpg. wt. 2 lbs. **235.00**

Extended Configuration Option for H-8 Computers.
HA-8-8, Assembled and tested, Shpg. wt. 1 lb. **65.00**

Wired All-In-One to H-47 Interface. Connects the H-89, WH-89 and Z-89 Computers to the H-47. The controller circuit board selects the correct drive for a write or read operation, properly handling the flow of data to or from the drives. The controller board includes Read-Only Memory (ROM) that operates the system and Random Access Memory (RAM) that serves as a buffer memory.

All data and address exchanges between the WH-88-47 All-In-One to H-47 Interface's circuit board and the All-In-One Computer's bus are buffered.
WH-88-47, Assembled and tested, Shpg. wt. 2 lbs. **195.00**

Replacement ROM for All-In-One Computers. Required to use H-47 or CP/M Operating System in all H-88 and H-89 Computer Kits – and in WH-89s and Z-89s without external brightness controls.
H-88-7, Shpg. wt. 1 lb. **55.00**

Backplate Modification Kit. Required to use H-47 with H-88, H-89, WH-89 and Z-89 All-In-One Computers which do not have an external brightness control.
H-88-6, Shpg. wt. 2 lbs. **50.00**

H-47 SPECIFICATIONS: Disk Type: 8-inch floppy, dual-density/dual-sided or single-density/single-sided diskette (in standard IBM 3740 format). **Disk Capacity:** Dual-density/dual-sided diskette, up to 1,261,568 bytes per disk (depending upon format used); Single-density/single-sided diskette, up to 256,000 bytes per diskette (depending upon format used). **Number of Surfaces per Diskette:** 1 or 2 (depending upon diskette used). **Number of Tracks Per Surface:** 77 on each side. **Recording Density:** Outer Track, 1836 BPI (single-density), 3672 BPI (dual-density); Inner Track, 6536 BPI. **Track Density:** 48 tracks per inch. **Sectors Per Track:** 8 to 26 (26 standard). **Data Transfer Rate: Rotational Speed (Spindle Motor Speed):** 360 rpm, ±2.5%. **Average Rotational Latency (Average Latency Time):** 83.3 mS. **Average Seek Time:** 78 mS. **Head Settle Time:** 15 mS. **Average Access Time:** 191 mS, including settle. **Track-to-Track Move Time:** 3 mS. **Head Load Time:** 35 mS. **Operating Temperature Range:** 40 to 90 degrees F (5 to 32 degrees C). **Power Requirement:** 120/240 VAC, 50/60 Hz, 204 Watts. **Overall Dimensions:** 10.2" H x 18.9" W x 18" D (25.91 x 48.00 x 45.72 cm). **Net Weight:** 65.8 lbs. (29.9 kg).

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

The GDZ-1320 Color Video Display complements your computer, VCR or color camera

$399.95

- **Fully assembled and tested unit features 13-inch (diagonal) color picture**
- **Accepts composite NTSC color video signal from computer systems, video cassette recorders (VCRs) and color TV cameras**

The Heath/Zenith GDZ-1320 Color Video Display represents outstanding value in its field. Team this colorful peripheral with the Heath HA-8-3 Color Graphics Board below. Or use it with computers, VCRs and color TV cameras which produce an NTSC composite video signal.

With the GDZ-1320, you can take advantage of the HA-8-3 and the color software offered by the Heath Users' Group (HUG) for the H-8 and All-In-One Computer Systems.

You get a higher-quality color picture, because this 13-inch (diagonal) color display accepts the composite NTSC color video signal directly from the HA-8-3 Color Graphics Board – as well as other devices. You get a better picture than that produced by an RF modulator, because direct reception eliminates interference caused during modulation and demodulation of the signal.

The GDZ-1320 also accepts a Hi-Z audio input. An RCA-type phono jack, with an impedance of 75 ohms, is provided to accept NTSC composite video input – while a miniature phone jack is built into the unit for audio input.

Fast warm-up capability lets you use the Display right away. Fully automatic color processing, built into the Display, assures consistent color levels and vivid hues, for a better all-around color picture. The GDZ-1320's picture stays so rock-steady that the vertical hold and horizontal hold controls have been eliminated. And a built-in audio amplifier and speaker faithfully reproduce each sound.

A high-impact black styrene cabinet protects the Color Video Display's electronics under normal operating conditions. For 120 VAC, 60 Hz. Draws 82 Watts. UL and CSA listed. Conforms to technical requirements of 21 CFR, Subchapter J, for X-radiation. Dimensions of the GDZ-1320 Color Video Display are 14" H x 20.25" W x 14.75" D (35.56 x 51.44 x 37.47 cm).

GDZ-1320, Assembled, Shpg. wt.44 lbs. . . **399.95**

HA-8-3 Color Graphics Board lets you create colorful displays with your H-8

$495.00

- **Advanced color video generator, programmable sound generator for maximum enjoyment**
- **Board is capable of accepting up to four X-Y joystick consoles and the AMD-9511 Arithmetic Processing Chip (both optional)**
- **Board is fully assembled and tested, for fast and easy installation in your H-8 Computer**

When you add the HA-8-3 Color Graphics Board to your H-8, you'll enter a new, colorful world of programming. This board connects to the GDZ-1320 above (preferred), or to other devices which accept NTSC composite video.

The advanced TI-9918 Color Video Display Generator produces vivid pictures for color and black-and-white video displays. Maximum resolution of this Color Video Display Generator is 256 x 192 pixels. The video display screen consists of 35 display planes.

Three color display modes: Pattern Mode, which produces 32 x 24 pattern positions, each with two unique colors; Text Mode, which produces 40 x 24 text positions on the screen (two colors are defined for the entire screen); and Multicolor Mode, which produces a grid of 64 x 48 positions. One color is allowed for each of the 3072 screen positions.

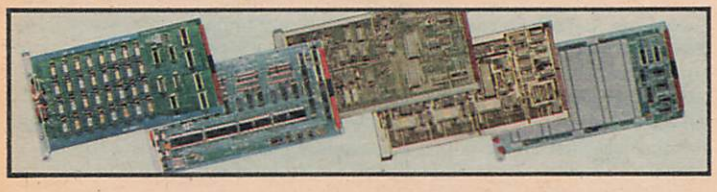
The AY-3-8910 Programmable Sound Generator can make nearly any sound desired for your game or other application – under software control.

Eight channels of A/D conversion are provided, for up to four X-Y joystick consoles (not included). Each channel has 4 bits of parallel I/O for switches and LEDs. A built-in socket accommodates the AMD-9511 Arithmetic Processor Chip (not supplied), which permits extremely rapid floating point, trigonometric and transcendental computations – as well as hardware multiplication/division of integer and floating point numbers.

Demonstration software is supplied on a 5.25-inch disk. Additional software will be developed and offered by the Heath Users' Group (HUG). Due to the use of wait states and an 18 VDC power requirement, proper operation of the board is guaranteed only when used with Heath memory boards – or with other memory boards which use fully static single-supply RAMs.

HA-8-3, Assembled and tested, Shpg. wt. 3 lbs. **495.00**

Memory, interfacing, accessories for H-8 Computer



16K RAM Wired Memory Board.
WH-8-16, Assembled, 2 lbs. **299.00**

4-Port RS-232C Serial Interface. Modem controls, WH-8-41 Cable.
Kit H-8-4, Shpg. wt. 2 lbs. **195.00**
WH-8-4, Assembled, 3 lbs. **250.00**
WH-8-41, Adapter Cable, 1 lb. **15.00**

1-Port, 1200 Baud Serial/Cassette Interface. Not to connect H-8 to H-14.
Kit H-8-5, 3 lbs. **125.00**
WH-8-5, Assembled, 2 lbs. **145.00**
WH-8-51, Adapter Cable, 1 lb. **15.00**

3-Port, 8-Bit Parallel Interface.
Kit H-8-2, Shpg. wt. 3 lbs. **150.00**

Save $26 on Reusable Circuit Design Breadboard Card. Kit H-8-7, 2 lbs. . . . . **Was $105, NOW 79.00**

Design and build custom circuits for your H-8

Wire Wrapping Board accepts 80 16-pin sockets, 3 50-pin flat cable connectors. Includes bus connectors, heat sink, 5V regulator, miscellaneous hardware.
Kit H-8-10, 1 lb. **29.95**

Wire Wrapping Kit – tool, 50' wire, 200 pre-cut, pre-stripped 1"-4" wires. **Kit HCA-6,** 1 lb. **13.95**

Wire Wrapping Socket Kit. 36 3-level W/W sockets (14 to 40-pin). **Kit HCA-7,** 1 lb. **29.95**

These accessories add versatility to your H-8

Boot up faster with PAMGO ROM. Use just 1 keystroke on power-up, 3 on reboot – instead of 11. 2708-compatible masked, programmed ROM is exactly like H-8's front panel ROM – except power-up or reset, program counter is set to 030 000 split octal default address. Not for H-8s with HA-8-8 Extended Configuration Option, which already have 1-button boot ROM. **H-8-9,** Shpg. wt. 1 lb. **20.00**

Extender Board lets you operate your H-8 Computer with accessory boards outside the card case. This board allows easier access to components for servicing, prototyping or debugging purposes.
HA-8-1, Shpg. wt. 1 lb. **40.00**

Music Synthesizer System. Board connects to stereo system with two shielded cables (included). True D/A converter provides excellent 27.5-3,300 Hz frequency response, up to 9 harmonics. Four-part harmony (voices) in stereo. Enter any song right from conventional sheet music – even if you've never read music before. Documentation shows how to get maximum enjoyment. Software on 5.25" disk. Requires 24K RAM, H-17 and terminal. **HA-8-2,** Assembled, 3 lbs. **159.00**

Wired H-47 Disk Interface with two RS-232C Serial Ports interfaces H-8 with H-47, line printers, video terminals and other serial devices.
WH-8-47, Assembled, Shpg. wt. 2 lbs. **235.00**

Extended Configuration Option. Required to run H-8 with H-47 and/or CP/M. Has PAMGO-type 1-button boot. Features included with HA-8-6 Z-80 CPU Card. **HA-8-8,** Shpg. wt. 1 lb. **65.00**

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

Save a big $1,335 — and get a complete, DEC-compatible educational/science computer system

Only **$3995.00**

- **System features full compatibility with DEC PDP-11/03 — at a very substantial savings!**
- **Includes 56K bytes of memory and 500K bytes of on-line data storage (in IBM 3740 format)**
- **Powerful 16-bit computer system features a half-size KD-11HA (DEC LSI-11/2) microprocessor**

Now you can save over $1,300 — and get DEC-compatible 16-bit power, with flexibility you need to run DEC programs and real-time laboratory applications. It uses the same microprocessor, memory, interfacing and operating system as the DEC LSI-11, and runs all DEC PDP-11/03 software.

1 **H-11A Computer has 16-bit power:** Your choice of a 16-bit or 8-bit computer depends upon your needs. If you're a professional who needs full DEC compatibility, the 16-bit H-11A is your choice. It has adequate computing power, even for the more complex jobs that you will tackle later.

Smaller, yet powerful microprocessor: A KD11-HA (half-size LSI-11/2) microprocessor – makes the H-11A identical to the DEC PDP-11/03, at a fraction of the cost. The KD11-HA features PDP-11/34 instruction set, 380 ns microcycle time, resident firmware debugging (ODT), ASCII console routines, single and double operand instructions. With no on-board memory, you get more flexibility to match ROM, RAM and interfacing to your particular needs.

Seven plug-in slots: handle up to 56K bytes of memory and interfacing. You can even combine LSI-11 and LSI-11/2 components.

The easy-to-build Heath H-11A Computer includes cabinet, heavy-duty power supply, backplane with bus and assembled CPU board.

In this special system configuration, the H-11A also comes with two WHA-11-16 32K Byte Memory Expansion Modules to provide the computer with its maximum memory capacity – and H-11-5 Serial Interface Kit to communicate with peripherals via either RS-232C Serial Interfacing or a 20 mA current loop – and a WH-11-51 Adapter Cable for the Serial Interface.

2 **The H-27 Dual-Drive Floppy Disk System,** included in the HKS-11 system, provides up to 500K bytes of on-line data storage – enough for most of your needs. It stores data on 8-inch disks, compatible with the IBM 3740 format.

You get fast access to data – The H-27's Z-80 microprocessor-based disk controller provides an average data access time of 250 milliseconds.

Full compatibility: The H-27 is compatible with DEC RX01 (PDP-11/03) and RXV11 (PDP-11V03) hardware and software – so you can use the hundreds of applications programs written for the DEC PDP-11 microcomputer.

Extra-value features: Single-board bootstrap/interface circuit takes just one H-11A backplane slot. Built-in diagnostics, mechanical interlock and write-protect function guard important programs.

Start programming right away – because this system includes both the HT-11 Disk Operating System and HT-11-1 FORTRAN (below).

Complete H-11A 16-Bit Microcomputer System. Includes H-11A Computer, two WHA-11-16 Memory Expansion Modules, H-11-5 Serial Interface, WH-11-51 Adapter Cable, H-27 Dual-Drive 8" Floppy Disk System, HT-11 Disk Operating System and HT-11-1 FORTRAN Language. $5330.00 if purchased separately.

Kit HKS-11, Shpg. wt. 176 lbs., Motor Freight ..... **NOW ONLY 3995.00**
Kit H-11A, DEC-compatible 16-Bit Computer, Shpg. wt. 43 lbs. **1395.00**
WH-11-UL, Assembled/UL-approved Computer, 37 lbs. **2100.00**
Kit H-27, 8" Disk System Kit with 2 drives, 93 lbs., Mtr. Frt. **2195.00**
WH-27, Assembled H-27 with 2 drives, 69 lbs., Mtr. Frt. **2595.00**

Line Time Clock Switch Modification Kit (shown above right) places the LTC switch on the front panel for easier access. Includes new front panel.
Kit 830-35, Postpaid **53.50**

Look at the Manuals before you buy. Manuals for H-11A Computer, H-11-5 Serial Interface, H-11-2 Parallel Interface and H-19 Video Terminal. Purchase price refunded when you buy an H-11A Computer. **HM-1100,** 12 lbs. **30.00**

H-11A/WH-11-UL SPECIFICATIONS: Memory: 64K bytes total. RAM/ROM Addressed-0 to 56K; I/O Addressed-56 to 64K. **Backplane:** Eight 2-wide module slots. **Power Requirement:** 120/240 VAC, 50/60 Hz, 200 Watts. **Dimensions:** 6.5"H x 19"W x 17"D.

H/WH-27 SPECIFICATIONS: Data Transfer Rate: Average Access Time: 250 mS. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 7.75"H x 18"W x 20"D.

Add flexibility to your H-11A with these accessories and interfaces

32K Byte (16K Word) Memory Expansion Module provides additional RAM. On-board refresh, 570 nS cycle time, 250 nS access time. Maximum H-11A memory capacity, 56K bytes (28K words).
WHA-11-16, Assembled and tested, 2 lbs. ... **495.00**

Extended Arithmetic Chip saves memory space, adds fixed point multiplication, division and extended shifts. Full floating point functions.
H-11-6, Shpg. wt. 1 lb. **190.00**

Serial Interface provides RS-232C or 20 mA loop interfaces. 50-9600 baud rates. Compatible with PDP-11V03, other LSI-11 computers. Plugs directly into the LSI-11 backplane. Includes mating connectors. To interface printers to H-11A, order WHA-11-5 (right).
Kit H-11-5, Shpg. wt. 2 lbs. **135.00**
WH-11-5, Assembled and tested, 1 lb. ... **150.00**

Adapter Cable for H-11-5 Serial Interface.
WH-11-51, Assembled and tested, 1 lb. **15.00**

Printer-to-H-11A Serial Interface Board.
WHA-11-5, Shpg. wt. 1 lb. **150.00**

Parallel Interface. 32 latched I/O lines, 16-bit word transfers and LSI-11 interface – as well as control logic for interrupt processing and vectored addressing. Drives cable up to 25' long. Compatible with TTL, DTL devices.
Kit H-11-2, Shpg. wt. 2 lbs. **125.00**
WH-11-2, Assembled and Tested, 1 lb. ... **150.00**

Wire Wrapping Board for designing custom circuits is punched, etched to accept 32 16-pin IC sockets (38 14-pin, other combinations). With card extractor, hardware. Uses HCA-6, HCA-7 (p. 76).
H-11-10, Shpg. wt. 1 lb. **35.00**

Program your H-11A more efficiently with Operating Software and FORTRAN

EXPAND applies user's or library's definition whenever source program references macro. **ASEMBL** Assembly Language outputs single relocatable binary object file, can also produce assembly listing with symbol table. **CREF** Cross-Reference appends index of symbol usage to assembly listing when specified as part of assembly output. All 3 programs support PDP-11 instruction set.

EDIT text editor creates, modifies ASCII source files for input to other system programs. **LINKER** converts assembler or FORTRAN object modules into run-time format for loading, execution. Relocates code, links global references, creates runnable program file for system. **LIBRARIAN** creates, maintains subroutine libraries for linker.

PIP transfers, merges, moves, copies, renames and deletes files; lists, zeros and compresses device directories. **ODT** (On-line Debugging Technique) provides commands to display, alter the state of a running program.

BASIC INTERPRETER offers access to HT-11's I/O system and file structure through BASIC. Variable-length strings, sequential files, virtual memory arrays, chaining, overlays. Calculator mode performs calculations, aids in debugging.

Requires H-11A/H-27 system with 32K bytes (16K words) RAM, H-19 (p. 74) and H-11-5 (above).

HT-11 (Requires Sublicense Grant on page 88), Shpg. wt. 12 lbs. **350.00**

FORTRAN Language for H-11A. Binary software features complete ANSI Standard 1966 FORTRAN IV with extensions for increased speed. Requires H-11A/H-27 system with HT-11 O/S above.

HT-11-1 (Requires Sublicense Grant on page 88), Shpg. wt. 9 lbs. **250.00**

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

Assembled commercial computer products from Zenith Data Systems

Z-89 Computer with free $150 operating system!

$2895.00

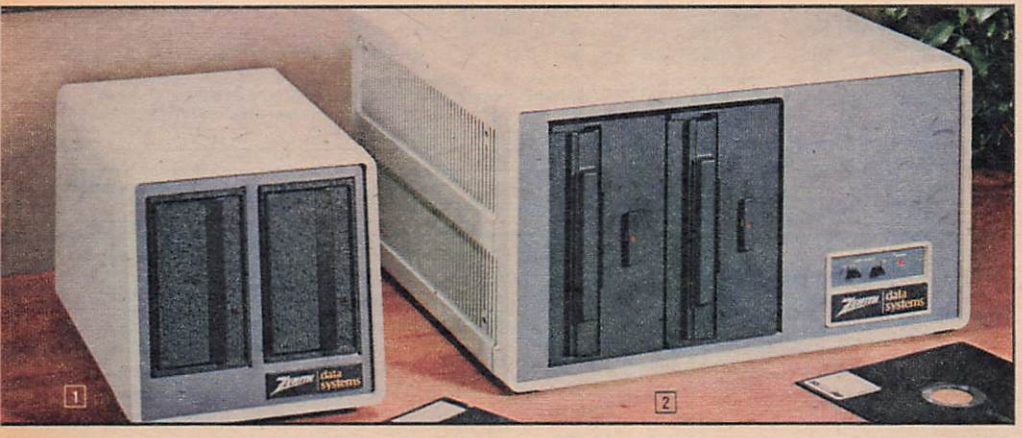
- **Includes either HDOS or CP/M Operating System, a $150 value, at no extra cost! Indicate model no. of the HDOS or CP/M System you want on order form – and write FREE in price space (see p. 83)**

Two Zilog Z-80 microprocessors – today's standard of the microcomputing industry–control computing and terminal functions, with a memory capacity of up to 64K bytes of RAM (48K bytes of RAM are standard). Built-in 5.25" floppy disk drive stores up to 100K. Optional external storage, using either 5.25" (Z-87) or 8" (Z-47) drives, can increase capacity to over 2.8 megabytes. Super-clear, large-capacity video display shows twenty-five 80-character lines (2,000 characters) at any one time. Typewriter-style keyboard with 33 special graphics characters. Three RS-232 Serial I/O Ports for printer and telecommunications expandability. Uses same memory and accessories as H-89 – see pgs. 70-71. For 120/240 VAC. Overall Dimensions, 13" H x 17" W x 20" D.

Z-89-FA, Assembled, 55 lbs. ..... **$3045.00 Value, NOW ONLY 2895.00**

Zenith Data Systems Computers, which are factory assembled and tested, are designed for commercial use. Operation of these models in residential areas may cause unacceptable interference to radio and TV reception – requiring the operator, pursuant to FCC regulations, to take whatever steps are necessary to correct the interference.

The Zenith line of commercial computer products includes the Z-89 All-In-One Computer, the Z-19 Professional Video Terminal, 5.25" and 8" floppy disk systems – as well as letter-quality and matrix printers.



1 Add 200K of on-line storage with Z-87 5.25" Disk System

$1195.00

- **Features dual drives, easy plug-in adaptability to Z-89, read/write protection**

Add 200K bytes of on-line data storage to your Z-89 with the Z-87. Two vertical disk drives take up less space. They accept single-density, single-sided, hard-sectored, 40-track 5.25" floppy diskettes. Extremely accurate–meets 1 x 10(9) bit soft error rate and 1 x 10(12) hard error rate. Single read/write gap-type recording head. Photosensor in each drive detects presence or absence of notch in diskette, assuring proper read/write protection. For 120/240 VAC, 50/60 Hz. Draws 75 Watts of power. Overall Dimensions 8.625" H x 8.875" W x 15" D (21.9 x 22.5 x 38.1 cm).

Z-87, Assembled with 2 drives, 28 lbs. . . . **1195.00**

2 Move up to over 2.5 megabytes on-line with Z-47

$3500.00

- **Compatible with Z-89; adds over 2.5 megabytes of on-line data and program storage**

The dual-drive Z-47 provides enough on-line data storage for extended accounting, inventory and mathematical functions – up to 2.5 megabytes. It accepts 8" floppy diskettes in IBM 3740 format. Door lock solenoids prevent inadvertent damage to diskettes by locking drive doors closed during activity. Photosensor read/write protection. Fast 191 mS average data access time. 120/240 VAC. 10.20" H x 18.90" W x 18" D. Compatible with current Z-89, but requires H-88-6 Mod. Kit and H-88-7 ROM (p. 71) to run on Z-89s with no external brightness control. Assembled.

Z-47-BA, 66 lbs., Motor Freight **3500.00**

Z-19 Video Terminal features fast, efficient operation

$995.00

- **Terminal interfaces with most standard systems; ANSI and DEC VT-52 compatible**

The Z-19 features a Zilog Z-80 microprocessor to allow complete screen control for easier data entry. A super-sharp, high-resolution video display shows twenty-five 80-character lines (2,000 characters). High-performance typewriter-style keyboard has 72 keys, 12 special user-function keys (8 of which are user-programmable), and a separate 12-key numeric pad. 33 special graphics characters. Edit by character or line. RS-232C Serial Interfacing runs at 110-9600 baud. All features controllable from keyboard, computer or interior switches. 120/240 VAC. 13" H x 17" W x 20" D.

Z-19, Assembled, Shpg. wt. 43 lbs. **995.00**

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

Rugged dot matrix and letter-quality commercial printers fill every need

You'll find a commercial printer for your particular need in our factory assembled and tested line. Choose from two letter-quality daisy wheel printers: the WH-44/Diablo 1640 KSR Printer/Terminal, with a full ASCII keyboard; and the WH-54/Diablo 630 RO Printer, which uses both metal and plastic daisy wheels.

There are also two dot matrix printers: The WH-24-1/TI-810 Printer, the fastest dot matrix printer we offer; and the WH-34/LA-34 DECwriter IV Printer/Terminal, which includes keyboard. And the HCA-2 Floor Stand fits all printers shown on this page.

