

Heathkit®

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FALL, 1980



New Audio Processor gives you complete control of your music



New high-power Audio Amplifier for the ultimate in stereo listening



New low cost Microprocessor Trainer teaches you programming



New Digital Depth Sounder makes boating safer and more fun!



New Hand held Digital Frequency Counter



New low cost Digital Frequency Counter



New Microprocessor Programming Course requires no electronic background

**NOW PHONE YOUR HEATHKIT
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800-253-0570**



Use your Visa or MasterCard credit cards to order by telephone from this wide array of new Heathkit products you can build for your family!

Six good reasons why kit-building is the easy, enjoyable and practical way to have the electronic products you

Kit-building is a hobby for everyone. Whether you're in business, retired, a housewife, or a youngster — you can probably build a Heathkit electronic kit... even if you've never had any experience in electronics before. How can we be so certain? Because each Heathkit electronic kit has been specially designed for hobby construction, with an assembly manual that leaves nothing to chance.

Our company motto: "We won't let you fail," is borne out by six reasons, listed

below. And that motto is supported by engineers, manual writers, customer service people — in short, everyone who works at Heath Company. Heath employees care about the products they design, the manuals they write, the services they provide and, most of all — the people they serve.

As you choose your kit, be it your first or your tenth, you have the satisfaction of knowing your kit-building experience is supported by hundreds of highly skilled

① Heath headquarters — home of a philosophy

A simple philosophy echoes through the headquarters of Heath Company located near Benton Harbor, Michigan. And it all has to do with you. It started with our founder, Edward Bayard Heath, back in the aviation era of the 1920's: A philosophy that anyone, regardless of technical knowledge or experience, given the necessary parts and properly prepared instructions, can build a kit.

You see, Ed Heath took that philosophy and sparked the imaginations of people like him. People like you. And the employees of Heath who design, test, package, and promote build-it-yourself kits share in that same philosophy. It has helped us grow into a world wide organization with nearly 400 kits that are fun to build.

② You get parts that make kit building easy

When you unpack your kit, you'll notice that we have taken the time to painstakingly package it — with parts labeled and placed in logical order. So you'll know where every part is and what every envelope and box contains. It makes kit building a lot easier and more organized.

You'll also be glad to know that before each small electronic component gets wrapped or packaged, it has been tested and counted three different ways: 1) by computer, 2) by machine, and 3) by our finicky line inspectors. This helps assure that every part in a kit meets our stringent specifications, and that each kit contains every part you'll need to assemble your kit — right down to the last lockwasher.

③ You get easy-to-read, step-by-step instructions

We receive hundreds of letters from our kit builders telling us how much they like our world famous manuals. You see, after our engineers develop a kit, our manual writers receive the parts for the kit. The writer builds the kit, making notes and writing the step-by-step procedure to assemble it. Meanwhile, an illustrator carefully draws the parts for each step. The result is a manual with simple instructions that illustrate and tell what to do for each step. With manuals like these, you'll definitely succeed in building your electronic kit, too.

④ There's a technical consultant ready to help you

Be it amateur radio, stereo, computers, television or general electronics, specially-trained technical consultants are ready to help you. In addition to a solid electronics background, a Heathkit technical consultant is so familiar with the kits in his area of expertise, he can usually solve a problem just by hearing a general description of the symptoms over the telephone. Each consultant is also skilled in communicating with people — be it with an advanced computerite assembling one of our latest systems, or like many of our customers, a novice constructing his or her first kit. With each kit you order, you receive the phone number of the consultant expert for that particular kit. Just another reason we can promise that you won't fail.

Here are six low-cost kits you can build leisurely over a weekend

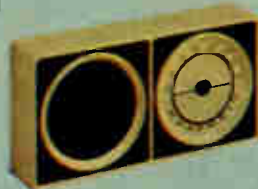
\$29⁹⁵



Digital Alarm Clock gently wakes you up

Pleasant electrical alarm nudges you awake. Doze button lets you catch 9-minute catnaps. Blue-green digital display tells when alarm is set, indicates AM and PM, and alerts you if clock has been shut off during power failures. See pages 85 and 101.

\$16⁹⁵



Carry music with AM Portable Radio

Take your music, news, weather, and sports anywhere. Built-in ferrite antenna pulls in those hard-to-get fringe area stations. Big 3½" speaker sings out your music loud and clear through all volume levels. Powered by 9 volt battery (not supplied).

More details about this kit on page 84.

Portable Outdoor Rechargeable Fluorescent Light

For camping, fishing, any outdoor chore. Gives you bright, full light. Built-in rechargeable battery for hours of illumination. Pre-assembled charger plugs into AC outlet. There's more information about this kit on page 85.

\$34⁹⁵



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2/LOW COST KITS



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

need, and why we can state, "We won't let you fail!"

people. Highly skilled people whose job it is to make sure that you will be successful.

So, whether you're a veteran kit-builder, or anticipating the fun of kit-building for the first time, be assured that it will be an enjoyable, satisfying experience. A great deal of time and effort have been expended to make it possible. And that's why we can say, with confidence, "We won't let you fail."

You're sure to find a number of practical... and fun-to-build kits in this catalog that you'll want to build for yourself and your family. Choose the ones you want and order now. There's a lot of kit-building fun waiting for you.



⑤ Expert service backs you up all the way

There are more than 180 specially-trained service technicians at our plant and stores to support your Heathkit product, and make sure you get years of satisfactory service out of it. Here, with the resources of precision test instruments, design engineers, and their own electronic expertise, these service technicians solve any unexpected problems a unit might encounter under warranty. You get personalized service from these technicians. They meticulously test and

repair your Heathkit product. Not only do they fix your unit and test to see that it works, but they also explain what went wrong and why. And all of their work is covered by a written 90-day limited warranty. It's another part of the all-important Heathkit philosophy that just won't let you or your unit fail, and more proof-positive that we do care what happens to you and your Heathkit product even after it leaves our factory.



⑥ Keep up-to-date at a nearby Heathkit Electronic Center

Fifty-five Heathkit electronic centers are located in metropolitan areas from coast to coast. There you can see the latest kits on display, purchase accessories or components, and get service on any Heathkit product. Friendly employees are eager to answer your questions because they share your interest in kit-



building. Every store employs at least one service technician, and most feature a "jiffy bench" where you can make minor, on-the-spot tests. Many stores also offer your favorite magazines and books on computers, digital electronics, amateur radio, and other facets of electronics.

Why not purchase a Heathkit product today?

Below and on the opposite page, you'll find some useful kits designed for the first-time kit builder and the experienced builder. Most take only a single evening to assemble with a conventional soldering iron and small hand tools.

Once you receive your kit and open it, you'll be on your way to discovering the philosophy that Ed Heath conceived: that you, too, can build an electronic kit. But more importantly, you'll find out just how easy electronics can be understood through kits that give you "hands-on" experience. And before you know it, you'll be more knowledgeable than you ever thought you'd be in this exciting field that's so rapidly becoming a part of your everyday life.

Turn on lights or appliances with a touch

Feather-touch remote turns on lamps and appliances. Plugs into AC outlets.

\$17⁹⁵



Find out more about this kit on page 85.

Freezer Alarm prevents food spoilage

\$14⁹⁵

For families with large storage food freezers. Alarm beeps with pulsating red light to warn you if freezer door is ajar, or if inside freezer temperature rises above +20°F. during black-outs. Runs on two "C" batteries. Easy mounting with 20' cable. Measures 1 3/4" H x 3 3/8" W x 4 7/8" D.

There's more information about this product on page 84.



Three-in-one Tune-up Meter

\$34⁹⁵

Combines a Distributor Cam Dwell Meter, and Electric Tachometer, and a DC Voltmeter on one, compact, portable package. Designed to be used with 4, 6, and 8 cylinder engines with 6 or 12 volt electrical systems. Positive or negative ground option. Also can be used with solid-state and high-energy ignition systems. Complete with leads, instructions and case.

See page 17 for more information.



Enter the fascinating world of Amateur Radio economically with high quality Heathkit equipment

You can be talking to the world from your own home soon with the help of Heathkit Amateur Radio equipment and self-instruction programs. With our help, you'll be surprised how easy it is to pass the new FCC exams for getting your Novice, Technician or General Class Amateur license. You'll soon be on the air.

Amateur Radio is a many-faceted hobby. For the public service-minded individual, Amateur Radio serves in times of national and international emergencies, and in everyday, routine message handling. The person intrigued by foreign lands will enjoy the opportunity to exchange views with Amateur Radio operators in other countries. Or, if you just like meeting new and interesting people closer to home, you can do that too through Amateur Radio.

For a real challenge, try QRP or low-power operation. Many Amateurs have worked the world on a couple of watts with our famous HW-8 QRP Transceiver. We offer transceivers to meet your needs whether your interest is in voice communications or CW — the Morse code.

Even if you already have a transceiver, the chances are the complete Heathkit line of Amateur Radio accessories offers some helpful station aid that you can build in kit form for much less than a comparable factory-assembled unit. And thousands of Amateur Radio enthusiasts will attest to the quality of Heathkit Amateur Radio equipment you build yourself.

Not all the Amateur-related or adaptable products are found in the Amateur Radio section of this catalog. If you're into computers, you might want to take a look at page 48 and consider membership in HUG — the Heath User's Group. HUG offers a wide-variety of Amateur Radio computer programs to its members.

Another practical idea for the Amateur is our GC-1107 Digital Clock on page 85. You can build it to show Universal Time, the 24-hour format used by Radio Amateurs. So be on the lookout for other Heathkit products you can adapt to your Amateur Radio hobby as you go through the Catalog.

The best news for the newcomer to Amateur Radio, of course, is that our Novice and General License Self-Instruction Program on page 10 can help you get your license and get on the air. These programs are well-organized to make most efficient use of your time — and make sure you pass your FCC exam the first time. So sure are we, that we offer a money-back guarantee if you fail to pass your exam after completing either one of these programs. That's confidence!

You can also build your own Amateur Radio equipment with confidence... even if you've never built an electronic kit before. Our step-by-step instruction manuals guide you through every enjoyable minute. And talk about a thrill! Imagine talking with another state or country on the Amateur equipment you built with your own hands. It's all possible, and easier than you might think — thanks to a complete line of Amateur Radio equipment and accessories from the more than 200 Hams at Heath, who invite you to enter the exciting world of Amateur Radio.



The new VF-7401 2-Meter FM Digital Scanning Transceiver is loaded with all the features you want at a price you can afford

\$339⁹⁵
with PTT
microphone

- Continuously adjustable, 15-watt output to match any amplifier
- 1 MHz scanning capability
- Needs absolutely no crystals
- Preprogrammed power-up on the channel of your choice
- Microphone is detachable
- Use either mobile or base

Throw away your repeater guide! Never again will you have to search through all that tiny print looking for a repeater as you drive through unfamiliar territory. The new Heathkit VF-7401 2-Meter FM Digital Scanning Transceiver will find all of the local activity for you. Because this exciting new transceiver scans the entire 2-meter band in 1 MHz segments, and when it finds an active channel, it stops!

The VF-7401 stays on the active channel, when you select the Scan/Lock Mode, until you reset it by pressing the 10 kHz button. Or, set your VF-7401 in the Scan/Latch mode, and it will resume scanning when the received transmission ends.

Of course, you don't have to put up with every weak signal that reaches your antenna. If you hate "picket-fencing," use the VF-7401's squelch control as a scanning sensitivity control. You can adjust the receiver to stop scanning for "full-quieting" signals only. Or, open up the squelch when there are 2-meter

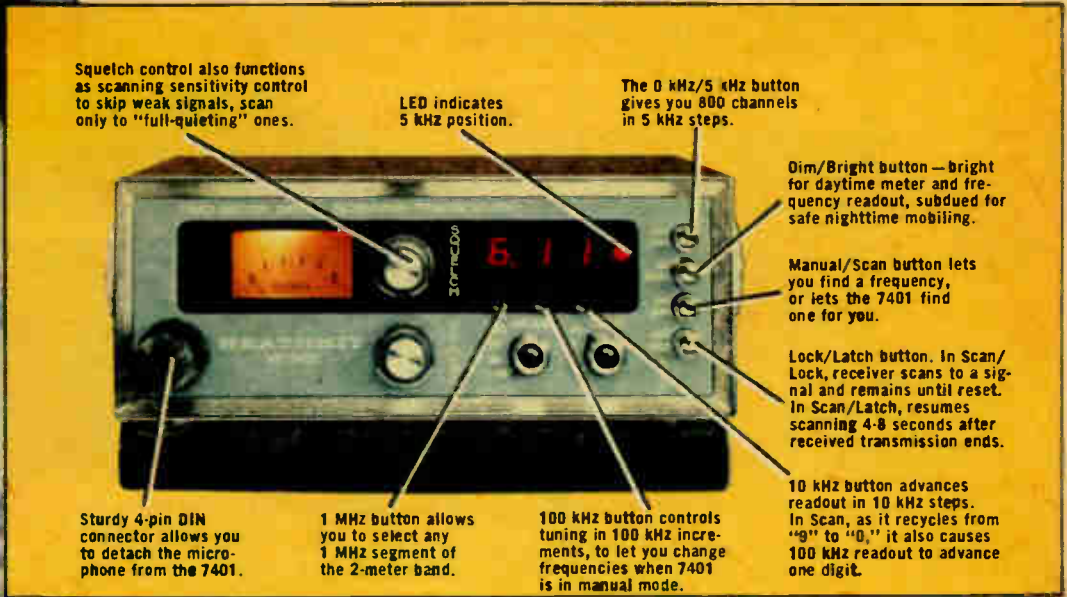
band openings. Your VF-7401 will find that "2-meter DX" for you without the tedious task of flipping through channels one by one.

Naturally, your VF-7401 lets you change frequencies manually, too. Three small front panel switches allow you to select manually any desired frequency at the scan rate. Once you have the frequency you want, you may also offset it by a separate 5 kHz switch.

Your new VF-7401 will "power-up" on the frequency of your choice. While building your transceiver, you program in any simplex or repeater frequency. Then, every time you turn it on, before it begins to scan, you can monitor that frequency first. Besides simplex, your VF-7401 has +600 kHz, -600 kHz and 1 MHz offsets. It can accommodate any 2-meter amateur band offset combination.

The VF-7401 is a continuously adjustable, 15-watt (nominal), solid-state, narrow-band FM transceiver.





Squelch control also functions as scanning sensitivity control to skip weak signals, scan only to "full-quieting" ones.

LED indicates 5 kHz position.

The 0 kHz/5 kHz button gives you 800 channels in 5 kHz steps.

Dim/Bright button — bright for daytime meter and frequency readout, subdued for safe nighttime moiling.

Manual/Scan button lets you find a frequency, or lets the 7401 find one for you.

Lock/Latch button. In Scan/Lock, receiver scans to a signal and remains until reset. In Scan/Latch, resumes scanning 4-8 seconds after received transmission ends.

10 kHz button advances readout in 10 kHz steps. In Scan, as it recycles from "9" to "0," it also causes 100 kHz readout to advance one digit.

Sturdy 4-pin DIN connector allows you to detach the microphone from the 7401.

1 MHz button allows you to select any 1 MHz segment of the 2-meter band.

100 kHz button controls tuning in 100 kHz increments, to let you change frequencies when 7401 is in manual mode.

adjustment, both now accessible from the rear panel without removing the case. Also added — a sturdy SO-239 antenna connector, plus chassis-mounted power and external speaker jacks.

Your VF-7401 has a detachable microphone with rugged 4-pin DIN connector. And if you choose the optional Micoder II Microphone/Auto Patch Encoder (described on page 15), stop worrying about when your microphone battery is going to run down — you don't need one anymore! The Micoder II now draws its power directly from the VF-7401.

Your VF-7401 Two-meter FM Digital Scanning Transceiver comes complete with a handy gimbal-mount bracket for mobile installation. The Transceiver requires a 13.8 V, 3 amp continuous, 4 amp intermittent, power source such as a charging automobile electrical system, or the optional VFA-7401 AC Power Supply described on page 6.

So, throw away that repeater guide and get in on all the fun you've been missing on two-meters. The exciting and versatile new Heathkit VF-7401 is waiting to make all of your two-meter contacts more enjoyable than ever. This feature-loaded Two-meter Digital Scanning Transceiver is the ultimate in state-of-the-art two-meter equipment, and it's brought to you by the more than 200 Hams at Heath. They've spent a lot of time and effort to make sure that the

7401 you build will give you years of service and enjoyment.

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 μ V for 12 dB SINAD (or 15 dB of quieting). Squelch Threshold: 0.3 μ V or less. Audio Output: 1.5 watts at less than 10% THD; 2 watts maximum output (typical). Image Rejection: -50 dB or greater. Spurious Rejection: -50 dB or greater. IF Rejection: -80 dB or greater. Internally Generated Spurious Signals: Below 1 μ V equivalent. Bandwidth: 6 dB at 15 kHz minimum and 60 dB at 30 kHz maximum. Modulation Acceptance: 6.5 kHz minimum. Transmitter: Power Output: 15 watts nominal to a 50 Ω < 0° (resistive) load at 25°C and 13.8 VDC. Harmonic and Spurious Output: -60 dB. Modulation: FM, 0-7 kHz, adjustable. Duty Cycle: 100% with VSWR of less than 10:1. Tone Encoder: 3 tones 70 to 200 Hz, approx. 700 Hz deviation. Transmitter Offset: -600 kHz, +600 kHz, +1 MHz (AUX). General: Frequency Coverage: Any 4 MHz segment from 143.5 to 148.5 MHz. Frequency Increments: 5 kHz. Frequency Stability: +.0015%. Operating Temperature Range: +15° F to +125° F (-10° C to +50° C). Operating Voltage Range: 12.6 to 16 VDC (13.8 VDC, nominal). Current Consumption: Receive Mode: 550 mA max., squelched; 750 mA max., full rated audio. Transmit Mode: 4A max. at 13.8 VDC. Dimensions: 2 3/4" H x 7 1/4" W x 10 1/4" D (7.0 x 18.4 x 26.0 cm).

Its fully-synthesized digital circuitry provides full-band coverage without the need for additional crystals — even MARS and CAP channels are covered. Featuring a hot receiver, the new VF-7401 incorporates 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.

An improved synthesizer eliminates the need for a panel-mounted sync lock light (it's inside, should you need it for servicing). And brought out from inside are power amp tuning and output power level

Code Courses, Study Guides and Reference Books to help you get more from Amateur Radio

Ameco Junior Cassette Code Course. This tape cassette course presents 10 lessons of Morse Code instruction. It begins with an introduction to the code symbols for letters of the alphabet, numerals and punctuation. It increases code speed progressively, finally taking you through eight words-per-minute, more than enough to qualify you for the FCC Novice or Technician class license code requirement of five words-per-minute.
HOP-432, Shpg. wt. 1 lb. 4.95

Ameco Senior Code Course. This course consists of two 33 RPM long playing records. It contains 22 lessons taking you from an introduction to the code through 18 words-per-minute.
HOP-433, Shpg. wt. 2 lbs. 7.50

Ameco Senior Cassette Code Course. As above, cassettes instead of LP's. HOP-532, Shpg. wt. 1 lb. 8.95

"By the Word" Code Course. Two audio cassettes teach you code using the world-famous "by the word" method. Unique course begins with simple material at 13 words-per-minute, then increasing in complexity, not speed. Develops proficiency in less time than with conventional code course methods.
HDP-132, Wt. 1 lb. 9.95

Amateur Radio License Study Guides. Makes getting your license easy; also serves as a convenient reference.
GENERAL, EOP-123 7.95
ADVANCED, EDP-124 6.95
EXTRA, EOP-125 5.95

US Callbook. Complete listing of Radio Amateurs in all US call areas and territories: SSTV, AMSAT, OSCAR users, Great Circle Bearings, more, 1070 pages.
EOP-126 16.95

OX Callbook. Complete listing of foreign Amateurs, addresses, postal rate charts, call zone maps, world time conversion chart, world QSL bureaus, more. 900 pages.
EDP-127 15.95

1980 Edition. ARRL Radio Amateur's Handbook. Up to date electronics theory and application. Covers all facets of Amateur operation. 538 pages in new, larger format.
HDP-293 10.00

73 Dipole Antennas. Description, construction of 73 different dipole and long-wire antennas. 160 pages.
EDP-180 4.95

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

(See page 52 for book ordering information)



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

AMATEUR RADIO/5

NEW

New AC Supply gives you double duty from your 7401

\$42⁹⁵

- Gives you the flexibility of operating your new VF-7401 from your home QTH, as well as on the highway
- A well-regulated supply providing 13.8 V, 3A continuous, 4A intermittent
- Rugged and reliable construction to give you years of service
- Modern "military" styling and color to match your VF-7401 Transceiver
- An easy-to-build kit you can get up and running quickly, and can wire for either 120 VAC or 240 VAC use

The new Heathkit Model VFA-7401-1 AC Power Supply is the perfect match-up for the VF-7401 2-Meter FM Digital Scanning Transceiver on pages 4 and 5. It provides well-regulated, low voltage, DC power from an AC power so you can put your VF-7401 on the air from your amateur station, as well as on the highway.

The VFA-7401 is an easy-to-build kit, so you can get it up and running quickly. And you can wire it to operate from either a 120-volt or 240-volt 50/60 Hz AC power line. It will maintain output regulation within 1.5%.

Designed primarily to provide +13.8 VDC for the VF-7401, this supply may also be used with other equipment that requires +13.8 VDC at a maximum of 3.0A continuous, 4A intermittent.

Rugged and reliable, this supply has been designed to match the VF-7401 in the popular, attractive "military" styling and color. It will be a great addition to your station... and it will give you many years of dependable service.



Kit VFA-7401-1, Shpg. wt. 7 lbs. 42.95

VFA-7401 1 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (Adjustable from approximately 12 to 15 VDC). Output Current: 4.0 amperes for 20 minutes (40% duty cycle), 3.0 amperes continuous. Output Regulation: Better than 1.5% from no load to full load (3.0 amperes). Output Ripple: Less than 2 mV peak-to-peak. Power Requirement: 110 to 130 VAC or 220 to 260 VAC, 50/60 Hz, at 85 watts (full load). Overall Dimensions: 3 1/4" H x 7 1/4" W x 9 7/8" D (7.8 x 18.4 x 25.1 cm).

Heathkit 40-Watt Amplifier increases your range on 2-meters

\$54⁹⁵

- Put extra punch in your 2-meter signal with this rugged 40-Watt Amplifier. The more than 200 Hams at Heath have designed it to meet and surpass FCC specs for harmonic and spurious radiation.



Are you tied too closely to your repeater? Or are you missing the fun of "2-meter DX" because of a weak signal? The Heathkit HA-202A 40-Watt Amplifier puts the extra punch in your signal. It delivers a solid 40 watts minimum for just 10 watts in. And it draws only 7 amperes maximum from your car's charging system. The HA-202A features an antenna changeover relay and sensing circuitry for completely automatic T/R switching. Tuned input/output circuits are designed to provide low spurious radiation. A special emitter ballasted configuration withstands VSWR's of up to 3:1. The HA-202A can be internally adjusted to cover any 1.5 MHz portion of the 143-149 MHz band. Final alignment requires a VTVM, wattmeter or SWR bridge. The amp mounts almost anywhere in your car, or team it with the PS-1175 Power Supply on page 12 for a better signal from your home QTH. The HA-202A includes SO-239 connectors for easy hookup.

Kit HA-202A, Shpg. wt. 4 lbs. 54.95
HDP-3622, 3 ft. RG8U jumper with PL259 connectors, 1 lb. 4.95

HA-202A SPECIFICATIONS: Power Output: 20 W @ 5 W in, 40 W @ 10 W in, 50W @ 15 W in. Impedance: 50Ω nom. Input VSWR: 1.5:1 max. Max. Stable VSWR: 3:1. Harmonic and Spurious Radiation: -60 dB or better. Standby Current: 1 mA. Power Requirement: 12-16 VDC, 7 A max. Size: 3" H x 4 1/4" W x 5 1/2" D.

Heathkit 10-Watt Amp gives your 2-meter hand-held clout

\$39⁹⁵

- Your 2-meter hand-held will be able to compete with "the big boys" once you add this compact 10-Watt Amplifier. It's designed to meet or surpass the latest FCC specifications for harmonic and spurious radiation, too.



Just because you like the convenience and portability of a hand-held 2-meter transceiver, it doesn't mean that you have to take a back seat when it comes to increasing your range. The Heathkit HA-201A 2-Meter Amplifier will get your hand-held into your favorite repeater full-quieting every time, because it delivers up to a full-bodied 10 watts for a mere 1 1/2-watt input. Or you can have 8 watts for just 1 watt in. It's an ideal amplifier for use with any low-power 2-meter transceiver such as the Heathkit VF-2031 on page 7.

The HA-201A features fully automatic operation with solid-state transmit/receive switching. It incorporates tuned input and output for maximum efficiency and reduced spurious emissions, and meets or surpasses FCC requirements for spurs and harmonics. It has been designed, also, to withstand infinite VSWR load without failure. Your HA-201A kit includes a dummy load and RF detector, as well as SO-239 connectors for easy hookup. A VTVM is necessary for tuneup. And the Amplifier requires a 12-16 VDC power source for operation.

Kit HA-201A, Shpg. wt. 2 lbs. 39.95
HDP-3622, 3-ft. RG8U jumper with PL259 connectors, 1 lb. 4.95

HA-201A SPECIFICATIONS: Power Output (at 13.6 VDC input): 8 W @ 1 W in; 10 W @ 1.5 W in. Input/Output Impedance: 50Ω. Power Requirement: 12-16 VDC, 2.2 A max. Size: 2 3/4" H x 5 5/8" W x 5 1/8" L.

\$199⁹⁵ buys it all in a 2-meter hand-held

- VF-2031 2-meter hand-held Transceiver
- Drop-in AC Battery Charger
- Rechargeable nickel-cadmium Battery Pack

Everything you need to begin operating, including 146.94 MHz crystal

Carry 2-meter action with you wherever you go with the great Heathkit VF-2031. You get a minimum of 2 watts out, more than enough to put you into your local repeater full quieting every time. The signal is clean, too. Careful design and plenty of internal shielding insures stability and puts spurs a full 60 dB down. With the Heathkit VF-2031, you'll never need to worry about accidentally accessing the wrong repeater or interfering with other services.

Single crystal transmit and receive circuitry covers 8 of your favorite channels. You can choose simplex or duplex with a ± 600 kHz split at the flip of a switch.