Letter-quality printer/terminal for word processing

$2995.00

- **45 cps bi-directional, letter-quality printing**
- **With full ASCII keyboard — upper, lower case**
- **Has RS-232C Interface, 256-byte print buffer**

Forward/reverse paper motion, ETX/ACK protocol, host program control, self-testing capabilities. Has 2-color/graphics capabilities with 1/20" horizontal, 1/48" vertical motion. Accepts data at 110-1200 baud; compatible with Bell 102, 113, 212, equivalent modems. With friction platen, power supply, operator control panel, HCS-22 Print Wheel (Elite 12 w/unslashed zero), HCS-51 Film Ribbon. 120/240 VAC, 9.25" H x 23.50" W x 15.75" D.

WH-44K, Assembled, Shpg. wt. 72 lbs., Motor Freight **2995.00**

Bi-Directional Tractor Feed for WH-44K, WH-54 allows moving paper backward through printer for graphics, improved registration. **HCA-1,** 9 lbs. **259.00**

The lowest price we've offered on Diablo quality!

NOW ONLY **$2295.00**

- **Diablo 630 RO is factory assembled and tested**
- **Uses high-quality metal, plastic daisy wheels**
- **Fewer parts, adjustments for reliable operation**

Now you can save $200 on this value-paced breakthrough! The WH-54 is ideal for word processing systems and other applications which require letter-quality printing. Fewer moving parts and field adjustments. Uses both metal and plastic print wheels. Prints full 96-character ASCII set, upper and lower case, at up to 35-40 cps. RS-232C Interface and 256-byte print buffer run at 110-1200 baud. Includes friction platen, power supply, operator control panel, HCS-22 Print Wheel (Elite 12 with unslashed zero) and HCS-51 Film Ribbon. 120/240 VAC. 9.25" H x 23.5" W x 15.75" D.

WH-54, Assembled, 65 lbs., Mtr. Frt. .... **Was $2495.00, NOW ONLY 2295.00**

Save $100 on this versatile DECwriter Teleprinter

NOW ONLY **$1095.00**

- **Assembled unit prints at true 30 cps speed**
- **Reproduces full 128-character ASCII set**

WH-34/LA-34 DECwriter IV has typewriter-style keyboard. Burst speeds to 45 cps. RS-232C Interface. 120 VAC. 7" H x 22" W x 15.5" D.

WH-34, Assembled, 47 lbs. ..... **Was $1195.00, NOW ONLY 1095.00**

WHA-34-2, Tractor Feed, Shpg. wt. 3 lbs. **179.00**

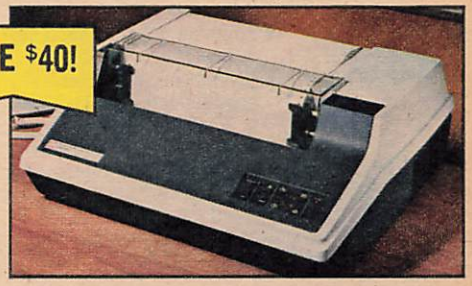
Floor Stand for commercial printers

Fits all printers on this page. Raises printer to desk level for easier operation. With paper rack.

HCA-2, Shpg. wt. 28 lbs. **99.00**

Save on WH-24-1/TI-810 — our fastest printer!

NOW ONLY **$1695.00**



- **Features optimized 150 cps bi-directional dot matrix printing**
- **Prints upper, lower case characters**
- **Handles forms up to 15" wide**

Reproduces full 96-character ASCII set, upper and lower case. Built-in RS-232C Serial Interface, 256-byte FIFO buffer accept data from 110-9600 baud. Adjust line width to 132 characters, vertical spacing to 6 or 8 lines per inch. Prints up to 5 copies of an original. 120/240 VAC, 50/60 Hz. 8" H x 25.75" W x 20" D. Requires WHA-11-5 Serial I/O Card (p. 77) for use with H-11A; not required for other Heath computers.

WH-24-1, Assembled, 66 lbs., Mtr. Frt. ... **Was $1735.00, NOW ONLY 1695.00**

See our full line of quality print wheels, ribbons and paper for these commercial printers on page 82.

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

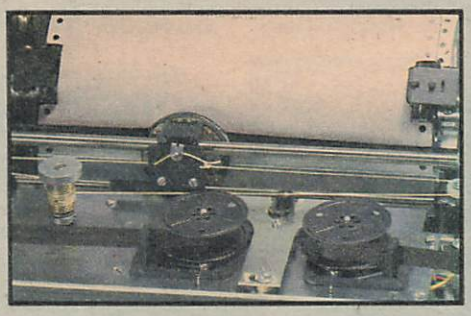
Lowest price ever on kit and assembled versions of popular H-14 Line Printer!

NOW ONLY
$495.00 Kit

- **Has extra features you won't find on comparably priced dot matrix line printers**
- **Prints std. 96-char. ASCII set at speeds of up to 75 cps**
- **Use with most computers – communicates via RS-232C or 20 mA loop interfacing**

Now save even more on the Heath H-14 Printer, with new, lower prices on both kit and assembled versions! With the H-14, you get hard copy for added convenience in reading, editing, debugging and modifying your computer programs. The H-14 can also provide handy printed copies of address lists or other data you need for any of your personal or business applications.

The versatile, microprocessor-based H-14 prints the standard 96-character ASCII set (upper and lower case) on a 5 x 7 dot matrix print head. Uses readily available 0.5-inch nylon inked ribbon on 2-inch spools. Maximum throughput rate is 75 characters per second, with selectable 80, 96 or 132 character line length. Standard vertical spacing is 6 lines per inch; 8 lines per inch spacing is a software selectable option.



Sharp printout, low payout: The Heath H-14 is one of the lowest-cost microprocessor-based line printers available today.

Baud rates are user-selectable, from 110 to 4800. Adjustable width sprocket feed handles edge-punched fan-fold paper from 2.5 inches to 9.5 inches wide, with a maximum form thickness of 0.006 inch.

The H-14 connects to most computers with an RS-232C Serial Interface or 20 mA current loop. Handshaking provided by busy control signal.

Standard equipment for the H-14 includes a 25-pin male EIA connector for fast, convenient hookup – and a matching paper catch which keeps the output of the printer handy and organized.

The H-14 is designed to give years of reliable, trouble-free service – at substantial savings, both in kit and assembled form. 120/240 VAC. 4.80" H x 18.33" W x 14.33" D. Requires HDOS or CP/M for H/Z-89; H-88-18 for H-88; any Heath-offered operating system for H-8.

SAVE $100 on easy-to-build H-14 Printer.
Kit H-14, 30 lbs. . **Was $595.00, NOW ONLY 495.00**

SAVE $200 on factory assembled WH-14 Printer.
WH-14, 27 lbs. . . . **Was $795, NOW ONLY 595.00**

HCA-5-14, Dust Cover for H/WH-14, 1 lb. . . **14.00**

H-14/WH-14 SPECIFICATIONS: Printing Speed: Initial time per full line is approximately 1.75 seconds on 60 Hz power line, 2.1 seconds on 50 Hz power line. Avg. throughput approx. 40 cps with 96 char. line. Print head temp. controlled by varying print speed. **Characters:** Impact prints 0.11" high characters. **Format:** 80, 96 or 132 cpi (96 cpi software selectable only). **Forms Handling:** Sprocket feed with adj. widths, 2.5"/sec slewing rate. Form depth selectable from 0.0210" to 0.1365". **Ribbon System:** Standard typewriter ribbon with automatic reversing mechanism. **Panel LED Indicators:** Power on/off, print head temp. **Operator Controls:** Power on/off, on/off line, fwd/reverse feed, top of form, wide characters.

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

HUG makes your Heath computer even more powerful with its 500-program software library

Heath User's Group

Membership in the Heath Users' Group (HUG) keeps you up to date on the latest Heath computer developments – while you expand your utility and applications software capabilities!

Here's what a membership in HUG gives you:

1. Special access to the HUG Software Library – a constantly updated and expanded library which now has more than 500 low-cost, user-submitted utility and applications programs for your H-8, H-88 or H-89/Z-89 All-In-One Computer. The library includes a diversified collection of programs, subroutines and procedures written by members of HUG. The programs are stored on cassettes and disks (see partial list below);

2. The HUG Software Library Catalog, which describes the contents of the HUG Software Library – including utility and applications programs in computer-aided instruction, business applications, personal finance, amateur radio programs and more. The catalog lists each program in the library by program name, program description, program language, version, equipment required to run the program and HUG author;

3. A one-year subscription to REMark Magazine (10 issues) – an exclusive periodical for HUG members. REMark provides these important services: It contains sneak previews of upcoming Heath computer products – and the magazine also serves as an open forum, where members of HUG can share new hardware modifications, software enhancements, applications programs and other ideas about their computers;

4. A vinyl-covered, three-ring binder – with an inside pocket containing the HUG Handbook. It explains the Heath Users' Group in more detail: why it was started, how members participate (some HUG members have even formed local users' groups to increase the benefits of belonging to HUG), plus hints on making the most of your membership. Use this binder to store HUG membership information, software documentation, back issues of REMark and other materials you will receive as a HUG member;

5. A chance to win valuable prizes by competing in HUG Software Contests – a great way to further your program-writing expertise and have fun at the same time. Besides receiving valuable gifts, the winners of these software contests have their names printed in REMark Magazine;

6. The official HUG Identification Card, which entitles you to all of the special benefits which are available only to HUG members.

Here's a quick peek at some of the different programs available from the HUG Software Library to its members:

- Memory Test Programs
- HUG Editor
- Page Editor
- Time for HDOS
- File Cruncher
- File Maintenance
- Create-a-Program
- Suppressing Command Completion
- String Sort
- Floating Point Package
- Fixed Point Package
- Cross-Reference Utility
- Disk Dump Utility
- Loan Amortization
- Cash Flow
- Real Estate Programs
- Stock Programs
- Tax Programs
- Time Managment
- Home Budget Maintenance
- Checkbook Programs
- Disk DUP Utility
- Disk Relabeler
- Credit Card Management
- Investments
- Annuities

Exciting H-8 Computer Games

In 1200 baud cassette form, requires H-8 Computer and H-8-5 Interface to load. Not for H/Z-89 Computer or H-8-4 Interface.

Biorhythm tells you when to face the world, when to stay in bed. Requires Extended BASIC, 16K RAM. **PA-82,** Shpg. wt. 1 lb. **10.00**

Space War lets you command the starship Enterprise on a galactic journey, fighting Klingons and solving problems. Requires 24K RAM. **PA-83,** Shpg. wt. 1 lb. **10.00**

Game Set #1. Includes Craps, Orbit, Tic-Tac-Toe, Nim, Hexapawn, Hangman, Hamrabi and Derby. Requires 8K RAM. **PA-84,** Shpg. wt. 1 lb. **10.00**

- Mailing List
- Basic Letters
- Spelling Words
- Vocabulary Practice
- Antonyms
- Arithmetic Practice
- Calculator
- Metric Conversion
- Simultaneous Equations
- Graphs
- Programs for Printers
- HDOS Device Drivers
- Renumbering Programs
- Modern Packages
- Text Processors
- Sort Utilties
- Disk Recovery Utilities
- Assembly Language Routines
- Disassemblers
- Map of BASIC Symbols
- Pilot Language
- Small Business Packages
- Business Analysis
- Accounts Receivable
- Accounts Payable
- Payroll
- Inventory Package
- Expense Report
- Finance
- Plotting
- Chemistry Symbol Quiz
- Education Game
- Electronic Formulas
- Solar Domes
- Music
- Morse Code
- Antenna Design Programs
- Amateur Radio Log Book
- QSL Files
- OSCAR Locator
- Baudot Driver
- Teletype Driver
- AC Circuits
- Resonant Frequency Calculator
- Op-Amp Programs
- Power Supply Design
- Weather Forecasting
- Games and Graphic Games
- HDOS2CP/M Utility
- 11 Disks of CP/M Programs

When you purchase a Heath computer, you'll find a HUG membership application enclosed. But if you don't own a Heath computer – or don't have an application form – you can still join HUG. Just fill out the Heath Users' Group application form below and mail to HUG Membership, Hilltop Road, St. Joseph, MI 49085.

	HUG Membership Rates (per year, U.S. Funds)		
	U.S.	Canada & Mexico	International
New Members:	$18	$20	$28
Renewal	$15	$17	$22

Send to: HUG Membership, Hilltop Road, St. Joseph, MI 49085.

Yes, I want to become a member of HUG and take advantage of keeping up to date on the latest Heath computer developments, while I increase my utility and applications software library.

I've enclosed $ _____ (U.S. Funds only) to cover my membership. NOTE: No charge orders or billings are accepted.

Name: _____

Address: _____

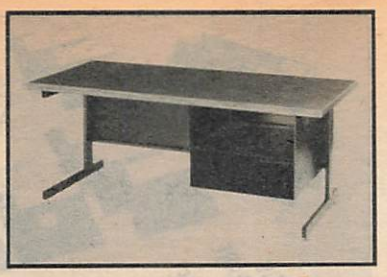
City: _____ **State:** _____ **Zip:** _____

Country: _____

Signature: _____

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

Space-saving Computer Work Station organizes your computer system



- **Gain attractive, rugged operating efficiency. The PD-11 Computer Work Station organizes your computer components in less space**

$295.00 Organizes your system in less space – yet all components are easily accessible. Designed to Heath specifications, the 60" x 30" easy-to-clean Formica desk top places terminals at a comfortable height for seated operators. Lower shelves hold the computer and disk systems (except H-47, H-77). Upper shelf measures 8.5" H x 20" W x 19.75" D (21.59 x 50.80 x 50.17 cm), while the lower shelf measures 7" H x 20" W x 19.75" D (17.18 x 50.80 x 50.17 cm).

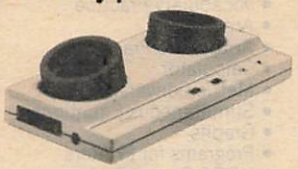
Rugged steel legs and sheet metal shelving last under constant use. Locking casters make it easy to roll the work station from place to place – and to keep your computer system components securely in place. Partially assembled.

PD-11, Shpg. wt. 95 lbs., Mtr. Frt., FOB El Segundo, CA **295.00**

Versatile Acoustic Modem is ideal for any phone

$159.00

- **Assembled modem allows your computer to communicate with other computers**



The Lexicon Lex-11 Modem lets your computer talk to other computers over standard telephone lines. Also communicates with any Bell 103 compatible modem. Selectable answer/originate modes. Many practical and useful applications. RS-232 interfacing. For 120 VAC.

WH-23, Assembled and tested, Shpg. wt. 3 lbs. **159.00**

Direct-Connect Modem offers improved quality

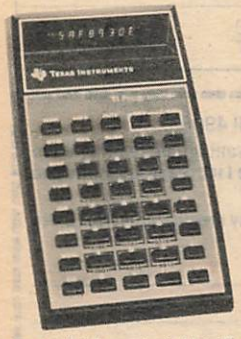
$195.00

- **UDS Direct-Connect Modem offers better quality than acoustic modems**

RS-232C interface. Two modular phone jacks. Connects to standard phone line. Full duplex communication, originate/answer modes. FCC Certified. Powered by phone line. Requires std. single-line phone with modular connectors. Phone-modem cable included.

WH-33, Assembled and tested, Shpg. wt. 2 lbs. **195.00**

Multi-Function TI Calculator for computer hobbyists



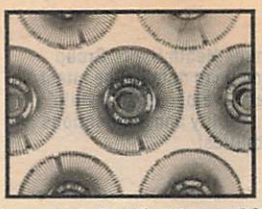
$59.95

- **Compact, goes anywhere**
- **Special memory, logic operations for complicated calculations and computer-related applications**
- **Factory assembled and tested**

Designed especially for the computer hobbyist, this fully assembled Texas Instruments® Pocket Programmer/Calculator features fast conversions between octal, decimal and hexadecimal number systems; special logic operations for computer applications; three-key independent memory and fifteen levels of parentheses to handle complicated calculations; constant mode to simplify repetitive calculations; and an easy-to-read 8-digit LED display. Lightweight and compact enough to fit in your shirt pocket, this Texas Instruments product is ideal for any computer-related application. A rechargeable battery and a 120 VAC, 60 Hz adapter/charger are standard features on this fully assembled and tested multi-function calculator. Overall Dimensions of the Texas Instruments PC-11 Calculator are 5.5" H x 3" W x 1.25" D (13.97 x 7.62 x 3.18 cm).

PC-11, Assembled and tested, Shpg. wt. 2 lbs. **59.95**

Choose from a full line of computer system supplies for highest-quality system performance



Letter-quality Diablo printwheels

Courrier 10 (Diablo 38100), Pica w/slashed zero. **HCS-20,** Shpg. wt. 1 lb. **8.00**

Courrier 72 (D. 38107), Pica w/unslashed zero. **HCS-21,** Shpg. wt. 1 lb. **8.00**

Elite 12 (D. 38102), Elite w/unslashed zero. **HCS-22,** Shpg. wt. 1 lb. **8.00**

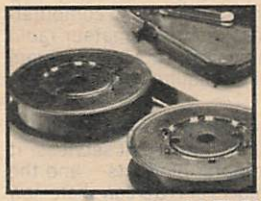
General Scientific (Diablo 38141). Greek letters, superscripts, math symbols. **HCS-23,** Shpg. wt. 1 lb. **8.00**

APL-10 (Diablo 38150). Special set for APL language. **HCS-24,** 1 lb. **8.00**

OCR-A (Diablo 38144). ANSI Std. OCR Type A font. **HCS-25,** 1 lb. **8.00**

Prestige Elite Legal 12A (Diablo 38105). Elite w/legal symbols, incl. ©, ® and ™. **HCS-26,** Shpg. wt. 1 lb. **8.00**

Courrier Legal 10 (D. 38104) Pica w/legal symbols. **HCS-27,** 1 lb. **8.00**



Ribbons for dark, clear printouts

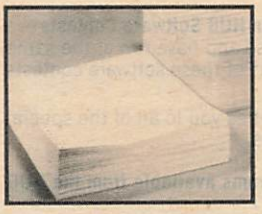
Ribbon for H-14 Line Printer. Also fits ASR-33 printers. **HCS-52,** 1 lb. ..... **Pkg. of 3, 8.00**

Cloth Ribbons for the WH-44 Diablo Printer. HCS-50, Shpg. wt. 1 lb. ..... **Pkg. of 3, 18.00**

Film Ribbons for the WH-44 Diablo Printer. HCS-51, Shpg. wt. 1 lb. ..... **Pkg. of 3, 18.00**

Ribbon for the WH-24/TI-810 Bi-Directional Line Printer and the H-36/LA-36 DECwriter II. Long-lasting, top-quality ribbon. **HCS-53,** Shpg. wt. 1 lb. ..... **Pkg. of 3, 18.00**

Ribbon Cartridges for the WH-34 DECwriter IV Computer Teleprinter. Eliminates messy ribbon changes. When old ribbon wears out, simply remove old cartridge and insert new ribbon cartridge. **HCS-54,** Shpg. wt. 1 lb. ..... **Pkg. of 3, 29.00**

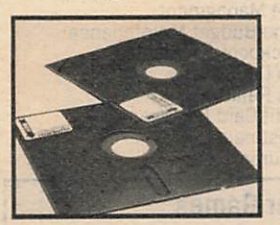


Top-quality paper for printers

Premium 8.5" x 11" Printer Paper. For all printers sold by Heath. 2800 sheets of premium, one-part fan-fold paper, approximately 20 lb. high-quality white bond. In box. **HCS-1,** Shpg. wt. 28 lbs. **32.00**

Standard 8.5" x 11" Paper. Package contains 3200 sheets of standard, one-part, fan-fold 8.5" x 11" (21.59 x 27.94 cm) white paper. Approximately 15 lb. bond strength. **HCS-2,** 31 lbs. **32.00**

14.875" x 11" Paper for WH-24, WH-34, H-36 and WH-44 Printers. Box contains 3200 fan-fold sheets of white/green lined paper. **HCS-3,** Shpg. wt. 47 lbs. **42.00**



Floppy disks for mass storage

5.25-Inch Single-Density, Single-Sided Floppy Diskettes. For use with all Heath 5.25-inch floppy disk systems – as well as North Star and some other personal computer systems. Formattable with either 40 or 35 tracks per diskette. Hard-sectored, with 10 sectors per track. Maximum data storage capacity of each diskette, 100K bytes. **HCS-61,** Pkg. of 5, 1 lb. **20.00**

8-Inch Single-Density, Single-Sided Diskettes. For the H-27 and H-47, virtually all other systems which use 8" soft sectored floppy disks. Std. CP/M media. 77 tracks. 250K byte capacity. Supplied in std. IBM 3740 format. **HCS-62,** Package of 5, Shpg. wt. 2 lbs. **25.00**

8-Inch Double-Density, Single-Sided Floppy Diskettes. For use with the Heath H-47 Floppy Disk System. 77 tracks. 500K byte capacity per diskette. **HCS-64,** Pkg. of 10, Shpg. wt. 2 lbs. **60.00**

8-Inch Double-Density, Double-Sided Floppy Diskettes. For use with the Heath H-47 Floppy Disk System. 77 tracks. 1 megabyte capacity per diskette. **HCS-65,** Pkg. of 10, Shpg. wt. 2 lbs. **70.00**

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

OPERATING SYSTEMS

Heath Disk Operating System (HDOS 2.0) for all H-8, H/Z-89 All-In-One Computer Systems

- **Versions available for both 5.25" and 8" floppy disk systems**
- **Updates supplied free of charge for one year after purchase**

The Heath Disk Operating System. (HDOS), Version 2.0, includes:

Extended Benton Harbor BASIC, Version 6.0 – an easy-to-use, enhanced version of Dartmouth BASIC which includes strings and files. It provides fast operation and includes character strings, convenience commands, numeric data with over six digits of accuracy, math functions, Boolean values which permit logical operations, free format programs and conditional statements;

ASM Assembly Language, a 2-pass absolute 8080 assembler with cross-reference feature which assembles source program into listing and object program in executable binary format;

EDIT Text Editor converts your computer and terminal into a powerful typewriter for generating and editing text. It prepares source code for Assembly Language and can help prepare reports, write letters and edit manuscripts;

DBUG Console Debugger for entry and debugging of machine language programs via an external terminal. Features single/multiple stepping through programs, breakpointing, load/dump from tape storage (user program required);

PIP to copy, concatenate or transfer files between devices; **INITialization** to format new or magnetically damaged diskettes; **SYStem GENeration** to write HDOS onto a newly formatted diskette; and **TEST,** a diagnostic utility program which assists in checking out and maintaining your floppy disk system.

HDOS is designed for efficient use of memory and disk space. 32K RAM and 1 disk drive are required, although 48K RAM and 2 drives are highly recommended – and may be required to use some other software products with HDOS.

Includes 713-page manual, diskette. 5.25", 8" versions identical (including code), except for media. Supports H-8, H/Z-89; H-17, H/Z-47 and H-77/Z-87 Floppy Disk Systems; many other software products.

HOS-817-1, on 5.25" diskette, Shpg. wt. 5 lbs. **150.00**

HOS-847-1, on 8" diskette, Shpg. wt. 5 lbs. **150.00**

Take advantage of the powerful, easy-to-use UCSD P-System with Pascal Language

- **Rapidly growing in popularity, system can run on many computers**
- **Modular design of this operating system makes programming easier**

Take advantage of the easy and fun-to-use Pascal Language. Its clear readability, with powerful structure and data types, has meant increasing popularity and rapid software development. Modular design makes each Pascal program more accommodating to changing needs, and more reliable when run.

UCSD Pascal is more versatile. Programs written for one computer can run on another, often without recompilation. And UCSD Pascal can be used on many systems, not just one. Its programs are compiled into universal P-code, which can be run on any microcomputer with a resident interpreter.

Heath's P-System with UCSD Pascal Language includes these modules:

OPERATING SYSTEM, an interactive system with disk file handling capabilities, run-time support routines and block I/O service routines; a fast one-pass **PASCAL COMPILER** which produces universal P-code, runnable on most microcomputers; an efficient and compact **INTERPRETER** which runs universal P-code; **TWO EDITORS,** a powerful screen-oriented editor that runs in both programming and text editing modes, and a character-oriented editor with a wide variety of commands for context editing with hard-copy terminals;

FILER, to manipulate and keep track of disk files; **CONDITIONAL MACRO-ASSEMBLER,** which produces code that can be linked with your Pascal program; **LINKER,** a utility for link-editing Pascal object code and assembly code modules; and **SYSTEM LIBRARY,** with frequently used utilities.

Requires 48K RAM, 2 drives. Includes manual, diskettes. For Heath computers only. Supported by Softech Microsystems; updates will be supplied for a nominal charge.

HOS-817-3, on 5.25" disks for H-8 and H/Z-89 Computers, 8 lbs. **295.00**

HOS-1127-3, on 8" IBM disks for H-11A/H-27 systems, 8 lbs. **295.00**

Program with industry standard CP/M – configured for H-8 and H/Z-89 Computers

- **Hundreds of CP/M applications software programs are now available**
- **Especially engineered and configured for Heath computer systems**

Digital Research's CP/M opens the door to more languages, utilities and applications software than any other microcomputer disk operating system. That's because CP/M is used by over 200 hardware manufacturers, OEMs and distributors – over 100,000 computer users – and many software vendors.

Standard (ORG-0) CP/M (Ver. 2.202) supports the H-8 and H/Z-89 Computers and their mass storage peripherals (allowing concurrent operation and automatic density selection) – as well as all Heath printers and hard copy terminals.

You get full source code for hardware drivers, including disk drivers, so you can customize the system to fit your special requirements. The IOBYTE allows device assignment, permits switching between hard copy and CRT terminals – or between several printers – without rebooting. A configuration utility permits changes to ease operation, such as setting disk step rate or selecting echo/cursor backup operation without reassembling.

Additional features, such as the implementation of BIOS as a disk-resident relocatable file, make this one of the best available implementations of CP/M.

CP/M includes three modules, plus utilities and an operating manual with almost 300 pages of detailed information. BIOS, supplied in source code and object code, contains all hardware-level I/O code, and is unique to Heath. BDOS is the resident nucleus, with all file level and logical I/O code. Its physical I/O is performed via calls to the BIOS. BDOS features fully dynamic allocation and de-allocation of physically non-contiguous files. CCP is the transient monitor, facilitating command-level communications between the operator and CP/M. Space used by CCP is available to user programs during normal operation.

Utilities include a 2-pass absolute 8080 assembler, a text editor, an 8080 debugger with traced execution and disassembly, file dump, system generation/relocation and file size/disk usage displays. You can also set file attribution (read only and/or system), assign physical/logical devices, display system parameters, copy files and convert Intel HEX files into memory images.

Requires 32K RAM, 1 disk drive (2 drives recommended). H-8 systems require HA-8-8 Ext. Configuration; H/Z-89 systems (except WH/Z-89-FA) require H-88-7 ROM Kit. Includes support and updates for one year. For Heath computers only.

HOS-817-2 (Requires Sublicense Grant, p. 88), on 5.25" diskette, 5 lbs. **150.00**

HOS-847-2 (Requires Sublicense Grant, p. 88), on 8" diskette, 5 lbs. ... **150.00**

Useful H-8/H-88 Cassette Operating Software

- **Helps form a solid base for future computer programming**
- **Supplied on audio cassettes, in convenient 1200 baud form**

The Heath Cassette Operating system helps you program your H-8 or H-88 Computer quickly and easily. Convenience features (automatic command completion to simplify typing, dynamic syntax checking to alert you to errors and a special user configuration feature which lets you personalize the system) make it easier to use and more practical than similar systems. The system includes:

Extended Benton Harbor BASIC (Version 6.0), an enhanced Dartmouth BASIC which includes strings and files. You get faster operation, convenience commands, math functions, dynamic storage allocation, expanded error messages and recovery ability. Also has numeric data with over 6 digits of accuracy, Boolean values for logical operations, free format programs, math functions, enhanced expression and conditional statement facilities;

HASL-8 Assembly Language, a two-pass absolute assembler that lets you create source programs using letters, numbers and symbols to generate efficient machine language code;

TED-8 Text Editor for generating and editing text. It prepares the source code for HASL-8 Assembly Language – and can also be used to prepare reports, write letters and edit manuscripts;

BUG-8 Console Debugger for entry/debugging of user machine language programs via external terminal. Features single/multiple stepping, insertion of breakpoints, loading/dumping of user programs to/from tape storage and display/alteration of contents of a memory location or any 8080 register.

Requires 16K RAM. H-8 systems also require H-8-5 Interface (p. 78). Cassette interfacing is standard with the H-88 and H-89 All-In-One Computers; H-88-5 Interface (p. 71) required for HS-89, WH-89 and Z-89 Computers.

H-8-18, for H-8 Computer, Shpg. wt. 11 lbs. **30.00**

H-88-18, for H-88 Computer, Shpg. wt. 5 lbs. **30.00**

PROGRAMMING LANGUAGES

Write your own computer programs with surprising ease. And execute programs just as easily. Each language functions best in its own unique programming environments. We'll even keep your language current by supplying updates free of charge for one full year – when you sign and return the registration card enclosed with each software package.

Microsoft BASIC Language for general use

As low as **$150.00**

- **Extra-value features make programming easier**
- **Has many math, algebraic and trigonometric functions**
- **Available for both HDOS and CP/M Operating Systems**

Heath computer owners can use and enjoy Microsoft BASIC – one of the most versatile general-purpose programming languages available for microcomputer systems. Scores of practical utility and applications programs are written in this BASIC. This version of MBASIC is written especially for the H-8 Computer and the H/Z-89 All-In-One Computer.

Capabilities include direct access to CPU ports and memory locations; an IF-THEN-ELSE control structure which allows more highly-structured programming (including editing during programming and random or sequential filing capabilities); mathematical and logical operators; and a DEF statement, which allows user-defined functions which are not listed as intrinsic functions.

You also get many extended features: Program edit facilities, including insertion, deletion, character change and search capabilities; file management facilities which include random files, sequential files and file manipulation.

Powerful string processing functions are provided, including LEFT, RIGHT, MID, ASC, CHR and concatenation; extended statements, operators, functions and commands which are not available in most other BASICs (ERASE to eliminate arrays from a program, LINE INPUT to add lines to string variables without delimiters, SWAP to exchange the values of two variables, the TRON and TROFF debugging aids to help trace the execution of program instructions, and WIDTH to set the width of the terminal printing line).

Microsoft BASIC also includes automatic line numbering and renumbering features; branching, loops and subroutines; and more aids.

Math functions include algebraic and trigonometric capabilities, as well as double precision floating point number and double precision mathematics.

This software package requires an H-8 (page 72), H-89 (page 70) or Z-89 (page 78) Computer with 40K RAM and HDOS or CP/M (page 83).

Microsoft BASIC Language Interpreter, Version 4.82. Includes manual and 5.25" diskette. Requires the Heath Disk Operating System (HDOS – page 83).
H-8-21 (Requires Sublicense Grant, p. 88), Shpg. wt. 3 lbs. **150.00**

Microsoft BASIC Language Interpreter, Version 5.21. Includes manual and 5.25" diskette. Requires the Heath Standard CP/M Operating System (page 83).
HMS-817-1 (Requires Sublicense Grant, p. 88), Shpg. wt. 5 lbs. **175.00**

Microsoft BASIC Language Interpreter, Version 5.21. Includes manual and 8" diskette. Requires the Heath Standard CP/M Operating System (page 83).
HMS-847-1 (Requires Sublicense Grant, p. 88), Shpg. wt. 5 lbs. **175.00**

BASIC Compiler speeds general programming

$250.00

- **Compiled computer programs run much faster**
- **Includes these useful utility programs – MACRO-80 Assembler, LINK-80 Editor and LIB-80 Library Manager**

Eliminate time-consuming interpretation when you run a computer program, by using Microsoft's BASIC Compiler, Ver. 5.23. First, compile your program with this compiler. It converts each line of the program into machine code – the language your computer understands best. You'll find that a pre-compiled program runs much faster than a similar program run through an interpreter.

Many utility programs are included to make compiling easier: The MACRO-80 Relocating Assembler converts Assembly Language programs into source code for the LINK-80 Editor. The LINK-80 Linkage Editor converts relocatable libraries and modules into runnable load modules. The useful LIB-80 Library Manager allows you to build your own library of relocatable modules.

The Microsoft BASIC Compiler System requires an H-8 (p. 72), H-89 (p. 70) or Z-89 (p. 78) Computer with 40K or more bytes of RAM, two floppy disk drives and the Heath Standard CP/M Operating System (see page 83).

HMS-817-4 (Requires Sublicense Grant, p. 88), on 5.25" disk, 5 lbs. ... **250.00**
HMS-847-4 (Requires Sublicense Grant, p. 88), on 8" disk, 5 lbs. **250.00**

Science, math-oriented Microsoft FORTRAN

As low as **$175.00**

- **Includes powerful Microsoft ANSI-66 FORTRAN IV Compiler**
- **Also features Macro-Assembler, Linkage Editor and Cross-Reference Generator**
- **Linkable library of mathematical, I/O and utility routines**

With more power to help you perform mathematical and scientific programs on your Heath computer, the Microsoft FORTRAN Programming System features:

1. **The unique Microsoft FORTRAN-80 Compiler,** which uses the powerful ANSI-66 FORTRAN IV Computer Language – so you can draw from a large base of utility and applications programs;
2. **The MACRO-80 Relocating Assembler,** for use with 8080 and Z-80 CPUs;
3. **The CREF Cross-Reference Generator,** for sorted cross-reference listings;
4. **The LINK-80 Linkage Editor,** which generates runnable load modules;
5. **The Microsoft FORTRAN Library,** filled with floating point mathematical routines – plus all FORTRAN I/O and utility routines;
6. **Sample FORTRAN-80 and MACRO-80 Assembler source programs.**

The Microsoft FORTRAN-80 Compiler is a true native-code compiler which supports the full ANSI-66 FORTRAN IV Language, except for complex numbers. This allows you to take advantage of the large base of utility and applications programs already written in the FORTRAN Language.

A microprocessor-based FORTRAN development package, which generates relocatable object modules, is included with the compiler. You can link these modules, using the loader in the LINK-80 Linkage Editor, and generate an absolute file.

This compiler also includes many extensions to increase system utility and efficiency – and it performs some object code optimization. An option to list generated object code in 8080 Assembly Language is available.

The Microsoft MACRO-80 Relocating Assembler is an assembler designed for use with both the 8080 and Z-80 microprocessors. It has complete facilities for macro development. The MACRO-80 Assembler generates relocatable object modules for use with the Microsoft LINK-80 Linkage Editor. It accepts Intel 8080 and Zilog Z-80 mnemonics, features macros and conditional assembly, and will generate a sorted cross-reference listing (when used with the CREF Cross-Reference Generator, included with this software package).

The LINK-80 Linkage Editor, included with this programming system, converts relocatable libraries or modules (such as those produced by Microsoft FORTRAN, BASIC, COBOL and Pascal language – as well as by the Microsoft MACRO-80 Relocating Assembler and Digital Research's PL/1 Compiler) into runnable load modules for direct execution or disk storage.

Capabilities of the Microsoft LINK-80 Linkage Editor include options to specify prommable code, and the ability to separately specify origin addresses for code and data segments. An absolute symbol table listing of the generated load module may be obtained.

Microsoft's FORTRAN Library includes all FORTRAN mathematical, I/O and utility functions. Using the FORTRAN Library, you can perform a multitude of functions – absolute values, truncation, remainders, maximum values, conversion, transfer of signs, positive differences, exponentials, logarithms, sines, cosines, hyperbolic tangents, arctangents and square roots.

The library contains arithmetic routines, conversion subroutines and subprogram linkages. Special functions (INP, CALL OUT, PEEK, CALL POKE and other subprogram linkages) allow sophisticated programming.

The versatile Microsoft LIB-80 Library Manager, included with CP/M versions of the Microsoft FORTRAN Programming System, allows the building of your own libraries of relocatable modules.

This programming system requires an H-8 (page 72), H-89 (page 70) or Z-89 (page 78) Computer with 40K or more bytes of Random Access Memory (RAM). Microsoft FORTRAN also requires two or more floppy disk drives (for the H-8 Computer, use the H-17 on page 73 or the H-47 on page 75; for the H-89 All-In-One Computer, use the H-77 on page 71 or the H-47 on page 75), and the Heath Disk Operating System (HDOS – see page 83) or the Heath Standard CP/M Operating System (see page 83), as indicated below.

Microsoft FORTRAN Programming System, Ver. 3.35, supplied on 5.25-inch disk. Requires the Heath Disk Operating System (HDOS – see page 83).
H-8-20 (Requires Sublicense Grant on page 88), Shpg. wt. 4 lbs. **175.00**

Microsoft FORTRAN Programming System, Ver. 3.40, supplied on 5.25-inch disk. Requires the Heath Standard CP/M Operating System (see page 83).
HMS-817-2 (Requires Sublicense Grant on page 88), Shpg. wt. 5 lbs. ... **195.00**

Microsoft FORTRAN Programming System, Ver. 3.40, supplied on 8-inch disk. Requires the Heath Standard CP/M Operating System (see page 83).
HMS-847-2 (Requires Sublicense Grant on page 88), Shpg. wt. 5 lbs. .. **195.00**

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

Run powerful, business-oriented COBOL

$395.00

- **The business world's most popular computer language**
- **Includes most Level-I features and many Level-II extras**
- **Available in 5.25" and 8" versions, for H-8 or H/Z-89**

You can run COBOL – the ideal programming language for business data processing – on your H-8 or H/Z-89 computer system. Microsoft's COBOL-80 Programming System, Version 4.01, is ideally suited for business data processing tasks – which include processing disk files and data bases.

Microsoft COBOL-80 far exceeds the minimum specifications of ANSI-74 COBOL, and has so many Level-II features and optional modules that you can easily use most COBOL programs written for large computer systems (Minimum required by ANSI Standard for COBOL Language is Nucleus, Table Handling and Sequential I/O modules only, at Level-I implementation):

MODULE	MCOBOL 4.01 IMPLEMENTATION LEVEL
Nucleus	Level-I plus these Level-II features:
CONDITIONS – Level 88 conditions with value series or range; use of logical AND/OR/NOT in conditional use of algebraic relational symbols (>, =); implied subject, or both subject and relation, in relational conditions; sign test; nested IF statements; parentheses in conditions.	
VERBS – Extensions to ACCEPT and DISPLAY for formatted screen handling; ACCEPTance of data from DATE/DAY/TIME; STRING and UNSTRING statements; COMPUTE with multiple receiving fields; PERFORM VARYING.	
IDENTIFIERS – Mnemonic names for ACCEPT or DISPLAY devices; procedure names consisting of digits only; qualification of names (in procedure division statements only).	
Table Handling	Level-I, some Level-II features
Sequential I/O	Level-I, most Level-II features
Relative I/O	Level-I, some Level-II features
Interprogram Communication	Level-I
Library	Level-I
Communication	None
Debugging	Special extensions to ANSI-74 Standard providing convenient trace-style debugging
Report Writer	None
Segmentation	Level-I
Sort/Merge	None now; full Level-II implementation will be available in late 1981, as an extra-cost option

The Microsoft COBOL Programming System includes the MACRO-80 Assembler – an 8080/Z-80 assembler which incorporates almost all "big computer" assembler features – without sacrificing speed or memory space. Featuring complete facilities for macro development, it generates relocatable object modules for use with the Microsoft LINK-80 Linkage Editor. MACRO-80 accepts Intel 8080 and Zilog Z-80 mnemonics, features macros and conditional assembly; **the LINK-80 Linkage Editor,** which converts relocatable libraries or modules into runnable load modules for direct execution or disk storage; the LIB-80 Library Manager, which allows you to build your own libraries of relocatable modules; **the special Microsoft COBOL Library; and run-time software** designed to make this system even more versatile.

This programming package also has important extensions which make the COBOL Language easier to use in a microcomputer environment – such as extended debugging facilities which feature special extensions to the ANSI-74 Standard for more convenient debugging, and advanced screen handling facilities which permit easy forms handling on CRT terminals with cursor control (like the Heath H-19A Professional Video Terminal, sold on page 74).

Microsoft COBOL can typically handle a 600-1,000 line program, in a H-8, H-89 or Z-89 Computer with 48K bytes of Random Access Memory (RAM).

Requires an H-8 (page 72), H-89 (page 70) or Z-89 (page 78) with at least 48K bytes of Random Access Memory (RAM), two floppy disk drives (the Heath H-47 Floppy Disk System, shown on page 75, is recommended for applications involving large disk files) and the Heath CP/M Operating System (sold on page 83). All versions of Microsoft COBOL are identical, except for media. Available in 5.25" or 8" versions (see below). For Heath computers only.

Microsoft COBOL Programming System, supplied on 5.25-inch floppy diskette.
HMS-817-3 (Requires Sublicense Grant, p. 88), Shpg. wt. 5 lbs. **395.00**

Microsoft COBOL Programming System, supplied on 8-inch floppy diskette.
HMS-847-3 (Requires Sublicense Grant, p. 88), Shpg. wt. 5 lbs. **395.00**

Write programs faster with Microsoft MACRO-80

$69.95

- **For sophisticated Assembly Language programmers**
- **Includes many extra-value features previously found only on large computer mainframes**

Here's a complete Assembly Language programming package – including the MACRO-80 Assembler, LINK-80 Linkage Editor and CREF Cross-Reference Generator. CP/M versions also include the LIB-80 Library Manager.

Microsoft's MACRO-80 Relocating Macro-Assembler is designed for 8080 and Z-80 microcomputer systems – including the H-8 and H/Z-89. It assembles code, generating relocatable object modules for the LINK-80 Editor.

You get almost all "big computer" assembler features without sacrificing speed or memory space. Accepting both Intel 8080 and Zilog Z-80 mnemonics, MACRO-80 supports a complete, Intel-standard macro facility – including IRP, IRPC, REPEAT, local variables and EXITM. Nesting of macros is limited only by memory. Code is assembled in relocatable modules that are manipulated with the flexible LINK-80 Editor. Conditional assembly is enhanced by pseudo-operators which include testing of assembly pass, symbol definition and parameters to macros. Nest conditionals up to 255 levels.

MACRO-80 can generate a sorted cross-reference listing when used with CREF.

LINK-80 converts relocatable libraries or modules – produced by MACRO-80 or other languages and compilers – into runnable load modules for direct execution or disk storage. Versatile loader capabilities are executed by easy command lines and switches. Programs load with one command, modules load in user-specified locations, and external references between modules are resolved automatically. LINK-80 also performs library searches for system subroutines and generates a memory load map, showing main program and subroutine locations.

CREF supplies a convenient alphabetic list of all program variable names, along with the line numbers where they are referenced and defined.

LIB-80 (in CP/M versions) lets you build libraries of relocatable modules.

Supplied on 5.25-inch floppy disk, the Microsoft MACRO-80 Package takes up approximately 14K RAM. It has an assembly rate of over 1000 lines per minute.

HMS-817-51, for HDOS systems, Shpg. wt. 2 lbs. **69.95**
HMS-817-52, for CP/M systems, Shpg. wt. 2 lbs. **69.95**

Gain more programming flexibility with C BASIC

$115.00

- **Widely used in CP/M applications systems**
- **Includes pseudo-code compiler, run-time interpreter**
- **Available in 5.25" or 8" floppy disk formats**

C BASIC is widely used by many software houses and distributors of CP/M software as their language of choice. This non-interactive BASIC includes a pseudo-code compiler and run-time interpreter.

C BASIC has a variety of extended features, including the IF . . . THEN . . . ELSE and WHILE constructs and access to disk files. C BASIC also allows the use of 31-character variable names, and the free use of comments, spaces and tabs. These aid in creating programs that are self-documenting and maintainable.

This version of C BASIC also has integer variables, multiple line functions, chaining with common variables, additional pre-defined functions and more. A cross-reference lister is also provided with Version 2.0 of C BASIC.

The C BASIC system consists of three programs. The first program converts the user's source language program into a series of coded operations that are placed on the intermediate disk file. The second program, the run-time monitor, directly executes the operations included in the intermediate file. The third and final program, XREF.COM, will produce a cross-reference listing of all variables used in a C BASIC source program.

Expressions available include string constants, integers and real numbers, identifiers, variables and assignment statements. Machine language linkage statements and functions – include PEEK, POKE, CALL and SAVEMEM – increase C BASIC's versatility. Several control and I/O statements allow for more sophisticated programming. Output can be directed to disk or printer.

The facilities available to the user of the C BASIC language for accessing disk files are extremely versatile – providing for many different file organizations and accessing methods.

Requires an H-8 (p. 72), H-89 (p. 70) or Z-89 (p. 78) with 24K RAM (48K RAM recommended), one disk drive and Heath CP/M (p. 83).

C BASIC Programming Language, supplied on 5.25-inch floppy disk.
HCM-817-1, Shpg. wt. 1 lb. **115.00**

C BASIC Programming Language, supplied on 8-inch floppy disk.
HCM-847-1, Shpg. wt. 1 lb. **115.00**

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

UTILITY PROGRAMS

Powerful program development capabilities are yours with WordMaster

WordMaster Video Text Editor, Ver. 1.07, provides everything needed for program development — and more. It's only 20% as large as WordStar and is much faster – without printer interface or formatting functions. Which means that you can enhance your file management capabilities at a lower price.

You get a video edit mode, automatic floppy disk I/O (forward and backward, for files too large to edit in RAM, a scratchpad memory for moving text and storing command strings, the ability to write/read text to/from files other than the file being edited – facilitating use of source libraries (as well as splitting/merging files), nestable loops in command string, pattern matching abilities, macro facilities (loops, execute scratchpad, branch out of loop on search failure), and extremely fast response to most commands.

At any given moment, WordMaster can operate in one of three modes:

In Video Mode, you can see the text as you make alterations – with the actual cursor position shown on the screen. You can move the cursor in all four directions, page through text forward and backward, insert and delete lines or part of lines, and input or delete characters and words.

Video mode speeds editing and reduces mistakes when using a CRT terminal (like the H-19 on page 74 – or the H/Z-89's built-in terminal) or video display. You can move to any point in the file without leaving Video Mode. The cursor can be positioned by line, word and character.

Command Mode permits search, global replacements, text moves and other functions – as well as making available most of the familiar command and editing functions of CP/M's Text Editor.

You can do everything in Command Mode that you can in Video Mode, but any changes in the text are only displayed at your command. In addition, other facilities are available – including searching, substituting, looping, matching and moving around blocks of text. You can also combine and/or separate text from/to different files on your diskettes.

The Insert Mode is used to enter all original text, and for large insertions of text into a WordMaster file. In this mode, a backspace also erases the last character typed. Video Mode is usually preferable for this purpose; Insert Mode is provided for use with hard copy terminals, and for compatibility with CP/M's ED Text Editor.

Includes manual, diskette. Requires a H-8/H-19 or H/Z-89 system with 32K RAM, one floppy disk drive and the Heath Standard CP/M (sold on page 83).

HMP-817-5, on 5.25" diskette, Shpg. wt. 4 lbs. **99.00**

HMP-847-5, on 8" diskette, Shpg. wt. 4 lbs. **99.00**

Make large sorting tasks faster, easier with the SuperSort Utility

SuperSort (Version 1.5) makes sorting so simple, it's simply in a class by itself. It offers superior sorting, merging and selecting power with unmatched speed and convenience. It can sort and merge up to thirty-two input files into a single file, at the rate of 560 records per minute. And new records can be integrated into a master file in one simple and efficient operation!

This utility can sort, merge and select records from data files compatible with BASIC, Assembly, FORTRAN and COBOL applications programs – and with text editors – on H-8 and H/Z-89 Computers using Heath CP/M.

SuperSort accepts just about any kind of record you can imagine. The data can be justified, or include floating decimals, exponential notation, or upper and lower case letters; it can even be in several standard formats (binary, EBCDIC, BCD, ASCII or others). You won't waste time and money translating records for the computer. And you can have fixed or variable length records and fields. In fact, you can have a different number of fields in each record.