With separate built-in microphone and speaker, adjustable deviation, and performance-designed FM engineering, what your 2031 says and hears is always crisp and clean. Sensitivity? Less than 0.5 μ V quiets the 2031's hot receiver section a full 20 dB. Volume and squelch are fully adjustable, too, so you can tailor your operation to match almost any listening condition. The VF-2031 covers 143.5 to 148.5 MHz.

There's more: The VF-2031 comes complete with a "rubber duckie" antenna and a crystal for 146.94 operation. There's a built-in phone jack with earphone included. A universal BNC output connector to give you a wide choice in antenna selection. And to give your 2031 even more flexibility, add the optional VFA-2031-3 encoder and enjoy the versatility of instant auto-patch accessing. Includes a long-life rechargeable nickel-cadmium battery pack to keep you on the air for up to 10 full hours. When the charge runs low, slip the 2031 into the drop-in charger, also included in the purchase price. The VF-2031 can be recharged usually in 14-24 hours.

The exciting VF-2031 is compact and lightweight, and features a rugged, high-impact case. Compare features and check the specs. You'll discover that the Heathkit VF-2031 is one of the most versatile hand-held transceivers on the market. And at this all inclusive price, it's also one of the best bargains in Amateur Radio today.

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

- "Rubber duckie" Antenna
- Built-in phone jack and earphone
- 8 Channel capability, duplex or simplex

Fitted Holster-style Carrying Case. See photo at right. Just put the VF-2031 on your belt. The top-mounted controls remain easily accessible.

VFA-2031-2, Shpg. wt. 1 lb. 17.95

Crystal Certificates. Specify frequency and send to manufacturer. Receive crystal postpaid by return mail. Order one certificate for each crystal you need.

VFA-2031-4, Postpaid 6.95

Auto-Patch Encoder. Access telephone lines through repeaters with auto-patch inputs to make telephone calls with your VF-2031.

VFA-2031-3, Shpg. wt. 1 lb. 34.95

Continuous Tone Encoder. Allows you to access most repeaters using your hand-held transceiver. Builds right into VF-2031.

VFA-2031-5, Shpg. wt. 1 lb. 34.95

External Microphone. PTT MIC with coiled cord plugs into VF-2031 so you can transmit without removing unit from holster. Coiled Mic cord attaches to a handy clip on the case so when you're not operating, both your hands are free.

Kit VFA-2031-6, Shpg. wt. 1 lb. 29.95

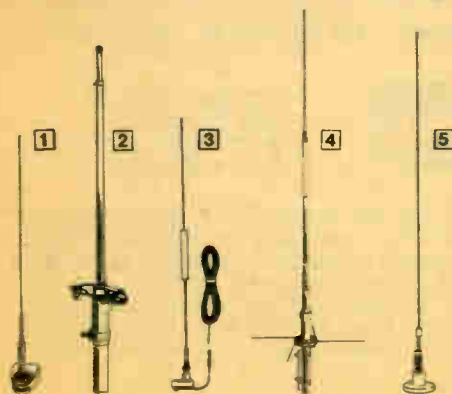
10-Watt Amplifier. Get greater range with your VF-2031. Full description on page 6.

Kit HA-201A, Shpg. wt. 2 lbs. 39.95

VF-2031 SPECIFICATIONS: Receiver — Sensitivity: 0.5 μ V or less for 20 dB quieting; 0.35 μ V for 12 dB SINAD. Squelch Threshold: 0.25 μ V or less. Audio Output: 1 watt at less than 10% THD. Operating Frequency Stability: 0.005% or better. Adjacent Channel Selectivity: 40 dB or greater. Image Rejection: —45 dB or greater. IF Frequency: 10.7 MHz. Usable Bandwidth: 7 kHz. TRANSMITTER: Power Output: 2.0 watts or more at 12.5 VDC (nominal). Deviation: 5 kHz (adjustable). Spurious Output: —60 dB or greater referenced to carrier. Stability: 0.005% or better. Oscillator Frequency: approx. 15 MHz. Multiplication Factor: x9. Type of Modulation: Frequency. Transmitter Offsets: 0 (simplex), —600 kHz, +600 kHz with crystals supplied. GENERAL: Frequency Coverage: 143.5 to 148.5 MHz (unit will meet specs ± 1 MHz from the alignment frequency within this range). Antenna Impedance: 50 ohms. Size (Overall): 9 $\frac{1}{8}$ " H x 3 $\frac{3}{8}$ " W x 1 $\frac{7}{8}$ " D. Transceiver Weight, including batteries: 2 lbs.



Shown with optional auto-patch encoder



Assembled 2-meter antennas to get your signal out from your shack or vehicle

① Hustler standard gain 2M mobile antenna. $\frac{5}{8}$ wavelength rear deck whip. 3.4 dB gain, 1.1:1 SWR. Handles 100 watts. 47" radiator. 17' coax and connectors included. Antenna is removable from mount. HWA-202-3, Shpg. wt. 2 lbs. 23.95

② Cushcraft AR-2 Ringo standard gain fixed antenna. 135-175 MHz. Omnidirectional. 3.75 dB gain, 1.1:1 SWR. 100 watts. 52 Ω feed with PL-259. Less coax. Mfr's suggested list price, \$24.95. HWA-202-11, Shpg. wt. 2 lbs. Our price, 19.95

③ Hustler CGT-144 super gain 2M collinear mobile antenna. Phased $\frac{1}{4}$ and $\frac{5}{8}$ wavelength radiators. 5.2 dB gain. 1.1:1 SWR; to 200 watts; Height 85".

17' RG-58/U coax and connectors are included.

HWA-202-9, Shpg. wt. 3 lbs. 39.95

④ Hustler super gain fixed antenna. Covers 140-150 MHz. 6 dB gain. 6 MHz bandwidth. 1.2:1 SWR. 1 kW. SO-239 connector. 117" tall. 4 radials of 21" alum. rod. For 1 $\frac{3}{4}$ " mast. Less coax.

HWA-202-10, Shpg. wt. 7 lbs. 79.95

⑤ Cushcraft 2-Meter Mobile Magnetic-Mount Antenna. $\frac{5}{8}$ wave. 3 dB gain. Covers 145-148 MHz. Wind-tested in excess of 90 mph. Includes PL-259 connector, cable. Preassembled and ready to use. Provides excellent 2-M reception, transmission.

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



Heathkit HW-101—the best buy in Ham Radio today — over 29,000 sold throughout the world

\$399⁹⁵

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

The Heathkit HW-101 is the economical, value packed way to put yourself on the bands. And with the kind of performance this transceiver has to offer, you'll find it hard to believe you're operating on a budget. Full coverage of all the bands, 80 through 10, lets you enjoy the total spectrum of ham radio operation. Operate PTT or VOX on upper or lower sideband or select CW transceive — they're all there, the options you'd expect to find on a transceiver that's always top notch.

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

There are a lot more features. A fast acting AGC circuit prevents fading and blasting. There's front panel metering to show you signal strength, plate current, and relative power out. And to make sure you're always right on frequency and inside the band, the HW-101's built in 100 kHz calibrator is ready for reference at the flick of a switch.

The HW-101's transmitter section is a top performer too. Triple action level control prevents distortion-producing overdrive to keep your signal clean. And power? With a rugged pair of reliable 6146s for finals, the HW-101 punches 180 watts PEP in on phone and 170 watts in on CW. Frequency stability is better than 100 Hz per hour after 45 minutes warmup, with less than 100 Hz variation for a 10% line voltage variation. An FET VFO provides excellent thermal stability for heavy-duty operating without excessive heat buildup. The 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. And when you're ready to go the legal limit, by adding the SB-201 or -221 Linear Amplifiers (see page 9) to your station, the HW-101 Transceiver will make the perfect exciter.

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. Look over the features and compare price with performance; it's easy to see the Heathkit HW-101 is ham radio's best buy. Requires Heathkit Model PS-23 power supply.

Kit HW-101, Shpg. wt. 22 lbs.	399.95
SBA-301-2, 400 Hz CW Crystal Filter, Shpg. wt. 1 lb.	44.95
Fixed Station AC Power Supply. See page 12 for details.	
Kit PS-23, 17 lbs.	64.95
Kit HS-1661, Matching Speaker, 5 lbs.	29.95

HW-101 SPECIFICATIONS: RECEIVER: Sensitivity: <0.35 μ V for 10 dB S+N/N for SSB operation. SSB Selectivity: (optional SBA-301-2 CW filter); 400 Hz. min. @ 6 dB down; 2.0 kHz max. @ 60 dB down. Spurious Response: Image and IF rejection >50 dB. TRANSMITTER: DC Power Input: SSB 180 W PEP (normal voice, cont. duty cycle). CW 170 W (50% duty cycle). RF Power Output: 100 W on 80 thru 15 M; 80 W on 10 M (50 non-reactive load). Output Impedance: 50 to 75 with <2:1 SWR. Harmonic Radiation: 40 dB below rated output. Mike Input: High impedance. Carrier Suppression: 45 dB down from single-tone output. Unwanted Sideband Suppression: 45 dB. Third Order Distortion: 30 dB from two-tone output. GENERAL: Frequency Coverage: 80-10 M amateur bands. Frequency Stability: <100 Hz per hour drift after 45 minutes warmup from normal ambient conditions. <100 Hz for \pm 10% line voltage variations. Modes of Op: USB, LSB, CW, tune. Dial Calibration: 5 kHz. Calibration: 100 kHz crystal. Power Requirements: 700 to 850 V at 250 mA with 1% maximum ripple; 300 V at 150 mA with 0.05% maximum ripple; -115 V at 10 mA with 0.5% maximum ripple; 12 V AC/DC at 5.76 amps. (See power supplies on pg. 93). Dimensions: 6 $\frac{1}{2}$ " H x 14 $\frac{1}{2}$ " W x 13 $\frac{3}{8}$ " D.

Back by popular demand — the SB-104A HF Transceiver!



This popular solid-state Transceiver will be offered again in our next catalog.

You asked for it, so the more than 200 Hams at Heath are bringing back the popular SB-104A Transceiver. This feature-laden HF Transceiver utilizes broadband technology to eliminate time-consuming pre-tuning and to give quick selection of the 80 through 10 meter Amateur bands. 100 watts PEP on SSB or 100 watts CW on all bands, plus 1-watt QRP operation. Digital read-out. Individual pre-selector filters for each band. See the SB-104A Transceiver and its full line of accessories right here in your next Heathkit Catalog.

The Heathkit SB-221 Linear Amplifier saves you \$20 — work the big DX with a solid 20 over 9 signal

Save \$20.00

\$579⁹⁵

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

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

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

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

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

A great amplifier with a great price, and it has full FCC acceptance.

Kit SB-221, Shpg. wt. 66 lbs. Was \$599.95, Now Only 579.95
HDP-3622, 3-ft. RG8/U Jumper w/PL259 Connectors, Shpg. wt. 1 lb. 4.95



SB-221 SPECIFICATIONS. Band coverage: 80, 40, 20 & 15 meters. Max. power input: SSB, 2000 W. PEP; CW, 1000 W; RTTY, 1000 W. Driving power: 100 W. Duty cycle: SSB, Continuous voice modulation. CW, Continuous (max. key-down 10 min.). RTTY, 50% (max. transmit time 10 min.). Third order distortion: -30 dB or better. Input Impedance: 52 Ω unbal. Output impedance: 50 Ω unbal.; SWR 2:1 or less. Front panel controls: Tune, Load, Band, Sensitivity Meter Switch, Power, CW/Tune — SSB, Plate meter, Multi-meter (Grid mA, Rel. Power, High Voltage) Rear panel: Line cord, circuit breakers (two 10 A). Antenna Relay (phono). ALC (phono). RF Input (SO-239). Ground post. RF Output (SO-239). Tubes: Two Eimac 3-500Z. Power req.: 12G VAC, 50/60 Hz @ 20 amp. max. 240 VAC, 50/60 Hz @ 10 amp. maximum. Cabinet dimensions: 8¼" H x 14¾" W x 14½" D (20.96 x 37.78 x 36.83 cm).

Punch your signal through the QRM and save \$20.00 when you get the Heathkit SB-201 1 kW Linear

Save \$20.00

\$399⁹⁵

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

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

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

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

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

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

From its front panel right on back to the rear apron, the SB-201 is packed with features that make this amplifier a bargain. Has full FCC acceptance.

Kit SB-201, Shpg. wt. 47 lbs. Was \$419.95, Now Only 399.95
HDP-3622, 3-ft. RG8/U Jumper w/PL259 Connectors, Shpg. wt. 1 lb. 4.95



SB-201 SPECIFICATIONS: Band coverage: 80, 40, 20 & 15 meters. Maximum power input: 1200 watts P.E.P. SSB, 1000 watts CW. Driving power required: 100 watts. Duty cycle: SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). Third order distortion: -30 dB or better at 1000 watts P.E.P. Output impedance: 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. Input impedance: 52 ohm unbalanced; broad-band pretuned input circuit requires no tuning. Meter functions: 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. Front panel controls: Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. Tube complement: Two 572B/T-160-L (in parallel). Power requirement: 120 volts AC @ 16 amperes (maximum), 240 volts AC @ 8 amperes (maximum). Cabinet dimensions: 6¾" H x 14¾" W x 13¾" D.



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

AMATEUR RADIO/9

Get your ticket and get on the air — faster and easier — with the Heathkit Novice License Program

\$39⁹⁵

Here's a self-instruction program that's guaranteed to help you get your Novice ticket and talk to the world! This deluxe learning program prepares you for the new Amateur Radio Novice FCC exam, and provides you with helpful guidelines for setting up and operating your own station once you pass the exam. When you have completed the Novice License program, you will be able to send and receive the Morse code accurately at the rate of five words per minute, and to pass a 20-question, multiple-choice written test from the FCC.

Note: This Program prepares you for the latest FCC examinations. We guarantee it.

At the end of each module, a multiple choice exam checks your understanding and retention of the material. After Module 9, two practice exams and a final exam styled after the actual FCC exam give you test-taking experience to make the actual thing a breeze. And, by successfully passing the optional final exam with a grade of 75% or better, you will earn 1.0 CEU and a Certificate of Achievement.

The Novice License Program includes two audio cassette tapes to aid you. The first contains an introduction to Amateur Radio, an explanation of RST

signal reporting, a review of circuit components, and a review of practical circuits. The second tape teaches you the Morse code in letter groups and then helps you bring your code speed up to five words per minute.

In addition, you will receive a set of Operating Aids, plus an attractive 31" x 22" Frequency Spectrum Chart and matching U.S. Call Area Map for display on the walls of your Ham "shack." All materials in this Program are packaged in an attractive vinyl binder for convenient reference.

This Program is guaranteed to help you get your license. If you fail to pass your FCC Novice exam after completing the course, we will REFUND your money. Simply return the program materials, along with your receipt and a copy of your rejection notice from the FCC.

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

ER-3701, Shpg. wt. 7 lbs. **39.95**
Kit HD-1416, CW Oscillator (see below)
Wt. 2 lbs. **13.95**



The Heathkit General Class Amateur Radio Program helps you move up to the thrill of voice communications

\$49⁹⁵

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

Note: This Program prepares you for the latest FCC examinations. We guarantee it.

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

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

An informative text takes you through the subjects covered on the new FCC written test. It concentrates on the information needed to pass the exam, so you don't get bogged down learning information that won't be covered by the FCC.

A simulated FCC written test gives you test-taking

experience, and allows you to review problem areas so you'll be more prepared for the actual exam. Once you pass your General exam, send us a copy of your new license or FCC notification of passing to receive 5.0 CEU's and a Certificate of Completion.

Your General License Program includes:

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

The Program is arranged in 10 units:

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

The General Class License Program carries the same guarantee as the ER-3701 Novice Program above.
ER-3702, Shpg. wt. 24 lbs. **49.95**



The Heathkit General License Program leaves nothing to chance. It's designed to help you get your license in a way that's organized, fun and easy. This Program is so good that we guarantee you'll get your license. So trade in your key for a microphone today.

Build up your code speed with this handy CW Oscillator

\$13⁹⁵

Get your speed up and pass your FCC exam with this handy Practice CW Oscillator. It features a telegraph key, phone jack and built-in speaker, plus volume and tone controls. And once you get your license, the HD-1416 can serve as a side tone oscillator for any transmitter using grid block keying. The cabinet measures 2 $\frac{3}{8}$ " H x 4 $\frac{1}{8}$ " W x 4 $\frac{3}{8}$ " D. It operates on a single 9 V transistor battery (not included). This easy-to-build, first-time kit even includes solder, as do all Heathkit electronic kits.

Kit HD-1416, Shpg. wt. 2 lbs. **13.95**

10/AMATEUR RADIO

Get a money-saving start in Amateur Radio today!

**SAVE
\$8⁹⁵**

This money-saving package can help you get started in the exciting world of Amateur Radio. Why delay?

We want to help you get started in Amateur Radio by saving you money on the ER-3701 Novice License Program (above) and the HD-1416 Code Practice Oscillator (at left) when you purchase them together. And to save you even more, we include a certificate good for a 10% discount on your first purchase of up to \$100 worth of Amateur gear from the Heathkit catalog. If purchased separately, the CW Oscillator and Novice Program would cost you \$53.90.

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



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

Great Amateur equipment at prices you can afford



The HX-1681 QSK CW Transmitter has power to span the globe

\$239⁹⁵

Buy the pair and save \$60

- 100 watts out on 80-15, 75 watts out on 10
- No crystals—built-in VFO
- Full break-in (QSK)
- Solid-state TR switching
- Rugged 6146 finals

Whether you're a veteran brass-pounder or have just earned your Novice ticket, the HX-1681 QSK Transmitter is the ideal CW transmitter for you. You get full break-in capability, so you can hear other stations whenever your key is up... even between individual dits and dahs of your 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 TR switching, adjustable sidetone output, and receiver muting. Keying is provided for adding an external power amp.

Covers 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5 and 28.0-28.5 MHz. You need the Heathkit PS-23 power supply on page 12. 6³/₄" H x 12³/₄" W x 12" D.

Kit HX-1681, Shpg. wt. 16 lbs. 239.95

Kit PS-23C, AC Power Supply, Shpg. wt. 17 lbs. 64.95

SAVE \$60. HRS-1680 Transmitter and Receiver. Wt. 37 lbs. 399.90

HR-1680 SSB/CW Receiver — ideal for serious Ham band listening

\$219⁹⁵

Buy the pair and save \$60

- No instrument alignment
- Dual conversion front end works 80 through 10 M
- 0.5 μ V sensitivity
- 4-Pole crystal filtering
- Active audio filtering
- Built-in preselector
- Built-in 100 kHz calibrator

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 hot dual-conversion front end and 0.5 μ V sensitivity covers 80 through 10 meters: 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5, 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. Also features built-in 100 kHz calibrator.

Assembly is easy, thanks to the detailed Heathkit manual. And you can align your HR-1680 without instruments. 120/240 VAC or 11.5-15 VDC. 6³/₄" H x 12³/₄" W x 12" D.

Kit HR-1680, Shpg. wt. 14 lbs. 219.95

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

SAVE \$60. HRS-1680 Transmitter and Receiver. Wt. 37 lbs. 399.90

For Novice or Extra, at home or in the great outdoors, the HW-8 is your passport to the ultimate challenge of QRP operation

\$139⁹⁵

- 80, 40, 20 and 15 meters CW
- 0.2 μ V receiver sensitivity
- Adjustable T/R delay and semi break-in
- Tunable preselector
- Two-position active audio filter
- Front panel meter to show relative power

Put more fun in a great hobby. Try QRP operation with the Heathkit HW-8. With your skill and this great little CW transceiver to back you up, you'll be amazed at what you can do. Join the growing number of Hams going to solar-powered QRP operation. Or power your HW-8 from a trail bike's battery, pumping that QRP signal into the great outdoors through a dipole strung between two pines. You can do it with this great little performer.

Performance starts with a quiet, super-sensitive receiver section. Hum and noise figures are minimal and as little as 0.2 μ V in at the antenna terminal gives you a usable signal. There's a tunable preselector, selectable wide and narrow audio filtering, RF and AF gain controls.

The HW-8 pumps a minimum of 3 watts in on 80 and 40, 2.5 watts in on 20 and 15. Semi-break-in operation with adjustable T/R delay, a built-in relative power meter, pushbutton bandswitching, and stable temperature-compensated VFO. Runs on batteries (not supplied) or from optional AC power supply.

A great performer that's going to give you hours of fun in the shack or on a mountain peak — that's the HW-8. Order yours now and join the growing numbers discovering the fun and fraternity of QRP operation with the popular HW-8. Requires headphones such as the GD-396 on page 81.



Kit HW-8, Shpg. wt. 6 lbs. 139.95

Kit HWA-7-1, AC Power Supply, Shpg. wt. 4 lbs. 19.95

HW-8 SPECIFICATIONS: Transmitter — DC Power Input: 3.5 W (80 M); 3.0 W (40 M); 3.0 W (20 M); 2.5 W (15 M). Frequency Control: built-in VFO. Frequency Stability: Less than 150 Hz/hour drift after 60 minutes warm-up. Receiver: Sensitivity: 0.2 μ V for readable signal; 1 μ V or less for 10 dB S+N/N. Frequency Coverage: 3.5-3.75; 7.0-7.25; 14.0-14.25; 21.0-21.25 MHz. Power Requirement: 12-16 VDC, 90 mA, receive; 430 mA, transmit. Size: 9¹/₄" H x 8¹/₂" W x 4¹/₄" D.

Tied to one band? Use dipole or long wire 80 through 10 meters with the Heathkit 2 kW Antenna Tuner

\$149⁹⁵

- Accepts both balanced and unbalanced feed lines
- Continuously variable inductor gives you exact matching
- Even write in band settings on the erasable front panel

You'll like the way the Heathkit SA-2040 2 kW Antenna Tuner helps you radiate more of your signal by maximizing power transfer from your transmitter to your antenna. It helps you reduce TVI, too. This Tuner gives you the versatility of using a built-in 4:1 balun for balanced feedlines, or unbalanced feedlines, or long wires.

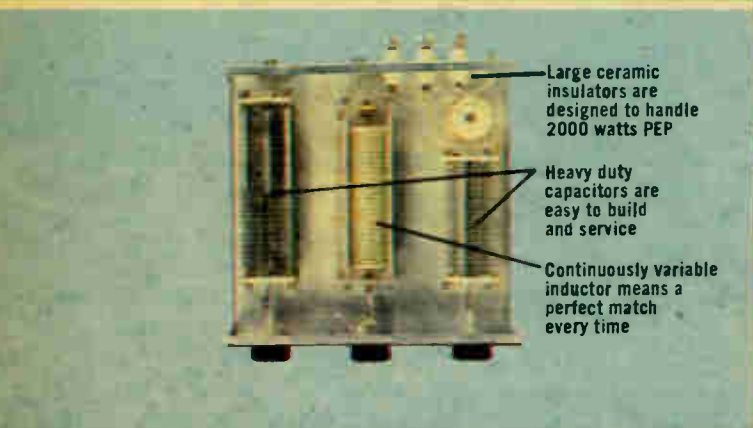
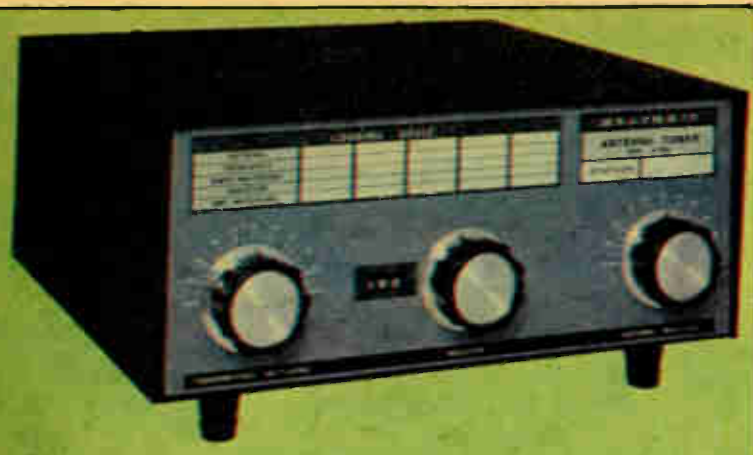
A continuously variable inductor — from 3.5 MHz to 30 MHz — gives you an infinite number of impedance settings, assuring precise antenna matching, and makes the SA-2040 ideal for MARS operation or the recently approved new band allocations. A convenient counter on the front panel indicates inductor settings. The Heathkit manual includes a chart giving you high-, mid- and low-band settings on each HF band, plus a full page logging scale for recording intermediate settings. Write your most frequently used settings on the SA-2040's erasable front panel.

Silver-plated straps and roller contact assembly minimize RF loss at high frequencies. And large ceramic feed-through insulators withstand high voltage RF. This Tuner can handle up to 2000 watts PEP on SSB, and 1000 watts on CW. SO-239 connectors allow incorporation into your 50 Ω system.

This easy-to-build kit is a two-evening project. And when you've tightened the cover, personalize your Tuner with stick-on numerals and letters that let you add your own call sign to the front panel. The rugged black metal cabinet measures 5 $\frac{5}{8}$ " H x 14 $\frac{1}{8}$ " W x 13 $\frac{1}{8}$ " D. Compare this Tuner with the competition — match power handling capabilities, features and price. You'll see why the SA-2040 is your best buy.

Kit SA-2040, Shpg. wt. 15 lbs. 149.95
HDP-3622, 3-ft. RG8U jumper with PL259 connectors, Wt. 1 lb. 4.95

SA-2040 SPECIFICATIONS: Frequency Coverage: 3.5-30 MHz. Power Input Capability: Full legal limit. Input Impedance: 50 ohm at match. Impedance Transformation: 4:1 (balance-to-unbalanced) balun. Output Impedance: Wide Range. Cabinet Dimensions: 5 $\frac{5}{8}$ " H x 14 $\frac{1}{8}$ " W x 13 $\frac{1}{8}$ " D (36.8 x 14.6 x 35.2 cm).



Large ceramic insulators are designed to handle 2000 watts PEP

Heavy duty capacitors are easy to build and service

Continuously variable inductor means a perfect match every time

AC Power Supplies for your Heathkit or other make Amateur Radio gear

1 AC Supply for most 2-meter transceivers

- Power mobile transceiver plus amplifier to add VHF capability at your home QTH

The Heathkit PS-1175 supplies the necessary voltage and current to power the new VF-7401 2-meter transceiver/HA-202A amplifier combination (or most other makes of VHF mobile equipment) from a standard 120 or 240 VAC outlet for base station operation. Output voltage of the PS-1175 is internally adjustable between approximately 12 and 14.5 volts DC. A Darlington circuit provides exceptionally high gain for excellent regulation. The supply is fused for overload protection, and comes complete with cables and 3-wire line cord. The easy-to-assemble kit even includes a generous supply of solder. Order now and start getting double duty from your mobile transceiver.

Kit PS-1175, Shpg. wt. 15 lbs. 69.95

PS-1175 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (internally adjustable from approx. 12 to 14.5 VDC). Output Current: 10 amperes intermittent, 10 minutes max. (5 amperes continuous). Load Regulation: less than 1% at 10 amperes. Ripples less than 0.5% at 10 amperes. Power Requirement: 120 VAC, 50/60 Hz at 4 amperes, 240 VAC, 50/60 Hz at 2 amperes. Dimensions: 5 $\frac{1}{8}$ " H x 6 $\frac{3}{8}$ " W x 11" D.

2 Here's the Supply to power HF equipment

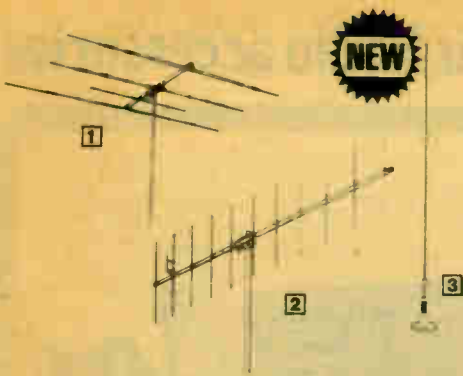
- Here's the ideal power supply for your HW-101 or older Heathkit transceiver

The Heathkit PS-23 Power Supply will provide the operating voltages for the popular HW-101 Transceiver, as well as those necessary for the operation of many older Heathkit transceiver models and other types of Amateur Radio equipment. It has high voltage and two internally selectable low B+ taps. It also provides fixed bias and 12.6 filament voltage. The PS-23 features excellent bias supply filtering, plus extremely low ripple content. A circuit breaker in the primary circuit provides overload and short circuit protection. Instructions are included for either 120 or 240 VAC wiring. This easy-to-assemble kit will have you on the air in no time. And will give you many years of service.

Kit PS-23, Shpg. wt. 17 lbs. 64.95

PS-23 SPECIFICATIONS: High voltage output: 820 VDC no load; 700 VDC @ 250 mA \pm 10%. AC ripple: Less than 1% @ 250 mA. Low voltage output: (High tap) 350 VDC, no load; 300 VDC @ 150 mA \pm 10%, (Low tap) 275 VDC, no load, 250 VDC @ 100 mA; \pm 10%. Less than 0.05% AC ripple @ 150 mA, continuous duty to 175 mA. Fixed bias: -130 VDC \pm 10%, no load; -100 VDC @ 20 mA. Power requirement: 120/240 VAC, 60/50 Hz, 350 watts maximum. Dimensions: 6 $\frac{3}{8}$ " H x 4 $\frac{3}{8}$ " W x 9" L.





1 Cushcraft ATB-34 Tri-Band Beam Antenna

Equals single-band yagi on 10, 15 and 20 meters. 7.5 dB gain. Broad bandwidth, four active elements for super performance. Low-loss 1:1 balun mates with your PL-259 connector. 18'9" turning radius, 5.4 sq. ft. wind area. Assembly required. Mfr's sugg. price \$289.00. UPS shippable.

HDP-1471, Shpg. wt. 46 lbs. 239.95

2 Cushcraft A147-11 11-Element 2-Meter Yagi

Features 13.2 dB forward gain, a 28 dB front-to-back ratio. Feeds with 52-ohm coax. 1000 W. 146-148 mHz. Assembly required. Mfr's sugg. price \$36.95.

HDP-1470, Shpg. wt. 6 lbs. 31.95

3 Cushcraft ATV-5 gives you DX capability

Vertical gives complete CW and SSB coverage on 80 through 10 meters. SWR is 1.5:1 or less at resonance on each band. Full legal power. Built-in coax connector. Nominal 50 ohm input. 28'4" on CW, 24'9" on phone. Assembly required.

HDP-1473, Shpg. wt. 10 lbs. 99.95

4 Alliance HD73 Heavy Duty, Dual-speed Rotator completes your antenna system

For antennas with up to 10.7 sq. ft. wind load area. For masts 1 3/8" to 2 1/2" OD. For 120 VAC, 60 Hz. Uses 6-cond. cable or 8-cond. cable listed below.

HDP-1295, Shpg. wt. 19 lbs. 119.95

IDA-1290-1, 50-ft. 8-cond. cable, 2 lbs. 7.95

IDA-1290-2, 100-ft. 8-cond. cable, 4 lbs. 14.95

IDA-1290-3, 150-ft. 8-cond. cable, 6 lbs. 21.95



Save \$30 on Station Console

SB-634 Five-function Station Console. Features 24-hour digital clock, 10-minute ID timer, RF wattmeter with 200/2000 W full scale ranges, SWR bridge with sensitivity control, phone patch with manual/VOX control. Power/SWR meter takes full legal power, 1.8 to 30 mHz.

Kit SB-634, 13 lbs. Was \$179.95, Now 149.95

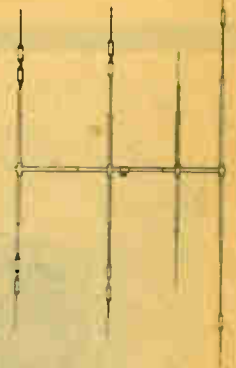
HDP-3622, 3-ft. Coax w/conn., 1 lb. . . . 4.95

Heathkit Tri-bander's easy-to-follow assembly manual gets this high-performance beam on the air quickly

If you've ever built a beam, you'll really appreciate the step-by-step Heathkit assembly manual that comes with the SA-7010 4-Element Tri-Band Yagi. The manual even shows you how to optimize performance for CW, HiPhone or LoPhone portions of each band.

And once you've assembled this compact beam, you'll love its performance. Three active elements and separate matched Hy-Q traps on each band give you an excellent 8.3 dB actual gain over a dipole on 10, 15 and 20 meters. Front-to-back ratio is 25 dB for minimum interference. A separate 10-meter reflector assures correct monoband spacing. Energy transfer is more efficient, with a VSWR of less than 1.5:1 at resonance on each band. The 7010 accepts full legal power, too. Boom length is 15'10", with a 31-foot longest element. Turning radius is 17'5". Wind load area is 5.8 sq. ft. Move up to the SA-7010.

Kit SA-7010, Shpg. wt. 45 lbs. 219.95



Superflex RG-8/U 52-ohm Coaxial Cable with PL-259 connectors (not shown). 11-gauge center foam polyethylene dielectric, 92% copper braided shield.

HDP-3620, 100-ft., Shpg. wt. 11 lbs. 29.95

HDP-3621, 50-ft., Shpg. wt. 6 lbs. 19.95

HDP-3622, 3-ft., Shpg. wt. 1 lb. 4.95

5 Famous "W2AU" Balun for a better match

Reduces TVI, balances antenna current distribution for maximum gain. Guards your antenna's feed point from the weather. Protects your equipment from lightning. For use with dipoles, vees, quads, yagis. Full power. Assembled.

HDP-3615, Shpg. wt. 1 lb. 14.95

6 Coax Switch allows up to four antennas

Choose up to four antennas or interconnecting gear. Handles 2 kW PEP to 250 mHz. 50 ohms.

Kit HD-1234, Shpg. wt. 1 lb. 12.95

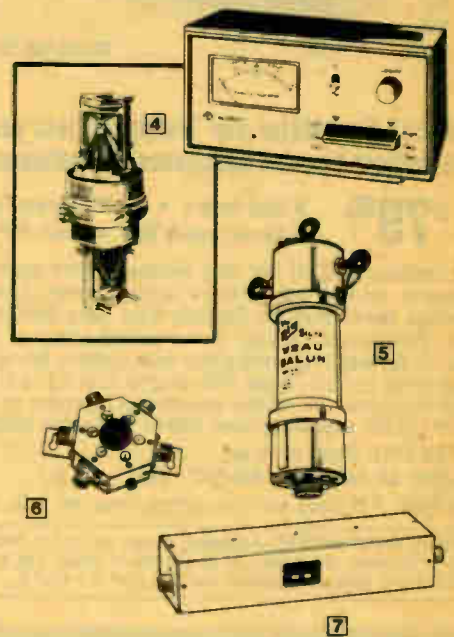
HDP-3622, 3-ft. Coax w/connectors, 1 lb. 4.95

7 Barker and Williamson Low-pass Filter

70 dB attenuation to reduce TVI. Less than 0.3 dB insertion loss. 160-10 meters. 50Ω. Full power.

HDP-3700, Shpg. wt. 2 lbs. 29.95

HDP-3622, 3-ft. Coax w/connectors, 1 lb. 4.95



Change antennas in seconds, save coax with the Heathkit Remote Coax Switch

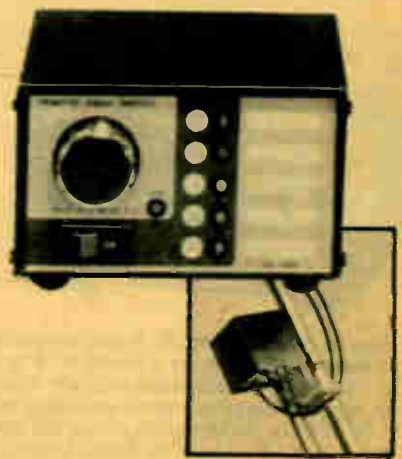
Turn the knob on the SA-1480 Remote Coax Switch. Whirr! A bright LED shows which of up to five antennas you have selected. Saves money, too, replacing five expensive coax feedlines from station to antennas with just one. Accepts signals to 150 mHz. Rated for full power. 50-70 ohm input impedance. Almost no insertion loss—less than 2 dB at 100 mHz. Silver-plated switch contacts reduce SWR. Special shielded, weatherproof switch housing protects switch, further reduces SWR. Grounding position for lightning protection. Includes U-bolt mounting assembly. Control Box is 3 3/8" H, 5 3/4" W, 5 1/4" D. Remote unit: 8 1/4" H, 4 3/8" W, 7 1/2" D. Order eight-wire cable below.

Kit SA-1480, Shpg. wt. 8 lbs. 89.95

IDA-1290-1, 50-ft. 8-cond. cable, 2 lbs. 7.95

IDA-1290-2, 100-ft. 8-cond. cable, 4 lbs. 14.95

IDA-1290-3, 150-ft. 8-cond. cable, 6 lbs. 21.95



Reliable, money-saving Amateur Radio accessories



For
VHF
use

Factory-assembled
and calibrated
sensor can be
mounted in housing or separately

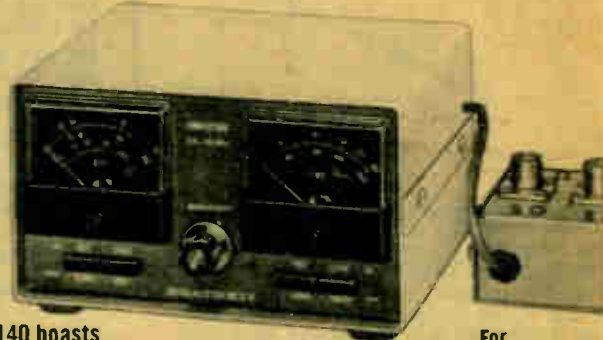
HM-2141 Dual Meter VHF Wattmeter lets you monitor forward and reflected power simultaneously between 50 and 175 MHz

\$79⁹⁵ • Dual meters • $\pm 7.5\%$ Forward power accuracy
• Direct reading SWR • Reads PEP or average power

The Heathkit HM-2141 VHF Dual Wattmeter gives you instant power readings. It measures forward and reflected average power, forward and reflected peak envelope power (PEP) and Standing Wave Ratio (SWR) between 50 MHz and 175 MHz. Simultaneous readings of transmitted output up to 30/300 watts forward and 10/100 watts reflected power make antenna tuning a snap. Average forward accuracy is $\pm 7.5\%$. Reads SWR directly from 1:1 to 3:1. Factory-assembled and calibrated sensor for reliable performance. Operates on 9V battery (not included) or on 120 VAC with the optional GRA-43-1 converter below.

Kit HM-2141, Shpg. wt. 5 lbs. 79.95
PS-2350, AC Adapter for HM-2141, Shpg. wt. 1 lb. 4.95
HDP-3622, 3 ft. coax with connectors. Shpg. wt. 1 lb. 4.95

HM-2141 SPECIFICATIONS: Frequency Range: 50 to 175 MHz. Insertion SWR: less than 1.05:1. Accuracy (full scale): 30 W and 300 W (FWD), 100 W (REF), $\pm 7.5\%$ (AVG), 10 W (REF), $\pm 10\%$ (AVG). Dimensions: 4 $\frac{1}{8}$ " H x 7 $\frac{1}{2}$ " W x 6 $\frac{3}{8}$ " D.



The HM-2140 boasts
 $\pm 5\%$ average forward power accuracy

For
HF use

HM-2140 Dual HF Wattmeter reads forward and reflected power to help you operate your low band station more effectively

\$79⁹⁵ • Reads PEP or average power • Direct reading SWR
• Factory-assembled and calibrated sensor

Handy wattmeter installs in your transmission line to measure forward and reflected power for frequencies between 1.8 and 30 MHz. It measures transmitter output up to 200/2000 watts PEP in the forward direction and up to 50/500 watts reflected. Has dual meters for forward and reflected power and SWR, $\pm 5\%$ forward power accuracy for precision measurements. High and low power ranges and a factory assembled and calibrated sensor insure accurate readings. Reads SWR directly from 1:1 to 3:1. Also reads PEP or Average power. Operates on 9-volt battery (not included) or 120 VAC with converter below.

Kit HM-2140, Shpg. wt. 3 lbs. 79.95
PS-2350, AC Adapter for HM-2140. Shpg. wt. 1 lb. 4.95
HDP-3622, 3-ft. coax with connectors. Shpg. wt. 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 W and 2000 W (FWD), 500 W (REF), $\pm 5\%$, 50 W (REF), $\pm 7.5\%$. Dimensions: 4 $\frac{1}{8}$ " H x 7 $\frac{1}{2}$ " W x 6 $\frac{3}{8}$ " D.

Solid-state Electronic Code Keyer with selectable word speed



Your CW transmissions will be 100% copy with the HD-1410, because sending code is easy, whether you're operating base or portable. The dot and dash paddles travel and tension are easily adjustable. When the two paddles are treated as one, the HD-1410 operates like a single-paddle keyer with dot and dash memories. Iambic operation forms most characters with reduced wrist movement. Dots and dashes are self-completing and

always in proper proportion. During construction, you select the speed range you want — 10 to 35 words a minute or 10 to 60 words per minute. Operates on 120 VAC or 12 VDC. Adjustable side-tone frequency, built-in speaker, headphone jack. A special weighted cabinet helps keep the HD-1410 stable to prevent sliding or fumbling. Its low-profile styling and compact size won't block other controls. 3" H x 5" W x 7 $\frac{1}{2}$ " D. An easy-to-build kit.

Kit HD-1410. Shpg. wt. 4 lbs. 54.95

Value-packed, solid-state Dip Meter covers 1.6 to 250 MHz

Another Heath value — a better dip meter at lower cost. 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 μ A meter movement for positive resonance indications. It includes a phone jack for modulation monitoring. It's smaller and lighter than others, 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. It fits your hand and thanks to its solid-state design and 9-volt battery operation, it's ready to use instantly wherever you are. Easy to build, too — usually just a single evening. The custom molded gray carrying case protects the meter and the 7 color-coded, pre-adjusted plug-in coils in transit, and makes a handy storage place.

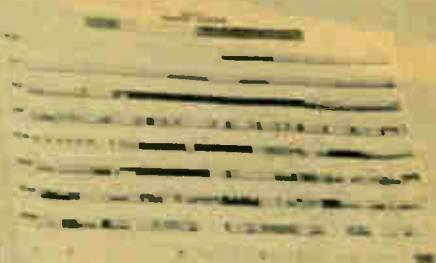


Kit HD-1250, less battery, Shpg. wt. 4 lbs. 64.95

to increase the operating efficiency of your station



NEW



1 Heathkit Micoder™ II Microphone/Auto Patch Encoder. Replace your old mike with the Heathkit Micoder II. 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 auto-patch. Operates on one 9V battery (not supplied) or power from transceiver. Use with most transceivers having a high-impedance input. Includes 6' coiled cord, hanger clip. 3 3/4" H x 2 5/8" W x 1 3/4" D.
Kit HD-1984, Shpg. wt. 1 lb.44.95

MM-102 SPECIFICATIONS: Frequency Range: 1.8 to 30 MHz. Wattmeter Accuracy: ±10% of full-scale reading. Power Capability: 10 to 2000 watts. SWR Sensitivity: Less than 10 watts. Impedance: 50 ohm nominal. Connectors: UHF type SO-239. Dimensions: 5 3/8" H x 2 1/4" W x 6 1/2" D.

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

HDP-3622, 3' jumper w. PL259 conns., 1 lb. ...4.95

2 NEW! Six-socket Multiple Outlet Box provides additional electrical outlets for your equipment in Amateur station, workshop, basement or garage. Features 6 three-hole outlets — 5 switched for killing power to equipment, and 1 unswitched for clock or memory save. Includes fuse holder, fuse and 6' cord. Handles 10A maximum load. For 120 VAC.
Kit HD-1360, Shpg. wt. 2 lbs.12.95

7 Hybrid Phone Patch. Add the versatility of phone patch capability to your station with the HD-15. Individual receiver/transmitter line gain controls simplify adjustment and 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's equipment. Interfacing is a simple matter. Matches 3-16 ohm speakers and hi-Z or 600 ohm inputs. PTT operation. 2 5/8" H x 9 3/4" W x 3 5/8" D.
Kit HD-15, Shpg. wt. 3 lbs.44.95

3 Twelve-socket Multiple Outlet Box. As above, but features 12 3-hole outlets — 11 switched and 1 unswitched. 10A maximum load. 12' cord.
Kit HD-1274, Shpg. wt. 4 lbs.17.95

8 Relative Field Strength Meter. Makes transmitter adjustments quicker and more precise. Provides visual indication that transmitter is radiating a signal, helps tune transmitter for maximum output. Covers 1.8 to 250 MHz. 2 5/8" H x 4 3/4" W x 4 3/8" D.
Kit HD-1426, Shpg. wt. 2 lbs.12.95

4 Frequency Spectrum Chart. This colorful addition to the wall of your Amateur station measures a big 31" W x 22 1/4" H. Shows graphically, in full color, a detailed breakdown of the radio frequency spectrum. Comes to you rolled in a mailing tube.
HDP-1495, Shpg. wt. 1 lb.4.95

9 Portable Twin Speaker ideal for mobiling. Plugs directly into the external speaker jack of most transceivers, tape players, etc. Plug included. Visor mount to overcome road noise. Can be quickly unplugged to remove from vehicle for theft protection. 3 3/4" H x 5 3/4" W x 1 3/4" D. Fully assembled.
HDP-1228, Shpg. wt. 1 lb.12.95

5 Famous Heathkit "Antenna"™ RF Dummy Load. 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 to 300 MHz, and less than 2:1 to 400 MHz. 50 Ω. Oil filled (oil not included).
Kit HN-31, Shpg. wt. 3 lbs.19.95
HDP-3622, 3' jumper w. PL259 conns., 1 lb. ...4.95

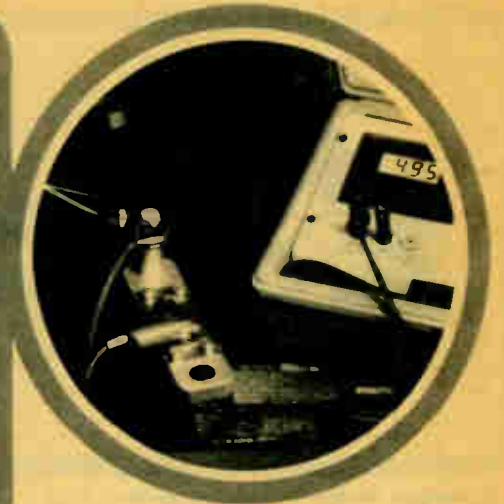
10 Fully assembled Heathkit Mobile PTT Mike. Features a high impedance piezo-ceramic element, with 200 to 5000 Hz response and a peak response frequency of 2300 Hz. Sensitivity: -55 ±3 dB below 1 volt per microbar at 1000 Hz. Complete with cable and mounting clip. Connector not included.
HDP-1340, Shpg. wt. 1 lb.14.95

6 Heathkit Combination HF Wattmeter/SWR Bridge. Features dual power/SWR scales, easy calibration, and extra long interconnect cable for positioning the meter up to six feet from the detector/bridge. Operates over the 1.8 to 30 MHz range with minimal insertion loss and a nominal impedance of 50 ohms.
Kit HM-102, Shpg. wt. 3 lbs.49.95

11 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. Includes cables.
HDP-121A, Shpg. wt. 4 lbs.54.95



Save money—tune up with Heathkit auto instruments



This low-priced portable Heathkit Engine Analyzer gives you digital accuracy!

\$94⁹⁵

- Measures dwell, RPMs, DC voltage, resistance and direct current
- Battery-operated — fewer clumsy wires
- Even does 5-cylinder engines

You will like this new CM-1550 Engine Analyzer — a versatile, accurate and portable digital engine analyzer at a price to fit your budget! You get all these critical tune-up measurements: Dwell for 4 through 8-cylinder engines, accurate to $\pm 0.2\%$; RPMs to 10,000 in two ranges, $\pm 0.1\%$; DC Voltage, in two ranges, to 200 Volts, $\pm 1.5\%$; and Resistance to 2.0 megohms, $\pm 1.5\%$, in three ranges.

With the optional CMA-1550-1 Shunt Accessory, the CM-1550 is one of the few analyzers in its price range that can measure starting current and battery

charge and discharge current — up to 400 amps with $\pm 5\%$ accuracy! And the CM-1550 has a large liquid crystal display that's easy to read.

Power is supplied by a 9-volt battery (not included), which means there are fewer clumsy wires under the hood. The CM-1550's inductive pickup for tach readings is simply attached to any spark plug wire with easy-to-use alligator clips. Thermal insulation on the wiring resists melting or burning under high heat conditions.

Assembles easily in two or three evenings, with just one circuit board. The CM-1550 can be easily calibrated from internal references — no special tools are required. For any spark-ignited engine, whether standard or electronic ignition. Convenient, light plastic carrying case included.

Only Heath puts so much versatility, performance and value into a self-powered portable digital engine analyzer! The CM-1550 (with optional CMA-1550-1 Shunt Accessory shown above) can even measure strong starting, battery charging and battery discharging currents safely.

Kit CM-1550, Shpg. wt. 5 lbs. 94.95

400 Amp Shunt Accessory for CM-1550 Analyzer. Required to use 400 amp range of CM-1550.

CMA-1550-1, Shpg. wt. 1 lb. 14.95

CM-1550 SPECIFICATIONS: Dwell Meter: Four dwell scales: 4 cylinders, 0° to 90° , $\pm 0.2\%$; 5 cylinders, 0° to 72° , $\pm 0.2\%$; 6 cylinders, 0° to 60° , $\pm 0.2\%$; 8 cylinders, 0° to 45° , $\pm 0.2\%$. Tachometer: Two RPM ranges: 0.00 to 10.0 (x1000), ± 100 rpm; 0 to 1999, ± 10 RPM. DC Voltmeter: Two voltage scales: 0 to 199.9 V, $\pm 1.5\%$; 0 to 199.9 V, $\pm 1.5\%$. Ohmmeter: Three resistance scales: 0 to 199.9 ohms; 0 to 19.99 kilohms; 0 to 1.999 megohms, all $\pm 1.5\%$. Direct Current: Two current ranges: 0 to 19.99 amperes, $\pm 3\%$ (standard); 0 to 400 amperes, $\pm 5\%$ (requires optional CMA-1550-1 Shunt Accessory). Operating Temperatures: 0° to 140°F (-18° to $+60^\circ\text{C}$). Power Requirement: 9-volt NEDA 1604 battery. Battery Life: up to 200 hours with alkaline battery. Lo-Bat indicated in last 20% of battery life. Overrange Indicator: Most significant "1" lighted, all other digits blank. Dimensions: $3\frac{1}{2}''$ H x $12\frac{1}{2}''$ W x $8''$ D.

Extra-versatile Timing Light with advance meter and built-in tachometer



\$69⁹⁵

Press the trigger to get a super-bright timing flash and a meter indication of distributor advance in degrees. Take your finger off the trigger to measure engine RPMs. Measures mech. or vacuum advance to 60° from 1500 to 4500 RPM, engine speed to 4500 RPM. Works with all ignition systems. 12 VDC.

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

Use this Timing Light in bright daylight!



\$34⁹⁵

Recommended for GM HEI and other systems. Features handy inductive pickup that clips directly around #1 sparkplug wire. Super-bright xenon flash lamp can be easily seen, even outdoors. Useful light range up to 2 ft. in daylight. Polarity protected. Powered by your car's battery or a separate 12 VDC supply. With all cables, pickup, clips. $6\frac{1}{2}''$ H x $2''$ W x $10''$ L.

Budget-priced, yet powerful

Kit CI-1043, Shpg. wt. 3 lbs. 34.95

Save 20% on this Self-powered Timing Light and Tachometer



\$39⁹⁵

The first self-powered, professional-quality timing light — no need for battery connections or clumsy wires! Just connect to #1 spark plug. Bright timing light. Tach measures to 6000 RPM. Includes rechargeable battery and battery pack. For 12 VDC ignition systems. $7\frac{1}{4}''$ H x $2\frac{5}{8}''$ W x $11\frac{1}{2}''$ L.