When you ask SuperSort to select or exclude records you can give it as many selection criteria as you like, such as between, not between, equal to, less than or greater than, and others. For example – if your file contains names, addresses, sex, annual earnings, age group, marital status and Zip Code you could select all records for single females over 35, earning between $25,000 and $35,000, and living in the western U.S. In the same single pass, the records could be sorted alphabetically within each Zip Code! In one simple operation, you can apply up to 32 sorting keys.

Several optional outputs are available from SuperSort: With the Keys-Only Output Option, the output file receives the specified keys as extracted from the input records – rather than the sorted input records. This permits building an index to a file, extracting fields in order to print a summary, or selecting and rearranging (positional) fields to form a new data base.

When you use the Record Number Output Option of SuperSort, the output file receives the record numbers of the input records, in either ASCII or binary format. The extracted keys may accompany the record numbers, or not. This permits building multiple indices into a file, ordered on various keys, without duplicating the data, so that another program may retrieve the records by key value or in key order.

When using the Pointer Output Option, the output file receives the sector number and byte offset at which each record begins – with or without the keys. This provides another method of building indices, whereby another program may retrieve the records from the original file.

Compatible with BASIC, SuperSort can handle delimited records of varying lengths, comma-delimited fields (with/without spaces surrounding data – quotes can be used to imbed commas or leading/trailing blanks). Free format numbers can be used as keys or in record selection tests. SuperSort can be called as a subroutine from a **Microsoft FORTRAN** program – handling formatted files and data in A, D, E, F, G, I and L formats. And it can also be called as a subroutine from a **Microsoft COBOL** program.

SuperSort is delivered to you — ready to run. Sort and merge instructions are easy to enter. Errors are a snap to correct.

Includes binder, diskette. Requires H-8 or H/Z-89 with 48K RAM, one floppy disk drive and Heath Standard CP/M (sold on page 83).

HMP-817-1, on 5.25" diskette, Shpg. wt. 4 lbs. **195.00**

HMP-847-1, on 8" diskette, Shpg. wt. 4 lbs. **195.00**

Source listings for selected Heath products give better understanding of operation

NEW! Complete Listing for Heath H-8-18 and H-88-18 Cassette Operating Software. Includes the following source listings: H-8-52 Debugger, H-8-53 Editor, H-8-54 Assembly Language and H-8-60 Extended Benton Harbor BASIC Language below. These listings would cost $100.00 if purchased separately.

HKS-50, Shpg. wt. 8 lbs. **65.00**

Source Listing for Heath Disk Operating System (HDOS), Version 1.6. Includes H-8-51 (Source Listing for ROM of H-17 Floppy Disk System) below, as well as all other utilities and device drivers. Purchasers of this source listing are eligible to receive updates as new releases become available (at a cost of $50.00 per update).

HOS-1-SL, Shpg. wt. 11 lbs. **195.00**

Source Listing for the Read-Only Memory (ROM) of the Heath H-17 5.25-Inch Floppy Disk System.

H-8-51, Shpg. wt. 1 lb. **25.00**

Source Listing for the ROM of the H-19 Video Terminal.

H-19-1, Shpg. wt. 1 lb. **25.00**

Source Listing for Cassette version of Extended Benton Harbor BASIC Language, in H-8-18 and H-88-18 Cassette Operating Software.

H-8-60, Shpg. wt. 2 lbs. **25.00**

Source Listing for Cassette Assembler in H-8-18 and H-88-18 Cassette Operating Software.

H-8-54, Shpg. wt. 2 lbs. **25.00**

Source Listing for the Cassette Text Editor in H-8-18 and H-88-18 Cassette Operating Software.

H-8-53, Shpg. wt. 2 lbs. **25.00**

Source Listing for the Cassette Assembler of Console Debugger in H-8-18 and H-88-18 Cassette Operating Software.

H-8-52, Shpg. wt. 1 lb. **25.00**

NOTE: All of these hardware and software source listings are copyrighted. Reproduction of these source listings is expressly prohibited. Updates of source listings for the Heath Disk Operating System (HDOS) are available for a nominal charge, as described above.

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

NEW WordStar Word Processing Software is powerful, CP/M-compatible

WordStar is a CP/M-compatible, screen-oriented word processor with integrated printing capabilities. The entry, alteration and formatting of text are performed directly on your video screen, resulting in the display of a true print image; additional enhancements are performed during printout.

WordStar's edit function includes on-screen text formatting (with automatic margination, justification, and centering on command), powerful editing commands and flexible find/replace commands.

The unique "Help" System can be displayed during editing. User-selectable comprehensive prompting, at 4 levels, eliminates the need to refer to a manual.

Helpful hyphenation facilities speed 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, "soft" hyphens will be automatically deleted.

Find and Replace is another WordStar feature you're sure to use. WordStar searches for specified character strings – replacing them with updated information quickly and automatically, throughout the document.

WordStar supports automatic page numbering, print enhancements (underlining, double striking, boldfacing, strikeouts, subscripts and superscripts) and several other operator options, on printers with appropriate capabilities.

With the decimal tab feature of WordStar, columns of numerical data can be typed as easily as operating an adding machine. This feature automatically lines up the numbers.

Use WordStar as a CP/M text editor: Edit program source files, input files for other text formatters, enter data and accomplish other tasks – because the disk document files are standard CP/M text files, with minor additions. Other programs can even be executed during use – with automatic return to WordStar.

WordStar also features print spooling. For greater efficiency, one disk file can be printed – while you work on a second file (requires 64K RAM).

WordStar includes both a "plain vanilla" version for customer installation with any computer and printer – as well as a pre-installed version for immediate, hassle-free use on the Heath H-8, Heath H-89 or Zenith Z-89 Computers – and all Heath printers. For daisy wheel and other incremental printers, variable spacing (down to 1/48" line spacing and 1/120" character pitch) is supported by WordStar.

The WordStar Word Processing System includes a detailed set-up and operating manual, along with a master diskette. It requires an H-8/H-19 (see page 72), H-89 (see page 70) or Z-89 (see page 78) Computer System with 48K bytes of RAM, two or more floppy disk drives, Heath CP/M (see page 83) and a printer. Any Heath-offered printer works with the WordStar system; we recommend the WH-44K (Diablo 1640 KSR) or WH-54 (Diablo 630 RO) Letter-Quality Printers (see page 79). Mfr.'s suggested list price, $495.00.

HMP-817-2, on 5.25" disk, Shpg. wt. 2 lbs. **395.00**
HMP-847-2, on 8" disk, Shpg. wt. 2 lbs. **395.00**

NEW Mail/Merge Mailing List Software adds new capabilities to WordStar

When you choose MailMerge, you add powerful file merging capabilities to WordStar. It can combine a names/addresses file with a letter text file, inserting data where variables are specified – even in mid-paragraph. Personalized form letters can be created with a specified salutation and/or closing. The same data file can be used for both form letters and mailing labels.

Features include merging of data from one file into another file (inserting data into text at user-designated places), multiple printing of the same file, automatic chained printing of several files on a common disk, printing of a file "nesting" in another file (8 levels of nesting can be accommodated), and the ability to print raw data in an easy-to-read form.

As data is merged with text, paragraphs are reformed – for form letters that look as though each received special attention.

Requires H-8/H-19, H-89 or Z-89 with 48K RAM, 2 disk drives, CP/M (p. 83), WordStar (above) and a printer. Any Heath-offered printer will work; we recommend the WH-44K or WH-54 (p. 79).

HMP-817-3, on 5.25" disk, Shpg. wt. 4 lbs. **135.00**
HMP-847-3, on 8" disk, Shpg. wt. 4 lbs. **135.00**

Save over 50% on Zenith Electronic Typing – our easy-to-learn word processing system

Now priced at a big $200 savings, Zenith Electronic Typing makes word processing practical for both single-secretary offices and departmentalized secretarial staffs. Anyone who can turn on a TV and type can increase their output by up to 50 percent, usually even on the first day. All you need are standard secretarial skills. A special self-instruction course shows you how – in as little as two hours.

Using Zenith Electronic Typing – which supports up to three 5.25" or 8" floppy disk drives – near-perfect documents can be produced in a fraction of the time required by conventional typing – with no white-outs, strike-overs or erasures.

Features include Upper/Lower Case Video Display; Creation, Addition or Revision on up to three 5.25" or 8" disk drives; Scrolling (moving through a document) and two Search Modes to quickly find area which need editing; Append Mode to create a new document by joining separate paragraphs; Automatic Replacement of any word, name or phrase throughout a document to speed production of customized form letters; Automatic Realignment to save hours of retyping; Automatic Centering and Justification – on command – to eliminate counting or guessing; and Block Move of words, sentences or paragraphs within a document.

Once the document is letter-perfect, the touch of another key automatically prints a clean copy of the document – on a separate printer (not included) – at an error-free rate of up to 450 words per minute.

Control the cost of paperwork, by using Zenith Electronic Typing. This complete word processing software system includes a detailed set-up and operating manual, easy-to-use training disk and master disk.

Zenith Electronic Typing requires an H-8/H-19, H-89 or Z-89 with 48K RAM – one floppy disk drives – and a printer. Any Heath-offered printer will work with this system; we recommend the WH-54 (Diablo 630 RO), or WH-44K (Diablo 1640 KSR), Letter-Quality Daisy Wheel Printers (see page 79).

H-8-40, on 5.25" disk, Shpg. wt. 6 lbs. ..... **Was $395.00, NOW ONLY 195.00**
HPG-847-1, on 8" disk, Shpg. wt. 4 lbs. **195.00**

NEW Magic Wand for Heath CP/M combines ease of use, versatility and power

Magic Wand Word Processing Software puts excellent versatility, ease of use, power and CP/M compatibility at your fingertips. More powerful than Zenith Electronic Typing (but not as powerful as WordStar), users will find Magic Wand easier to learn and use with its special set-up and operating manual.

Magic Wand consists of two modes: EDIT and PRINT.

EDIT features forward and backward scrolling, insertion by character (for editing) or full insertion (for creating files), deletion of characters/lines/blocks of copy, search/repeat search/search and replace/multiple search and replace commands, the ability to move blocks of copy from one spot to another within the same file (leaving or deleting the block in its original location), the ability to examine the disk directory without leaving EDIT, and the ability to display or include all or part of any pure ASCII file on disk into the text you are editing (without exiting EDIT or affecting any of the text).

You can even print one file while editing another – with Magic Wand's printing in background (print spooling) feature.

Features found in Magic Wand's PRINT mode include the ability to enter commands directly from the keyboard – or to imbed commands in a text file, regular or paragraph indentation, justification and centering (on command), underscoring, kerning/strikeover, boldfacing, superscripting and subscripting (to make writing math, scientific and other papers with superscripts or subscripts easier), ghost hyphenation (which enables Magic Wand to automatically hyphenate words at the ends of lines – when necessary – in the right places) and the ability to print multiple copies of a single file.

Magic Wand also supports proportional printing, horizontal spacing down to 1/120 inch and vertical spacing to 1/48 inch (on capable printers).

Includes an extensive user's manual with set-up and operating instructions as well as a master disk. It requires an H-8/H-19 or H/Z-89 computer system with 48K RAM, Heath CP/M and a printer. Any Heath-offered printer will work; we recommend the WH-54 or WH-44K Letter-Quality Printers (see page 79).

HRS-817-9, on 5.25" disk, Shpg. wt. 6 lbs. **295.00**

UTILITY PROGRAMS

These programs – the MAC Macro Assembler, DESPOOL Spooler and SID/ZSID Debugging Utility – add new capabilities to the Heath CP/M Operating System (page 83). Each program includes full documentation and free updates for one year, when the registration card enclosed with each software package is signed and returned.

Advanced, easy-to-use MAC Macro-Assembler

$85.00

- **Uses full Intel-compatible macro definitions**
- **Full documentation, diskette with macro libraries**
- **Fully compatible with CP/M's ASM Assembly Language**

Digital Research's Macro-Assembler makes writing Assembly programs easier – and can generate a SID-compatible symbol table file for debugging use. The 168-page manual is practically a macro-assembler textbook, while the diskette has macro libraries for performing many useful tasks. Requires H-8 (p. 72), H-89 (p. 70) or Z-89 (p. 78) with 1 disk drive and CP/M (p. 83).

HDR-817-1 (Requires Sublicense Grant below), on 5.25″ disk, 2 lbs. **85.00**
HDR-847-1 (Requires Sublicense Grant below), on 8″ disk, 2 lbs. **85.00**

DESPOOL for multi-tasking printer operation

$50.00

- **Perform two tasks at the same time on your computer**
- **Print one file while working on another file**
- **Quick set-up, easy to use on H-8, H-89, Z-89**

DESPOOL gives your system maximum efficiency by allowing it to print one file through your printer – while you continue to use the assembler, editor, BASIC or an applications program. This spooler requires an H-8 (p. 72), H-89 (p. 70) or Z-89 (p. 78) computer with 1 disk drive and Heath CP/M (p. 83).

HDR-817-3 (Requires Sublicense Grant below), on 5.25″ disk, 2 lbs. **50.00**
HDR-847-3 (Requires Sublicense Grant below), on 8″ disk, 2 lbs. **50.00**

SID/ZSID upgrades the CP/M DDT Debugger

$125.00

- **Get both 8080-compatible SID and Z-80-compatible ZSID – save substantially over separate prices**
- **Advanced version of CP/M's DDT Debugging Utility**

Allows use of names used at the source level, instead of addresses, for greater versatility and ease in program modification. Can also draw histograms of programs and subroutines. Fully functional in DDT-type mode without symbol file. Requires H-8 (p. 72), H-89 (p. 70) or Z-89 (p. 78) with 1 disk drive, Heath CP/M (p. 83), MAC (above) and LINK-80 Linkage Editor or Digital Research's Linkage Editor (to create table file used for symbolic references).

HDR-817-2 (Requires Sublicense Grant below), on 5.25″ disk, 2 lbs. ... **125.00**
HDR-847-2 (Requires Sublicense Grant below), on 8″ disk, 2 lbs. **125.00**

Books to help you get more from your computer

Introduction to Microprocessors, Volume 1. This book introduces you to basic principles of microprocessors. **EDP-224** **12.95**

Getting Acquainted With Microcomputers. 228-page guide explains what microprocessors can do. **EDP-275** **8.95**

8080 Machine Language Programming for Beginners. EDP-272 ..... **7.95**

PDP-11 Programming Fundamentals. Program a PDP-11 computer in Assembly Language and get the most out of it. **EDP-239** **10.00**

101 Basic Computer Games. 250-page book describes family-oriented games. Contains listing, sample run, description of each game. **EDP-237** **7.50**

The Software Gourmet Guide and Cookbook. 218-page publication for 8080A computers with general-purpose routines, time delays, random number generators, 6 appendices. **EDP-228** **12.95**

Basic Software Library, Volume II. Basic computer programs in the fields of engineering and statistics. **EDP-241** **24.95**

Basic Software Library, Volume III. Advanced business programs in this volume of the Basic Software Library help cut clerical costs. **EDP-242** **39.95**

Basic Software Library, Volume IV. This volume contains general-purpose programs for many applications. **EDP-243** **9.95**

(Book ordering information on page 52.)

CUSTOMER SOFTWARE SUBLICENSE GRANT FOR DIGITAL RESEARCH, MICROPRO AND MICROSOFT PRODUCTS

(Check all boxes which apply, sign and return to HEATH COMPANY. Another Sublicense Grant form should be used with future orders for additional SOFTWARE products.)

☐ Digital Research CP/M ☐ Digital Research DESPOOL ☐ Digital Research MAC
☐ Digital Research SID/ZSID ☐ MicroPro WordStar ☐ MicroPro MailMerge
☐ MicroPro SuperSort ☐ Microsoft BASIC Compiler ☐ Microsoft BASIC Interpreter
☐ Microsoft COBOL ☐ Microsoft FORTRAN

HEATH COMPANY (HEATH) of Benton Harbor, MI, for itself and on behalf of the licensor(s) listed above (referred to individually or together as LICENSOR) grants to CUSTOMER a non-transferrable and non-exclusive Sublicense to use the software programs checked by CUSTOMER above (referred to individually or together as SOFTWARE), under the terms and conditions stated in this Sublicense Grant.

CUSTOMER hereby agrees to either accept, sign and return the license agreements enclosed with each product, or, if those terms are not accepted, to return the product for a full refund with the sealed media packette unopened. SOFTWARE is furnished to CUSTOMER for use only on a single CPU, and may be modified or copied (with the inclusion of LICENSOR's copyright notice) only for use on such CPU. CUSTOMER shall not provide or otherwise make SOFTWARE, or any portion thereof, available in any form to any third party without the prior approval of LICENSOR. LICENSOR retains title in the ownership of SOFTWARE at all times. LICENSOR and HEATH JOINTLY AND SEVERALLY DISCLAIM ALL IMPLIED WARRANTIES WITH REGARD TO THE SOFTWARE LICENSED HEREUNDER, INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS; and any stated express warranties are in lieu of all obligations or liability on the part of either LICENSOR or HEATH for damages, including but not limited to: special, indirect or consequential damages arising out of or in connection with the use or performance of SOFTWARE licensed hereunder. This Sublicense Grant, the licenses granted hereunder and the SOFTWARE may not be assigned by the CUSTOMER without prior written consent from LICENSOR. No right to reprint or copy SOFTWARE, in whole or in part, is granted hereby, except as otherwise provided herein.

FOR SID/ZSID, MAC AND DESPOOL PURCHASERS ONLY: The serial number of your Digital Research CP/M System must be supplied in advance. HEATH or VEC will supply the information if SID, MAC and/or DESPOOL are purchased on the same order with a DIGITAL RESEARCH Operating System.

CP/M SERIAL NUMBER _____

HEATH COMPANY
By _____ Jay H. Jarrett

ACCEPTED AND AGREED:
CUSTOMER'S SIGNATURE _____ **DATE** _____

CUSTOMER SOFTWARE SUBLICENSE GRANT FOR DIGITAL EQUIPMENT CORPORATION (DEC) SOFTWARE PURCHASERS

(Check all boxes which apply; sign and return to HEATH COMPANY. Another Sublicense Grant form should be returned with future orders for additional SOFTWARE products.)

☐ HT-11 Operating System ☐ HT-11-1 FORTRAN

Write in the blank below your CPU make, model and serial number.
(If CPU is purchased with this order, HEATH will fill in the blank.)

CPU _____
(Fill in blank)

HEATH of Benton Harbor, MI, for itself and on behalf of the LICENSOR listed above grants to CUSTOMER a non-transferrable and non-exclusive Sublicense to use the software programs checked by CUSTOMER above (referred to individually or together as SOFTWARE), under the terms and conditions stated in this Sublicense Grant.

SOFTWARE is furnished to CUSTOMER for use only on the single CPU listed above, and may be modified or copied (with the inclusion of LICENSOR's copyright notice) only for use on such CPU. CUSTOMER shall not provide or otherwise make SOFTWARE, or any portion thereof, available in any form to any third party without the prior approval of LICENSOR. LICENSOR retains title to the ownership of SOFTWARE at all times. LICENSOR and HEATH JOINTLY AND SEVERALLY DISCLAIM ALL IMPLIED WARRANTIES WITH REGARD TO THE SOFTWARE LICENSED HEREUNDER, INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS; and any stated express warranties are in lieu of all obligations or liability on the part of either LICENSOR or HEATH for damages, including but not limited to: special, indirect or consequential damages arising out of or in connection with the use or performance of SOFTWARE licensed hereunder. This Sublicense Grant, the licenses granted hereunder and the SOFTWARE may not be assigned by the CUSTOMER without prior written consent from LICENSOR. No right to reprint or copy SOFTWARE, in whole or in part, is granted hereby, except as otherwise provided herein.

HEATH COMPANY
By _____ Jay H. Jarrett

ACCEPTED AND AGREED:
CUSTOMER'S SIGNATURE _____ **DATE** _____

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

SOFTSTUFF™

Affordable Software Tools

SOFTSTUFF offers a full line of quality software tools, priced to fit your budget. All SOFTSTUFF programs have been tested on the Heath and Zenith hardware indicated. Documentation for each SOFTSTUFF product has also been improved. SOFTSTUFF products are supplied to you on 5.25-inch floppy diskettes (unless otherwise indicated), and are shipped to you postpaid. Specify your operating system (HDOS or Heath CP/M) when ordering.

NEW — New SOFTSTUFF products add versatility and fun to H-8 and H/Z-89 Computers

Mailpro 127.1 Mailing List Package. Random access files, user-selected fields, sorting and retrieval on any field (such as name or Zip Code), user-specified printing formats, selective printing (print all names and addresses or only selected ones), form letters and special error trapping routines. Requires H-8 or H-89 with 48K RAM, one disk drive and HDOS.

SF-9009, for HDOS systems, Postpaid **39.95**

Commsoft's Roots-89 Genealogy Software helps you track your roots. It's designed to store, retrieve and display thousands of facts about your family. Roots-89 will list family members, display and print family group sheets and pedigree charts, compute relationships and show important anniversaries for each day of the year. Includes 100-page illustrated course in genealogy and operation of the package. Requires H-8 or H/Z-89 with 48K RAM, one disk drive and HDOS.

SF-9008, for HDOS systems, Postpaid **124.95**

With the SOFTSTUFF HDOS to CP/M File Converter, you can transfer HDOS files to CP/M disks – and vice versa. Requires H-8 or H/Z-89 with 32K RAM and one disk drive. Also requires both HDOS and CP/M.

SF-8512, for HDOS and CP/M systems, Postpaid **29.95**

Sharpen your chess-playing skills by taking on Mychess. Provides worthy, challenging competition. Winner at 1980 West Coast Computer Faire. Consistently beats Sargon. The Mychess Chess Game requires a Heath H-8 Computer with HA-8-6 Z-80 CPU Card – or a Heath H-89/Zenith Z-89 Computer – with 32K bytes of RAM, one disk drive and Heath CP/M.

SF-9010, for CP/M systems, Postpaid **39.95**

Play SOFTSTUFF's Air Traffic Controller Game – and run your own airport. With this realistic game, you control all air traffic around your own airport – with planes taking off, in the air and landing. Requires an H-8 or H/Z-89 with 32K RAM, one disk drive and HDOS or CP/M (as indicated below).

SF-9014, for HDOS systems, Postpaid **29.95**

SF-9114, for CP/M systems, Postpaid **29.95**

Keep your books up-to-date with SOFTSTUFF's General Ledger II Accounting Software Package. This powerful software package includes versatile programs which facilitate the entry, maintenance, reporting and analysis of accounting data. Includes following features:

Custom Chart of Accounts, for determining account names and numbers. Use any numbering system, with or without decimal notation; Comprehensive Printouts upon request, in 96-column format; Double Entry and Automatic Entry Checking, which automatically checks the equality of debits and credits with each entry; Fast and Simple Data Entry, with one quick keystroke;

Account Verification, which prevents entries to non-existent accounts – and rejects account numbers already in use; New Account Facility, to open new accounts at any time with no disruption to the transaction being entered; Balance Reporting, to call up the balance of any account during data entry. All balances are instantaneously updated with the entry of new transactions; Audit Trail, to provide source number and free-form description.

This is one of the easiest-to-use, most flexible systems of its type you'll find anywhere. Includes listings and sample printouts. Requires H-8 or H/Z-89 with 48K RAM, one floppy disk drive HDOS or CP/M (see below) and Microsoft BASIC Interpreter (page 84).

SF-9004, for HDOS systems, Postpaid **124.95**

SF-9104, for CP/M systems, Postpaid **124.95**

General Ledger Software Manual. Purchase price of manual refunded when complete General Ledger Package is purchased.

595-2500, Postpaid **15.00**

Keep track with our Small Business Inventory Package. Designed to facilitate a complete analysis of a small business' inventory. Accepts alpha-numeric part numbers up to 12 characters long. Descriptions of individual parts can be up to 18 characters long.