Kit CI-1098, 4 lbs. Was \$49.95, Now ... 39.95

Save more with Heathkit professional-quality auto test equipment



Professional-quality Ignition Analyzer assures you of precision auto tuneup

\$479⁹⁵

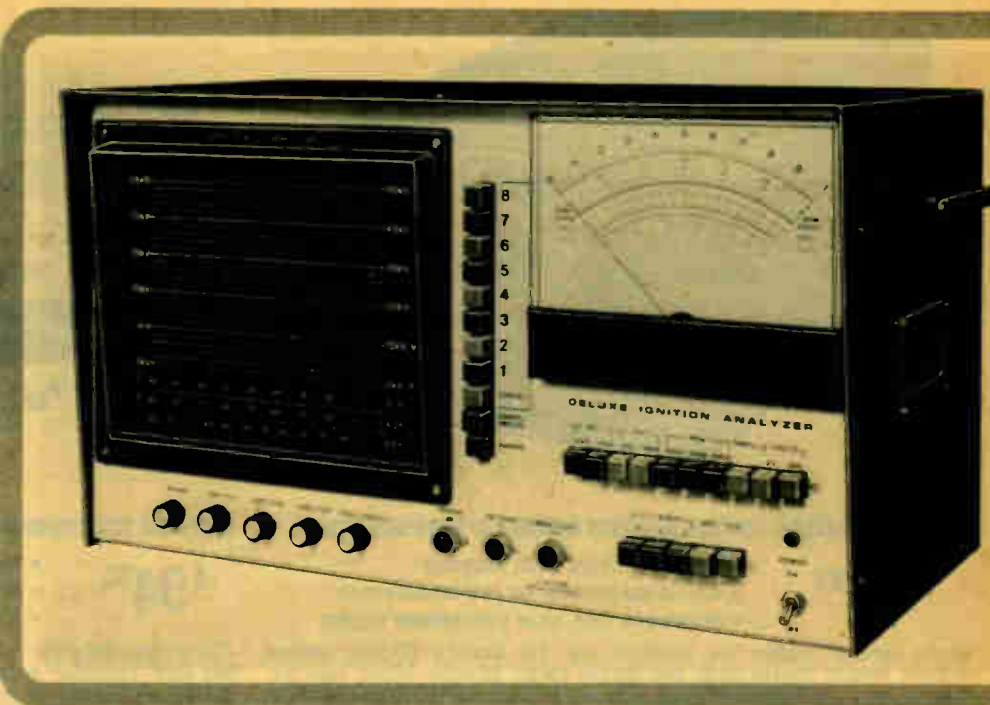
- Pushbutton for individual or multiple cylinders
- Parade and superimpose
- Cylinder shorting for balance

The Heath CO-2600 provides the most asked for features in an ignition analyzer of this quality. Rock steady parade patterns are made possible by the latest design in inductive pickup circuitry and switch selection of number of cylinders — four, six or eight. Dwell, RPM and voltage measurements are indicated on the big eight-inch meter.

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

Cylinder selection buttons can be pushed in multiple numbers so that banks of cylinders can be shorted for carburetor balance and for display of one or more cylinders. Both parade and super-imposed displays of primary or secondary waveforms at two different amplitudes are available on the 12" diagonal CRT.

Rugged high-temperature oil and gas resistant neoprene cables provide easy, positive connections to



engine. Includes adaptor for GM HEI ignition systems. For use with 4, 6, or 8-cylinder (4-cycle) or 2-rotor Wankel engines and standard, transistorized or C-D ignition systems. Assembly and operation of the CO-2600 is a simple matter. This quality instrument measures 12 $\frac{7}{8}$ " H x 25 $\frac{1}{4}$ " W x 14 $\frac{1}{8}$ " D. Order yours now for precision tuneups.

Kit CO-2600, Shpg. wt. 83 lbs. 479.95

COA-2600-2, Alternator Test Adaptor, 1 lb. ... 12.95

Kit COA-2600-4, Timing Light/Advance Meter.

Plugs directly into CO-2600 and provides a bright flash that can be seen even in daylight. Has built-in advance meter to measure distributor advance to 60 degrees from 1500 to 4500 rpm. All cables included. Shpg. wt. 3 lbs. 54.95

WOA-2500-1, Assembled Timing Light.

Shpg. wt. 3 lbs. 29.95

CO-2600 SPECIFICATIONS: For Use With: Standard, transistorized, or C-D ignition systems. 4, 6, or 8-cylinder (4-cycle), or 2-rotor Wankel engines. Signal Pickup: Direct for primary, inductive for parade trigger, and capacitive for secondary. Tachometer and Voltmeter Accuracy: $\pm 3\%$ of full scale on any range. Scope Vertical Expand: Min. 2 to 1. Operating Temp. Range: 32°F to 104°F. Tachometer: 1000 rpm, 3000 rpm, 6000 rpm. Voltmeter: 2 or 20 VDC. Power Requirement: 120, 240 VAC, 50/60 Hz. Dimensions: 12 $\frac{7}{8}$ " H x 25 $\frac{1}{4}$ " W x 14 $\frac{1}{8}$ " D.

Handy universal Tune-up Meter for most small engines

Tests volts, ohms, dwell, continuity on 1-4 cylinder, 2 & 4 cycle engines

This handy, easy-to-operate meter helps you keep your small engines at top efficiency. Ideal for garden tractor, lawn mower, motorcycle, snowmobile, outboard motors, small cars — all small engines including Briggs and Stratton. Tests volts, ohms, dwell and continuity on 1 to 4 cylinder, 2 and 4 cycle engines. Built-in tach and snap-on pickup for easy set-up and use. Requires three 1.5 V cells. (Batteries not included).

Kit CM-2045, Shpg. wt. 4 lbs. 54.95

CM-2045 SPECIFICATIONS: Voltmeter: 0-20 V DC. Ohmmeter: 0-100 k Ω (10 k Ω center scale). Tachometer: 0-3000 rpm, 0-15000 rpm. Dwell Meter: 1 cyl. 90°-360°; 2 cyl. 40°-180°; 3 cyl. 30°-120°; 4 cyl. 20°-90°. Dimensions: 9 $\frac{1}{2}$ " H x 9 $\frac{3}{4}$ " W x 5 $\frac{1}{4}$ " D.



Economy three-in-one Tune-up Meter

Just two leads to connect to the engine; draws its power from car battery

Combines a distributor cam dwell meter, an electronic tachometer and a DC voltmeter in a single, compact unit. Can be used with both 6 and 12-volt electrical systems with positive or negative ground, and with solid-state and high-energy ignition systems. Complete with leads, instructions, case.

Kit CM-1073, Shpg. wt. 5 lbs. 34.95

CM-1073 SPECIFICATIONS: Dwell meter: Three dwell scales: 8 cyl., 10-45 degrees; 4 cyl., 20-90 degrees; 6 cyl. & 3 cyl. x 2, 25-60 degrees. Tachometer: Two RPM ranges; Low range — 0-1500 RPM; High range — 0-2500 RPM. Dimensions: 4 $\frac{1}{4}$ " H x 8 $\frac{1}{2}$ " W x 7 $\frac{1}{4}$ " D.



Deluxe Scope Cart

Keeps CO-2600 at ideal viewing angle for easy reading.

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

Get the best from your car with Heathkit auto instruments



Versatile Heathkit Ignition Analyzer makes car tune-ups easier

\$189⁹⁵

- Easier-to-use than meter analyzers
- Built-in rpm indicator for easy measurements
- Designed for four, six or eight-cylinder engines

Locate ignition troubles the scientific way. The Heathkit CO-1015 Ignition Analyzer detects shorted plugs, bad ignition points, defective wiring, worn distributor parts, incorrect dwell angle, plus coil or condenser defects and transistor or capacitive discharge circuitry problems. Can be used with any standard, transistorized or capacitive discharge ignition system on four, six or eight-cylinder engines with distributors. You select one of four different patterns — primary or secondary, in either parade or superimposed display. For detailed analysis, the horizontal sweep can be expanded 10 to 1, vertical sweep 2 to 1. Includes adapter for use with General Motors High Energy Ignition systems. Operation handbook (supplied) illustrates typical auto engine waveforms.

Kit CO-1015, Shpg. wt. 22 lbs. 189.95

Kit COA-1015-1, 12-Volt Inverter. Lets you operate CO-1015 from your car's 12-volt lighter socket. Shpg. wt. 3 lbs. 34.95

CO-1015 SPECIFICATIONS: Power Requirement: 120/240 VAC, 60/50 Hz, 16 W. RPM Range: 400-5000. Cylinders: 3, 4, 6 or 8. Connection Cables: 12' pick-up clamp; ground and secondary clip leads extend 2' beyond pick-up clamp. Tachometer: 0-1000 RPM, 0-5000 RPM $\pm 5\%$ of full scale. Dimensions: 7" H x 10½" W x 17½" D.



Low-cost professional-grade Engine Analyzer tests batteries, too

\$94⁹⁵

- Works with any voltage, any 3, 4, 6 or 8-cylinder engine
- With all leads and accessories for complete tuneups
- Accuracy is excellent — $\pm 3\%$ for all settings

This professional-grade instrument tests conventional, magneto, transistorized, and most capacitive discharge ignition systems — both positive and negative ground, any voltage, on any 3, 4, 6 or 8-cylinder engine. Also tests storage battery, generator or alternator, voltage regulator, starter, distributor, ignition circuit (points, condenser and coil), accessories and all the electrical wiring. The large 6" meter is color-coded for easy reading. No need to recalibrate between functions. Easy to connect and use. Needs 3 "C" batteries (not supplied).

Kit CM-1050, Shpg. wt. 8 lbs. 94.95

CM-1050 SPECIFICATIONS: Voltmeter Ranges: 0-3.2 V DC, 0-32 V DC, $\pm 3\%$ of full scale. Ohm-meter: Two ranges: R x 1 (100 Ω center scale). R x 100 (10 Ω center scale), $\pm 3\%$ arc. Tachometer: Two ranges: 0-1200 rpm, 0-6000 rpm, $\pm 3\%$ of full scale. Dwell Meter: Two ranges: 0-45° (on 0-60° scale). 0-60°, $\pm 3\%$ of full scale. Amperes: -5 to +90 amperes DC, $\pm 3\%$ of full scale. Spark Output: 0-50. Point Resistance: Good/Bad. Alternator: Good/Bad. Condenser: 0.22 μ F, 10%. Accuracy: $\pm 3\%$ of full scale. Cables: Two 8" test cables. One 2' alligator/alligator lead. One 2' alligator/push-on connector lead. One calibration cable. Accessories: 90-amp shunt. 0.25 Ω resistor assembly. One alligator clip. Two $\#10$ solder lugs. Dimensions: 7½" H x 10½" W x 8¾" D.



Give your battery instant starting power when you have to get going

① 15-Amp Automatic Battery Charger has safety turn-off, battery boost

\$79⁹⁵

Charges 12-V car batteries at 15-amp rate; provides a 50-amp boost charge to charge dead batteries fast!

Don't let a dead battery make you miss important work and social commitments ruining your family's plans. The GP-1044's front panel meter monitors the battery and indicates charge rate, current and full charge, or if boost charge is required. When the battery is fully charged, the GP-1044 turns itself off. Complete circuit breaker protection prevents damage to charger or battery. For use on positive or negative ground batteries. All solid-state. Comes with all cables for fast, easy hookup. 6½" H x 11½" W x 7¾" D. For 110-130 VAC, 60 Hz.

Kit GP-1044, Shpg. wt. 22 lbs. 79.95

② 10-Amp Automatic Battery Charger for quick starts in any weather

\$54⁹⁵

Won't overcharge and ruin your battery, even if you leave it hooked up to this charger for long periods of time!

Your battery may not wait for winter until it needs a charge, so you need the Heathkit 10-amp Automatic Battery Charger. It charges 12-volt car batteries at 10-amp rate, turns off automatically when battery is fully charged. A front panel meter monitors battery to indicate rate of charge and full charge. Easy to use — just connect the battery cables (included) to your car battery terminals and plug charger into AC outlet. Safety circuit prevents sparking until proper hookup. 5½" H x 9" W x 6¾" D. For 110-130 VAC, 60 Hz.

Kit GP-21, Shpg. wt. 13 lbs. 54.95

Heathkit auto accessories

\$89⁹⁵ Heath/Dana Speed Control increases driving comfort and reduces fatigue on long car trips

Just accelerate to your desired speed, set the control and the CS-2048 automatically maintains that pre-set speed uphill or downhill, around curves and on straightaways! You can take your foot off the gas pedal, relax, and pay attention to the road! A touch of the brake pedal releases control and a resume control lets you slow down or pass cars without affecting the set speed, a set button lets you set a new cruise speed as you desire. The CS-2048 can be used with both automatic and manual transmission, with most domestic cars, trucks, light vans. For foreign and front-wheel drive cars, order the appropriate adaptor kit listed below. 12 VDC negative ground only. Save up to 50% by installing it yourself.

CS-2048, Shpg. wt. 6 lbs. **89.95**

CSA-2048-1. Kit contains magnet pair, adhesive and filament tape along with instructions for front-wheel-drive cars or for parts replacement use. For parts replacement or front wheel drive cars not specifically covered in kits below. Shpg. wt. 1 lb. **6.95**

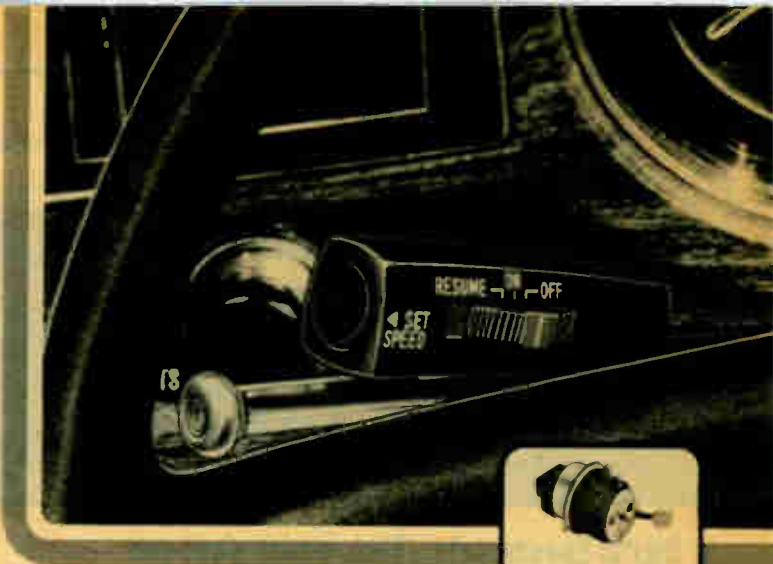
CSA-2048-2. Contains servo cable, throttle linkage adaptor hardware and magnet pair for '73-'75 Honda Civic, '75-'79 Honda CVCC and '77-'79 Honda Accord. Shpg. wt. 2 lbs. **15.95**

CSA-2048-3. Kit contains servo cable, throttle linkage adaptor hardware and vacuum tee for '75-'79 Toyota Corollas. Shpg. wt. 2 lbs. **15.95**

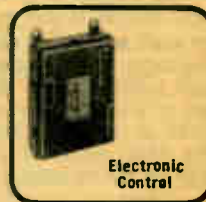
CSA-2048-4. Kit contains throttle linkage adaptor hardware and vacuum tee for '73-'79 Toyota Corona, Celica, Crown and Mark II; '75-'78 Toyota Pickup, '75-'77 Datsun 610/710, '77-'79 Datsun 810, '75-'79 280-Z, ZX. Shpg. wt. 1 lb. **5.95**

CSA-2048-5. Kit contains servo cable, magnet pair, throttle linkage adaptor hardware, vacuum tee and engagement switch mounting post for the following fuel-injected cars: '76-'80 Volkswagen Rabbit, Dasher, Scirocco, Audi Fox. Shpg. wt. 2 lbs. **15.95**

CSA-2048-6. Kit contains servo cable, magnet pair and throttle linkage adaptor hardware for '75-'80 Datsun B-210/210, '77-'80 Datsun F-10/310. Shpg. wt. 2 lbs. **15.95**



Vacuum Servo attaches to throttle



Electronic Control

IMPORTANT INSTALLATION NOTE: While the CS-2048 Heath/Dana Speed Control comes fully assembled and tested, and includes a fully detailed manual, installation does require a certain amount of mechanical proficiency. Modifications must be made to the throttle linkage of your car, and work must be performed under the vehicle in order to install the speed transducer unit. If you are uncertain of your abilities, you may wish to employ the services of a qualified auto mechanic to install your Speed Control.

The Heathkit Capacitive-Discharge Ignition System saves you money

- Get a precisely-controlled spark
- Get longer life from plugs and points



Get up to 50,000 miles between tune-ups on cars, trucks, inboards, I/O & outboard marine engines with 12V battery/distributor/coil negative ground systems. Delivers a larger, more precisely-controlled spark to the plugs to better burn the air-fuel mixture. Reduces problems caused by point bounce and wear. External override button switches to conventional system. Construction and installation are quick and easy. 3 1/8" H x 3 3/4" W x 6" D. Kit CP-1060, Shpg. wt. 3 lbs. **44.95**

Need a tune-up? The Heathkit Exhaust Analyzer will tell you

The CI-1080 monitors your car's exhaust for minimum air pollution and maximum efficiency by measuring thermal conductivity of the exhaust gases. Shows the air-fuel ratio, combustion efficiency and the percentage of carbon monoxide in the exhaust. Ideal for checking a car which must meet

auto manufacturer's specifications or environmental agency requirements for exhaust emissions. The CI-1080 is contained in a rugged carrying case with a foldaway handle and includes all necessary cables and tubing for easy connection. Easy-to-build kit.

Kit CI-1080, Shpg. wt. 6 lbs. **89.95**



Concealed horn

Exterior horn



Get the Emergency Siren/PA for your volunteer unit

If your community's volunteer emergency unit or rescue squad is trying to make its dollars stretch as far as possible, the GD-18 Emergency Siren/PA will meet your requirements for high quality, convenient features and low cost. It's a 55-watt siren with automatic or manual "wail", a 20-watt Public Address System to amplify your voice, or a radio call alert when you're away from your vehicle. Has push-to-talk noise-cancelling microphone for clear voice reproduction. Select your choice of high output speakers—either concealed or exposed horn. Concealed speaker requires 4 1/2" x 4 1/2" x 13" behind grille. Note: please check standards for mobile sirens in your area. Kit GD-18, Shpg. wt. 6 lbs. **74.95**

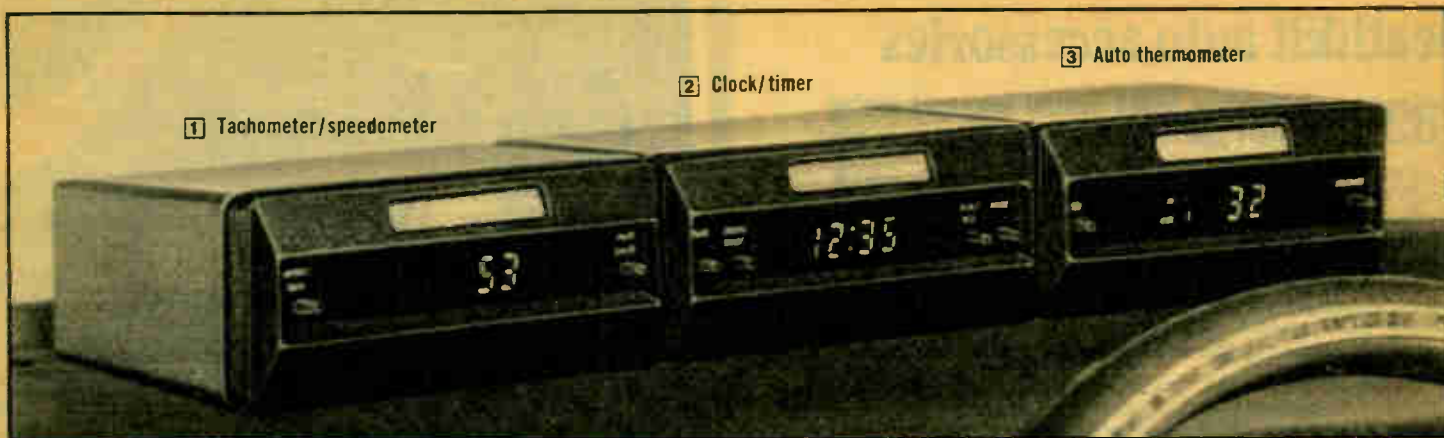
WD-5130, Siren/PA amp, assembled, Wt. 6 lbs. **129.95**

GOA-18-1, Exterior horn, assembled, Wt. 10 lbs. **89.95**

Kit GDA-18-2, Concealed horn, Wt. 10 lbs. **89.95**

WDA-5130-2, Concealed horn, assembled, Wt. 10 lbs. **109.95**

SAVE \$20.00 On these Siren/PA systems! If purchased separately, \$164.90.
 GD-18A (Kit GD-18 and Exterior Horn) Shpg. wt. 21 lbs. ... **144.90**
 GD-18B (Kit GD-18 and Concealed Horn) Shpg. wt. 21 lbs. ... **144.90**



① Tachometer/speedometer

② Clock/timer

③ Auto thermometer

① Digital Speedometer/Tachometer gives you accurate speed and engine RPM instantly

More accurate than conventional speedometers, the CI-1265 constantly shows your car's speed up to 199 mph or kph. It's so sensitive, the CI-1265 records speed changes as little as 1 mph!

And you'll detect those changes day or night on the CI-1265's bright, easy-to-read, illuminated digital display. You'll appreciate your CI-1265 when you travel on roads outside the U.S. With a push of a button, it automatically converts from mph to kilometers per hour — so you can relax and not worry about speeding tickets or radar traps. Push another switch, and the CI-1265 becomes a tachometer. RPMs register in variations of 100, so you can immediately tell if your engine is purring smoothly.

The CI-1265 measures 1 1/16" H x 4 1/16" W x 3 1/8" D. It's made for 4, 6, or 8 cylinder, 4 cycle engines with spark ignitions (12 VDC neg. ground). Includes hardware and mounting brackets. Front-wheel-drive cars require CSA-2048-1 adaptor kit below.

Kit CI-1265-1, for cars without CS-2048 Cruise Control, Shpg. wt. 3 lbs. . . . 59.95

Kit CI-1265-2, for cars with CS-2048 Cruise Control, Shpg. wt. 3 lbs. . . . 49.95

Kit CSA-2048-1, Adaptor Kit for front-wheel-drive cars, 1 lb. . . . 6.95

② Dependable Heathkit Digital Clock/Timer tells you the time with quartz precision

Now you can install a reliable clock, the GC-1415 Clock/Timer, in your car, boat, camper, or motorcycle (12 VDC, neg. gnd. — not approved for aircraft).

Automatic dimmer controls the brightness of easy-to-read clock face. It illuminates when you turn on the ignition, but fades off when your vehicle isn't running — conserving your battery power. Of course, the quartz crystal continues to vibrate, giving the correct time every time you start your car or boat.

The GC-1415 also has a timer, a real navigational aid on long trips by land or water. The timer acts like a stopwatch: it keeps track of hours and minutes up to 24 hours, or minutes and seconds up to 10 minutes. You can switch back and

forth from clock to timer and hold either one without affecting clock's or timer's accuracy. Unit measures 1.8" H x 4.71" W x 3.12" D., compact enough to slip into or mount on many dashboards. Easy-to-follow manual instructions makes this unit fun to build and install in your car, boat, motorcycle, or recreational vehicle.

Kit GC-1415, Digital clock with timer, Shpg. wt. 2 lbs. . . . 39.95

Save 16% on Digital Clock without timer.

Kit GC-1406, Shpg. wt. 1 lb. . . . Was \$29.95, Now 24.95

③ The Heathkit Inside/Outside Auto Thermometer lets you monitor inside and outside temperatures

Here's a nice device to have on hand in your car, motor home, camper, van, R-V, or boat. It measures temperatures from -20 deg. F to +140 deg. F, and -30 deg. C to +60 deg. C. Accuracy: ±3 deg., thanks to integrated chips in sensors and a dual-slope analog-to-digital converter in the unit.

Gives you control of inside climate — inside sensor keeps track of interior temperature, permitting you to adjust car's heat and air-conditioning units to insure driver and passenger comfort. Automatic dimmer switch for digital display tunes the fluorescent readout to changing light conditions.

Tells you what to expect outside — exterior sensor can alert you to freezing weather on long trips, warning you of possible hazardous road conditions such as freezing water on pavement. Fishermen note: because the sensors are submersible, they can be attached below boat's water line to read lake or river temperature.

Kit includes: Inside and outside sensors with 9 1/2' cable for easy placement. Also contains sticky tape and gimbal mounting bracket to ease installation. Thermometer is designed with solid-state technology for long life, and years of trouble-free service.

Unit makes an ideal gift for families who take long trips, or the fisherman in the family. It's easy to build with our step-by-step instructions.

Mounts just about anywhere in car or boat. Fits on any dash — measures 3.12" H x 4.71" W x 3.12" D.

Kit CI-1525, Shpg. wt. 2 lbs. . . . 79.95



Delays wipers up to 30 seconds

\$17⁹⁵
Kit

Heathkit Windshield Wiper Delay makes driving safer on hazardous drizzly, rainy days

Wiper delay ends wiper switch fumbling on light misty days and helps keep your attention on the road. Solid-state circuitry lets you time wiper sweeps up to 30 seconds to handle drizzle and road spray from passing traffic. You can also set the delay to shorten sweep intervals down to .5 second for heavy snow and downpours.

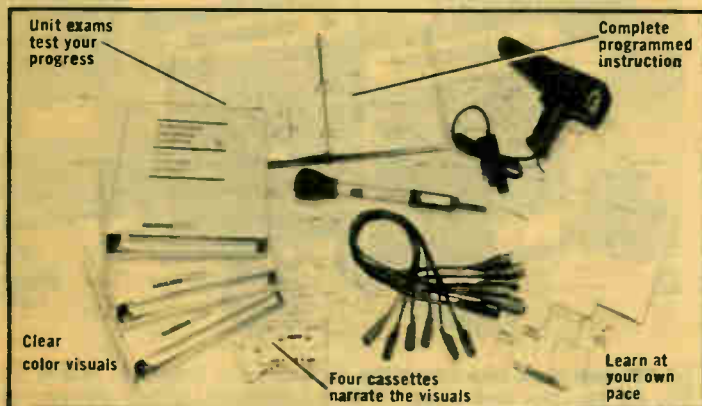
Fits most single and 2-speed electric wiper systems on GMs, AMCs, Fords (except '72-'76 Montegos & Torinos, '74-'76 Cougars) and Chryslers (except those with motor reversing parking systems). Auto wiring diagrams must be obtained from car manual or through local car dealership.

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



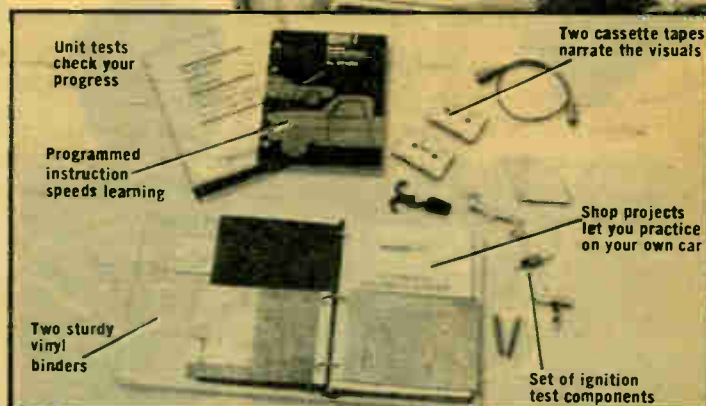
Auto Electrical Systems and Ignition/Tune-up Programs can pay for themselves

Use these Programs to prepare for the National Institute for Automotive Servicing Excellence (N.I.A.S.E.) professional exams, or just to keep your car out of expensive repair shops. Not only could one repair job save you more than the cost of the Programs, but you'll also save money with a car that performs better — that's an important consideration in these times of high fuel costs. Our proven audio-visual techniques make learning easier and more interesting than ever. Optional experiments give you hands-on experience so you really learn how to make the actual repairs.