Provide up to 12 items of information on each part – including reorder level, usage history by month and year-to-date, and much more. Printouts include all information, part number/description/price, reorder list. Requires H-8/H-19 or H/Z-89 with 48K RAM, HDOS, or CP/M (see below) and Microsoft BASIC Interpreter (page 84).

SF-9005, for HDOS systems, Postpaid **89.95**

SF-9105, for CP/M systems, Postpaid **89.95**

Use our Full Screen Editor to program more efficiently. Uses the video display screen of the H-19 Video Terminal or the H/Z-89 Computer as a window into a file. Changes can be typed anywhere on the screen. Function keys perform character and line insertion/deletion functions.

Also features a string search function and the ability to move and copy single or multiple lines – as well as scrolling of text in the window. Requires H-8/H-19 or H/Z-89 system with 32K RAM, one floppy disk drive and HDOS or CP/M (as indicated below).

SF-9000, for HDOS systems, Postpaid **49.95**

SF-9100, for CP/M systems, Postpaid **49.95**

Use the SOFTSTUFF Text Formatter with your Text Editor. This Text Formatter performs fill and justification (straight right margin) functions on text prepared by your text editor. Features include page numbering, headers and footers, indents, hanging indents, centering and underlining. Inclusion feature allows the automatic insertion of up to 26 user-defined strings, as well as the merging of documents. Requires H-8/H-19 or H/Z-89 system with 32K RAM, one disk drive and HDOS or CP/M (as indicated below).

SF-9001, for HDOS systems, Postpaid **54.95**

SF-9101, for CP/M systems, Postpaid **54.95**

The Computerized Phone System (CPS) gives you and your Heath computer access to more information. This data communications interfacing utility program permits the transfer of data files between your computer and CompuServe's MicroNET Information Service.

MicroNET's large time-sharing computer provides features not available in a stand-alone microcomputer system. You can write and edit programs and data files, and store them on the system. You are able to run your own programs – and you can also access data files and programs in the large MicroNET library.

CPS features user-defined keys for auto log-in, mail check and more. Full error checking and an on-screen elapsed time clock are provided.

Easy to use on time-sharing systems, CPS gives your Heath computer system access to other computer systems. Requires H-8/H-19 or H/Z-89 system with 32K RAM and HDOS or CP/M (as listed below).

SF-9003, for HDOS systems, Postpaid **39.95**

SF-9103, for CP/M systems, Postpaid **39.95**

RTTY Communications Processor adds fun to your Ham radio hobby. Split screen means you can copy incoming messages – while editing outgoing messages. Complete system status (time, CW ID, ASCII or Baudot operation) is graphically displayed on screen. Disk-based autostart.

SF-9006, for HDOS systems, Postpaid **99.95**

Now from Heathkit/Zenith — an effective Pascal Programming Self-Instruction Course

$99.95

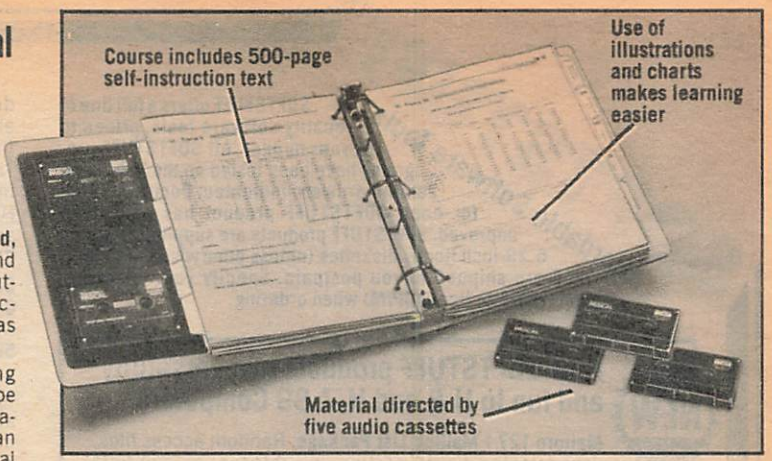
- **Pascal...the ideal computer language for beginning programmers, as well as experienced computer users**
- **Our audio-tutorial self-instruction format simplifies Pascal programming**

Now you can learn Pascal, a modular, sophisticated, powerful programming language. If you've been around programming languages or even if you're new to computers, you've probably heard about Pascal. It's the structured and adaptable programming language that has quickly swept into popularity.

Pascal incorporates these structured programming features: Top-Down Detail, where overall structure can be established before adding details; and Modular Organization, which makes fixing programming errors easier than with other programming languages. Segments of a Pascal program can be isolated and tested independently from the rest of the program.

Proven audio-tutorial methods make learning easier: Whether you're new to computer programming, or already accomplished in one or more languages, our approach makes Pascal easier to learn. Five audio cassettes guide you through the 500-page self-instruction text, letting you see AND hear each concept of the Heathkit/Zenith Pascal Language Programming Course as it is presented, so that learning is reinforced and made more effective. Our Pascal Course is the result of the combined talents of highly qualified programming instructors, with assistance from specialists in instructional design.

An introduction shows how to identify and write simple Pascal programs. In **Module 2,** students learn to identify and write self-contained procedures. **Module 3, Making Decisions** teaches students how and when to incorporate IF...THEN...ELSE and CASE statements in Pascal programs, as well as how to use Boolean variables. **Module 4** covers REPEAT...UNTIL, WHILE...DO and FOR loops. **Module 5** discusses Pascal data types and teaches how to declare your own data types. **Module 6, Arrays and Character Strings,** shows how to use



arrays in solving problems. **More about Procedures, Module 7,** covers the writing of complete Pascal procedures to perform the desired tasks. **Students learn about Records and Sets in Module 8. Module 9, Pointers,** covers the difference between pointers, linked lists, stacks, queues, binary trees and other statements. **The last module** covers sequential files and standard Pascal files, so that you can store files or data on disks.

To earn 4.0 Continuing Education Units (CEUs) and a Certificate of Achievement, pass the optional final examination with a 70% or better score after completing this Heathkit/Zenith Course.

EC-1111, Shpg. wt. 7 lbs. **99.95**

MONEY-BACK GUARANTEE: If you're not satisfied with any Heathkit/Zenith Educational Systems Course, return course materials and proof of purchase for a refund of the purchase price.

Learn COBOL, the business computer language

$149.95

- **Field-proven, audio-tutorial techniques make learning the COBOL Language easier than before**
- **Learn to write COBOL Language programs**

Learn the language of business computers — COBOL – with this popular self-instruction course. The Heathkit/Zenith COBOL Course is the low-priced way to learn this important language. It covers the basics of encoding, input characteristics, program hierarchy, identification, environment, data and procedure divisions. Both the ANS 74 and ANS 68 versions of COBOL are covered in the course.

The Heathkit/Zenith COBOL Programming Course uses the effective audio-tutorial learning method. You get a clearly written self instruction textbook full of diagrams, tables, illustrative programs and unit tests.

A set of nine audio cassettes complements the student text, allowing you both to see and hear each concept as it is presented.

The student textbook covers these aspects of COBOL: a sample COBOL program; 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 more.

A set of six practice COBOL programs is located at the end of the workbook. You can work on them at specified points in the course – or you may prefer to wait until the end of the text. A master COBOL coding sheet is also included. Use it as an aid in writing your COBOL programs.

If you pass the optional final examination with a score of 70 percent or better, you'll earn 3.0 CEUs and a Certificate of Achievement.

Learn the programming language that thousands of businesses use world-wide. Order the Heathkit/Zenith COBOL Programming Course today. To get the most out of COBOL Programming, we recommend that you use a H-8 (see page 72), H-89 (see page 70) or Z-89 (see page 78) computer system with floppy disk capability, the Heath CP/M Operating System (offered on page 83) and the Microsoft CP/M COBOL Programming System (sold on page 85).

EC-1105, Shpg. wt. 7 lbs. **149.95**

Learn BASIC the fast, easy Heathkit/Zenith way

$44.95

- **BASIC is one of the easiest computer languages to use**
- **BASIC is easy to learn with this self-instructional course**
- **Use with any BASIC-programmable computer**
- **Programming experiments reinforce each concept**

Here's the fast and easy way to learn BASIC Language. This course covers many BASIC Language versions, formats, commands, statements and procedures, plus special problem-solving tips you can use while writing your own programs. This course is divided into 14 easy-to-follow programmed-instruction segments which will teach you the standardized words of BASIC, and the operation that each standardized word causes the computer to perform. You'll get a grasp on the tools of BASIC Language programming – including numbers, statements, functions, loops, lists, arrays and strings.

You'll participate in the decision-making factors which are part of writing a meaningful BASIC program – as well as the creative aspect of program writing. Learn to define and plan a program, format and write it, and how to adapt programs to suit your specific needs. Interactive experiments give you hands-on experience in writing and running BASIC Language programs.

The course material includes a programmed-instruction textbook explaining BASIC, a special workbook of programming instructions, and experiments you can perform on your own computer. Also included are 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.

To earn 3.0 Continuing Education Units (CEUs) and a Certificate of Achievement, score 70 percent or better on the optional final examination after completing this Heathkit/Zenith Educational Systems Course.

See the classroom version of this Course on page 42.

EC-1100, Shpg. wt. 7 lbs. **44.95**

College-Level Examination. See page 31 for more information.

ECC-1100, Shpg. wt. 1 lb. **25.00**

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

NEW Microsoft BASIC Programming introduces you to this enhanced language

$99.95

- **Learn to write and modify powerful computer programs, using this popular version of BASIC Language**
- **Audio-tutorial course uses programming experiments to give you actual hands-on experience with MBASIC**

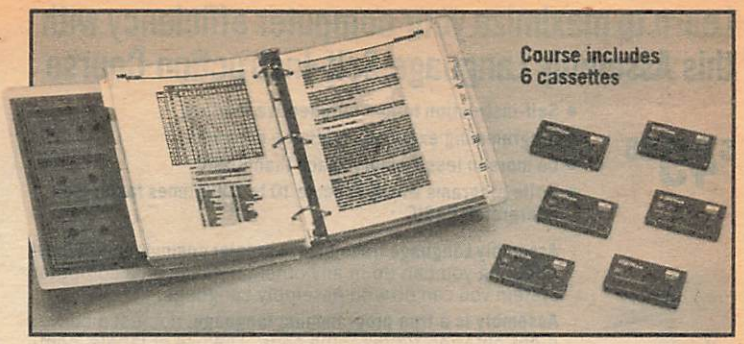
Microsoft BASIC is one of the most versatile languages available for microcomputers – with scores of practical programs available. If you use MBASIC on your H-8, H/Z-89, All-In-One, TRS-80 or Apple computer, now you can get the most from this language with our new 800-page course.

Audio-tutorial learning means you'll read, hear AND perform specific directed functions to achieve maximum learning.

Unit 1 is an Introduction to Computers and Programming – covering computers, programs, data, the computer system and programming languages. **Immediate Mode, the second unit,** discusses arithmetic in BASIC, numeric variable, intrinsic functions and strings. Sequences, branching and loops are the topics covered in **Unit 3, Program Structures. Unit 4 has More about Decisions and Loops** – including relational operators, counter driven loops and nested loops.

One-dimensional arrays, N-dimensional arrays and strings records are taught in **Unit 5, Data Structures.** User-defined functions and subroutines are the topics covered in **Unit 6, Subprograms. Unit 7, Complex Structures,** discusses logical operators, multiple branching and structured programming.

The last five units are dedicated to disk operations and extensions available on disk versions of the language. In **Major Language Extensions, Unit 8,** you'll learn about 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.**

Self-test reviews let you check progress. Three cassettes reinforce the text. Experiments give you actual experience in writing programs.

The course emphasizes programming in Microsoft BASIC. It contains the features of our Microsoft BASIC software (p. 84), except for the TRON and TROFF debugging feature. To get full benefit, you must have a computer.

Upon completion, you will be able to write Microsoft BASIC programs that instruct a computer to perform specific tasks – such as sorting, plotting and organizing programs and data, and more.

To earn 5.0 CEUs, pass the optional final exam with a score of 70% or better.
EC-1110, Shpg. wt. 7 lbs. **99.95**

NEW FORTRAN Programming teaches you how to use this powerful language

$99.95

- **Interested in FORTRAN programming? Heathkit/Zenith offers an easy, effective way to learn the language**
- **Audio-tutorial presentation and interactive programming experiments reinforce learning three ways**

Are you ready for a language that takes on scientific tasks with ease? Our new course's effective audio-tutorial method teaches FORTRAN programming fundamentals. The 500-page text and 6 cassettes concentrate on programming – not on computers – for more complete learning.

Enclosed in an attractive three-ring binder, the 11-unit text includes a special Introduction to Computers:

Getting Started, Unit 1, shows you how to analyze a FORTRAN program, introduces you to statement types/elements and the character set. **Unit 2 covers Arithmetic Operations.** You learn about integer operations, real number and alphanumeric input/output in **Unit 3, Elementary I/O.**

Unit 4, Library Functions, covers elementary control statements, flowcharting and conditional transfer of control. **Other Control Statements** are taught in **Unit 5. Unit 6** introduces you to **Arrays. Programming Practices, Unit 7,** covers different types of programming, coding considerations and debugging.

Other Variables, Unit 8, includes explicit type specification; logical and numeric data; and the implied DO statement. In **Unit 9,** you'll learn about **Advanced I/O. Unit 10** covers **Subprograms,** including statement functions and common storage. **Special I/O, Unit 11,** discusses block data subprogramming; object time format specification; tape and disk command; and unformatted input/output.

Interactive hands-on experiments give you actual experience in writing FORTRAN programs – the necessary coding forms are included with the course. The text also offers extensive practice in writing FORTRAN programs and using the character set. Self-test reviews let you check your progress. And a comprehensive final examination is included.

When you complete this course, you will be able to write FORTRAN programs that instruct a computer to perform specific tasks – such as keeping track of student records, sorting, solving geometry problems and many more.

Earn 5.0 CEUs – pass the optional final exam with a 70% or better score. It's not necessary to have a math background – but a H-8 or All-In-One Computer with two floppy disk drives, HDOS or CP/M (p. 83) and Microsoft FORTRAN Language (p. 84) is highly recommended to get the most out of this course.
EC-1101, Shpg. wt. 7 lbs. **99.95**

NEW Computer Dictionary is a complete reference source of computer terms

Need a dictionary to understand computer jargon? The Heathkit/Zenith EB-1020 Computer Dictionary: A Sourcebook of Computer Terms fills your need for knowledge. It's a handy reference for hobbyists, technicians, engineers or professionals who deal with computer-related terms.

It contains thousands of computer-related words and phrases, along with complete definitions.

Browse through this dictionary and you can learn significant detail about the products, procedures problems and proliferating applications of the microcomputer revolution. Definitions are made clear and explicit throughout the text.

EB-1020, Shpg. wt. 2 lbs. **14.95**

Learn to maximize your computer 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**
- **Write programs which execute 10 to 1000 times faster than interpreted BASIC**

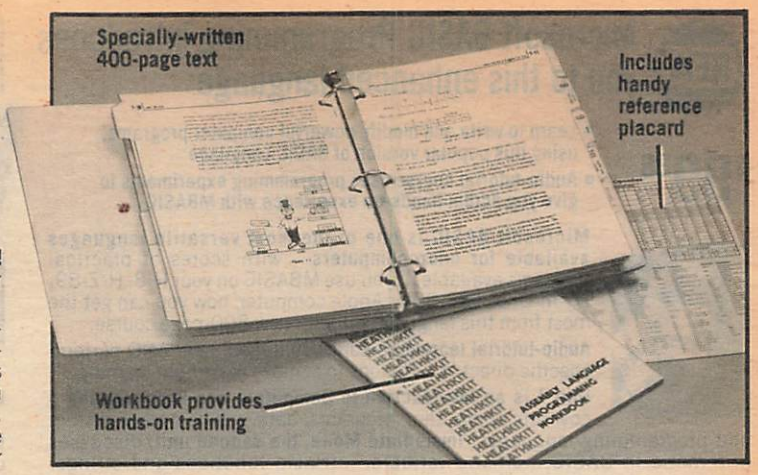
Assembly Language translates to greater computer efficiency! Anything you can do in any other language on a computer system you can do with Assembly Language.

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. Symbolic notation and easy to implement documentation methods make program listings easy to understand.

This unique Self-Instruction Course teaches you to program your computer in Assembly Language. You learn the details at your own pace, using a specially designed 400-page text. An exercise workbook provides hands-on experience with programming exercises – you perform each exercise on your own computer system. The programmed-instruction text and workbook are so thorough that you learn to program your computer by studying them. You'll study flowcharting, device polling, code conversions, masking, subroutines, 8080 instruction set, I/O routines, multi-precision arithmetic and much more. To perform the optional experiments in the Heathkit/Zenith EC-1108 Assembly Language Self-Instruction Course, you must have access to a computer (such as the H-8, H-88 or H/Z-89 Computers).

The Assembly Language Self-Instruction Course, from Heathkit/Zenith Educational Systems, is specifically designed for 8080/8085-based microcomputer systems which use standard Intel 8080 mnemonics. The Assembly Language taught in this course can be used with the Heath H-8, Heath H-88, Heath H-89 and Zenith Z-89 Computers. (The H-8, H-89 and Z-89 Computers use the 8080 subset of the Z-80 microprocessor).



In addition to the programmed instruction text and workbook, the Assembly Language Course includes a special Reference Placard which lists all 244 assembly instructions as well as an ASCII code chart. When you take the optional final examination for the course and achieve a score of 70 percent or better, you earn a Certificate of Achievement and 6.0 Continuing Education Credits (CEUs).

Now is the time to learn the computer language that puts you in command of your computer's full potential. Start your Heathkit/Zenith Assembly Language Self-Instruction Course...today!

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. The Heathkit/Zenith Computer Concepts Course is designed to give 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 units – which present computer concepts in business terms. **Unit 1 – The Computer and How It Works** – covers different types of memory, input/output devices, capabilities of different types of storage media and applications software. It explains what a computer can do in a small business environment.

The Data Processing Department and Personnel, Unit 2, teaches you how to organize a data processing (DP) department. It explains the roles of the DP manager, data processing engineer, systems analyst, operator and other personnel. **The third unit of this Course, Alternatives in Computer Services,** compares the advantages of owning your own computer system – versus a time-sharing arrangement or using a computer service bureau.

How to Select a Computer, the fourth and final unit, shows you how to define and fulfill your data processing requirements.

A passing score of 70 percent or better on the optional final examination will earn you 1 Continuing Education Unit (CEU) and a Certificate of Achievement from Heathkit/Zenith Educational Systems.

EC-1103, Shpg. wt. 5 lbs. **49.95**

Personal Computing explains computers

$39.95

- **Learn how a computer can help you**
- **Explains computers 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 Personal Computing 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, simple terms.

No extensive math, electronics or computer background needed: The effective audio-tutorial teaching format – featuring a self-instruction textbook and two audio cassettes, lets you see and hear each concept in our Personal Computing Course.

Five easy-to-understand units explain different parts of the computer system:

In the first unit, Computers and Data: you'll find out how to apply the capabilities of a computer to your specific problems. You will see how computers "understand" electronic data – and how to convert written words into the electronic data computers understand.

Unit 2, Hardware, shows you how to compare computers – by understanding how each computer performs. **Systems and Interfacing, the third unit,** teaches how to evaluate small computer systems by understanding how different components perform. You'll find out how the computer communicates with other components – and how to distinguish between analog and digital data. **Software, Unit 4,** shows you how to choose software programs that help solve your problems.

In the last unit of this course, BASIC Language Programming, you'll actually learn to write short computer programs – using BASIC.

By passing the optional final examination with a score of 70 percent or better, you'll earn 1 Continuing Education Unit (CEU) and a Certificate of Achievement from Heathkit/Zenith Educational Systems.

EC-1000, Shpg. wt. 5 lbs. **39.95**

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

Now you can save a big $210 when your family builds the Heath/Thomas Organ Kit

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

$789.95

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

Now save $210 on the Heathkit/Thomas TO-2130 Organ everyone in your family can play. Quick-learn features such as Color-Glo keys, color-coordinated music, rhythm, one-finger chords and an easy-to-follow instruction manual make the TO-2130 easy...and a real delight to play – even for youngsters or grownups who have never made music before!

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

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

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

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

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

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

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

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

Kit TO-2130,
205 lbs. Mtr. Frt. .... **Was $999.95, NOW 789.95**

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

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

FAST, EASY 1-EVENING KIT

$22.95

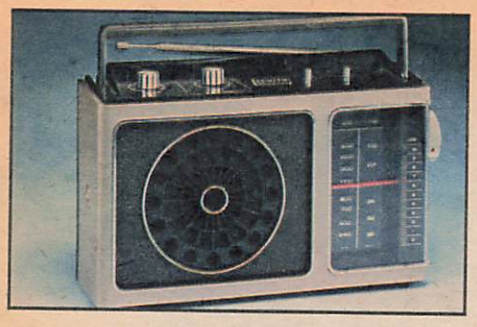
- **Adjustable tempo between 40 and 210 beats per minute for more efficient practice**
- **Features a handsome cherry finish birch cabinet with non-marring felt feet**

When a student (and parents) invest a great deal of time, energy and money in music lessons, it makes sense to practice efficiently. The Heathkit Electronic Metronome is designed for exactly that purpose. This handsome addition to the music room maintains a steady beat so the student can practice at the correct tempo. The Electronic Metronome's tempos can be adjusted between 40 and 210 beats per minute with the convenient front panel control. And volume can be adjusted, too, with a rear panel control. The Electronic Metronome even includes a handy chart that goes on the bottom of the cabinet, so the musician can relate the number of beats per minute to tempos in different time signatures. It's the practical way to practice music.

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

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

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



Zenith AC/DC Portable gives years of great AM/FM radio

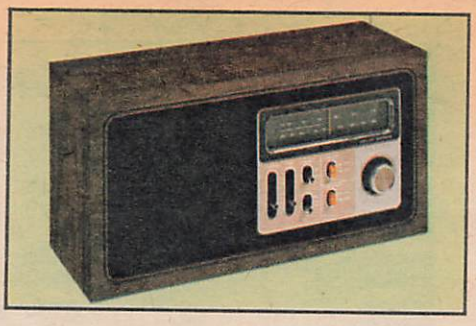
$37.95

- AGC smooths signal variations
- Features sturdy 3½" speaker, tone control for rich, full sound

Here's a portable radio with a speaker big enough to give you enjoyable music and understandable news – the Zenith R-70. Tuned stages and ceramic filters provide excellent AM and FM reception, while Automatic Gain Control prevents sudden variations in volume.

The Zenith R-70 features solid-state circuit design for low energy usage. Comes in Shadow Taupe/Black cabinet with bright aluminum and chrome trim. Uses 120 VAC, 60 Hz power or three 1.5 VDC "C" cell batteries (not included). Measures 5.75" H x 9" W x 2.75" D (14.6 x 22.9 x 7.0 cm).

GRZ-70, Assembled, Shpg. wt. 4 lbs. **37.95**



Get AM/FM/Storm Alert stations with this Zenith Table Radio

$74.95

- Weather alert bulletins will override FM/AM broadcasts
- Solid-state design, 5" speaker

Solid-state Weather Command Radio with Storm Alert automatically turns radio on when a severe weather warning is broadcast by National Weather Service. Will override FM/AM radio reception or activate radio even if it is off. Telescoping weather band antenna, built-in AM and FM antennas, plus terminals for external FM and weather antennas. Quality 5" speaker. Features AFC on FM, AGC on AM/FM and RF state on FM and weather band. Precision vernier tuning, slide-type on/off, tone and loudness controls. Simulated Pecan cabinet measures 7¼" H x 14⅛" W x 5½" D. 120 VAC.