MONEY-BACK GUARANTEE

So good are these Programs, that we guarantee you will pass your N.I.A.S.E. exam. If not, we'll refund your full purchase price upon return of the materials along with your receipt.



WINNER

Highest award of the Society for Technical Communications

\$79⁹⁵

Teaches you to repair today's complex automobile electrical systems

- Prepares you for the NIASE Electrical Exam
- Learning is easier and more effective because you see and hear each step
- Four audio cassettes, programmed-instruction and experiments aid your learning

The Automotive Electrical Systems Self-Instruction Program is professionally designed and carefully organized for fast, efficient learning. You can move at your own pace, as fast or slowly as you choose. You'll learn:

1. Basic Automotive Electrical Principles, including batteries, positive and negative charges, Ohm's Law, series and parallel circuits, and use of a VOM to measure voltage, current and resistance.
2. Automotive Starting System — how motors work, how to correct common starting problems, starter relay, solenoid and motor testing, voltage drop on starter motor, how to locate opens, shorts.
3. Automotive Charging System and operation of components such as voltage regulator and alternator, how to energize alternator field, test voltage regulator, and use an engine analyzer like the CM-1050 on page 18.
4. Accessory and Body Electrical Circuits that power the lights and accessories such as seat belt system, and instrument panel, determine if system can handle another accessory, and use wiring diagrams.

Upon completing the Automotive Electrical Systems Program, you'll have the knowledge, experience and confidence to correct almost any auto electrical problem that arises. You'll have the know-how you need to avoid repairs.

When you pass the optional final exam with a 70% or better score, you will earn 4.0 Continuing Education Units (CEUs) and a Certificate of Achievement. The Auto Electrical Program includes text, binders, four audio cassettes, clip leads, electrical components for optional experiments, and a professional hydrometer. EAC-1, Shpg. wt. 23 lbs. **79.95**

NOTE: The programs on these two pages prepare you to pass the respective National Institute for Automotive Servicing Excellence professional auto mechanic certification exams. For more information on the exams, contact NIASE, 1825 K Street NW, Washington, DC 20006.

Learn professional auto tune-up, even pass your NIASE exam with Ignition and Tune-up Program

\$80⁰⁰

- The most in-depth study available on GM, Ford and Chrysler electronic ignitions
- Have the fun and satisfaction of tuning it yourself
- Will more than pay for itself by freeing you from reliance on costly ignition tune-ups and repairs

The EA-2000 Auto Ignition and Tune-up Program uses audio-visual instruction and programmed learning for easy, enjoyable learning. The Program text and two cassettes are organized into eight units:

1. Ignition Fundamentals teaches four-stroke cycle, auto ignition system, dwell, timing.
2. Components covers coil and points, distributor, spark plugs, wires.
3. Instruments presents use of auto oscilloscope, tachometer timing light and dwell meter.
4. Tune-up covers a complete ignition tune-up and power balance.
5. GM Systems teaches you about General Motors ignitions.
6. Troubleshooting and tune-up of GM systems.
7. Ford and Chrysler Systems covers most ignitions for these two makers.
8. Troubleshooting and tune-up of Chrysler and Ford ignitions systems.

Score 70% on the optional final exam to earn 4.0 CEUs. Program includes jumper leads, ignition tester, universal coil adapter, spark plug adapter, ignition pliers, plug gauge, gapping tool, feeler gauge set, tune-up chart book, and 24" x 17" plug chart. Completion of shop projects requires engine analyzer like the CM-1050 on page 18, timing light like the CI-1096 on page 16, and ignition analyzer like the CO-2600 on page 17. Also useful is Instrument Package below. EA-2000, Shpg. wt. 12 lbs. **80.00**

High-quality Small Accessory Auto Instruments. Compression tester, vacuum pressure gauge and vacuum "T" fitting EAC-2-1, 1 lb. **14.95**

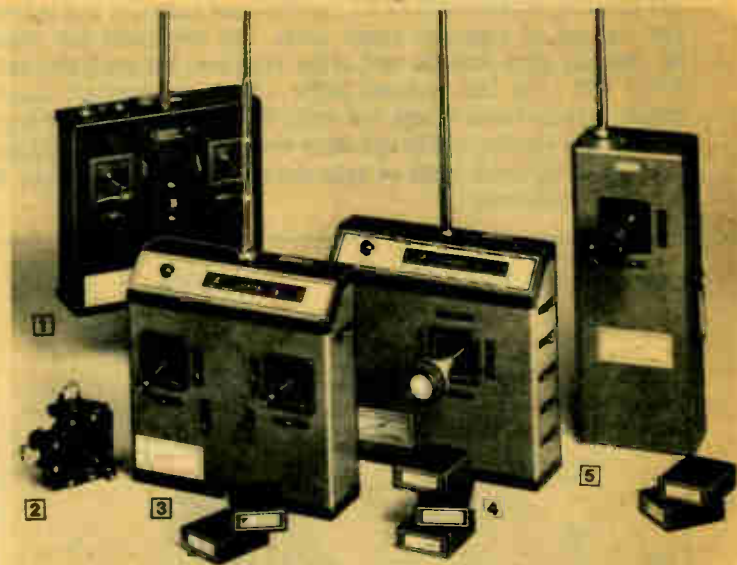
Save \$25.00 on your Ignition and Tune-up Program. Order it with the EAC-1 Auto Electrical Program (left) and EAC-2-1 Small Instruments (above). If purchased separately, \$174.85

EAS-2000, Shpg. wt. 32 lbs. **149.85**



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

Heathkit Pack-17™ R/C lets you



Choose our patented Heathkit Pack-17 R/C system for uncompromised performance, unbeatable value

Heathkit Pack-17 R/C is a unique radio control system that gives you a choice of 17 different receiver and transmit modules, so you have the capability for instant frequency change. It's the only system of its kind in radio control. In fact, we hold the patent on it. Heathkit R/C gear was also the first to use ceramic filters to eliminate drift, and the first to put 8 channels in a single, versatile unit. That's why Heathkit Pack-17 R/C is first in quality and value.

Latest design 5- and 8-channel transmitters feature open gimbal

1 Check this exciting 5-Channel Dual Open-Gimbal Stick R/C Transmitter. Here's dual-stick control of four R/C channels (one with ratchet) plus a switch-activated auxiliary channel for retracts or other switched functions. Open-gimbal sticks provide smoothness and control you'll appreciate. Plug-in module capability and step-by-step instruction manual for easy kitbuilding and do-it-yourself service make this your best R/C value. Transmitter includes your choice of one plug-in frequency module — specify frequency from the list of plug-in modules at top of column one on the next page (no model number needed). Order your GDA-1919-1 transmitter as part of a complete system from next page.

Kit GDA-1919-1, Shpg. wt. 4 lbs. 129.95

2 Open-Gimbal Stick Conversion Kit. Owners of Heathkit GD-1205-D and GD-505-D R/C transmitters can now get the convenience and control of open-gimbal stick R/C with this easy to install conversion kit. GD-1419 includes two sticks. Kit GD-1419, Shpg. wt. 1 lb. 37.95

3 8-Channel Dual Open-Gimbal R/C Transmitter. Heathkit top-of-the-line R/C transmitter now gives you Open-Gimbal stick convenience too! Two control sticks and a retractable landing gear switch provide control of five servos. Three auxiliary controls allow control of three more servos. Four trim tabs allow you to make fine adjustments to the first four channels, without changing stick position. It's one of the most versatile R/C transmitters you'll find anywhere! Easy kit assembly. Includes your choice of one plug-in frequency module from 17 frequencies on opposite page (no model number needed). Powered by rechargeable 9.6 volt nickel-cadmium battery pack, recharger included. Order your 8-Channel R/C Transmitter as part of a complete system from the next page. Kit GDA-1205-0G, Shpg. wt. 5 lbs. 149.95

22

4 8-Channel Single-Stick Transmitter. Stick control of 3 channels, throttle with trim and aux., plus landing gear switch & 2 additional channels. Includes your choice of one frequency module — see next page (no model number needed).

Kit GDA-1205-S, Shpg. wt. 6 lbs. 169.95

GDA-1205 AND GDA-1919-1 SERIES SPECIFICATIONS: TRANS. — RF Frequency: crystal controlled, all bands. Frequency stability: within $\pm 0.005\%$ on 27 MHz; within $\pm 0.002\%$ on 53 MHz; 72 MHz. Temp. Range: 0 to 160°F. RF Output Circuit: pi network. RF Input Power: at least 500 mW. Modulation: on-off carrier keying. Approx. Current Drain: 100 mA on all bands. Controls: GDA-1205, 8 channels (4 with trim), on/off, trainer button; GDA-505, 5 channels (4 with trim), on/off switch, trainer button. Power Supply: Internal 9.6V 500 mA Ni-Cad. battery. Rechargeable simultaneously with receiver battery at 35 to 40 mA from 120 volt power line. Dimensions: 7" H x 7" W x 2" D. Net Weight: 2½ lbs., with battery. **GDA-1205-2 SPECIFICATIONS: RECEIVER** — Local Oscillator Operating Frequency: crystal-controlled, all bands. Temperature Range: 0 to +160°F. Sensitivity: 5 μ V or better. Selectivity: 6 dB down at ± 4 kHz; 30 dB down at ± 9 kHz. Current Drain: 10 mA. Intermediate Frequency: 453 kHz. Power Supply: 4.8 V battery pack (GDA-1205-3). Controls: On/off switch. Dimensions: 5½" H x 1¾" W x 1¾" D. Net Weight: 2 ozs.

5 3-Channel Pack-17™. Has the convenience and versatility of plug-in frequency change and it's the only 3-channel system we know of that includes rechargeable batteries and an external charger so you fly with full power and uncompromised performance. Has 2-axis stick assembly, easy to handle transmitter with convenient strap for one-hand operation. An optional conversion pack lets you go 4-channel by adding another channel to the stick. All three stick channels have trim control, the 4th channel is controlled by a thumb tab. Compatible with all Heathkit servos. Specify frequency when ordering (see specs below — no model number needed).

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

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

GDA-1405-1 SPECIFICATIONS: TRANSMITTER — RF Carrier Frequency: One frequency, crystal-controlled on 27 MHz, 53 MHz or 72 MHz bands. Operating Temperature: 0°-160°F. Controls: 3 channels (two with trim); ON-OFF switch. Optional fourth channel. Power Supply: Internal 9.6V, 500 mA hours, nickel-cadmium battery. Rechargeable simultaneously with receiver battery at 35-40 mA from external charger. Frequencies Available: 27 MHz (11 meters) — 26.995, 26.045, 27.095, 27.145 & 27.195. 53 MHz (6 meters) — 53.100, 53.200, 53.300, 53.400, 53.500. 72 MHz (4 meters) for R/C planes only — 72.080, 72.240, 72.400, 75.640. (All Models — 72.160, 72.320, 72.960.) Dimensions: 9½" H x 3½" W x 2¼" D (24 cm H x 9.5 cm W x 5.7 cm D).

Advanced Radio Control book. Tells how to use R/C to make model airplanes, boats and other R/C devices perform complicated maneuvers. An ideal introduction to rocket and robot automation, proportional control servomechanisms.

EDP-158 4.95

Radio Control Handbook. Explains the basics of radio control, covering most conventional control systems. This book is a must for the RCer's library.

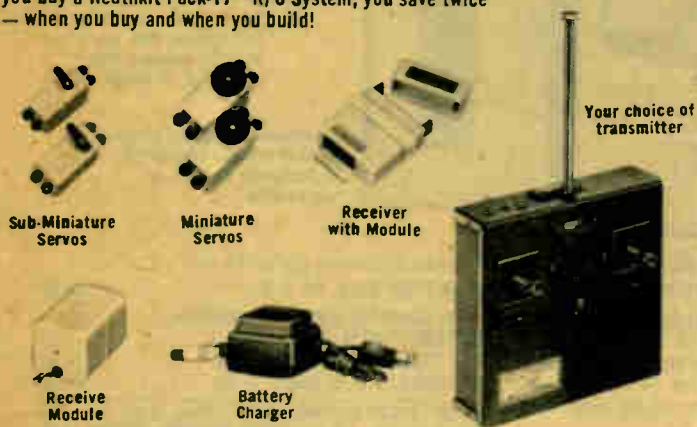
EDP-159 9.95

See page 52 for book ordering information.

design your R/C system for optimum performance

Heathkit Pack-17™ R/C Systems save where it counts —

in the pocketbook, not in performance. Heathkit R/C outperforms top-of-the-line assembled systems. And when you buy a Heathkit Pack-17™ R/C System, you save twice — when you buy and when you build!



Convenient plug-in modules let you add more frequencies

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

When ordering specify exact frequency desired (see list below).

Transmit Module, 1 lb. 19.95 Receive Module, 1 lb. 13.95

FREQUENCIES AVAILABLE (MHz): 26.95, 27.045, 27.095, 27.145, 27.195, 53.1, 53.2, 53.3, 53.4, 53.5, 72.08, 72.16, 72.24, 72.32, 72.40, 72.96, 75.640 MHz.
(When ordering, specify transmit or receive.)

SPECIAL 5-MODULE OFFER — SAVE \$39.55!

5 Transmit and 5 Receive Modules of your choice. 2 lbs. . . . Only \$129.95

High-quality Heathkit Servos, Receivers and Batteries

SERVO COMPARISON CHART	Miniature GDA-1205-4	Sub-Miniature GDA-1205-5	Hi-Torque GDA-1205-8
Idle Current (max.)	15 mA	15 mA	20 mA
No Load Current	80 mA	80 mA	150 mA
Stall Current (nom.)	450 mA	450 mA	1000 mA
Thrust	3 lb.	3 lb.	38 in. oz.
Travel Time	0.5 sec.	0.5 sec.	0.4 sec.
Rotary Travel	90°	90°	90° or 180°
Dimensions (HxWxL*)	1 1/2 x 1 1/4 x 2 1/2"	1 1/4 x 1 1/4 x 2 1/2"	1 1/2 x 1 1/4 x 2 1/2"
Net Weight	1.75 oz.	1.25 oz.	1.75 oz.

All servos: Power Requirement: 4.8 VDC. Position Accuracy: 1%. Output: 1 rotary arm, 1 rotary wheel. Input Signal: Pulse, 1-2 msec, 4V P-P. Temperature Range: 0° to 160° F. Backlash: <0.002". *H includes outputs, L includes mtg. ears.

Kit GDA-1205-5, Sub-Min. Servo. Shpg. wt. 1 lb. 27.95

Kit GDA-1205-4, Miniature Servo. Shpg. wt. 1 lb. 27.95

Kit GDA-1205-8, Hi-Torque Servo. Shpg. wt. 1 lb. 32.95

Kit GDA-1205-2, Receiver with 1 Frequency Module. 1 lb. 59.95

Kit GDA-1205-3, Receiver Battery Pack. 1 lb. 14.95

Trainer Link Accessory. Lets you hook up two 1205 transmitters for flight instruction. GDA-1205-6, Shpg. wt. 1 lb. . . . 10.95

Thumb Tach® measures rpm without physical connection to engine. 0-5000 & 0-25,000 ranges. Ideal for needle valve adjustment, selection of glow plugs, etc. Kit GD-69, wt. 1 lb. 29.95

R/C Battery Monitor. Expanded scale voltmeter checks capacity (under load) of batteries. Includes meter, connector for all Heathkit battery packs, clips and case.

Kit GD-1188, Shpg. wt. 1 lb. 14.95

Order the Cessna 172 airplane with your system

This beautiful, maneuverable Cessna 172 plastic and foam model airplane will complete your Heathkit Pack-17 R/C system. 48" wingspan. Assembly required. Order with an R/C system below and save \$10.00.

RP-1172, Airplane only, Shpg. wt. 8 lbs. 79.95



Includes Fox .25 engine, fuel tank and line, glass-filled nylon mount, wheels, prop and hardware.

SAVE \$86.70! Complete system outfits your model for R/C

5-Channel Open-Gimbal Stick System: Includes the GDA-1919-1 open gimbal stick transmitter described on the opposite page, plus one plug-in frequency module, receiver and one plug-in frequency module, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, this system would cost you up to \$316.65. Save nearly \$100 by getting the complete 5-Channel Open-Gimbal Stick System! (Specify frequency modules from left — no model number needed).
GDS-1919, Shpg. wt. 9 lbs. 229.95

SAVE \$10.00 when you get the Cessna 172 as part of a system

Buy the RP-1172 Cessna 172 plus any R/C system in this column, and deduct \$10.00 before totaling your order.

Save when you get one of these complete R/C systems

Choose a complete Heathkit Pack-17 R/C System and pay much less than if you purchased the components separately.

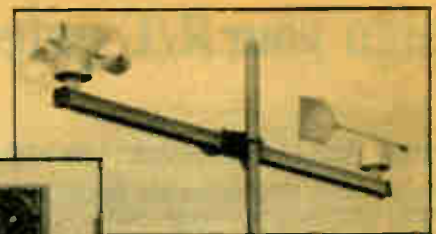
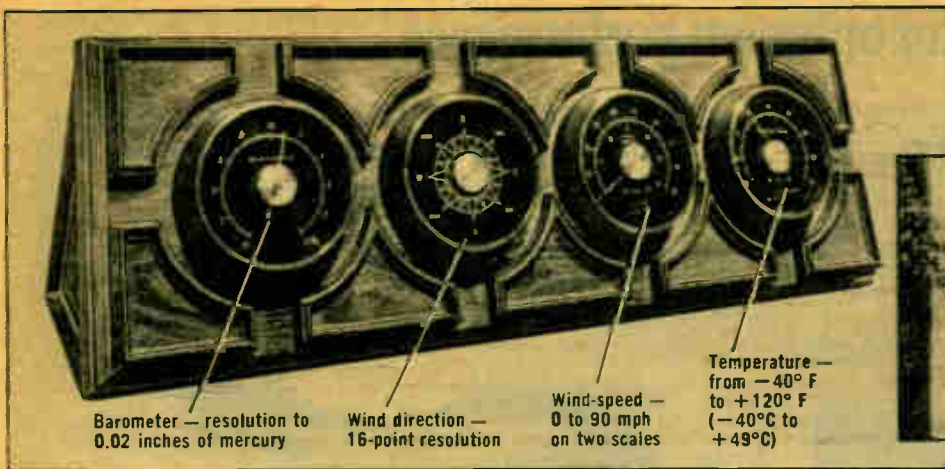
The following systems include a) transmitter and one frequency module of your choice, b) receiver and one frequency module of your choice, c) receiver battery pack and batteries, d) four servos (specify miniature, subminiature or both) — except GDS-1405-1 and GDS-1405-2 include 2 servos.

Save \$66.70 on 8-Channel Dual Open-Gimbal Stick System. Includes GDA-1205-0G Open Gimbal Stick Transmitter described on the opposite page. If purchased separately, would cost up to \$336.65. (Order frequency modules from column at left — no model number needed). Includes four servos of your choice.
GDS-1205-0G, Shpg. wt. 11 lbs. 269.95

Save \$66.70 on 8-Channel Single Stick System. Includes GDA-1205-S Single-Stick Transmitter described on the opposite page. If purchased separately, would cost up to \$356.65. Specify frequency modules from list in left-hand column — no order number needed. Includes four servos of your choice.
GDS-1205-S, Shpg. wt. 11 lbs. 289.95

Save \$20.80 on 3-Channel System. Includes GDA-1405-1 Three-Channel Transmitter described on left-hand page. If purchased separately, would cost up to \$220.75. Specify frequency modules from column at left — no order number needed. Includes two servos.
GDS-1405-1, with miniature servos, Shpg. wt. 8 lbs. 199.95
GDS-1405-2, with subminiature servos, Shpg. wt. 8 lbs. 199.95

BONUS: Receive free the R/C Handbook with the purchase of any system above. Specify GDA-1205-7 on your order.



The remote transmitter unit clamps onto any 1" to 1½" TV antenna mast on roof or TV tower

Handsome woodgrain plastic cabinet mounts horizontally or vertically on wall, or use on desk

Five-Function Weather Station gives instant weather reports

Whenever you need instant, electronically accurate weather information, the Heathkit ID-1290 Weather Station keeps track of indoor and outdoor temperatures, barometric pressure, wind speed and direction. You always know what the weather is going to do.

The ID-1290's high accuracy thermometer is calibrated in two-degree increments from -40°F to $+120^{\circ}\text{F}$ (-40°C to $+49^{\circ}\text{C}$) for precise readings every time. A switch lets you select indoor or outdoor temperatures. The precision barometer helps

you keep on top of changing conditions by indicating movements as small as 0.02 inch of mercury.

You can read wind speed from 0 to 90 mph in two ranges, with eight wind direction lights providing 16-point resolution for precision readings. With its walnut-grained plastic cabinet, the ID-1290 can be used as a handsome desk set, or can be hung horizontally or vertically.

The remote transmitter assembly (windcups, weather vane and outdoor sensor) is included with the ID-1290. It clamps to any 1" to 1½" diameter TV antenna mast, and is connected to the cabinet with optional eight-wire cable (below).

This easy-to-build kit will keep you on top of changes

in the weather every day of the year.

Kit ID-1290, Shpg. wt. 8 lbs. 129.95

8-Wire Cable for remote transmitters.

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

IDA-1290-2, 100 ft. Cable, 4 lbs. 14.95

IDA-1290-3, 150 ft. Cable, 6 lbs. 21.95

ID-1290 SPECIFICATIONS: Wind speed: 0-30 mph, ± 2 mph; 0-90 mph, ± 5 mph. Wind direction: 16-point readout over 360° . Temperature: Typ. indoor: 0°F to 120°F , $\pm 2^{\circ}\text{F}$ (-18°C to $+49^{\circ}\text{C}$, $\pm 1^{\circ}\text{C}$). Typ. outdoor: -40°F to $+120^{\circ}\text{F}$, $\pm 2^{\circ}\text{F}$ (-40°C to $+49^{\circ}\text{C}$, $\pm 1^{\circ}\text{C}$). Barometric pressure: 29 to 31 inches of mercury ± 0.05 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.



High-accuracy digital Wind Speed/Direction Indicator

Outstanding accuracy and an easy-to-read digital display make this kit a must for pilots, boaters — anyone whose activities are affected by the wind. Choose the two readout modes you want from the three available (mph, kph or knots). Switches select the mode; front panel lights show which mode is in use. Lights mark the eight principal compass points for 16-point resolution. Includes remote transmitter. Requires eight-wire cable (above).

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

ID-1590 SPECIFICATIONS: Wind speed: 0 to 99 in mph, km/h or knots (choice of two). Response threshold: 3 mph. Accuracy: ± 1 digit or $\pm 10\%$, whichever is greater. Direction response threshold: approx. 2 mph. Operating temperature: Receiver: 0°F to $+150^{\circ}\text{F}$ (-18°C to $+65^{\circ}\text{C}$). Transmitter: -40°F to $+120^{\circ}\text{F}$ (-40°C to $+49^{\circ}\text{C}$). Power requirement: 120 VAC, 50/60 Hz, 6.5 watts. Dimensions: 2½" H x 7" W x 5" D.



Easy-to-build digital Indoor/Outdoor Thermometer

Monitor indoor/outdoor (or any two) temperatures with a big, bright ½" high digital readout. The readout includes plus and minus signs, as well as indoor and outdoor indicator lights. Select Fahrenheit or Celsius temperatures, continuous readings of one temperature or alternate readings of both. The 10' indoor and 75' outdoor cables (included) let you place the temperature sensors almost anywhere (home freezer, basement, green house).

Kit ID-1390, Shpg. wt. 4 lbs. 69.95

ID-1390 SPECIFICATIONS: Temperature range: -40°F to $+120^{\circ}\text{F}$ (-40°C to $+50^{\circ}\text{C}$). Accuracy: $\pm 2^{\circ}\text{F}$ from -30°F to $+20^{\circ}\text{F}$, $\pm 1^{\circ}\text{F}$ from $+20^{\circ}\text{F}$ to $+120^{\circ}\text{F}$, $\pm 2^{\circ}\text{C}$ from -30°C to -15°C , $\pm 1^{\circ}\text{C}$ from -15°C to $+50^{\circ}\text{C}$. Display: 2½-digit planar gas discharge with + and - signs. Power requirement: 120 VAC, 60/50 Hz, 4 to 6 watts approx. Dimensions: 2½" H x 7" W x 5" D.



Get instant weather reports with this computerized weather station




THE Electronic Weatherman

You get indoor and outdoor temperatures, wind speed and direction, barometric pressure...even the time and date...all right at your fingertips.

The only one of its kind, the Heathkit Digital Weather Computer uses a real microprocessor to give you instant, accurate past, present and future weather data. For boaters, pilots, campers, for anyone going outdoors, the weather station can tell you what to expect.

Easy to use. A compact transmitter mounts on your TV antenna mast and relays weather data to the computerized console indoors. The transmitter unit, with windcups and weathervane, features special infra-red sensing devices that are far more sensitive and reliable than old-fashioned mechanical switches or wipers.

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

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

Order the Heathkit Weather Computer today, kit or assembled. And you'll have your own reliable, weather reports at the press of a button.

Kit ID-4001, Shpg. wt. 15 lbs. 389.95
 Factory Assembled and Tested Version of above.
 IDW-4001. Includes 100' cable. Shpg. wt. 22 lbs. 539.95

ID-4001 SPECIFICATIONS: DIGITAL CLOCK/4-YEAR CALENDAR. Time Accuracy: Determined by accuracy of AC line. No accumulative error. **WIND VECTOR:** Accuracy: $\pm 5\%$ or better. Direction Display: Accuracy: $\pm 11.26\%$ degrees. **THERMOMETER:** Temperature Range: -40° to 70° C; -40° to 158° F. Accuracy: $\pm 1^\circ$ on Celsius readings; $\pm 2^\circ$ on Fahrenheit readings. **BAROMETER:** Pressure Range: 28.00 to 32.00 in Hg (inches of mercury). 981.9 to 1050 millibars. Accuracy: ± 0.075 in Hg plus ± 0.01 in Hg/ $^\circ$ C. Operating Temperatures: Outdoor assemblies, -40° C to $+70^\circ$ C (-40° F to 158° F). Unit, 10° to 35° C (59° to 95° F). Power Requirement: 120/240 VAC. Provision for external battery connection for memory backup during power failures. Dimensions: $7\frac{1}{4}''$ H x $16''$ W x $6''$ D.