GRZ-425, Assembled, Shpg. wt. 14 lbs. **74.95**

Digital Alarm Clock/Radio gives rich sound, reliability to you

$154.95

- Even in power failures, you stay on time
- Special 7-minute alarm delay

Wake up on time...every time when you have the rugged, reliable Digital Alarm Clock/Radio. Indicates hours, minutes and AM or PM. Snooze button for seven-minute catnaps before alarm sounds again. Wake up to a gentle, pulsating electronic "beep" or to your favorite AM or FM station. Pull in many stations, too, with 5 μV/ FM and 300 μV/M AM sensitivities. Built-in 3" x 5" oval speaker for great sound. Two 9 V batteries (not included) keep clock running automatically during power failures for up to 8 hours. Wire for 120 or 240 VAC. Case measures 4½" H x 13⅜" W x 8⅛" D.

Kit GR-1075, Shpg. wt. 10 lbs. **154.95**

Ultrasonic Cleaner makes parts, jewelry, even dentures sparkle

FAST, EASY 2-EVENING KIT

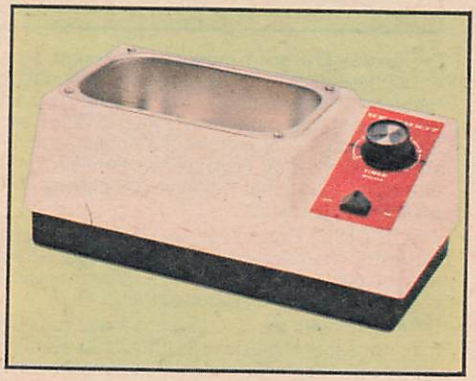
$99.95

- Cleans delicate items safely; uses almost any non-volatile cleaning solution
- Handles those almost-impossible special cleaning chores
- Cleans delicate items faster than is possible with other cleaning methods
- Cleaning action occurs right at the dirty or contaminated areas for better cleaning

Brighter jewelry, clean parts that last longer and work better, even cleaner dentures are yours when you build the Heathkit GD-1151 Ultrasonic Cleaner. The GD-1151's scientific cleaning method is probably the most effective way to clean dirt, stains and other undissolved solids from such items as jewelry and watch parts.

This easy-to-operate Cleaner lets you deep clean any delicate item (except pearls and turquoise) that could be damaged or otherwise harmed by harsh cleaning agents. Simply fill the stainless steel tank with any detergent or cleaning solution safe for the item to be cleaned. Place the object or objects in the anti-corrosive stainless steel tank, set the timer, and the Heathkit Ultrasonic Cleaner does the rest, cleaning the object or objects with gentle, yet effective ultrasonic sound waves.

The GD-1151 features all-solid-state circuitry to produce, amplify and feed a 41 kHz signal to a lead-titanate-zirconate transducer. The transducer, by expanding and contracting, converts the electrical signal into a mechanical motion which is coupled to the tank.



The motion of the tank creates microscopic bubbles within the contaminants. These bubbles grow and collapse rapidly, forcing the cleaning solution through the contaminants – so they can be dissolved and rinsed away.

The built-in timer can be set for any time up to five minutes, and then automatically shuts off the Cleaner. A durable plastic cabinet houses the Heathkit Ultrasonic Cleaner.

Easy kit assembly means you can put the Ultrasonic Cleaner together in as little as two evenings. The comprehensive, illustrated Heathkit assembly manual shows you how.

The Heathkit Ultrasonic Cleaner operates on 120 VAC, 60 Hz power. Overall dimensions: 4.6" H x 5.8" W x 11" L. Tank dimensions: 6" L x 4" W x 2.4" D, including lid.

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

Wireless Intercom gives you hands-free communications

For home or office – anywhere you plug units into the same power transformer. Just build, plug into AC outlet and communicate. Pleasant call tone signals other units. Transmit indicator lights in talk mode. Dictate switch allows hands-free operation, monitoring baby's room. Automatic squelch. 3" speaker. 120 VAC. 3" H x 8.6" W x 5.7" D. At least 2 stations (each sold separately) required to operate.

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

Light Show enlivens music

Attaches easily to speaker leads of sound source. See your stereo pulsate 140 four-color lights which appear to spin and flash with the music. 120/240 VAC.

KIT TD-1006, Wt. 34 lbs. **109.95**

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

NEW

Zenith Trans-Oceanic Radio covers world, local communications

$379.95

- Receive 12 bands — AM, FM, CB, SW, LW, Air, PSB
- Use as a radio direction finder out at sea
- Designed with state-of-the-art electronic components
- Runs on battery power, 120 or 240 VAC house current

The Zenith R7000 Trans-Oceanic 12-Band Radio is a superior multiple-band portable receiver with many features formerly found only on commercial and military radios. It offers a wide variety of radio listening adventure on its 12 bands. Besides the standard AM and FM broadcast bands, you also get coverage of Citizen's Band (CB) frequencies, shortwave bands (both normal and single sideband transmissions) which are used by both commercial stations and amateur radio operators around the world, longwave AM, VHF aircraft and public service bands.

Use the Trans-Oceanic as a radio direction finder, to supplement primary navigation equipment. This is particularly useful to yachting enthusiasts when out of sight of land. Home in on a station to guide your craft to shore — or determine your position by finding two different signals and intersecting their vectors on a map.

Advanced engineering and communications technology give the Trans-Oceanic superior reception, sensitivity, selectivity and operating convenience. Sophisticated tuning circuitry offers easier, more precise tuning of SSB and other closely-spaced signals. Dual-gate MOS FET RF Amplifier circuitry handles signal overloads more effectively, eliminating distortion from nearby stations. Up-conversion mixing techniques offer superior image rejection. Double balanced IC mixers improve spurious signal rejection, keeping undesired stations locked out. Uses built-in or external antennas.

Operates on world-wide house current: Requires eight 1.5 VDC "D" cell batteries (not included) or 120/240 VAC, 50/60 Hz house current. Meets UL and CSA standards for fire and electrical shock. The Zenith Trans-Oceanic Radio is your best choice in a quality all-purpose receiver.

SWZ-7000, Assembled, Shpg. wt. 13 lbs. **379.95**

SWZ-7000 SPECIFICATIONS: Frequency Ranges: LW Band, 170-450 kHz; AM Broadcast Band, 540-1600 kHz; SW 1 Band, 1.8-4.0 mHz; SW 2 Band, 4.0-7.4 mHz; SW 3 Band, 7.4-10.4 mHz; SW 4 Band, 11.0-15.5 mHz; SW 5 Band, 15.5-22.0 mHz; SW 6 Band, 22.0-30.0 mHz; SW 7 Band, 26.8-27.5 mHz (electronically spread to allow increased tuning range for the 40 CB channels); FM Broadcast Band, 88-108 mHz; VHF/Aircraft Band, 108-138 mHz; VHF/High Band, 144-172 mHz. **RF Amplifier Circuitry:** Dual-gate MOS FET. **BFO and SSB Product Detector:** Crystal-controlled. **Spurious Signal Rejection:** Provided by double balanced integrated circuit (IC) mixers. **Power Requirements:** Eight 1.5 VDC "D" cell batteries (not included) or 120/240 VAC, 50/60 Hz. **Overall Dimensions:** 9.38" H x 14.06" W x 6.56" D (23.82 x 35.71 x 16.66 cm), with handle folded down. **Net Weight:** 13.75 lbs. (without batteries).

Save a big $110 on this action-packed Pinball Game and enjoy more stay-at-home family fun

$389.95

- Eighteen scoring areas for high-point action
- Keeps score for 1-4 players
- Build yourself and save — takes only two evenings

Now save a big $110.00. The Schussring high-action board keeps the ball lively and zippy between the thumper bumper, kickers and spin gates. Two independent flippers keep the regulation pinballs moving.

Play your friends: The GD-1210 Aspen Pinball Game has a microprocessor-based electronic memory that keeps score for up to four players during each five-ball game. It shows the player shooting and the number of the ball in play for greater fun and excitement.

High scoring action: Eighteen scoring areas give you the opportunity to score over a million points. The 19.50" x 33" (49.53 x 83.82 cm) lighted playing surface features a 1000-point thumper bumper, two 50-point jet kickers, three rollover switches, three 50-point spin gates, three 100-point target gates and six 50-point rubber band bumpers — plus bonus scoring areas.

This is no toy: The GD-1210 Aspen Pinball Game is solidly built, with seven musical melodies. The game is enclosed in a sky blue pre-painted wood cabinet. And it's easy to build — the playing field and all circuit boards are factory assembled and tested. Operates on 120 VAC, 60 Hz power. Overall Dimensions, 59.50" H x 25" W x 49.50" D (151.13 x 63.50 x 125.73 cm).

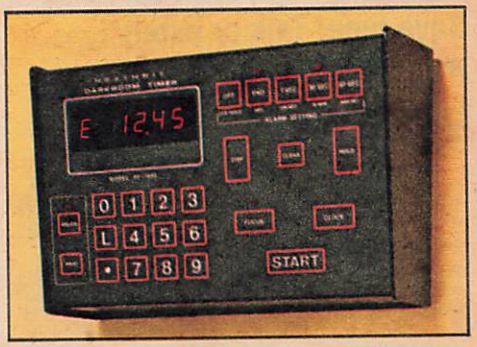
Kit GD-1210, Shpg. wt. 141 lbs., Motor Freight ... **Was $499.95, NOW 389.95**

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

The Programmable Heathkit Darkroom Timer gives you consistent developing quality for great photos

$129.95

- Process with microprocessor-timed accuracy
- Program up to 9 steps, auto-step sequencing

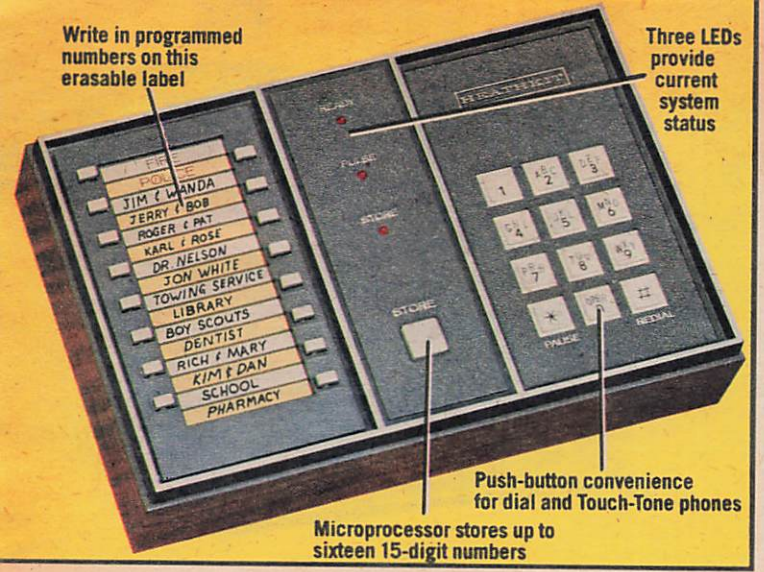


Features 4-digit LED clock to time developing and enlarging steps. Memory holds up to 9 processing steps, one enlarging step. Auto-step sequencing automatically loads the timer, so you're ready for the next step. Alarm settings for developing steps are marked at 1, 30 or 60 second intervals (any combination), or once at the end. Ten-second end-of-cycle alarm tells you when to begin the pour from the tank. Optional Auxiliary Outlet turns on an external device (such as a color drum) during countdowns in Process Mode. Enlarger and safelight outlets are toggled so one goes on when the other turns off. Optional foot switches make operation even easier.

Darkroom chemicals won't hurt the backlighted Litetouch™ front keyboard panel. Metal Case. 120/240 VAC. Dimensions, 3.13" H x 9.25" W x 5.88" D.

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**

PT-1500 SPECIFICATIONS: Switched Outlets: Enlarger, 1000 W; Safelight, 190 W (Enlarger, Safelight outlets not for inductive loads); Optional Aux. Outlet, 100 W. **Timing Accuracy:** Determined by accuracy of AC line frequency.



Dial frequently-used telephone numbers with Heathkit one-button convenience

$79.95

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

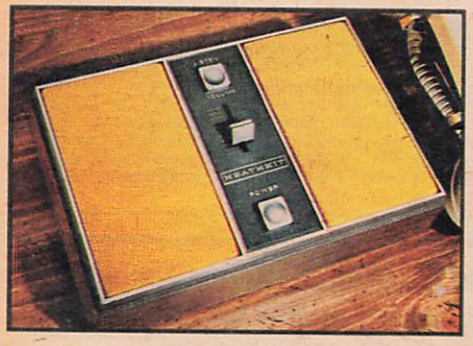
The Heathkit One-Button Telephone Dialer ends the inconvenience of looking up every number. Program emergency numbers – and the numbers of frequently-called neighbors, businesses, friends and relatives. It can store up to sixteen full 15-digit telephone numbers (enough for all access or area codes).

Easy programming lets you change numbers quickly. A memory-saver circuit maintains stored numbers during power failures (9 VDC battery not included).

The GT-1217 converts any telephone to pushbutton convenience. Compatible with both standard and Touch-Tone services, it complies with all FCC interconnection regulations. However, it cannot be used on party lines or pay telephones.

An ideal first-time kitbuilding experience, our Dialer is housed in a 2" H x 8.75" W x 5.75" D high-impact plastic case. It features an attractive two-color, heavy-duty label that allows you to write in the numbers you have programmed. Want to change numbers? The label is easily erasable. 120 VAC.

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



Save time! Talk or listen with both hands free

$49.95

- **Talk without lifting receiver**
- **Talk from up to 10 feet away**
- **Easy assembly, installation**

Our Phone Amp lets you work with both hands while talking on the phone. Press the power button to answer the phone; press it again to hang up.

Voice-activated switch changes instantly from talk to listen. Talk from up to 10' away. Comes with ¼" phone plug, 1.75" square 4-pin phone plug and 6' of 4-conductor cable for easy installation. Uses one 9 VDC battery (not included) or AC power with battery eliminators below. Requires regular telephone to initiate calls. 2.50" H x 9.50" W x 5.75 D.

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

PS-2350, 120 VAC, Eliminator, 1 lb. **7.95**

PS-2450, 240 VAC Batt. Eliminator, 1 lb. .. **14.95**

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

Call for your phone messages from anywhere in the world!

$299.95

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

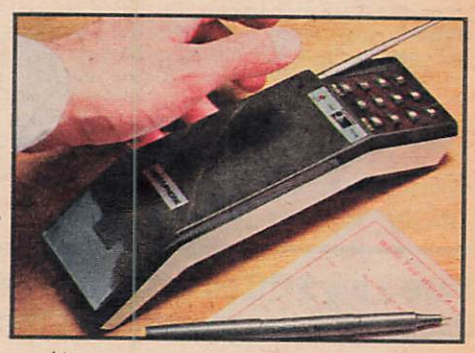
The Record-A-Call Remote 80A Telephone Answering System won't let you miss important messages.

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

Voice-actuated; so callers won't be cut off in mid-sentence. Or choose fixed 30-second message time.

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

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



NEW

Cordless extension phone goes with you

$199.95

- **Cordless unit works up to 600' away from telephone**
- **Includes battery recharger**

Make or receive telephone calls up to 600 feet away from your phone – with no wiring to get in the way! The Muraphone MP-600/601 Cordless Extension Phone's duplex circuitry lets you talk and listen at the same time, with conventional phone quality. Handset is small enough to carry in your pocket. 12-button dial pad includes button which remembers last number dialed. AC adapter (included) keeps handset's batteries fully charged. Base unit draws power from phone line. Base, 7" H x 8" W x 2" D with 23.50" telescoping antenna; Handset, 2" H x 2.38" W x 8.63" L. Includes 4.5' phone cord. FCC approved. Minimum of 2 wall phone sockets required. Not for party lines, pay phones. Notify phone co. before installation.

GDP-1239, Assembled, 5 lbs. **199.95**

Turn on lights and appliances with just a touch

$18.95

Tap the touch plate, and our Remote Control Kit turns lights or appliances on or off instantly. Place the touch plate right where you want it – in any location, at any height. Takes just one evening to install – assembly to set-up. No rewiring – plug into 120 VAC outlet; plug in lamp or appliance.

The main unit plugs between an outlet and a lamp or appliance cord.

FAST, EASY 1-EVENING KIT

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

Remote Kit for TVs to 225 W, fans to 180 W. Not for AM radios. **Kit GD-1287,** 2 lbs. **19.95**

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

Programmable Doorbell greets your visitors

$49.95

- **Program it to play up to 16 beats of your favorite tune**
- **Easy programming procedure lets you change tunes to fit your mood or any season of the year**

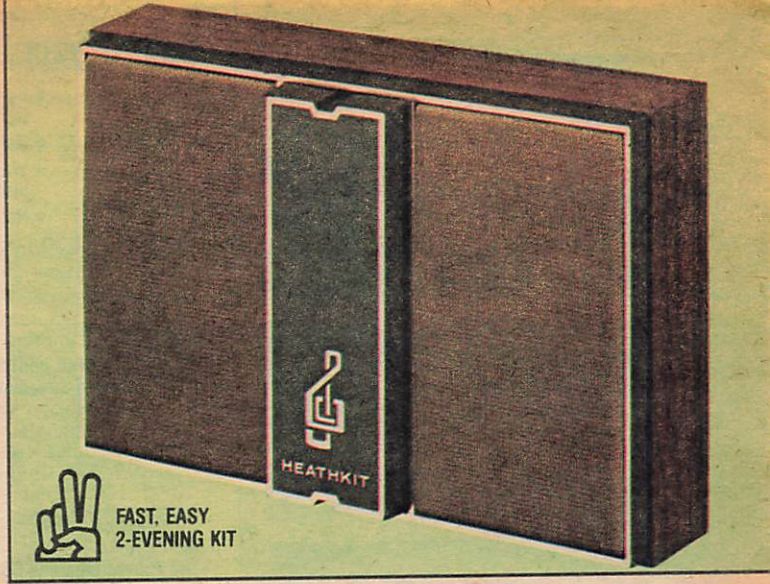
Put some variety in your doorbell and greet friends with a tune – build the Programmable Doorbell for your home. What a unique and warm way to say "welcome." What a great way to break the ice for conversation – be it a new neighbor, a guest, or an old friend of the family.

Greet them with our preselected songs, or with one of your own. Our songbook (included) lets you program over 50 tunes, including 15 college songs to reflect your loyalty, 7 seasonal songs plus 9 Christmas songs, 5 songs to commemorate special occasions, and many more to celebrate your mood. Even create your own using the piano-style programming section.

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

The TD-1089 takes just two evenings to assemble with our step-by-step instructions. Its rugged housing measures 5¾" H x 8⅝" W x 2⅜" D. Attaches easily to your existing doorbell transformer. For more fun, see our new Programmable Auto Horn featured on page 47.

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



You can build an accurate, precise Digital Scale

$99.95

- **Electronic mechanism delivers weights accurate to 2/10 pound**
- **Battery-operated-weight with space-age digital accuracy anywhere, displayed by 4½" tall LEDs**

Weigh items, large or small, with accuracy when you have the Heathkit Digital Scale. Because it's battery powered, you can use it safely after a shower. The platform is water-resistant, too, to stand up to constant use in the bathroom and maintain the attractive look of its beige and walnut display cabinet. An electronic strain-gauge mechanism eliminates the mechanical springs and weights that can go out of adjustment in conventional scales.

Four bright, easy-to-read ½" LEDs display your weight. You can mount the display cabinet either on the matching platform assembly, or at some other suitable location such as at eye level on a bathroom wall.

The Heathkit Digital Scale features both manual and automatic operation. In manual operation, the display is on constantly, and the scale will measure weight as small as 1/10 pound. In automatic operation, the display conserves battery power by remaining off until weight is placed on the platform.

Electronic tare adjustment means you can weigh the baby, without weighing the blanket. And manual adjustment lets you weigh small items accurately. Water-resistant platform. Requires 6 "C" cells (not supplied).

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

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

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

GD-1186 SPECIFICATIONS: Display: Readout in pounds or kilograms (jumper config.). .5" character LED. Low battery indicator LED. **Display Update Rate:** Approximately 1 sec. **Full Scale:** 300 pounds. **Resolution:** 1 part in 3000. **Accuracy:** ±1% or ±1 count, whichever is greater. **Repeatability:** ±5% of reading or ±1 count. **Operating Temperature Range:** 32° to 122° F. **Power Requirement:** Six "C" type dry cell or alkaline batteries. **Current Drain:** 250 mA (approx.). **Platform dimensions:** 1⅜" H x 11½" W x 11½" L. **Cabinet dimensions:** 1½" H x 3½" W x 6" L.

This space-age Digital Thermometer fills all your home needs

$49.95

- **Ideal for medical, photography and other home applications**
- **Gives reading in 10 seconds**

Got a cold? Developing pictures? Fixing baby's bath? This space-age Digital Thermometer will perform well in the darkroom, kitchen, nursery or any other part of the house where you need accurate temperatures in a hurry. It reads temperatures from 32° to 230° F (0° to 110°C) and features ± 0.2°F (± 0.1°C) accuracy in the biomedical range, and 0.5% accuracy overall with 0.1° F or C resolution. It never needs calibration either. No more squinting, waiting and guessing – solid-state circuitry assures accurate, easy-to-read 4-digit temperature displays in as little as 10 seconds. It's convenient, too. This digital marvel weighs just 5.5 ounces, and fits comfortably in your hand for maximum versatility. An attractive, shock-resistant high-impact plastic case protects it from damage. The Digital Thermometer operates on one 9 VDC battery (not included) for up to one year under normal use. Even features a flashing decimal low battery warning. Measures a compact 2" H x 2.5" W x 5" L.

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

Control your lights and appliances with BSR's System X-10!

Cordless Controller for GDP-1510

The Timer Command Console runs your home on time

ONLY **$34.95** for GDP-1510

- Control up to 16 groups of lights and appliances
- Helps conserve energy
- Ward off intruders – one button turns on all lights
- No special wiring needed

The BSR System X-10 adds convenience – and saves money! Light the hall, turn on the news and start the morning coffee from the comfort of your bed! Save energy by turning off unnecessary lights and appliances, dimming other lights.

It's easy to take control: Plug Command Console, modules into 120 VAC outlets – and plug appropriate lights, appliances into each module. Modules receive signals via existing house wiring. Use as many Modules – on the same code – as you wish. Use GDP-1511 Cordless Controller (right) to run GDP-1510 Command Console from up to 30' away. GDP-1510 measures 4.75" H x 3.5" W x 3.5" D.

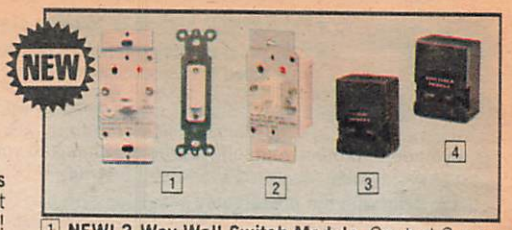
GDP-1510, Assembled, UL Listed, 2 lbs. ... **34.95**

The Timer Command Console runs everything on time. Creates "lived-in" look when you're away – can even simulate movement from room to room! Turns up to 8 groups of 120 VAC lights/appliances on/off up to twice daily. Power failure clears memory, prevents accidental on/off cycles. No dim feature. 3" H x 5.75" W x 5.13" D.

GDP-1520, Assembled, UL Listed, 2 lbs. ... **64.95**

Cordless Controller. For GDP-1510 only.

GDP-1511, Assembled, UL Listed, 1 lb. **19.95**



1 **NEW! 3-Way Wall Switch Module.** Control 3-way wall switches. Includes two switches with independent on/off buttons. 120 VAC, 500 Watts.

GDP-1516, Assembled, UL Listed, 1 lb. **21.95**

2 **Lamp Module** turns on/off, dims 120 VAC incandescent lamps. 300 W. 2.25" H x 2" W x 1.5" D.

GDP-1512, Assembled, UL Listed, 1 lb. **15.95**

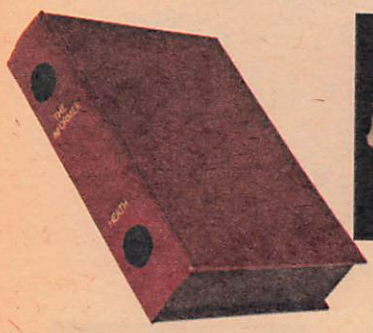
3 **Wall Switch Module** for 120 VAC lights. Dims lights when operated by GDP-1510. 500 Watts.