8-Wire cable for ID-4001 kit version

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

IDA-1290-2, 100 ft. cable, 4 lbs. 14.95

IDA-1290-3, 150 ft. cable, 6 lbs. 21.95

The ID-4001 can be interfaced to the H8 Computer. For details write Heath Tech Correspondence Department.



The ID-4001 comes with the remote transmitter assembly shown here. The transmitter assembly attaches easily to your TV antenna mast. Cable for kit ID-4001 must be ordered separately in the length you require. IDW-4001 comes with 100' cable included.

Kits that your whole family will enjoy for years



The ASPEN™ Pinball Game — spend less for stay-at-home family fun

- SAVE \$30
Was \$529.95
Now only **\$499.95**
- Save up to \$100 from similar models
 - SCHUSSRING™ high-action field adds arcade-like excitement
 - Electronic memory keeps score for up to four players
 - Easy to assemble — playing field and circuit boards are pre-assembled

Put all the fast, action-packed excitement of a pinball arcade into your family room with the Heathkit/Brunswick® ASPEN Home Pinball Game. This full-sized pinball game features a SCHUSSRING high-action field with 18 scoring areas. Follow the regulation pinballs as they rack up points in almost no time. Double and triple scoring add to the fun and excitement, too.

A thumper bumper, two jet kickers, three rollover switches, three spin gates, three target switches and six rubber band switches keep the action fast and feverish. A free ball lane can help you score more points. Two independently operated flippers keep you in maximum control of each pinball. An adjustable tilt sensing mechanism stops action on

the ball in play when you tilt the field. And seven musical melodies play at the beginning and end of each game, at bonus scores and when the game field is tilted.

The ASPEN Pinball Game features a microprocessor-based electronic memory that keeps score for up to four players in each five-ball game. The memory also tells you which player is shooting, which ball is in play and when the game is over, with a bright digital display.

Build the ASPEN yourself — in as little as two evenings — and save up to \$100 from similar assembled models. All you need are tools normally found in the home. A complete Heathkit manual takes you, step-by-step, from unpacking the ASPEN to enjoying your first action-packed pinball game.

To make your kitbuilding experience even easier, the ASPEN's circuit boards and playing field are factory assembled and tested.

The ASPEN is designed for years of trouble-free fun. An easy-to-read operation manual and two built-in diagnostic tests make servicing simple.

Buy the ASPEN today — enjoy all the fun and excitement of a pinball arcade. For 120 VAC, 60 Hz only. Dimensions, 59½" H x 25" W x 49½" D.

Kit GD-1210,
141 lbs., Mtr. Frt. Was \$529.95, Now 499.95

The Heathkit Programmable Darkroom Timer — one of the most versatile available

State-of-the-art electronics mean our Darkroom Timer can handle almost any processing situation

\$124.95

- Programmable memory holds up to nine process steps
- Auto-step sequencing automatically controls your entire process
- Convenient Litetouch™ control panel

The Heathkit PT-1500 Darkroom Timer is one of the most versatile darkroom timers available anywhere. This 4-digit timer is microprocessor-controlled for maximum accuracy.

The PT-1500's programmable memory can hold times for up to nine process steps and one enlarger step. Auto-step sequencing automatically loads the timer so you're ready for the next step.

If you use the optional Auxiliary Outlet to connect the timer to an external device (such as a color drum), the Auxiliary Outlet is turned on during countdowns in the Process mode. Enlarger and safelight outlets are toggled so one goes on when the other goes off.

Four alarm settings mark time in 1, 30 or 60-second intervals (selectable in any combination), or once at the end. The four-digit LED display times to 99 minutes, 59 seconds or 999.9 seconds. When not in use, the PT-1500 functions as a 12-hour clock.

Unlike other timers, the PT-1500 includes a Litetouch™ front keyboard panel which provides a waterproof seal for the front surface, and is impervious to darkroom chemicals. And a display switch turns off the LEDs and keyboard backlighting without affecting countdowns or memory.

Control start or focus switch with our optional Single Foot Switch, or control both start and focus switches with the optional Dual Foot Switch.



- Kit PT-1500, Shpg. wt. 5 lbs. 124.95
Optional Auxiliary Outlet.
PTA-1500-3, Shpg. wt. 1 lb. 13.95
Optional Single Foot Switch.
PTA-1500-1, Shpg. wt. 1 lb. 9.95
Optional Dual Foot Switch.
PTA-1500-2, Shpg. wt. 3 lbs. 24.95

PT-1500 SPECIFICATIONS: Switched Outlets: Enlarger, 1000 watts max.; Safelight, 100 watts max. (Enlarger and Safelight outlets not recommended for inductive loads); Optional PTA-1500-3 Auxiliary Outlet, 100 watts max. Alarm Settings: End of interval, every second, every 30 seconds, every 60 seconds. Timing Accuracy: Determined by accuracy of AC line frequency. No cumulative error. Power Requirement: 120/240 VAC, 50/60 Hz, 1009 watts max. with switched outlet. Dimensions: 3½" H x 9¼" W x 5¾" D (7.9 x 23.5 x 14.9 cm).



Model Railroad Power Supply/Throttle for railroading realism

The Heathkit RP-1065 makes an HO or N-gauge layout dramatically realistic. Just operate the slide throttle control to make your engines gradually build up speed just like a real train, maintain realistic acceleration and braking at slow speeds, and stop gradually. The RP-1065's DC compensation circuit prevents stalling out when climbing grades, and helps overcome train and track obstacles.

Easily powers two HO or N-gauge engines, has two auxiliary outputs for operating switch machines, signals and building lights 120 VAC, 50/60 Hz. 4¾" H x 9½" W x 8½" D.

Kit RP-1065, Shpg. wt. 9 lbs. 79.95

Walk-Around Remote Control for RP-1065.

Kit RPA-1065-1, Shpg. wt. 3 lbs. 22.95

Save — Buy RP-1065/RPA-1065-1 together.

RPS-1065, Shpg. wt. 19 lbs. 99.95

Your whole family will enjoy building... and playing this beautiful-to-look-at, beautiful-sounding Heath/Thomas Organ

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

\$999⁹⁵

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

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

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

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

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

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



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

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

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

Making beautiful music was never easier. Find out for yourself today. The TO-2130 includes an attractive matching padded bench.

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

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

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

\$19⁹⁵

- Adjustable tempo between 40 and 210 beats per minute for more efficient practice
- 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 differ-

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

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

Kit TD-1257, Shpg. wt. 2 lbs. **19.95**

The exciting Heathkit Screen Star Projection TV

Thrill your family. The Heathkit Screen Star TV puts excitement back in TV viewing. Its sharp, clear picture is 8 times larger than the one you now watch!*

\$2195⁰⁰

- Three-tube projection for a brighter, more vivid picture
- 6-foot diagonal high-reflectivity, washable viewing screen for a big, bright, lifelike image
- A full 5 watts of clear, low-distortion sound
- Built-in adjustments for easy self-service



For the first time, Heath brings its world-famous quality, performance and reliability to you in a TV Projection System you can build yourself! There's nothing better than the Heathkit Screen Star TV for bringing the theater-like realism of sporting events, movies and entertainment specials into your living room. And the Screen Star gives you the most performance for your TV dollar!

Three-tube projection gives you a brighter, more vivid color picture and provides a wider viewing angle from the projection screen. Both the picture tubes and lenses are the finest available, giving you an unsurpassed state-of-the-art color projection system. Each high-resolution color picture tube beams its image through its own large, high-quality 127 mm f1.0 lens to give you the brightest, sharpest, most beautiful picture!

This image is projected onto a 6-foot diagonal, high-reflectivity viewing screen. The easy-care screen is washable to let you maintain high reflectivity and a bright color picture, and is designed to provide years of enjoyment. The viewing screen is equipped with brackets for mounting on any wall. Or to make your viewing screen free-standing and portable, order the optional GRA-4000-1 Screen Stand (at right).

The electronics of the Heathkit Screen Star provide a bright, clear, lifelike image for years to come! Automatic Fine Tuning (AFT) and an exclusive Heath LC filter maintain IF alignment and reduce drift, keeping your picture in tune from channel to channel. In fact, the IF amplifier never needs re-alignment! Special black level clamps help to faithfully reproduce every scene, whether it's outdoor sun or moonlight. These clamps maintain constant blacks and grays for more accurate brightness levels. Bridge-type low-voltage power supplies provide superior voltage regulation and better all-around performance. And a ferro-resonant power transformer delivers correct power supply voltages, even in areas where line voltages are too low or too high. Proper voltage regulation means you get constant brightness and picture size — even during voltage brownouts.

The external antenna input is designed to give you clearer, crisper TV reception with less troublesome interference! An internal UHF/VHF splitter means you need only one antenna connection to your GR-4000. This true 75-ohm antenna hookup, combined with complete shielding of the tuners, makes the new Heathkit Screen Star TV ideally suited to hook up to your cable television system. (If you don't have cable TV, get the best reception of TV stations in your area with the antennas, rotor and accessories on page 32).

We've even designed a video input/output panel with an auxiliary 120 VAC outlet that lets you directly connect a video cassette recorder like the Zenith Video Director (see page 32). Direct connection assures higher-quality video.

The major television networks have improved the fidelity of their sound — and with the Heathkit Screen Star you can really hear the difference! The sound system provides a full 5 watts of sound as beautiful, rich, clear and distortion-free as the picture. You can listen through the large 6" x 9" speaker, or use the external speaker jack or the VCR audio output jack — to connect to your stereo system for even better high-fidelity sound!

The Heathkit Screen Star is designed to be energy-efficient. Quick warm-up picture tubes bring the picture up fast — but without high energy consumption — or cost.

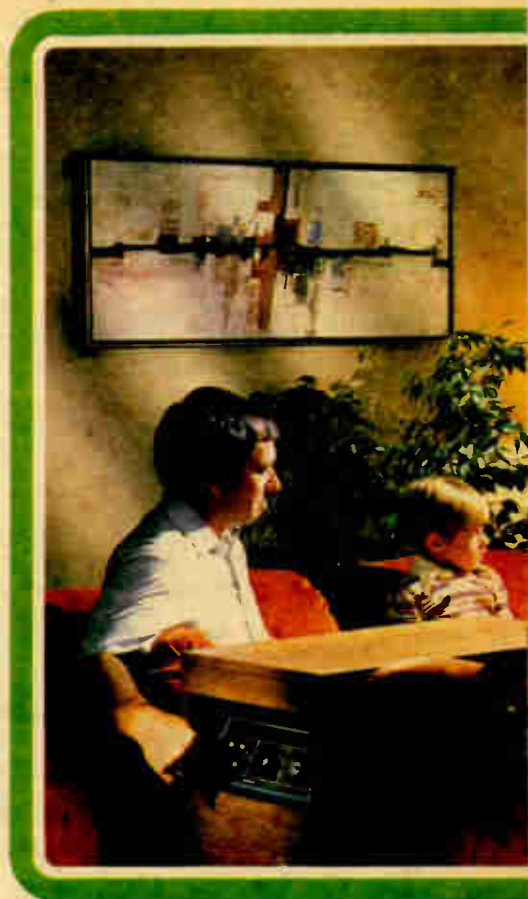
All controls on the projector are easy-to-find and easy-to-use. Illuminated channel indicators instantly tell you which of the 82 UHF and VHF channels you're tuned to. And all adjustments, including the focus controls, are on top of the chassis or an easily accessible panel.

You can easily move the Heathkit Screen Star from room to room! The projector's smooth-rolling casters let you move the projector anywhere, easily — even store it out of the way — when not in use. And with the optional Screen Stand, the lightweight screen can be moved with the same ease. Just place the screen about 8 feet in front of the projector, and you can see lifelike, big-screen color TV.

The new Heathkit Screen Star TV is Heath's easiest-to-build solid-state color TV! It takes just 40 to 50 hours for an intermediate kit builder to assemble. The entire picture tube, yoke and lens units, as well as the high-voltage supply, UHF and VHF tuners, are factory-assembled and adjusted for easier building and more reliable performance. Transistors and integrated circuits plug in for easier assembly and — if needed — simpler testing, adjustment and replacement.

Heath is world-famous for the simplicity and thoroughness of its kit-building manuals — and the Screen Star's assembly manual is no exception! Kit-building is a snap, with the assembly manual taking you every step of the way.

Solid-state reliability means you'll spend less on repair bills. And a complete self-servicing manual, with full illustrations, shows you how to perform your own service and save even more by eliminating costly repair bills! The built-in self-service features make maintenance and repair fast and simple.



A convenient swing-back cabinet on the projector gives you access to make adjustments that can't be made with the easy-to-reach controls on the projector. All convergence controls are located on the upper chassis to simplify adjustments. A built-in crosshatch generator makes it easy to maintain convergence for a sharp picture. The entire chassis conveniently swings back for easy servicing. And a test meter is included for making checks before the TV projector is placed into operation, and to aid you in making more precise adjustments. The test meter can also be used for servicing in the future. With these built-in service features, you can really save money on service calls.

Should you ever run into a problem, however, help is as close as the nearest Heathkit Electronic Center or the Heath factory. You receive complete service support to help you keep your Screen Star in perfect working condition.

Order today! Get the brightest, sharpest, most beautiful picture in breath-taking big-screen realism — with solid-state reliability and the Heathkit self-service advantage — in the new Heathkit GR-4000 Screen Star Projection TV. Your color television viewing will never be the same again.

Kit GR-4000, Wt. 190 lbs., Mtr. Frt. 2,195.00

Optional Screen Stand for GR-4000.
GRA-4000-1, wt. 18 lbs., Mtr. Frt. 79.95

(*If your present TV is 25" diagonal or smaller.)

brings big-screen color television right into your living room



All operating controls are conveniently located on the projector to make operating the Heathkit Screen Star a breeze!



The Screen Star uses the highest-quality f1.0 lenses to beam a brighter, clearer picture!



The Screen Star Color TV Projection Unit is mounted on easy-rolling casters. Move it anywhere when not in use.



The big, high-reflectivity 6-foot diagonal viewing screen is washable. (Shown with optional GRA-4000-1 Screen Stand)

Simulated TV picture (Shown with optional screen stand)

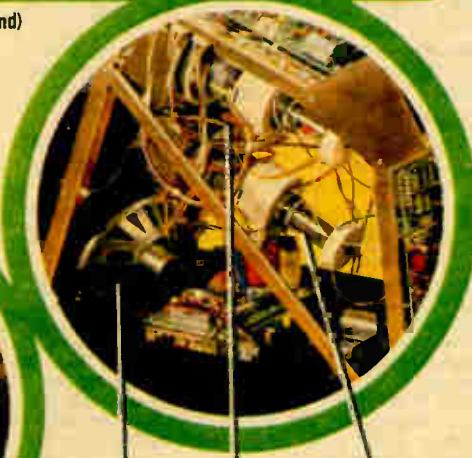
Chassis swings back for easier servicing

All convergence controls are located on the upper chassis to make adjustments easier

Focus controls for each picture tube help you keep your color picture sharp and clear



Plug-in ICs and circuit boards make servicing easier than ever!



Large 6" x 9" speaker gives you 5 watts of full-bodied hi-fi sound!

Three high-quality picture tubes — the best way to get the brightest, most beautiful color picture!

The picture tubes, lenses, high-voltage supply and tuners are factory assembled and adjusted to assure more reliable performance

GR-4000 SPECIFICATIONS: Antenna Input Impedance: 75 ohms, 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 W at speaker and external 8-ohm speaker jack. Total Harmonic Distortion: Less than 0.5%. 30 dB Sound Quieting: Greater than 100 dB at 1 V. Video IF Bandwidth: 4.08 MHz at 6 dB down. Peak Picture Sensitivity: Greater than 100 dB. Video Cassette Recorder: 1 V composite video in/out at 75 ohms, .75 VRMS audio in/out at 600 ohms. Projector Lenses: 127 mm focal length, f 1.0/1. Projector Distance from Screen: Approximately 98 inches. Screen Dimensions: 45" H x 60" W. Projector Dimensions: 28" H x 16 1/4" W x 32" D. Power Requirement: 120 VAC, 60 Hz, 150 Watts.

The Heathkit GR-2001 Computer TV System brings incomparable color television viewing enjoyment

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

—Radio Electronics

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

—Budget Electronics



Full computerization gives you a magnificent 25" diagonal color picture

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

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

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

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

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

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

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

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

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

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

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

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

Kit GRA-2001-9, Shpg. wt. 1 lb. 9.95



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

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

Kit GD-1185, Shpg. wt. 9 lbs. 159.95

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

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

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

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

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

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

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

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

Save more by getting an entire system

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

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

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

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

Beautifully styled cabinets make your Heathkit Color TV look good even when it's not turned on

These lovely cabinets of specially selected wood solids and veneers will draw as many compliments as the superb picture on your TV



Contemporary Cabinet is constructed of wood solids and veneers. It features an oiled walnut finish. Has dual speaker capability. Comes assembled and finished. 28 $\frac{3}{8}$ " H x 48 $\frac{1}{8}$ " W x 23 $\frac{3}{8}$ " D (with cup).
GRA-602-25, 66 lbs. Motor Freight . . . 199.95



Compact Contemporary Cabinet. Beautifully finished in luxurious oiled walnut. Fully assembled with cutout for one speaker. 34 $\frac{3}{8}$ " H x 20 $\frac{5}{8}$ " W x 24 $\frac{1}{8}$ " D (with cup).
GRA-608-25, 65 lbs. Motor Freight . . . 159.95



Mediterranean Cabinet. Dark oak finish. Assembled. Accepts two speakers. 30 $\frac{3}{8}$ " H x 49 $\frac{1}{8}$ " W x 23 $\frac{1}{8}$ " D (with cup).
GRA-604-25, 82 lbs. Motor Freight . . . 219.95



Early American Cabinet. Fully assembled, finished. Two speaker cutouts. 31 $\frac{3}{8}$ " H x 47 $\frac{1}{8}$ " W x 23 $\frac{1}{8}$ " D (with cup).
GRA-603-25, 83 lbs. Motor Freight . . . 219.95

LAST CALL



You deserve the set that brought color TV into the digital age

Heathkit solid-state technology brings you a color picture you'll be proud to show off to your friends. And a picture that will bring more enjoyment to your family's television viewing for many years to come.

This beautiful 25" diagonal Color Television offers one of the best value color TV's you'll find anywhere — with a host of state-of-the-art features! Has electronic tuning which scans through the preset channels; black matrix picture screen for extra bright and sharp pictures; fixed IF filter which virtually eliminates adjacent channel interference and never needs alignment; automatic gain control.

It has famous Heathkit built-in service circuits too — dot generator, purity and convergence circuits, vertical and horizontal centering circuits and a test meter. Easy kit assembly too — with most circuits mounted on plug-in printed circuit boards and factory-assembled wiring harnesses to minimize point-to-point wiring. You can custom-mount your GR-2000 in a wall or your own installation, or you can order one of our fine furniture cabinets described at left. Kit GR-2000, 147 lbs., Motor Freight . . . 669.95

GR-2000 SPECIFICATIONS: Picture Tube: 25" (diagonal). Viewing Area: 315 sq. in. Deflection: Magnetic, 90°. Antenna Input Impedance: VHF: 300 Ω balanced or 75 Ω unbalanced. UHF: 300 Ω balanced. Tuning Range: TV channels 2 thru 83 (Preset any 16). Hi-Fi Output: Output Impedance: 2000 Ω . Frequency Response: ± 1 dB, 50 to 15 kHz. Harmonic Distortion: Less than 1% at 1 kHz. Output Voltage: Greater than 1.0V rms. Audio Output: Output Impedance: 4 Ω or 8 Ω . Output Power: 2 watts. Dimensions: 20 $\frac{1}{8}$ " H x 29 $\frac{1}{8}$ " W x 21 $\frac{3}{4}$ " D. Power Requirement: 120 VAC, 60 Hz, 200 W.

Second Speaker for GR-2000. Includes cables.
GRA-2000-7, Shpg. wt. 2 lbs. 9.95
On-Screen Digital Clock. See description at right.
Kit GRA-601, Shpg. wt. 1 lb. 29.95
Ultrasonic Remote Control. Described at right.
Kit GRA-2000-6, Shpg. wt. 4 lbs. 99.95

"The picture obtained on the GR-2000 can only be described as superb...equal to that of many studio color monitors."

— Popular Electronics

"Anybody who can follow instructions, solder and use wire cutters is capable of building himself a great television set."

— Mechanix Illustrated



On-Screen Digital Clock for GR-2000. Shows the time in hours, minutes and seconds in bright 1" high white digits right below the on-screen digital channel display. The clock can be set for four-or-six digits readout and 12

or 24-hour format. A useful, versatile addition to your GR-2000 Color Television.

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



Ultrasonic Remote Control for GR-2000. Watch and control your set from your easy chair. On/off, color and tint controls, digital readout, channels up and down, volume up and down. Operates up to 20 ft.

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

Our special warranty service plan for solid-state TV modules: During the 90-day warranty period, modules with defective components will be serviced at no charge for parts and labor. If the problem is due to a construction error, the inspection and service charge is \$5.00 per module. After the 90-day warranty expires, the service fee is \$5.00 per module plus parts. All picture tubes warranted for 2 years.



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

TELEVISION/31



1

Your favorite shows will look even better on the super sharp screen of the GR-2050

2

Great color on this negative matrix screen



Simulated TV pictures

19" and 21" Diagonal Measure TVs for super color

1 See all your favorite TV shows in vivid color with a picture the others envy. This outstanding Color Television kit brings you all the technical excellence and quality design of our famous GR-2000 on page 31, but in the popular 21" diagonal size. It uses the same optional on-screen clock and remote control as the GR-2000 and it has the same bright, accurate color picture. Modular circuit boards and color-coded wiring harnesses keep point-to-point wiring to a minimum. Built-in service features and adjustment circuits include a dot generator, service circuit board, centering and pincushion circuits.

Kit GR-2050, with chassis, picture tube, one speaker, 122 lbs. Mtr. Frt. 629.95
GRA-2050-1, Contemporary Cabinet, 28 $\frac{1}{2}$ " H x 30 $\frac{1}{2}$ " W x 22 $\frac{1}{8}$ " D (with cup), 74 lbs. Mtr. Frt. 179.95

Kit GRA-2000-6, Optional Remote Control, wt. 4 lbs. 99.95
Kit GRA-601, Optional On-Screen Digital Clock, wt. 1 lb. 29.95

2 GR-500 19" Diagonal Measure Color TV has in-line gun color tube, on-screen channel display, hi-fi output. Avoid future repair bills with trouble-shooting meter included.

Kit GR-500, less cabinet, 99 lbs. UPS 499.95
GRA-500-1, Walnut veneer table model Cabinet (shown), 17 $\frac{1}{4}$ " H x 25 $\frac{1}{2}$ " W x 17" D (including cup), 28 lbs. UPS 44.95
GRA-403-18, Roll-around Cart, Shpg. wt. 17 lbs. 21.95
GRA-601, Digital Clock Accessory, Shpg. wt. 1 lb. 29.95



Programmable Zenith Video Director lets you record up to four different channels over a 14-day period — up to five hours of your favorite TV shows!

Increase your television viewing pleasure with the exciting Zenith Video Director. Record shows while away, record while watching, or record one and view another. Remote Video Action Control edits unwanted scenes...during recording...from your easy chair. Stop tape for "freeze action." Speed Search locates scenes at 10 times normal speed. Reverse it for "instant replay." Or view at three times normal speed. Record/play in Beta II or Beta

Zenith Recorder, antennas and accessories for more viewing enjoyment

III modes — to 5 hours in Beta III. Audio Dub adds music/narration later. Accepts optional camera or monitor. Includes remote, transformers, cables, 120 VAC, 55 W. Comes with 5 free GDZ-9700-4 Tapes (if pur. sep., an \$89.75 value). Record your favorite shows to suit your viewing schedule.

GDZ-9700S, Assembled/tested, 58 lbs. Was \$1239.75, Now only 1150.00

Videotapes	Beta II	Beta III	Wt.	Price
GDZ-9700-5 (L-820)	3 $\frac{1}{2}$ hrs.	5 hrs.	1 lb.	20.95
GDZ-9700-4 (L-750)	3 hrs.	4 $\frac{1}{2}$ hrs.	1 lb.	17.95
GDZ-9700-3 (L-500)	2 hrs.	3 hrs.	1 lb.	14.95

"Super Antenna" 60-element VHF-UHF-FM antenna is real signal-grabber. 171" boom, 109" turning radius. Weather-protected finish. Includes removable FM blocking elements. Less mast and cable.

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

GDS-1461, 75 ohms, 16 lbs., Mtr. Frt. 84.95

"Deluxe Fringe Antenna." 28-element. VHF/UHF. 131" boom, 80" turning radius. Less mast and cables. All-weather construction.

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

GDS-1441, 75 ohms, Shpg. wt. 12 lbs. 44.95

Cornell-Dubilier Rotator System. Heavy-duty auto-rotator system features control box and mast-mount rotator. Pinpoints your outdoor antenna on the station for greatly improved TV and FM. Heavy-duty 1 rpm rotator has positive automatic stop, instant reverse. $\frac{1}{2}$ " diameter ball thrust bearing supports antennas to 150 lbs. Lower mast clamp takes $\frac{7}{8}$ " to 2" diameter masts; removable for direct mounting on tower's rotator plate. Lifetime lubricated bearings. 360° rotator control. 120 VAC. Requires 5-wire cable (not supplied). Improve your TV viewing for more stay-at-home enjoyment.

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

75/300 Ohm Transformer-Splitter. Matches one 75 ohm coaxial cable to separate 300 ohm VHF and UHF leads 82 channel. Has no-strip, pre-attached leads.

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

Matching Transformer. Converts 300 ohms to 75 ohms for coax. 82 channels.

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

Coaxial Cable. 100 ft. of high-quality coaxial cable with both antenna boot and connectors installed. 75 ohm.

GD-328, Shpg. wt. 4 lbs. 12.95

NEW

Smart 13" Diagonal Zenith System 3 Color Portable TV



Now the best Zenith ever...is even better! This 13" diagonal portable features Tri-Focus Picture Tube for the sharpest picture in Zenith history. Triple-plus chassis has modular design, few inter-connections and is cooler running for longer life. Color Sentry corrects the picture 30 times per second... automatically. Light Sensor adjusts picture to ambient light. Electronic Power Sentry voltage regulating

and other energy-saving features combine for 25% less average energy use than comparable previous model. Space Command® 800 Remote Control allows control from across the room. 13 $\frac{3}{4}$ " H x 20 $\frac{3}{8}$ " W x 14 $\frac{7}{8}$ " D.