GDP-1513, Assembled, UL Listed, 1 lb. **16.95**

4 **Appliance Module** for most 120 VAC household devices/lights, including self-starting fluorescents (no dim feature). 15 A resistive or ⅓ hp motor. 2.75" H x 2" W x 1.75" D.

GDP-1514, Assembled, UL Listed, 1 lb. **15.95**

NEW! Night Sentry Timed Wall Switch for 120 VAC incandescent lights. Accepts 48 on/off settings daily. Randomness for lived-in look. **GDP-1236,** Assembled, UL Listed, 2 lbs. **19.95**



FAST, EASY 2-EVENING KIT

$59.95

Low-cost Informer® Ultrasonic Security Alarm

- Ultrasonic sound waves "see" intruders up to 25 feet away
- Built-in delay lets you enter without setting off alarm
- Use as automatic light switch to make entry brighter, safer
- Book cover design conceals unit in home or office

Activates indoor buzzers, outdoor bells or lights when field is broken. Also use the Informer to alert you to a child getting out of bed. Book-like styling fools intruders. NOTE: Since the GD-49 operates on the same frequencies as some ultrasonic TV remote controls, positioning to eliminate interference may be required. 120/240 VAC. 10.88" H x 2.38" W x 7.5" D.

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

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

GDA-39-2, 120 VAC Alarm Bell Accessory, Shpg. wt. 5 lbs. **29.95**

Save $49.05 on this TV/Security System

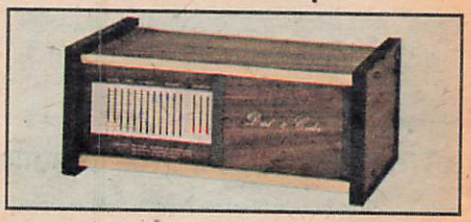
NOW ONLY **$349.95**

Use Zenith Video Sentinel to answer door, view caller and talk safely – or monitor indoor/outdoor locations. Has operational 12" diagonal B/W VHF/UHF TV set, camera with stand, doorbell button (attaches to present doorbell), intercom, 60' camera-TV cable, 25' intercom-TV cable. TV Dimensions, 11.38" H x 16.25" W x 12" D.

GDZ-620, Assembled and tested, 28 lbs. .... **Was $399.00, NOW ONLY 349.95**

Telephone Security Dialer calls for help

$179.95



When an intruder trips your alarm, this device automatically calls a friend, relative, neighbor or the police. 3-digit location code. Separate microphone lets you listen to secured area. Automatic redialing if line is busy. Uses four 9 VDC batteries (included). 4.75" H x 11" W x 6" D (12.07 x 27.94 x 15.24 cm).

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

Low-priced Eye Spy™ Photobeam Alarm

Activates warning devices when beam is broken. Use 120 VAC devices to 300 W. Includes light source, mirror and relay. The relay measures 5.38" H x 4.38" W x 5.25" D.

FAST, EASY 1-EVENING KIT

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

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

Minuteman II Alarm System keeps intruders out of your home or business, day or night

- **Component system design offers total flexibility**
- **Famous Delta Minuteman II Alarm System — available in kit form**

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

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

Portable protection: If you move, you can take Minuteman II with you.

Dependable security: Exit (16 seconds) and selectable entry (none or 8 seconds) delays prevent false alarms. Ten rechargeable AA batteries (included) keep the system working after intruders cut 120 VAC line current (does not protect against blackouts). Self-testing circuits assure reliable operation.

Now available in affordable, easy-to-build kit form: Heathkit Electronic Centers bring you the Minuteman II alarm system, exclusively in kit form, at prices designed to fit your budget. Easy kit assembly, with step-by-step Heathkit manuals. Separate components described below. Not for outdoor use.

1 Control Unit/Detector runs Minuteman II alarm system

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

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

2 Minuteman Sentinel gives you additional protection

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

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

3 Key Switch provides remote alarm system control

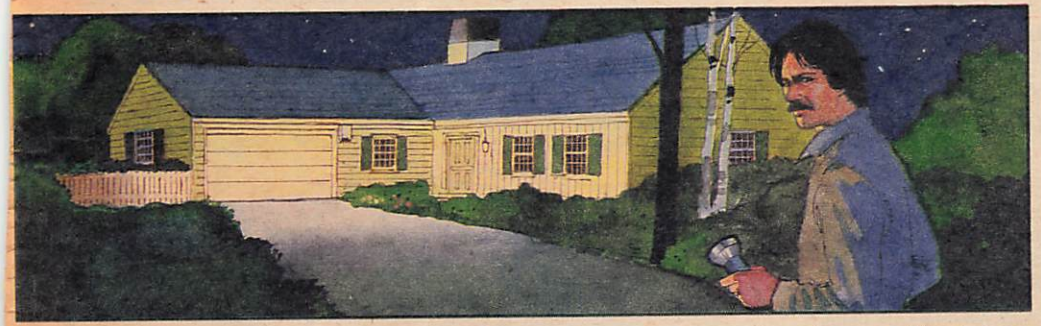
Arm or disarm your Minuteman II Alarm System with this professional-looking key switch accessory. Includes loop-secure LED, to positively indicate armed and secure status – along with a special pick-resistant key and lock set. Requires GD-1800 Master Control Unit/Detector for power. Overall dimensions,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

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

4 All-Weather Speaker sounds indoors or outdoors

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

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



Infra-red Security Light Control helps make your home safe during those long, dark nights

$139.95

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

One of the most useful security devices you can buy — available exclusively in kit form from Heath! The GD-3510 Security Light Control, by Colorado Electro-Optics, uses a passive infra-red sensor to turn on lights at night, when motion is detected.

When an intruder is detected, the GD-3510 surprises him with the most recognized deterrent to crime – light. The unexpected lighting makes the intruder think that he has been observed.

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

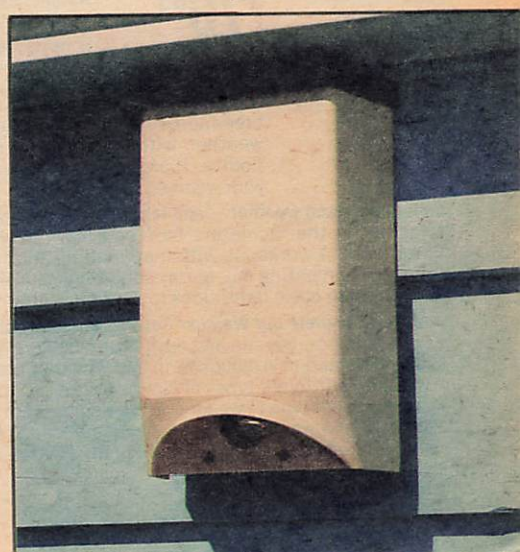
How does this revolutionary device work? The passive infra-red sensor detects changes in temperature, when accompanied by motion. It will not trigger on temperature changes without movement. When a warm-bodied object moves through the detection pattern, a relay turns on lights or devices (up to 500 watts). Unit automatically shuts off 4 minutes after all movement has ceased. Manual sensitivity control lets you adjust sensitivity to optimum level. Photo-transistor prevents unit from triggering during daylight.

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

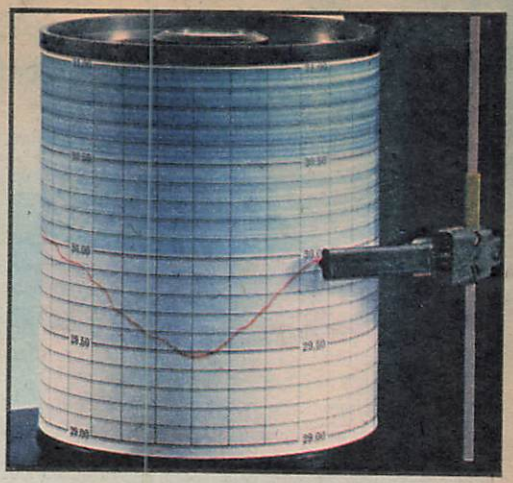
You'll enjoy this kitbuilding experience: The thorough Heathkit manual shows you how.

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

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



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



NEW

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

$295.95 Kit

- **Most important parameter which influences the weather is barometric pressure change. Barograph charts changes so you stay informed about recent changes – and can see rate of most recent change**
- **Microprocessor-based instrument displays current pressure and time; remembers dates, times and levels of maximum and minimum barometric pressure**

Here's a unique, super-accurate instrument for reading barometric pressure. The ID-2090 Digital Barograph permanently records pressure changes – in inches of Mercury (Hg), millibars or kilopascals – on its drum chart. You can adjust the chart to record at 7-day or 31-day speeds (with appropriate chart paper). You can even make written notations on the chart, during or after recording.

In addition, a four-digit LED display shows the current pressure at the same time it's recorded on the chart. An LED indicates the unit of measurement currently in use (inches of Hg, Millibars or KiloPascals). Cabinet switches allow you to recall maximum and minimum barometric pressure readings (since last cleared), with the time and date they occurred, from the ID-2090's memory.

The ID-2090 features a temperature-controlled oven, which minimizes the effects of changing temperatures to maintain a high (±0.03 in. Hg) level of accuracy – comparable to a mercury column barometer.

A separate 6-digit display alternately shows the current time (in 12 or 24-hour formats) and a 4-year calendar – or continuously display time or date.

A handsome addition to office or home, this easy-to-build instrument features an attractive, transparent smoked plastic dust cover for the chart recorder drum. Includes one year supply of chart paper.

Kit ID-2090, Shpg. wt. 11 lbs. **295.95**

IDW-2090, Assembled and tested, Shpg. wt. 7 lbs. **395.95**

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

ID-2090 SPECIFICATIONS: Digital Clock/4-Year Calendar: 6-digit time readout in 12-hr. format, with AM/PM indicators. **Accuracy:** Determined by line frequency accuracy. No cumulative error. **Barometer: Display:** 4-digit readout with inches of Mercury (in. Hg), Millibars (MB) or KiloPascals (KPA) indicators. **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, 59-95 deg. F (15-35 deg. C). **Memory:** Date, time, magnitude of max. and min. pressure readings. **Chart Recorder: Chart Width:** 4 inches. **Range:** 29-31 in. Hg. **Balance Time:** 6 sec. for 2 in. of travel. **Overshoot:** 0.5% of full scale. **Overall Error:** 0.04 in. Hg. **Chart Speed:** 1 revolution per 7 or 31 days (user-selectable). **Chart Speed Error:** 0.5% max. **Controls:** Min. or max. pressure select/clear, MB/KPA or in. Hg, gain, coarse adjust, fine adjust. **Power Requirements:** 120/240 VAC, 50/60 Hz, 14 Watts. One 9 VDC battery (not included) prevents memory loss during momentary power failures. **Dimensions:** 7" H x 15.25" W x 5.50" D.

Learn about weather and how to predict it with the Heathkit/Zenith Weather Course

$79.95

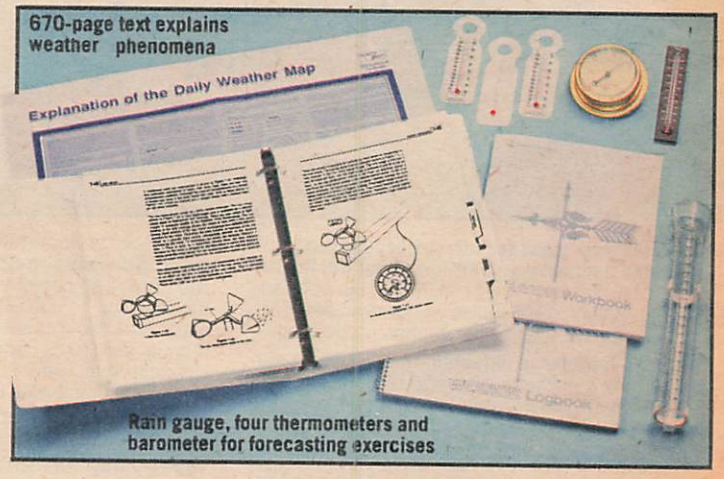
- **Teaches you how to predict upcoming weather conditions**
- **Gives you necessary knowledge to start a home weather station**

Why do clouds have different forms? Why they are called the sign posts of the skies? What atmospheric conditions breed tornadoes or hurricanes? Take the mystery out of weather with our complete award-winning Weather Course. It explains how nature's invisible forces change your weather.

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

When you complete our Weather Course, you'll be able to:

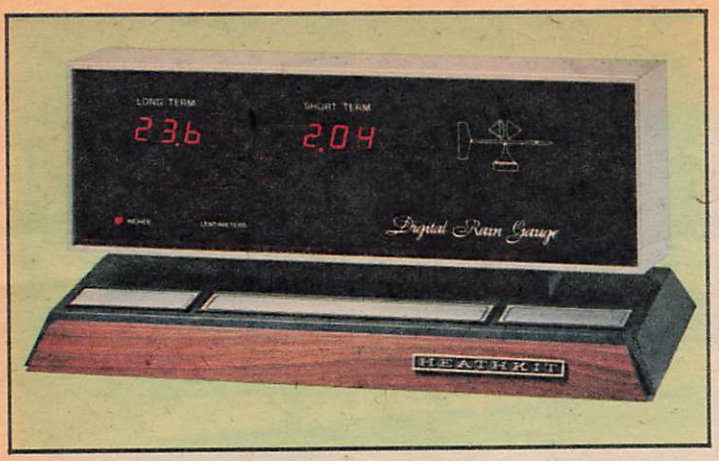
1. Explain how the sun and earth's atmosphere affects our weather.
2. Understand how clouds form and why they precipitate.
3. Identify different types of clouds by their shapes.
4. Know what type of weather is coming by reading the clouds.
5. Learn how weather instruments operate and how to read them.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



Earn 2 CEUs – score 70% on the optional final exam. (Also see our Electronics (pgs. 31-42), Automotive (p. 47) and Computer Courses (p. 90-92).)

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

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



Let the Heathkit ID-1790 Automatic Rain Gauge measure the rainfall while you stay dry indoors

$149.95 Kit

- **Accurate readings within ±2% in inches or centimeters**
- **Keeps track of both short- and long-term rainfall with two separate, bright digital LED displays**

Measure both short- and long-term rainfall quickly and accurately with the Heathkit ID-1790 Automatic Rain Gauge. It features an indoor display unit and an outdoor collector that automatically brings you up-to-date, precise rainfall measurements in your choice of either centimeters or inches.

With the ID-1790, you don't have to go outdoors to read the rainfall! The outdoor collector catches and measures it for you. Included is a 100' water-proof cable for sending all measurements to the indoor display. You stay warm and dry, and get up-to-the-minute rainfall measurements. Because the tipping bucket automatically empties when full, you don't have to go outside.

The ID-1790's outdoor collector is sturdy and fully-protected from the elements. It's housed in a weather-resistant 14½"H x 10"W x 10"D assembly that can be installed on a fence post or other convenient open location for accurate readings. A protective screen over the plastic tipping bucket keeps out dirt, leaves and other natural debris that could cause errors in your readings.

The ID-1790's indoor digital display takes the guesswork out of rainfall readings. Two sets of bright, red ½" LEDs on a glareless flat black background constantly tell you the short- and long-term rainfall amounts. The first set of LEDs 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 instruments in the Heathkit weather series. It measures 5⅜"H x 12½"W x 4¾"D and comes in a handsome plastic case with a walnut grain front panel and runs on household current (120/240 VAC, 50/60 Hz). A 9-volt back-up battery (not included) keeps the unit's memory and measuring circuits operating in the event of power failures.

Take the "guess and wet" out of measuring rainfall – order your Heathkit Automatic Rain Gauge today.

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

IDW-1790, Assembled Automatic Rain Gauge, 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). **Power Requirements:** 120/240 Volts AC, 50/60 Hertz, 5 Watts; 9 Volts DC, transistor battery keeps the ID-1790's measuring and memory circuits operating during power interruptions. **Dimensions:** Rain Collection Unit, 14.5"H x 10"W x 10"D (36.8 x 25.4 x 25.4 cm); Digital Readout Unit, 5.38"H x 12.5"W x 4.75"D (13.65 x 31.75 x 12.06 cm). **Net Weight:** Rain Collection Unit, 5.0 pounds (2.27 kilograms); Digital Display Unit, 3.5 pounds (1.6 kilograms).

Choose the Heathkit Digital Wind Computer

$194.95 Kit

- **Displays both average and instantaneous wind velocity readings.**
- **Recalls day and time of peak wind gusts from computer memory**

Pilots, sailors, even professional meteorologists – anyone who needs up-to-date information – will like the accuracy of the Heathkit Digital Wind Computer. 16-Point compass dial shows wind direction. Two LEDs tell wind speed. Switchable mph, kph or knots, 12/24-hour time displays. Stores peak gusts by speed, date and time. Clock/calendar for logging. Rugged wind vane and anemometer. Assembled IDW-1890 includes 99' cable.

Kit ID-1890, Shpg. wt. 10 lbs. **194.95**

IDW/1890, Assembled Wind Computer, wt. 14 lbs. **250.00**

IDA-1290-3, 150' 8-Wire Cable, wt. 6 lbs. **23.95**

IDA-1290-2, 100' 8-Wire Cable, wt. 4 lbs. **16.95**

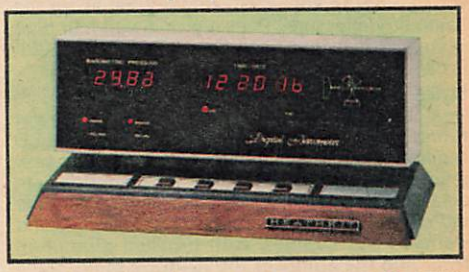
IDA-1290-1, 50' 8-Wire Cable, wt. 2 lbs. **9.95**

ID-1890 SPECIFICATIONS: Rear panel controls: Clock Start/Stop, Hours/Month Advance, Minutes/Days Advance, 10 Minutes Advance, Time/Date Hold, 12/24 Hour Time. **Memory:** Date, time maximum gust. **Accuracy:** ± 5% or better. 120/240 VAC. 5.5"H x 12.5"W x 4.8"D.

Computerized Barometer helps you forecast

$234.95 Kit

- **Remembers minimum/maximum readings for tracking**
- **Accurate to ± 3%**
- **Two sets of LEDs display pressure/date information**



Enter the computer age of weather forecasting – put the Heathkit ID-1990 Computerized Barometer in your home.

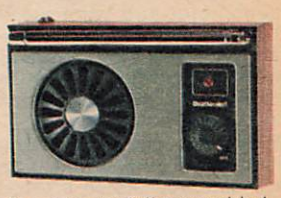
It gives you current pressure, rate of change, direction of change, maximum and minimum pressures...even the date and time. All information is displayed on two sets of ½" H LED readouts, and available at the push of a button. Reads pressure in inches or millibars, or in kiloPascals with a slight wiring modification. All pressure information is sent by a sensing mechanism protected against ambient temperatures. Runs on 120/240 VAC. Memory save requires 6.2 to 14 volt external power source. Measures 5¼"H x 11½"W x 5"D.

Kit ID-1990, Shpg. wt. 10 lbs. **234.95**

IDW-1990, Assembled Computerized Barometer, Shpg. wt. 8 lbs. **275.00**

ID-1990 SPECIFICATIONS: Pressure Ranges: 28.00 to 32.00 inches of mercury; 981 to 1050 Millibars; or 98.1 to 105 kiloPascals. **Memory:** Date, time and magnitude of maximum and minimum pressure. **Operating Temperature:** 59-95 degrees F.

Radio gives severe weather reports automatically



Never miss a severe weather forecast when you have the Storm Alarm Radio. It gives you up-to-the-minute weather forecasts when you want them. And sounds a severe weather alarm – day or night – when triggered by local National Weather Service transmissions. Excellent reception, both indoors and out. Uses 120 VAC, or with a standard 9 volt battery (not included) becomes portable. Measures 1¼"H x 5"W x 3"D. Comes to you fully assembled.

EWA-4100, Shpg. wt. 2 lbs. **44.95**

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

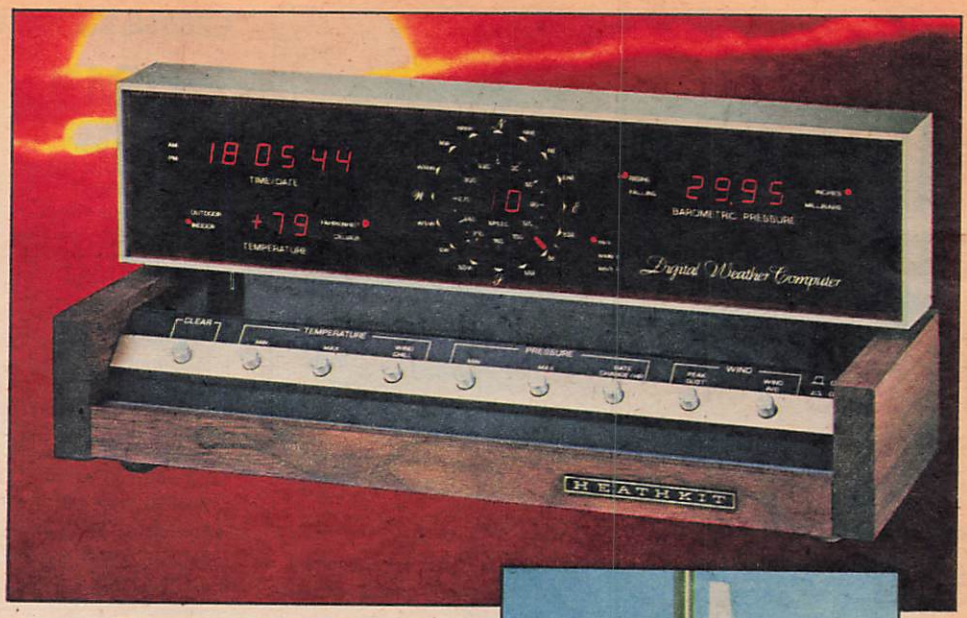
This Digital Weather Computer does more than any other single weather instrument

- **Displays time/date, indoor/outdoor temperatures, wind speed & direction, pressure**
- **Microprocessor accuracy and memory – stores past and present weather data and trends**
- **Instantly recalls past weather statistics with the push of a button**
- **Professional-looking walnut cabinet**

No weather station manufactured today can give you the number of functions, the computer accuracy and memory, or the convenience of the ID-4001.

More weather information at your fingertips: Go ahead, compare the ID-4001 with any other desktop weather station. Does it give you the time in 12/24 hour format, plus the date for exact log entries? Does it tell you both the indoor and outdoor temperature, whether it's above zero or below, or in Fahrenheit or Celsius? Does it tell you the minimum and maximum temperatures – even the wind chill? Can you get instantaneous wind velocity with digital accuracy and 16 point compass resolution? And if you want to know the average wind speed and direction or peak gust, will it tell you? And how about that wind speed? Can it tell you in mph? In kph? Or in knots? What about the barometric pressure? Does it give it with four digit accuracy? In inches or millibars? Even tell you if it is rising and falling? Well, the ID-4001 does!

Styled with convenience: Not only do you get more weather data with the ID-4001, but you also get functional design. All the digits are red ½" LED segment displays on a black background for easy reading. In addition, the front panel buttons are clearly marked for mistake-free logging. And the indoor unit features a professional-looking, solid walnut wood cabinet, with brushed aluminum trim. Add the ability of the ID-4001 to interface with our H-8 computer, and you have a unique blend of versatility and convenience unmatched by any weather station available today.

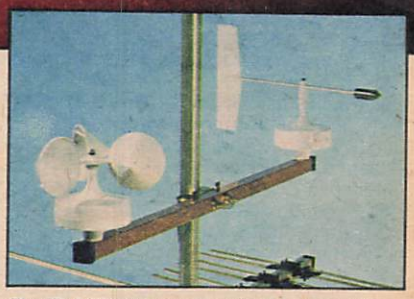


Comes with full transmitter assembly: The ID-4001 includes a weather-proof aenometer and wind vane, sealed temperature sensors, and mast hardware. Order your ID-4001 today with the correct cable (see box right).