GRZ-1325, Assembled and tested, 44 lbs. 439.95

NEW

Famous Zenith quality in an AC/DC/Battery portable TV



This versatile black and white portable goes anywhere... because it plays on AC for home viewing; DC in car, camper or RV; optional 12 V battery for picnic, beach... wherever you go. 9" diagonal measure screen. 100% solid state. Molded cabinet measures 9 $\frac{3}{4}$ " H x 14 $\frac{5}{8}$ " W x 9 $\frac{1}{2}$ " D. Uses a mere 28 watts of power. Cabinet color not finalized at catalog press time. We will send you either almond or ebony as we receive them.

GRZ-92, Assembled and tested, 17 lbs. 109.95

GRZ-92-1, Rechargeable battery pack, 9 lbs. 49.95

GRZ-92S, Save \$10.00. TV & battery pack, 33 lbs. 149.90



Heathkit Computer Systems let you take control of your specific computing needs

The world's leader in quality electronic kits leads the way again — with computer systems that give you more versatility and flexibility — at affordable prices

Heath Company offers one of the most complete and innovative lines of computers, computer systems, peripherals, software, accessories and supplies available anywhere. Heathkit Computer Products offer extra value for your computing dollar.

How to select a computer: Do you want built-in peripherals or the flexibility to design your own system? Do you want to expand your memory power as your skills grow? How good is the systems software? Is it compatible with existing software? Will the manufacturer stand behind the computer? You can be sure of the answers when you consider Heathkit Computer Systems.

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. The H-89 will run all disk-based H-8 software. And the new H-77 Floppy Disk system adds

a new dimension of flexibility — up to three drives, including the H-89's built-in floppy. For more information on the All In-One, see page 34.

For flexibility — the H-8. If you're interested in developing hardware, need more than 48K of read-write memory or write physical I/O routines in Assembly language, the H-8 is for you. Its versatile bus-oriented architecture, expandability and hardware front pane position it as the right choice. More details can be found on page 36.

For DEC[®] compatibility — the 16-bit H-11A. If you need a computer for scientific uses, real-time systems or similar applications, and DEC PDP-11V03 hardware and software capability is significant, the H-11A is your choice. We offer a large selection of compatible hardware and software. See page 38.

Heathkit Accessories — including new wire wrapping products, memory, interfacing and others — make your computer more useful. See pages 35 and 43.

Value-packed Heathkit Software includes programs written in BASIC[™] and Assembly languages, on floppy or cassette, that make your computer more versatile. In this catalog, we introduce MICROSOFT[™] FORTRAN for the H-8/H-89, Zenith[™] Electronic Typing Word Processing Software and source listings for selected Heathkit software. Our complete software line can help you write your own programs

easily. And for one year after purchase, we'll send you any changes to our disk-based software, free of charge. See pages 45, 46 and 47 for more.

HUG — the Heath Users' Group — keeps you informed of new programs, written by other members and available to you. It also keeps you up to date on new Heathkit computer developments. Owners of Heathkit Computers can become members of this group, which shares an extensive program library. See page 48 for more information.

Our documentation is the best in the industry. If you want to build a Heathkit Computer yourself, we make it easy with complete assembly manuals which take you from unpacking to plug-in. You'll understand your computer from the inside out. Operating and instruction manuals are fully detailed.

We offer complete service support. Technical expertise, advice and service are always available. Service experts at the Heath factory and Heathkit Electronic Centers can help you keep your computer system working right.

You get the convenience of one-stop shopping. The complete selection of Heathkit Computer Products is available here in the Heathkit Catalog, and at Heathkit Electronic Centers.

Complete documentation shows you the way

Professional video terminal makes programming simpler

Heathkit Computer Systems — designed to look together, and to look like they belong together

Everything you need to design your own system — or buy one of our complete systems

Full selection of line printers — from matrix to letter quality font



H-8 Computer with 7 plug-in positions for memory and I/O for more flexibility

H-89 All-In-One Computer with built-in floppy and 16K RAM, expandable to 48K



The Heathkit All-In-One Computer: extra convenience in a compact unit — built-in video terminal, 16K RAM expandable to 48K, built-in floppy, H-8 disk software compatibility — at an affordable price

Only
\$1695⁰⁰
 for H-89

- Two Z-80 microprocessors — one for computer, one for video terminal
- Heavy-duty professional keyboard
- Easy-to-read 12-inch CRT monitor
- Runs all disk-based H-8 Software
- Kit versions include audio cassette interface
- Numeric keypad in calculator format

Are you looking for all the computing power and built-in peripherals you need — but your computer budget doesn't allow for extravagance? The Heathkit All-In-One Computer has the power, peripherals and convenience features 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.

The professional video terminal displays data in the format of 24 lines by 80 characters per line — up to 1920 characters at any one time. The terminal also features a special-purpose, non-scrolling 25th line, software-controlled.

The heavy-duty professional keyboard, designed in typewriter format, controls all terminal functions. The keyboard prints the entire ASCII set, including both upper and lower case letters — along with 33 special graphics symbols for an extra measure of flexibility.

Select baud rates up to 9600 through the keyboard. Direct cursor addressing lets you insert or delete characters anywhere on the screen. All 32 terminal functions can be controlled 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.

The All-In-One Computer comes with more memory power. 16K of random access memory (RAM) is supplied. And memory diagnostics are built-in to make memory checks easier and faster.

You can expand to meet your specific needs. The All-In-One will accept up to 48K (RAM). To add memory, just plug integrated circuits into sockets. No soldering is necessary.

The built-in floppy disk system makes this a true All-In-One Computer, giving you tremendous storage capacity for programs and data. Each 5.25-inch standard, hard-sectored 40-track diskette stores up to 100K bytes of data. The Siemens 82 single-drive system gives you fast, accurate access to data. You'll be able to load programs in seconds, access and update data fast. And the disk drive is factory assembled and tested, for easier kitbuilding.

If you need even more data storage, buy the H-77 Floppy Disk System. Designed with the All-In-One Computer in mind, the H-77 (with appropriate accessories) can give your All-In-One system up to 300K bytes of on-line data storage (3-drive systems require Heath Disk Operating System, Version 1.6).

The All-In-One gives you instant H-8 compatibility. All disk-based H-8 software will run on All-In-One systems with floppy disk storage.

Choose from a wide selection of software. The Heath Users' Group (page 48) maintains over 500 applications programs, most of them compatible with the All-In-One.

You get more flexibility with the All-In-One. An audio cassette interface, standard with kit versions, lets you communicate with cassette storage systems. With other accessory interfaces, you can communicate with printers or time-share systems (all with appropriate software). All communication is EIA RS-232C.

The All-In-One is built to withstand the toughest working environments. And a convenient lift-off top gives you easy access to the components and circuitry.

With so much power and so many features built in, this desktop computer brings exceptional value within your reach. Put it to work for you now. Requires HDOS or similar systems software for normal operation.

Kit H-89, Shpg. wt. 86 lbs. 1695.00

WH-89-CA Completely Assembled All-In-One Computer, with floppy, 48K memory and serial I/O. Does not include audio cassette interface.

WH-89-CA, Shpg. wt. 54 lbs. 2895.00

H-88 All-In-One Computer, without floppy. Includes H-88-5 Audio Cassette Interface.

Kit H-88, Shpg. wt. 59 lbs. 1295.00

H-89/WH-89-CA/H-88 SPECIFICATIONS: Microprocessor: Two Z-80 microprocessors (one in computer, in video terminal). Clock: 2.048 MHz. Memory: 16K bytes user random access memory (RAM) — expandable to 48K. Video Terminal: High-resolution 12" diagonal CRT with P4 phosphor. Keyboard: 80 keys, typewriter format, with numeric keypad in calculator format. Cursor: Blinking, non-destructive underline or block. Cursor Controls: Up, down, left, right, home, CR, LF, back space and tab. Cursor Addressing: Relative



and direct. Tab: Standard eight-column tab. Refresh Rate: 60 Hz at 60 Hz line frequency, 50 Hz at 50 Hz line frequency. Edit Functions: Insert and delete character or line. Erase Functions: Erase from beginning of line, erase to end of line, erase from beginning of page, erase to end of page, erase line and erase page. Power Requirement: 120/240 VAC, 50/60 Hz at 90 watts maximum. Overall Dimensions: 13" H x 17" W x 20" D (33.02 x 43.18 x 50.80 cm).

Design an All-In-One system for your needs

Add memory up to the All-In-One's 48K RAM capacity. Add cassette storage or other I/O accessories to your All-In-One.

Choose from a full line of printers and other accessories, because the All-In-One is flexible enough to meet your needs.

Memory:

16K
 H-88-2
 (add up to two)

Mass Storage:

Cassette
 ECP-3801A

Floppy
 H-77/WH-87

Interfacing:

Cassette
 for WH-89-CA
 H-88-5

Serial 2-port
 H-88-3

Peripherals:

Printers
 H/WH-14, WH-24,
 WH-34, WH-44

Modem
 WH-13



H-77 Floppy Disk adds even more versatility and flexibility to your Heathkit All-In-One Computer

\$595⁰⁰
Kit

- Additional data storage capacity, easier copying of programs
- Each disk drive is fully assembled and tested for easier kitbuilding
- Each drive installs vertically to take up less space

Designed especially for the Heathkit 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 Floppy Disk with your All-In-One Computer, you have room for up to three disk drives. You can mount your operating system and program disks at the same time, to get rapid access to programs and data.

Floppy disk storage is far more versatile and reliable than paper tape or cassette storage systems. You'll be able to load programs in seconds, access and update data fast. And because the H-77 Floppy Disk System is designed with the All-In-One Computer in mind, 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.

You get the flexibility to add as much data storage

capacity as you need. You can add the H-77 to your H-89, or to your H-88 (with the optional H-88-4 Disk Drive) for two-drive capability and 200K bytes of on-line data storage. The H-77 comes with a diskette storage box which fits into the second drive housing, so your system looks neat and efficient.

Or, for three-drive capability and 300K bytes of on-line data storage, add the optional H-17-1 Second Drive to your H-77. For instant three-drive capability, the factory assembled and tested WH-87 — which includes two disk drives — can be used in place of the H-77/H-17-1. (NOTE: 3-drive systems require Heath Disk Operating System, Ver. 1.6.)

Expand the capability of your All-In-One Computer today — with the H-77 Floppy Disk System.

Kit H-77, with one drive, 25 lbs. **595.00**

Assembled Dual-Drive Floppy Disk System. Requires H-88-6 Modification Kit for installation.

WH-87, Shpg. wt. 28 lbs. **1195.00**

H-88-6 Modification Kit. Cables, junction box to connect WH-87, future accessories to H-88, H-89. Not required, but may be used with H-77.

H-88-6, Shpg. wt. 2 lbs. **50.00**

H-77/WH-87 SPECIFICATIONS: Number of Tracks per Diskette: 40. Number of Sectors per Track: 10. Formatted Bytes per Sector: 256. Spindle Motor Speed: 300 rpm, +1 percent. Data Transfer Rate: 128 kilohertz. Motor Start Time: 1 sec. Operating Temperature Range: 32 to 104 degs. F (0 to 40 degs. C). Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 8.625" H x 8.875" W x 15" D (21.9 x 22.5 x 38.1 cm). Net Weight: 22.5 lbs (10.2 kg).

All-In-One Accessories

16K Random Access Memory Expansion Chip Set. H-88-2, 1 lb. Was \$150, Now **95.00**

Two-Port Serial I/O Interface. Communicate with printers, other peripherals (w/appropriate software). RS-232C serial interfacing. H-88-3, Shpg. wt. 2 lbs. **100.00**

Floppy Disk Storage System/Interface for H-88 All-In-One Computer. Diskettes not included. H-88-4, Shpg. wt. 22 lbs. **450.00**

Audio Cassette Interface for WH-89-CA. H-88-5, Shpg. wt. 2 lbs. **75.00**

NEW! Wire Wrapping Board for the All-In-One. Design custom circuits. Punched, etched board with room for 48 16-pin sockets (or other combinations). With bus connectors. Full description, p 43. Uses HCA-6, HCA-7 below. Kit H-88-10, Shpg. wt. 1 lb. **30.00**

NEW! Wire Wrapping Kit. Description on page 43. Kit HCA-6, Shpg. wt. 2 lbs. **12.95**

NEW! Wire Wrapping Socket Kit. Description on p. 43. Kit HCA-7, 1 lb. **29.95**

NEW! Panelgraphix Anti-Glare CRT Filter. Plastic. HCA-3, Shpg. wt. 1 lb. **8.95**

NEW! Sun-Flex CRT Filter. Fabric anti-glare cover. HCA-4, Shpg. wt. 1 lb. **19.95**

Optional Second Drive for H-77 Floppy Disk. H-17-1, Shpg. wt. 5 lbs. **325.00**

See the complete line of All-In-One Software, including the new Zenith Electronic Typing Word Processing System, on pages 45-47.



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

Get immediate programming versatility and plug-in flexibility — with the popular, budget-pleasing Heathkit H-8 Computer

Only
\$299.00
Kit

- Built-in ROM monitor to control front panel program
- Heavy-duty power supply handles full complement of memory, I/O devices

- Fully-buffered bus has 7 plug-in positions for memory and I/O
- Convection-cooled power supply — no noisy fan needed

The Heathkit H-8 — the computer that grows as you grow. You get flexibility to design a computer system just the way you want it. With 7 positions for plug-in modules, you can put together any combination of memory and I/O. And our large selection of peripherals, accessories and software give your H-8 Computer unmatched versatility.

Novices can use the H-8 as a computer trainer. The 16-key front panel keyboard provides octal data entry, direct access to registers and memory, one-button program load and dump, and input/output keys to communicate directly with any port. And you can directly monitor program activity with the H-8's nine-digit octal readout, which provides much more information than conventional computers.

The features we pack into the H-8 Computer mean more value to you. A heavy-duty power supply lets the H-8 handle up to 65K of memory (including I/O), while convection cooling means no fan is needed to prevent overheating.

The CPU board, including the 8080A chip, clock, systems controller and ROM monitor, is fully assembled, wired and tested for easier kit assembly and faster system setup. An exclusive Heath 50-pin fully-buffered bus gives you more room for memory and I/O. The H-8's built-in speaker gives you audible feedback and special effects. Front panel lights keep you up to date on your computer's status. With all these features and more, the Heathkit H-8 Computer is an excellent choice to be the heart of your computer system.

When you add more memory, interfaces and peripherals, your H-8 system can become even more powerful and versatile. You'll be able to write more highly-sophisticated, higher-level programs.

Heathkit Floppy Disk Systems, which are sold separately, provide even greater flexibility for your H-8 Computer. The H-17 Floppy Disk System, available in both kit and fully assembled forms, provides up to 100K bytes of on-line data storage capacity. And when you add an optional second drive, on-line data storage capacity is expanded to a capacity of 200K bytes. Designed especially for the H-8 Computer, the H-17 Floppy Disk System gives you the capability to load programs and update files instantly.

The unique flexibility of the H-8 means you have total freedom to design a system that meets your own needs. You can start with our Complete Advanced H-8 System, described at right. Or choose from a vast selection of peripherals and accessories — including additional memory, cassette data storage, CRT terminals, hard-copy printers and an acoustic modem.

Choose from a vast software library. An expanding selection of languages — including new Microsoft™ FORTRAN — lets you start programming right away. And the Heath Users' Group maintains over 500 applications software programs for the H-8 — from business accounting and personal budgeting to computer-aided instruction, exciting computer games — even weather forecasting! Open the door to this expanding world of software when you order your H-8 Computer.

Memory and I/O accessories are offered separately from the computer itself, so you have complete freedom to assemble a computer system that meets your

specific computing needs. To build a complete system using the Heathkit H-8, you'll need both memory and interface accessory cards. The type and number of memory and interface accessories you'll need will be determined by your particular application.

The H-8's optional software is supplied in 1200 baud audio cassette or diskette forms to help get you up and running faster.

The value-priced H-8 is housed in a heavy-duty metal cabinet with modern, high-impact structural foam side panels.

Get the flexibility and versatility you need to really personalize your computer system — at a price that fits your budget. Requires at least 4K of memory to operate (see page 43 for memory).

Kit H-8, Shpg. wt. 31 lbs. 299.00

Factory Assembled and Tested H-8 Computer.

WH-8, Shpg. wt. 30 lbs. 399.00

Look at the Manuals before you buy — with no risk. Complete assembly and operating manuals for H-8 Computer, H-8-4 Interface, H-14 Line Printer, WH-8-16 Memory Board and H-19 CRT Terminal. When you order the H-8 Computer, deduct \$30.00 from the purchase price (not including shipping and handling charges).

HM-800, Shpg. wt. 13 lbs. 30.00

NOTE: Individual product manuals are included with each kit.

H-8/WH-8 SPECIFICATIONS: Microprocessor: 8080A. Monitor: In on-board 1K x 8 ROM. Octal addresses, data input and display from the front panel. Monitor Functions: Memory display and alter, register display and alter, memory load and dump, single instruction execution, program execution, port input and output. Clock: 2.048 MHz, crystal-controlled. Interrupts: Seven, priority vectored. Power Supplies: +8 VDC at 10 amperes maximum. Regulated to +5 VDC on each circuit board. +18 VDC at 500 mA. Regulated to +12 VDC and -5 VDC on the CPU circuit board. Chassis Capacity: Seven locations on the mother circuit board for memory or I/O cards. Four memory cards maximum. One bus expansion maximum. Operating Temperature: 32 deg. F to 104 deg. F (0 deg. C to 40 deg. C). Power Requirement: 120/240 VAC, 50/60 Hz, 150 watts. Dimensions: 6.5" H x 16.25" W x 17" D (16.51 x 41.28 x 43.18 cm). Net Weight: 21 lbs. (9.5 kg).



Complete Advanced H-8 Computer System. Includes Heathkit H-8 Computer, H-8-4 Four-Port Serial I/O, WH-8-16 16K Wired Memory Card, H-17 Floppy Disk System, H-19 CRT Terminal and H-8-17 HDOS Operating Software. \$2173.00 if purchased separately. Save **\$178.00** when you purchase the complete advanced H-8 Computer system.

HKS-82, Shpg. wt. 143 lbs. 1995.00

Design your own H-8 Computer System

With 7 plug-in positions for memory and I/O devices, your H-8 Computer System can grow as your needs grow.

Some of your options are described on the chart below. Each box represents a plug-in module.

Memory:
(4 cards, up to 64K)

Wired 16K
WH-8-16

Mass Storage:

Cassette
ECP-3801A
(requires H-8-5
Interface)

Floppy
with controller
H-17

Interfacing:

Serial/Cassette
1-port
H-8-5

Serial
4-port
H-8-4

Parallel
3-port
H-8-2

Peripherals:

Terminal H-9, H-19;
Printers H-14, WH-24,
WH-34. Modem WH-13





Increased data storage capacity — yours with the H-17 Floppy Disk

\$575⁰⁰
Kit

- Make your H-8 Computer System even more versatile
- Store up to 100K bytes of data on a single 5.25-inch disk
- Rapid access to any program
- Easier loading of programs
- Assembled and tested Siemens 82 drive system for easier kitbuilding
- Optional second drive available to double on-line storage capacity
- Take advantage of disk-based H-8 software

The Heathkit H-17 Floppy Disk System gives you the storage and programming capacity you need to load programs quickly. Store hundreds of programs on a single disk and have rapid access to any one of them, anytime you need it. And you can update your data in place, in real-time. The H-17 makes your Heathkit H-8 Computer System a total versatility computer system.

Designed exclusively for use with the H-8, the H-17 stores up to 100K bytes of data on a standard, hard-sectored 40-track diskette which is just 5.25 inches in diameter. The floppy disks are easier to handle — and easier to load — than paper tape or cassettes.

See the complete line of systems and applications software for the Heathkit H-8 Computer. Turn to pages 45, 46 and 47 for full details. And turn to page 48 to see the expanding world of H-8 applications software available through the Heath Users' Group.

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 is designed especially for the H-8 Computer, you get a harmonious system that interfaces properly and runs smoothly.

The H-17 uses the famous Siemens 82 single-drive system, a performance-proven disk drive which provides accurate high-speed access to data. This drive performs much better than most equivalent competitive drive systems. Specifications of this drive system include a 30 millisecond track seek time and a typical random sector access time of less than 250 mS. The Siemens 82 disk drive system is supplied fully assembled and tested for the Heathkit H-17 Floppy Disk System.

For even 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.

Add the Heathkit H-17 Floppy Disk System to your Heathkit H-8 Computer and enjoy the full capabilities of your computer system. Take advantage of all the practical and fun programs available to you.

To use the H-17 Floppy Disk System effectively, you need an H-8 Computer with at least 16K of random access memory (RAM), as well as the H-8-17 HDOS Operating System Software (see page 47). Includes a single blank 5.25-inch floppy diskette.

Kit H-17, with one drive, 28 lbs. 575.00

Factory Assembled and Tested H-17 Floppy Disk System. Includes all of the features in the H-17. Maximum on-line data storage capacity, 100K bytes. Supplied with one disk drive.

WH-17, Shpg. wt. 28 lbs. 645.00

Optional Second Drive for the H-17 Floppy Disk System. Adds dual-drive versatility to your H-17 Floppy Disk System. Run operating system and program disks simultaneously. Gives you up to 200K bytes of available on-line data storage area.

H-17-1, Assembled, Shpg. wt. 5 lbs. 325.00

H-17/WH-17 SPECIFICATIONS: Storage Media: 5.25-inch, hard-sectored diskette. Number of Tracks per Diskette: 40. Number of Sectors per Track: 10. Formatted Bytes per Sector: 256. Drive Type: Siemens Model 82. Track Seek Time: 30 milliseconds. Random Sector Access Time: Less than 250 milliseconds. Power Requirement: 120/240 VAC, 50/60 Hertz, 75 watts. Dimensions: 6.25" H x 13.5" W x 13.5" D (15.89 x 34.29 x 34.29 cm).



DEC®-compatible educational/science computer for laboratory and scientific applications — available at a price you can afford

Only
\$1195⁰⁰
Kit

- DEC half-size KD11-HA (LSI-11/2) CPU
- Full compatibility with DEC PDP-11/03 — at a fraction of the cost
- Choose from a wide variety of DEC-compatible software programs
- Room for up to 60K bytes (30K words) of memory
- Plug-in flexibility — with seven plug-in positions for memory and interfacing
- Rugged, long-life construction
- 16-bit computing power

Designed with full DEC LSI-11 compatibility, the Heathkit H-11A Computer offers the versatility and flexibility you need to perform DEC programs and real-time laboratory applications.

The H-11A uses the same microprocessor, memory I/O and operating system as the DEC LSI-11, and runs all software designed for the DEC PDP-11/03.

You can choose from a vast selection of practical programs to run your home more efficiently, to reduce the clerical costs of your business and to process all types of data more efficiently than before.

The 16-bit vs. 8-bit issue: Your choice of a 16-bit or 8-bit computer depends upon your needs. If you're a professional who needs full DEC compatibility, the 16-bit H-11A is your choice. The H-11A has adequate computing power, even for the more complex and sophisticated jobs that you will be tackling later.

The H-11A features the physically smaller KD11-HA Microcomputer Module (a half-size LSI-11/2 microprocessor). That makes the Heathkit H-11A identical to the DEC PDP-11/03, but at a fraction of the cost. There's no on-board memory, so the KD11-HA Microcomputer Module gives you more flexibility to match your ROM, RAM and interfacing requirements to your particular needs.

This smaller configuration allows you to put more computing versatility into the H-11A by providing an extra plug-in slot for additional memory or I/O interfacing. The H-11A's total of seven plug-in slots lets you add any combination of ROM, RAM and interfacing, up to a maximum memory capacity of 60K bytes. And full compatibility with the LSI-11 family means you can combine components from both the LSI-11 and LSI-11/2 families.

Features of the KD11-HA Microcomputer Module include a PDP-11/34 instruction set, a raw computer speed of 380 nS microcycle time, resident firmware debugging (ODT) and ASCII console routines, as well as single and double operand instructions. With the KD11-HA Microcomputer Module, you set the capabilities you need for effective system configurations.

The extra-value features built into the H-11A Computer ensure longer life and greater return on your computer investment. A switching power supply uses less electricity than other power supplies, which saves money. And it generates less heat than other supplies, which prolongs the life of the H-11A. The H-11A Computer features a rugged steel chassis and an extra-thick backplane to help ensure long, reliable performance.

Available in economical, easy-to-build kit form — or in factory assembled and tested form, the basic Heathkit H-11A Computer includes a handsome cabinet, a heavy-duty power supply, and a backplane that includes the bus and a fully-assembled CPU board. You can add your selection of optional memory and I/O accessories to the mainframe.

Learn by building it yourself. What better way is there to get to know your computer than by building it yourself? The Heathkit H-11A Computer lets you understand it better. You can build-it yourself

and benefit from the knowledge — and the savings. Like all Heathkit computers, the H-11A comes with an easy-to-follow assembly and operation manual. When you build it yourself, you can also perform more of the service steps yourself, to keep your computer in top operating form. A nationwide network of Heathkit service centers are ready to help you with technical advice and expert service.

Whether you buy a full Heathkit H-11A Computer System or the computer itself, compare the price of the Heathkit H-11A with comparable 16-bit computers. Buy this DEC compatible Heathkit computer and find out why the combination of advanced design and quality components make the Heathkit H-11A Computer one of the best 16-bit computer values anywhere. For 120/240 VAC, 50/60 Hertz, 200 watts maximum power consumption. Dimensions, 6.5" H x 19" W x 17" D (16.5 x 48.3 x 43.2 cm).

Kit H-11A, Shpg. wt. 43 lbs. 1195.00

Factory Assembled and Tested H-11A Computer.

WH-11A, Shpg. wt. 43 lbs. 1995.00

Modification Kit for H-11/H-11A Computers. This special modification kit places the line time clock switch on the front panel for easier access. It's easy to assemble, and includes an entirely new front panel.

Kit 830-35, Shipping charges prepaid 53.50

Look over the Manuals before you buy. Complete assembly and operation manuals for the Heathkit H-11A Computer, the H-11-2 Parallel Interface, the H-11-5 Serial Interface and the H-9 Video Terminal.

Get a first-hand look at the accurate, easy-to-follow Heathkit assembly manuals that take you, step-by-step, from unpacking to final plug-in. Know your H-11A Computer System inside out — before buying. And when you do buy the H-11A Computer, we'll deduct the price of this manual set.