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

Assembled and Tested ID-4001. Incl. 100' cable.
IDW-4001, Shpg. wt. 22 lbs. **569.95**

ID/IDW-4001 SPECIFICATIONS: Digital Clock/4-Year Calendar: Time Accuracy: Determined by accuracy of AC line. No cumulative error. **Wind Vector Accuracy:** 5 percent or better. **Direction Display Accuracy:** ±11.26 percent (in degrees). **Thermometer: Temperature Range:** –40 deg. F to 158 deg. F (–40 deg. C to 70 deg. C). **Accuracy:** ±2 deg. F (±1 deg. C). **Barometer: Pressure Range:** 28.00 to 32.00 in. Hg/inches of mercury (981.9 to 1050 millibars). **Accuracy:** ±0.075 in. Hg/inches of mercury, ±0.01 in. Hg/deg. C. **Operating Temperatures:** Outdoor Assemblies, –40 deg. F to 158 deg. F (–40 deg. C to 70 deg. C); Unit, 59 deg. F to 95 deg. F (15 deg. C to 35 deg. C). **Power Req.:** 120/240 VAC. External battery connection for memory backup. **Dimensions:** 7¼" H x 16" W x 6" D.



The ID-4001 also comes with this transmitter assembly (mast not included).

8-wire Cable for the ID-4001, ID-1290 and ID-1590 Heathkit Weather Instruments.

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

Digital weather instruments priced for your wallet

1 Low-cost Digital Wind Indicator

This ID-1590 Digital Wind Indicator may skimp on price, but certainly not on accuracy or reliability.

For instance, the outdoor transmitting unit is one of the best around. It's designed to give you precise wind speed and direction year after year. Both the aenometer and wind vane are constructed with materials that won't cake up with corrosion to obstruct the readings. The bearings for the aenometer and vane are made of durable, lubrication-free Teflon™ for no-maintenance operation and error-free readings in hot and cold weather. Even the reed switches are hermetically sealed to prevent weathering that could cause inaccurate readings.

You get the same attention to accuracy and quality in the indoor display unit as well. All the transmitted data appears on a sensitive, easy-to-read, seven-segment digital readout. The readout can be wired to display two out of three scales: mph, kph, or knots. Readout digits mark speeds in these scales from 0-99. The 8-compass-point wind direction indicator has 16 point resolution capability 120 VAC. Requires 8-wire cable above.

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

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

2 Digital Indoor/Outdoor Thermometer

When you compare the advantages this Digital Indoor/Outdoor Thermometer has over a conventional mercury bulb or aneroid thermometer, you'll wonder how you did without one for so long.

One big advantage is that you don't have to squint to read the ID-1390. It features big, easy-to-read, ½" segmented displays that can be seen in broad daylight, as well as night. Try doing that with one of those mercury bulb thermometers!

Another advantage is that the ID-1390 monitors two temperatures instead of one. It has two sensors for monitoring the temperature outdoors and indoors. And, the ID-1390 will display these temperatures within an accuracy of 2 degrees or less. Furthermore, the ID-1390 can tell you the temperature in Fahrenheit or in Celsius. That's not only convenient for amateur meteorologists, but it also lets you get ready for the metric system coming in this decade.

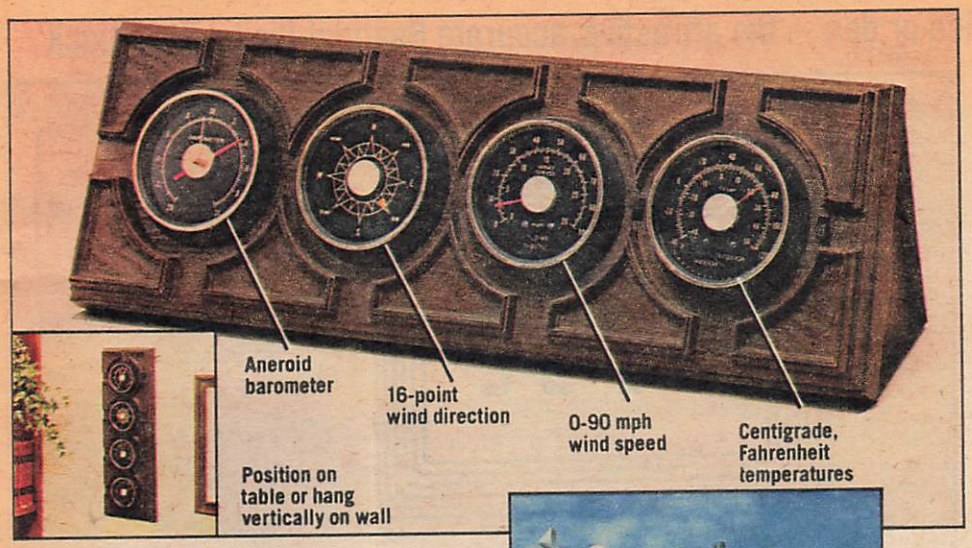
And finally, this Thermometer offers styling and eye appeal lacking in conventional thermometers. The red display on the black Cycolac™ cabinet and teakwood trim just add a touch of class to any room. And the Thermometer goes with any decor, too. It measures 2.5" H x 7" W x 5" D. Kit includes 10' indoor cable and 75' outdoor cable. Runs on 120 VAC. 50/60 Hz.

Step-by-step instructions make the Digital Indoor/Outdoor Thermometer an easy-to-build as well as practical kit for your family.

KIT ID-1390, Shpg. wt. 4 lbs. **74.95**

ID-1390 SPECIFICATIONS: Temperature Accuracy: –30°F to 20°F, ±2°F; 20° to 120°F, ±1°F; –30°C to 15°C, ±2°C; 15°C to 50°C, ±1°C. **Display:** 2½-digit planar gas discharge with plus and minus signs. **Power Requirement:** 120 VAC, 50/60 Hz.

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

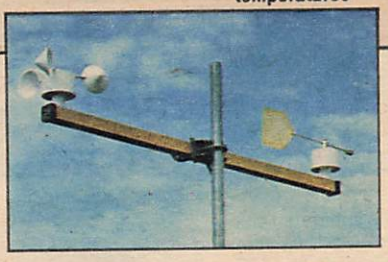


Low-cost weather station gives accurate weather information

For the price, you won't find the features or the accuracy of the ID-1290. It contains professional grade instruments, plus a remote transmitter assembly – all for less than $140.

The indoor instrument unit features a barometer, thermometer, and wind speed and direction indicators. The barometer is sensitive, showing changes in pressure as small as 0.05 inches of mercury. The thermometer is also precise. It records temperatures in Celsius and Fahrenheit with ±2°C (±2°F) accuracy. The wind speed indicator displays wind speed in two switchable scales: 0-90 mph, and 0-30 mph. And the wind indicator shows wind direction with 16 point resolution.

Besides the indoor unit, the ID-1290 also comes with a complete outdoor transmitter assembly. It features an anemometer and wind vane made from non-corroding materials that provide accurate readings year after year. (Select the right cable for your station below.) Order your ID-1290 today!



Transmitter Unit clamps to any 1-1.5" mast

Heathkit Five-Function Weather Station.
Kit ID-1290, Shpg. wt. 8 lbs. **139.95**

Transmission Cable for ID-1290 Weather Station.
IDA-1290-2, 100', Shpg. wt. 4 lbs. **16.95**
IDA-1290-3, 150', Shpg. wt. 6 lbs. **23.95**

ID-1290 SPECIFICATIONS: Wind Speed: 0-30 mph, ±2 mph; 0-90 mph, ±5 mph. **Wind Direction:** 16-point readout over 360°. **Temperature:** Typ. outdoor: 0°F to 120°F, ±2°F (−18°C to +50°C, ±2°C). Typ. outdoor: −40°F to +120°F, ±2°F (−40°C to +50°C, ±2°C.) **Barometric Pressure:** 28 to 31 inches of mercury ±0.1 inch, accurate to 10,000 feet. **Power Requirement:** 120 VAC, 50/60 Hz, 3.5 watts. **Dimensions:** Wall Mount: 7" H x 20½" W x 2" D; Desk: 7" H x 20½" W x 6¾" D.

1 **Heathkit Wind and Speed Indicator**

2 **Heathkit Digital Indoor/ Outdoor Thermometer**

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

Has red display for night flying

Accepts preflight data for up to 9 legs

Makes navigating much easier

Available with handy carrying case

Cut 28%! Pilot's computer saves fuel, time

The Heathkit Air Navigation Computer has the power and versatility of an expensive on-board navigation computer! It accepts preflight data and vectors for up to nine separate flight legs. One-keystroke action instantly computes your magnetic heading, ground speed, true air speed, time to next checkpoint/destination, and estimated time of arrival (ETA). It even computes in-flight wind speed and updates your ETAs in-flight. Includes rechargeable batteries. 1.75 H x 3.13" W x 6.38" D.

Kit OC-1401, 3 lbs. . **Was $139.95, NOW 99.95**

Save 25% on Assembled Heathkit Portable Air Navigation Computer.
OCW-1401, 4 lbs. . . **Was $199.95. NOW 149.95**

Save 25% on Custom Carrying Case for your Air Navigation Computer (see inset). Provides additional power supply for OC-1401. Recharges in 15 hours. Handy pocket for instruction guide. 120 VAC. 3.13" H x 12.25" W x 8" D.

Kit OCA-1401-1, 5 lbs. **Was $39.95, NOW 29.95**

Save $5.00 on Assembled Custom Carrying Case.
OCW-1401-1, 5 lbs. . . **Was $54.95, NOW 49.95**

Save 20% on Leatherette Carrying Case for OC-1401.
OCA-1401-2, 1 lb. . . . .**Was $4.95 NOW $3.95**

Aircraft Clock/Timer marked down 20%!

- **Tells time in GMT/Zulu or local time**
- **Low fuel/check-point alarm**
- **Quartz crystal controlled for accuracy**
- **Fits in standard 3½" dash mount**

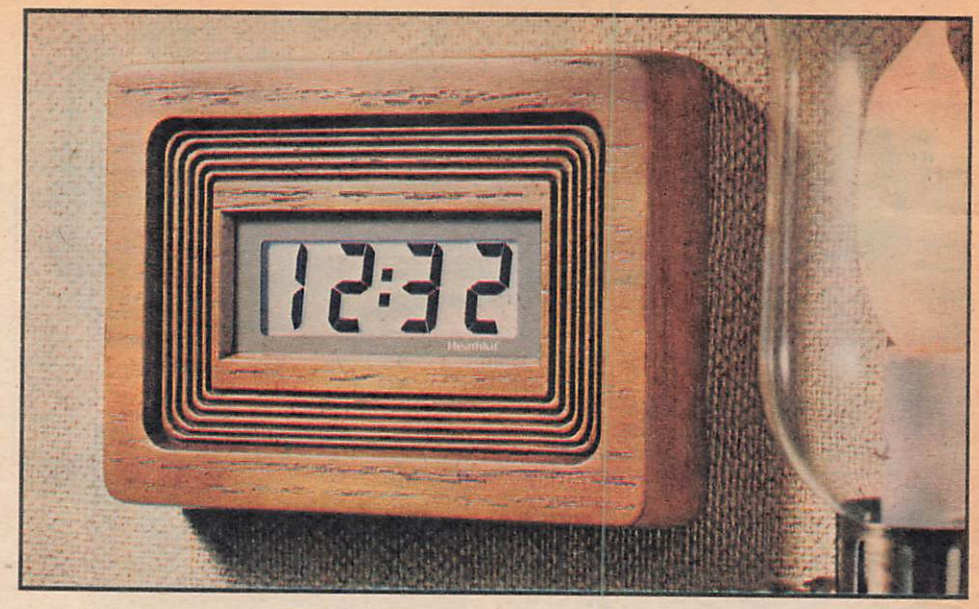
Features two 4-digit time displays with red LED segments for easy night-viewing. Top display shows Zulu time, while bottom shows local time and acts as a 24 hr/minute timer. 14 or 28 VDC. Draws .5 A max. Meets FAA Reg. No. DO-160. Must return for DMIR inspection.

Kit OI-1154, 3 lbs. . . . **Was $99.95, NOW 79.95**

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

Only **$49.95**

- **Quartz-controlled accuracy within ±1 minute per year**
- **Runs for up to two years on a single 1.5 AA alkaline cell**
- **Big one-inch high LCD digits for across-the-room reading**
- **You can wire it to display the exact time in either 12-hour or 24-hour formats**



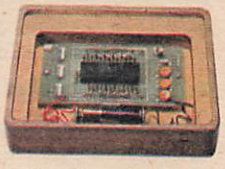
It's attractive. It's accurate. And it's fun to build. That's why the Heathkit GC-1720 Digital Wall Clock is so popular. Like a digital quartz watch, this Clock uses a quartz crystal and a single integrated circuit to give you on-the-dot accuracy. In fact, our GC-1720 is so precise, it tells time within 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 V alkaline cell (not included).

Because it's battery-powered, you can 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 failures 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 room where you need to know the exact time.

And you can wire your Digital Wall Clock for either 12- or 24-hour time format. That's a valuable feature for amateur radio operator, sailor, pilot or anyone who wants a 24-hour format for logging sign-on times, navigation, or filing flight plans.

An attractive light-weight 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 starter kit, be sure to see our line of selected kitbuilding tools on pages 53 and 54.

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

GC-1720 SPECIFICATIONS: Accuracy: ±1 minute per year, after adjustment according to instructions. **Power Requirement:** One type AA 1.5 V battery (not included). **Battery life:** 1 year with carbon-zinc cell; 2 years with alkaline cell. **Dimensions:** 5¼" H x 7⅛" W x 1½" D.

Heathkit Handy Index

Ordering Information – pages 52-53

AIRCRAFT: clock/timer, navigation computer 103

AMATEUR RADIO: antennas, tuners, courses, keyer, novice, portable power system, transceivers 11-23

AUTOMOTIVE: cruise control, courses, tune-up equipment, wiper delay 43-47

BOOKS 23, 51, 55, 60, 64, 67, 88

CLOCKS: digital clocks 3, 103, 104

COMPUTERS: accessories, computers, courses, peripherals, printers, software, terminals 69-92

COMPUTER PRODUCTS, COMMERCIAL: computer, peripherals 78-79

EDUCATION: Amateur Radio, 22; Automotive, 47; Classroom, 42; Computers, 36-37, 40, 90-92; Electronics, 31-35, 38-40; Test Equipment, 34; Weather, 100

GENERAL INFORMATION: Heathkit Electronic Centers, Ordering Information, Warranties 52-54

HOME PRODUCTS: air cleaner, 4; digital scale, 97; garage door openers, 46; intercom, 94; light switches, 2; log splitter & portable power system, 5; radios, 2, 23, 94, 95; telephone, 96; setback thermostats, 4

INSTRUMENTS: counters, oscilloscopes, generators, probes, supplies, testers, chart records, meters 56-58

MARINE: depth sounders, direction finder, fish locators 48-49

MUSIC 93

NAME PLATE 28

NEW PRODUCTS: capacitance meter, 56; earth station, 10; education, 38; digital barograph, 100; portable power system, 5; programmable car horn, 47; remote telephone, 96

PHOTOGRAPHY 95

R/C MODELING 50-51

SECURITY: alarms, timers 98-99

SHORTWAVE 23, 95

STARTER KITS: amplifier, 29; burglar alarm, 2; clocks, 3, 104; doorbell, 97; freezer alarm, 2; frequency counter, 59; lamp switches, 2, 96; lamp, 5; log splitter, 2; radio, 2; setback thermostat, 4; timing lights, 43; ultrasonic cleaner, 94; VOM, 64

STEREO HIGH FIDELITY: amplifiers, speakers, receivers, tuners 24-30

TELEPHONE PRODUCTS: amplifier, answering machine, dialer, remote phone 96

TELEVISION: antennas, computerized TV's, earth station, projection TV, video tape recorder 6-10

TOOLS: soldering irons, tools 54-55

WEATHER: computerized weather station, digital barometer, digital barograph, rain gauge, wind computer, weather course 100-103

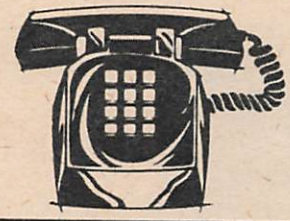
Units of Veritechnology Electronics Corporation

All prices quoted are Mail Order, Net F.O.B. Benton Harbor, Michigan and apply in the United States and Possessions only. Prices and Special Offers herein are effective July 20, 1981 through October 11, 1981. Prices and specifications are subject to change without notice. Heath Company cannot be responsible for typographical or pictorial errors.

Printed in U.S.A.

Want your kit faster? Phone toll free

Operators are on duty from 8:00 A.M. to 8:00 P.M. Eastern Time to take your toll-free phone charge order. (Sorry, toll-free service not available in Alaska, Hawaii or Michigan – but you can call – 616-982-3411 – to place your order 24 hours a day). To save yourself time, fill out the order blank and have your credit card account number handy before dialing.



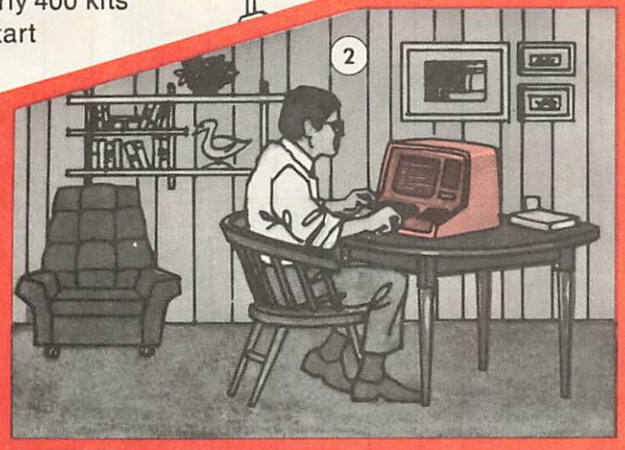
800-253-0570

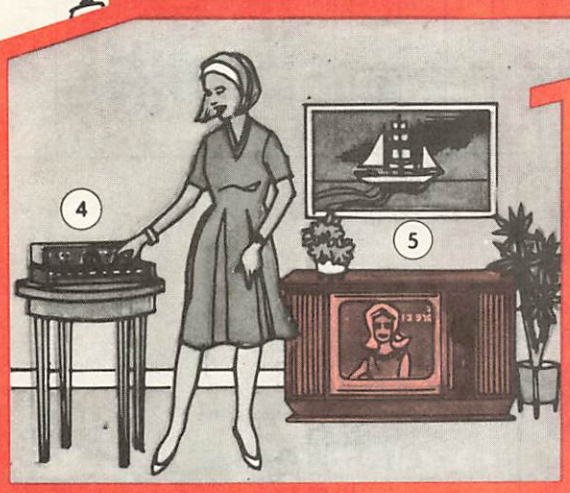
Now you can charge your kits any of three different ways

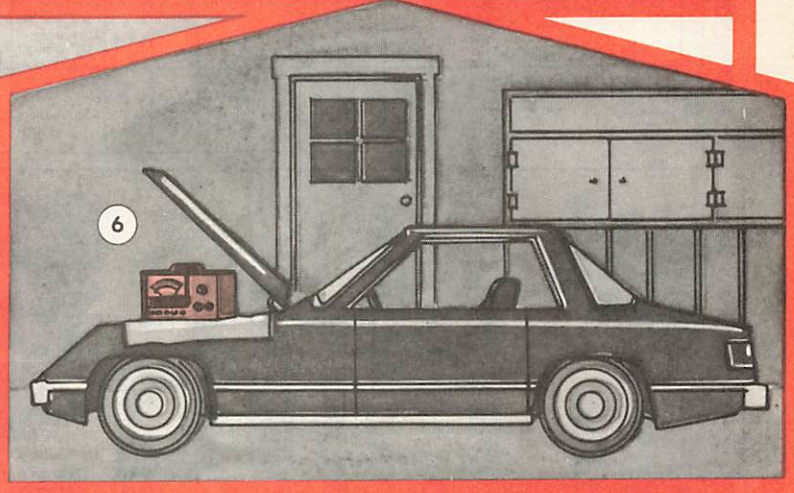
Now you can use your Heath Revolving Charge, Visa or MasterCard to purchase the kits you need for your home or business. See page 52 for details and ordering information.

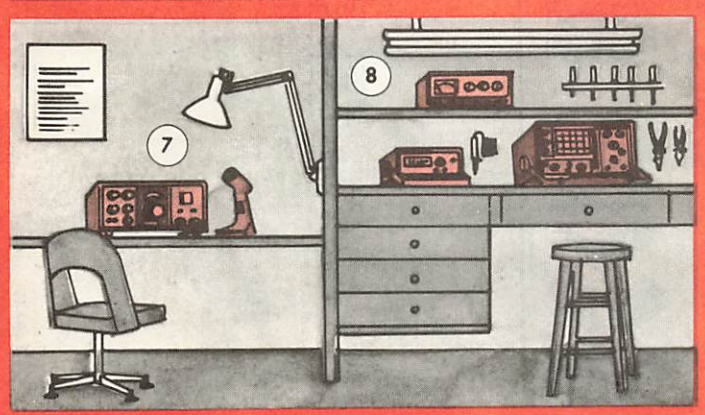
There's a Heathkit project for every room of your house.

Choose from the nearly 400 kits in your catalog and start your project now.









1. New self-study programs make it easy to learn electronics.
2. Home computers offer more efficient operation of your home or business and exciting games for your family.
3. Fine audio components fill your home with beautiful music.
4. Weather instruments help you plan for the sunshine.
5. Beautiful color televisions make all your favorite programs look their best.
6. Auto accessories and tune-up aids save you money on gas and maintenance.
7. Amateur radio gear lets you communicate with faraway places and people.
8. Precision test instruments for the complete test bench.

Heathkit

TO SPEED YOUR ORDER
CALL TOLL-FREE

800-253-0570

In Michigan, Alaska & Hawaii,
Call (616) 982-3411.

PLEASE DO NOT WRITE IN THE SPACE ABOVE

ORDERING INSTRUCTIONS

1. Do *not* include money for shipping and handling charges if *any* item on this order is marked "Motor Freight" in the catalog: In this case, *all* items will be sent freight collect.
2. To open a charge account, fill out the application between pages 52 and 53 and enclose it with **this entire page.**

Name _____

Street Address _____

City _____

State _____ Zip [ ][ ][ ][ ][ ]

QUAN.	MODEL NUMBER	KIT DESCRIPTION	WT.	PRICE EACH	TOTAL PRICE	SHPG. CHARGES*

Payment Method

- ☐ **CASH** Please send check or money order only
- ☐ **COD** Include 20% deposit. (Minimum order $10).
- ☐ **CHARGE** Check one ☐ VISA or ☐ MasterCard ☐ Heath Revolving Charge (see #2 above)

Acct. # _____

Exp. date _____ Daytime Phone _____

Signature _____
Signature necessary to send merchandise

	MERCHANDISE TOTAL	
	10% DISCOUNT (UP TO $100) ON MERCHANDISE TOTAL (Enclose certificate).	
	MICHIGAN RESIDENTS: ADD 4% SALES TAX on merchandise total.	
	SHIPPING CHARGES See ordering information at center of catalog. Write Zone Here ☐	
	TOTAL AMOUNT	

Amount included with this order $ _____

***Figure Shipping Charges for each item individually. Enter in column provided.**

Return this entire page.

Heathkit
HEATH COMPANY
BENTON HARBOR MI 49022

POSTMASTER: If addressee has moved, deliver to current resident

BULK RATE
U.S. Postage
PAID
Heath Company

854-401

854-401

DAVID R. STINE
14 EAST UNIVERSITY AVENUE
BETHLEHEM, PA 18015

SAVE 10%

...up to $100...on any kit purchase. Limited-time offer.

It's our way of saying "welcome...to Heath," when you buy a kit from this catalog.

Mail your order today!

Use your VISA or MasterCard at Heath
(SEE FRONT COVER FOR DETAILS)