HM-1100 Manual Set, Shpg. wt. 12 lbs. 30.00

DEC, DIGITAL and PDP are registered trademarks of Digital Equipment Corporation.



H-11A/WH-11A SPECIFICATIONS: Central Processing Unit: Uses DEC KD11-HA CPU. Word Length: 16 bits. Instruction Set: PDP-11/03. Memory: Directly addresses 32K. I/O Addressed: 28K to 32K. RAM/ROM: 0 to 28K. Backplane: Eight 2-wide module slots. Power Supply: Overcurrent and overvoltage protected, switching regulator. Internal fan for cooling. Power Requirement: 120/240 VAC, 50/60 Hz, 200 watts maximum. Power Outputs: +5 VDC at 15 amperes max., and +12 VDC at 3 amperes maximum. Dimensions: 6.5" H x 19" W x 17" D (16.5 x 48.3 x 43.2 cm).

Configure your own H-11A Computer System

With seven plug-in positions for memory and I/O, you can design a Heathkit H-11A Computer System to meet your exact needs. Choose from a full selection of memory, interfacing

and peripherals to complement your H-11A Computer. And with full DEC compatibility, you can be sure to get full use from all H-11A hardware and software.

Memory:
(Max. 30K words)

Wired 4K
WH-11-1

Wired 16K
WHA-11-16

Mass Storage:

Floppy
H/WH-27

Interfacing:

Serial
H-11-2

Parallel
H-11-5

Peripherals:

Video Terminals
H-9, H/WH-19

Printers
H/WH-14, WH-24,
WH-34 (DEC)

Modem
WH-13





Shown with optional
830-35 LTC Switch

H-27 Floppy Disk gives much faster access to data and information

\$1995⁰⁰

- Full compatibility with DEC RX01 (PDP-11 V03) system
- Z-80 microprocessor-based controller

- Uses larger 8" floppy disks with greater capacity

The Heathkit H-27 Floppy Disk System gives you dual-drive versatility, with a total of ½ Meg bytes of on-line program and data storage area — enough room for most of your general-purpose application needs. The H-27 stores data and information on 8-inch floppy disks, which are compatible with equipment using the IBM 3740 format.

The Z-80 microprocessor-based disk controller in the Heathkit H-27 Floppy Disk System provides an average data access time of 250 milliseconds. This means you will have very fast access to data.

You get full compatibility with DEC and RXV11 RX01 (PDP-11/03 and PDP-11V03) hardware and software when you use the Heathkit H-27 Floppy Disk System. This gives you the capability of using the hundreds of application programs written by users of the DEC PDP-11, one of the most popular microcomputers. Performance-proven hardware and software bases, including the Heathkit H-11A Computer, provide outstanding computer power.

See the full line of software for the H11A Computer, including the FORTRAN language, on pages 45, 46 and 47.

- Dual-drive system for more on-line storage — up to ½ Meg bytes
- Fast 6 mS head step time

While compatible with the DEC systems, the H-27 Floppy Disk System gives you even more. A built-in self-test diagnostic, which operates during power-up, protects existing programs on your disks. A mechanical interlock prevents accidental damage to data and information — if the floppy disk is not seated properly, the door will not close and the H-27 Floppy Disk System will not operate. A write-protect function protects important files and programs from being inadvertently written over. And a reformatting procedure gives you the capability of initializing a diskette with the standard IBM 3740 format.

A single-board bootstrap/interface circuit uses just one backplane slot in the Heathkit H-11A Computer, leaving more space for memory and I/O additions to your Heathkit H-11A Computer System. The H-27 Floppy Disk System measures 7.75" H x 18" W x 20" D. It operates on 120 or 240 VAC, 60 Hz power, and draws a maximum of 240 watts. To use the full capabilities of the HT-11 Operating Systems Software, which is designed for use with the Heathkit H-27 Floppy Disk System, you need a Heathkit H-11A Computer with at least 16K words of memory.

Kit H-27, Shpg. wt. 93 lbs., Motor Freight . . . 1995.00

Assembled WH-27 Dual-Drive Floppy Disk System.

WH-27, Shpg. wt. 69 lbs., Motor Freight . . . 2595.00

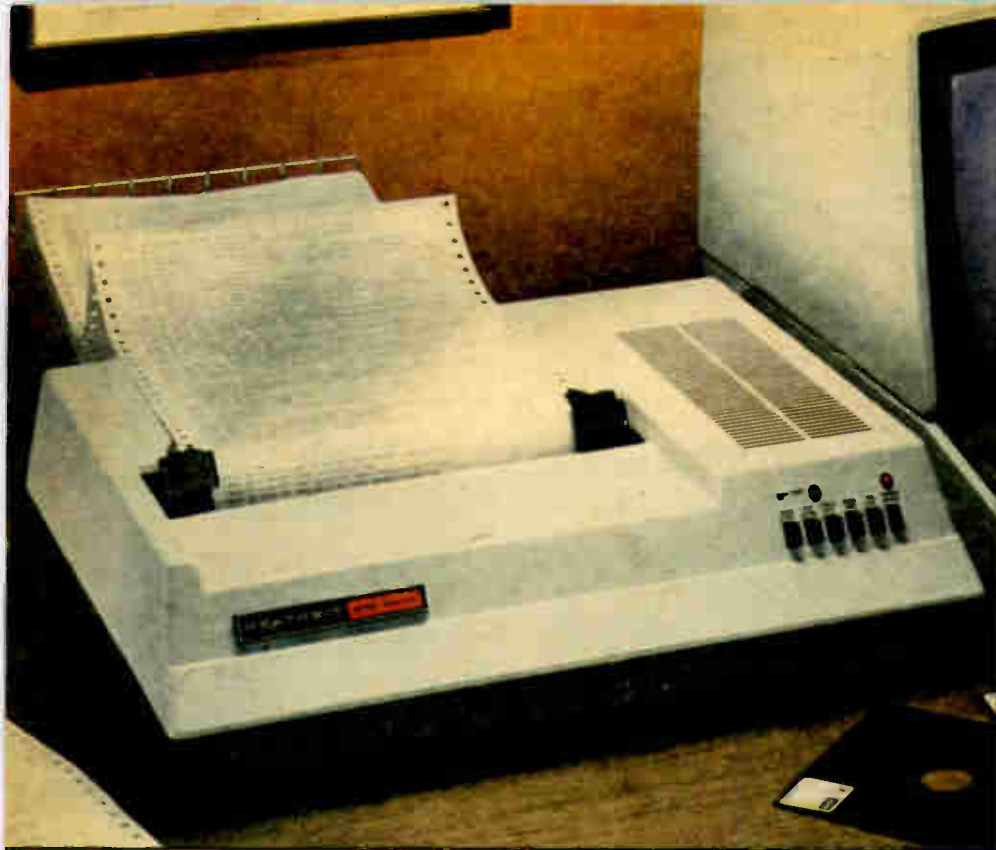
Package of 5 Blank 8-Inch Floppy Disks for the Heathkit H-27 Floppy Disk System, supplied in standard IBM 3740 format.

H-27-2, Shpg. wt. 2 lbs. 25.00

H-27/WH-27 SPECIFICATIONS: Diskette: 8-inch. Capacity (8-bit bytes, IBM 3740 format): 256,256 bytes per diskette; 3,328 bytes per track; 128 bytes per sector. Recording Surfaces Per Diskette: One. Tracks Per Diskette: 77 (0-76 or 0-114(8)). Sectors Per Track: 26 (1-26 or 1-32(8)). Bit Density: 3200 bpi at inner track. Track Density: 48 tracks per inch. Recording Technique: Double frequency. Data Transfer Rate: Diskette to Controller Buffer: 4 μS/data bit (250k bps). Track-To-Track Move: 6 mS/track maximum. Head Settle Time: 15 mS maximum. Rotational Speed: 360 rpm, ±2.5%; 166 mS/revolution nominal. Average Access: 250 mS, calculated as follows: Seek (77 tracks/8.3) x Settle (3 mS + 15 mS) + Rotate (166 mS/2) = Total (250 mS). Temperature: Operating: 59 deg. F to 90 deg. F (15 deg. C to 32 deg. C) ambient. Maximum Temperature Gradient: 20 deg. F/hr (11.1 deg. C/hr). Non-Operating: -30 deg. F to +140 deg. F (-35 deg. C to +60 deg. C). Diskette Non-Operating: -30 deg. F to +125 deg. F (-35 deg. C to +52 deg. C). Humidity: Operating: 77 deg. F (25 deg. C) maximum wet bulb; 36 deg. F (2 deg. C) minimum dew point, 20 to 80% relative humidity. Non-Operating: 5 to 98% relative humidity (no condensation). Diskette Non-Operating: 10 to 80% relative humidity. Power Requirement: 120/240 VAC, 60 Hz, 240 watts maximum. Interface Module Power Requirement: 5 VDC, 1 amp typical, 1.5 amps maximum. Dimensions: 7.75" H x 18" W x 20.75" D (20.32 x 45.72 x 52.71 cm). Net Weight: 61 lbs. (27.67 kilograms).



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



Low-cost, microprocessor-based Line Printer provides hard copy

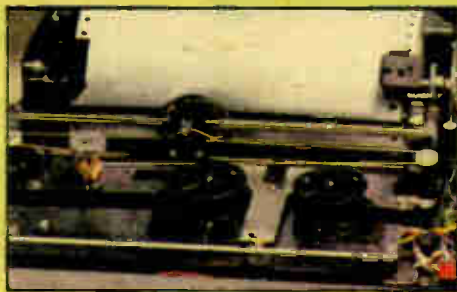
Only
\$595.00
Kit

- Packed with extra features you won't find on comparably priced line printers
- Use with most any computer — RS-232C or 20 mA loop interfacing

The Heathkit H-14 Line Printer brings hard-copy value and performance comparable to units costing \$800 to \$1000 — for hundreds of dollars less. Hard copy provides added convenience in reading, editing, debugging and modifying your computer program. The H-14 can also provide handy printed copies of address labels, lists or other data you need for any of your personal or business applications.

The H-14 prints the standard 96-character ASCII set (upper and lower case) on a 5 x 7 dot matrix print head. Uses readily available 0.5-inch nylon inked ribbon on 2-inch spools. Maximum throughput rate is 75 cps, with selectable 80, 96 or 132 character line length. 6 lines per inch spacing, 8 lines per inch software selectable. 110-4800 baud rates. Adjustable width sprocket feed handles edge-punched fan-fold paper from 2.5" to 9.5" wide, with a maximum thickness of 0.006 inch.

Whatever your computer system, the H-14 Line Printer provides extra value and performance — at a price that won't break your budget. Connects to H-8, H-11A Computers with standard RS-232C serial interface or 20 mA current loop. Handshaking provided by busy control signal. Includes 25-pin male EIA connector and matching paper catch. Dimensions, 4.80" H x 18.33" W x 14.33" D (12.19 x 46.56 x 36.70 cm). For 120/240 VAC, 50/60 Hz. Requires H-8-17, H-8-18 or HC-8-14 software for H-8; HT-11 software for H-11A.



The Heathkit H-14 Line Printer is one of the lowest-cost microprocessor-based line printers available today

Kit H-14, Shpg. wt. 30 lbs. \$595.00
Factory Assembled and Tested H-14 Line Printer.
WH-14, Shpg. wt. 27 lbs. \$895.00

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 w/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 w/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. Internal Controls: 120/240 VAC, 50/60 Hz operation, baud rate selection.



WH-24-1/TI-810 — get more performance without spending more

\$1695⁰⁰

- Fully assembled and tested for fast system setup
- Optimized bi-directional printing system
- Prints up to 5 clear copies on up to 15-inch wide paper
- Includes upper and lower cases, self-testing capabilities

The WH-24-1/TI-810 Line Printer is a high-quality, low-priced printer that can make a big impact on both your printing and your printer costs.

The WH-24-1's optimized 150 cps bi-directional printing minimizes printhead travel time and maximizes efficiency. Vertical and horizontal tabbing help produce maximized data, regardless of format.

A 256-character FIFD buffer lets you receive data at speeds from 110 to 9600 baud. Programmable forms length and a wide carriage handle multiple-part forms, tickets and reports from 3" to 15" wide. A 9 x 7 dot font prints clearer, more legible characters, and produces up to five high-quality copies.

The WH-24-1's adjustable tractor drives make it easy

to operate. Once a form has been engaged by the tractor drives, alignment can be made at the main control panel. And adjustments for forms thickness control can be made by use of the printhead-to-platen adjustment while the WH-24 is printing.

The WH-24-1 has both rear and bottom paper/forms loading. And its status and fault indicators supplement extensive self-testing capabilities.

This printer includes upper and lower cases. Needs WHA-11-5 Serial I/O Card for use with H-11/H-11A Computers only; not required for other Heathkit Computer Systems.

WH-24-1/TI-810 Printer. Floor stand not included.
WH-24-1, Shpg. wt. 66 lbs., Mtr. Frt. 1695.00

WHA-11-5, Serial I/O Card for H-11 and H-11A Computers, Shpg. wt. 1 lb. 150.00

WH-24-1 SPECIFICATIONS: Printing: Technique: Seven-wire matrix, impact. Method: Bi-directional. Speed: 150 characters per second; 64 lines per minute (at 132 characters per line), up to 450 lines per minute (at 10 characters per line). Characters: 9 x 7 dot matrix. Character Set: 64-character ASCII. Characters Per Inch: 10. Format: Up to 132 characters per line maximum; 6 or 8 lines per inch (operator or software selectable). Forms Handling: 5 in/sec (127 mm) slewing rate. Paper feeds from rear or bottom. Panel Indicators: Power on/off, on line/off line, error, paper out LEDs. Operator Controls: Power on/off, on line/off line, forward and reverse feed, fwd. line and from feed, tab/reset. Communications: Interfacing: EIA Standard RS-232C Serial Interface. Baud Rates: 110, 150, 300, 1200, 2400, 4800 and 9600. Parity: Odd, even or ignore. Operating Temperature Range: 37 to 104 deg. F (5 to 40 deg. C). Operating Humidity Range: 5 to 90% (no condensation). Power Requirement: 120/240 VAC, 50/60 Hz, 200 watts. Dimensions: 8" H x 25.75" W x 20" D (20.3 x 65.4 x 50.8 cm), without floor stand or paper catch tray. Net Weight: 55 lbs. (25 kg).

Letter-quality daisy wheel printing for word processing systems

\$2995⁰⁰

- The WH-44/Diablo 1640 Printer features famous daisy wheel printing quality
- 2-color and graphics capabilities
- Also available with optional keyboard for more versatility

The WH-44/Diablo 1640 Printer is designed for applications that require a serial printer, such as data communications or word processing systems. The 1640 combines the latest in microelectronic technology with its field-proven daisy wheel printer mechanism.

This printer produces the standard 96-character ASCII set, both upper and lower case. With bi-directional printing, maximum print speed is 45 characters per second. Adjustable horizontal and vertical tabs can be directly set in any position. Adjustable forms width means the Diablo 1640 will accept forms up to 15.5 inches (39.3 cm) wide. Adjustable forms length lets you set page length to your needs. Top of form control, combined with full forward and reverse paper motion, give you complete control of most any form.

Graphics capability is also featured, with 1/120"

horizontal, 1/48" vertical incremental motion. 2-color printing capability provides more versatile, more striking document production, when used with two-color ribbons.

The serial interface provides RS-232C levels. With a 256-byte print buffer, the serial interface runs at standard baud rates from 110 to 1200, and is compatible with Bell 102, 113, 212 and equivalent acoustic modems.

Other extra-value standard features include ETX/ACK protocol, ribbon out, paper out and cover open sensors, self-testing capability and host program control through escape sequences.

Includes friction platen, power supply, operator control panel, HCS-22 Printwheel (Elite 12 with unslashed zero) and HCS-51 Film Ribbon. For 120/240 VAC. Dimensions, 9.25" H x 23.5" W x 15.75" D (23.5 x 59.69 x 40.0 cm).

Assembled and Tested Diablo 1640 RO Printer.
WH-44, Shpg. wt. 60 lbs., Mtr. Frt. 2995.00

NEW! Diablo 1640 KSR Printer/Terminal. Includes full ASCII upper/lower case professional typewriter-style keyboard. Factory assembled.

WH-44K, Shpg. wt. 60 lbs., Mtr. Frt. 3295.00
Bi-Directional Tractor Feed Accessory. Dual tractors, before and after print head, allow moving paper backward through printer for high resolution graphics, and provide much better registration for word processing and forms preparation.

HCA-1, Shpg. wt. 8 lbs. 259.00

See page 44 for the full selection of Diablo 1640 printwheels and ribbons

WH-44 SPECIFICATIONS: Printing Speed: 45 cps maximum. Print Wheel: Interchangeable 96-character daisy wheel. Format: Line length adjustable to 13.1" max. (132 chars. at 10 pitch, 158 chars. at 12 pitch). Forms Handling: Adj. forms width to 15.5 in. (39.3 cm) max.; form thickness selectable to 27/1000 in. (0.0686 cm) max. Communications: Baud Rate Selection: 110, 300, 600 or 1200 baud.

Compact, versatile DEC Desktop Teleprinter — now \$100 less

\$1195⁰⁰

- Save an additional \$100 on this ideal office tool
- Fully assembled and tested
- Clearly prints the full 128-character ASCII set
- True 30 cps print speed

Reduced an additional \$100 from Catalog 848, the WH-34/LA-34 DECwriter IV Teleprinter sets new standards for convenience in computer and data communications terminals. Small and lightweight, it's a natural for the office environment. The keys are sculptured and arranged like a typewriter keyboard. And snap-in cartridge ribbons mean easier changes and no mess.

This 300 baud, 30 cps desk-top terminal can print at burst speeds up to 45 cps. An alternate 110 baud/10 cps speed is keyboard-selectable. The terminal operates full duplex, with optional local echo. A 9 x 7 dot matrix impact printhead clearly prints the full 128-character ASCII set, upper and lower case. Adjustable character width from 10 to 16.5 cpi, with adjustable 6-12 lines/inch vertical spacing.

Designed for operator simplicity, the WH-34's VIEW mode can be used for last character visibility. The off-line set-up mode lets the operator select performance parameters from the keyboard or a computer, making the terminal useful in almost any kind of office function.

Also included is an EIA Standard RS-232C Serial Interface to communicate with computers, acoustic couplers and Bell 103J or equivalent modems. A start-up supply of ribbon and paper is provided, so you can use the DECwriter right away.

Assembled WH-34/LA-34 DECwriter IV.
WH-34, 40 lbs. Was \$1295, Now 1195.00

Tractor Feed Accessory for WH-34 DECwriter IV.
WHA-34-2, Shpg. wt. 3 lbs. 150.00

See the complete selection of Heathkit printer supplies and accessories on page 44

WH-34 SPECIFICATIONS: Printing Speed: 10 or 30 cps, asynchronous. Character Size: 9 x 7 dot matrix, upper and lower case. Character Set: Full 128-character ASCII set. Format: 10, 12, 13.2 or 16.5 characters per inch horizontal spacing, keyboard selectable — up to 132 characters per line maximum; 2, 3, 4, 6, 8 or 12 lines per inch vertical spacing, keyboard selectable. Forms Handling: Standard typewriter platen. Optional WHA-34-2 Tractor Feed available. 5 inches per second slewing rate. Communications: Code: ANSI Standard. Bit Structure: Bit Serial: 1 start, 7 data, 1 parity, 1 stop bit at 110 and 300 baud. Interfacing: EIA Standard RS-232C Serial Interface; compatible with Bell 103J or equivalent modems. Parity: Odd, even, mark or space — switch-selectable. Power Requirement: 120 VAC, 60 Hz. Dimensions: 7" H x 22" W x 15.5" D (17.78 x 55.88 x 39.37 cm). Net Weight: 25 lbs.

NEW! Universal Floor Stand fits WH-24, WH-34 and WH-44/WH-44K Printers. Raises printer to desk level for easier operation. Includes paper rack.

HCA-2, Shpg. wt. 28 lbs. 99.00





Professional Video Terminal with full ASCII set, pro keyboard and super-sharp CRT display

Only
\$675⁰⁰
 Kit

Look at all these professional features:

- Z-80 microprocessor-based for fast, efficient data handling
- Heavy-duty typewriter-format keyboard with separate 12-key numeric keypad
- Eight separate user-definable function keys for more versatility
- Addressable blinking cursor
- OEC VT-52™ software-compatible

The Heathkit H-19 Professional Video Terminal is designed for use with the Heathkit H-8 and H-11A Computers, or with any device which uses a standard RS-232C Interface. Its powerful Z-80 microprocessor makes it ideal for high-speed data handling.

The H-19's typewriter format lets you begin entering data from the keyboard right away. The terminal's 32 separate functions can be controlled from the keyboard, or from a computer. A 12-key numeric keypad, in calculator format, makes entry of arithmetic data fast and easy. Baud rates of up to 9,600 are keyboard selectable for easy changes. Eight user-function keys give you extra flexibility.

The H-19 prints the entire ASCII character set, including upper and lower case letters. The terminal can also display 33 different graphics characters, which can be arranged for a variety of graphic displays and effects. Prints 24 80-character lines (with

a software-controlled 25th line). Using direct addressing, a blinking cursor lets you make corrections or edit, anywhere on the video screen.

The 12-inch diagonal CRT features extremely wide bandwidth for outstanding resolution and bright, clear readouts. Reverse video lets you emphasize any portion of the screen by reversing white on black.

Kit H-19, Shpg. wt. 49 lbs. 675.00

Factory Assembled and Tested H-19 Video Terminal. WH-19, Shpg. wt. 43 lbs. 995.00

NEW! Pannelgraphix CRT Filter. Plastic cover makes video displays of the H-19 Terminal easier to see.

HCA-3, Shpg. wt. 1 lb. 8.95

NEW! Sun-Flex™ CRT Filter. Nylon anti-glare cover makes video displays stand out, cuts eye strain.

HCA-4, Shpg. wt. 1 lb. 19.95

H-19/WH-19 SPECIFICATIONS: Character Set: 128 characters (95 ASCII and 33 graphic). Character Type: 5 x 7 dot matrix (upper and lower cases), 5 x 9 dot matrix (lower case with descenders). Keyboard: 80 keys (60 alphanumeric, 12 function) plus a 12 key numeric pad. Cursor: Blinking, non-destructive underline or block. Cursor Controls: Up, down, left, right, home, CR, LF and tab. Cursor Addressing: Relative and direct. Tab: Standard 8-column tab. Erase Functions: Erase page, erase to end of line, erase to end of page. Scroll: Auto or line/page freeze. Bell: Audible alarm on receipt of control G. Video: Normal and reverse (using escape sequence). Communication: Interfacing: EIA Std. RS-232C Serial Interface. Baud Rates: 110 to 9600. Mode: Full or half duplex. Parity: Even, odd, stick or none. Handshaking: Software, control S — control Q; all RS-232 control lines tied high internally. Buffered terminal is capable of keeping up with most operations and normal scrolling text output, at 9600 baud or less. Power Requirement: 120/240 VAC, 50/60 Hz, 45 watts. Dimensions: 13" H x 17" W x 20" D.

Versatile, budget-priced Heathkit Video Terminal



For auxiliary or starter systems, the H-9 is the least expensive CRT terminal available today.

The H-9 displays up to twelve 80-character lines, or forty-eight 20-character lines in short form. A built-in speaker serves as an end-of-line warning. Automatic line carryover and auto-scrolling, in long or short form, are standard. A special plot mode permits graphs, curves and simple figures to be entered from keyboard or external inputs.

Serial interface provides EIA RS-232C levels, a 20 mA current loop and standard TTL levels. Parallel interfacing includes standard TTL levels, 8 bits input or output and 4 handshaking lines for connection to other peripherals. 120/240 VAC, 50/60 Hz. 12.5" H x 15.625" W x 20.75" D.

Kit H-9, Shpg. wt. 50 lbs. 299.95

WH-9-1, Interface Adapter Cable, Shpg. wt. 1 lb. 15.00



Add color to your computer system with the Heath/Zenith Color Display

Only **\$399⁹⁵** Assembled

- 13" (diagonal) color display
- Accepts composite color video from computers, VCRs, cameras

Add a colorful new dimension to your video displays. The new Heath/Zenith 13-inch (diagonal measurement) Color Video Display is the ideal choice to complement



your computer system, video cassette recorder or color camera. Accepts composite NTSC-system color video and Hi-Z audio inputs. A built-in audio amplifier and speaker are also included.

Supplied with RCA-type phone jack for video input, miniature phone jack for audio input. 120 VAC, 60 Hz. Cabinet measures 14" H x 20.25" W x 14.75" D. GDZ-1320, Shpg. wt. 42 lbs. 399.95



H-11A Accessories and Interfaces for flexibility

Save \$55.00 on the WH-11-1 Assembled 4K Memory Expansion Module. Plugs into H-11/H-11A backplane, adds 4K x 16-bit word capacity to memory. Uses reliable 1K x 4 static MOS RAM chips. Access time, less than 500 nS. Decode circuitry to operate on 4K address boundaries. Handle for easier installation/removal. Factory assembled and tested.

WH-11-1, 2 lbs., Was \$150.00, NOW 95.00

Assembled 16K Memory Expansion Module. 16K dynamic MOS RAM on a 5" x 8.5" board. On-board refresh, 570 nS cycle time, 250 nS access time. Fully expand memory with only two of these boards. Max. H-11A memory capacity, 30K words.

WHA-11-16, Shpg. wt. 2 lbs.480.00

Extended Arithmetic Chip adds powerful mathematical instructions to any LSI-11 Computer. Instructions include fixed point multiplication, division and extended shifts. Also includes full floating point addition, subtraction, multiplication and division operations. This extended arithmetic chip minimizes the need for subroutines and saves memory space in your computer.

H-11-6, Shpg. wt. 1 lb.190.00

Serial Interface. Use this interface between the bus of any LSI-11 Computer and serial peripherals (like video terminals and line printers). EIA or optically isolated 20 mA current loop interfaces are available. Baud rates between 50 and 9600 are selectable. This serial interface is fully compatible with PDP-11V03 Computers, as well as other LSI-11 machines. It plugs directly into the LSI-11 backplane. Includes mating connectors. To interface the WH-24-1/TI-810 Teleprinter to the Heathkit H-11A Computer, order the WHA-11-5 Interface (see page 41 for description).

Kit H-11-5, Shpg. wt. 2 lbs.105.00

Assembled and Tested Version of Above.

WH-11-5, Shpg. wt. 1 lb.150.00

Adapter Cable for H-11-5 Serial Interface. This fully assembled cable provides EIA interfacing between the H-11-5 Serial Interface and other peripherals.

WH-11-51, Assembled and Tested, Shpg. wt. 1 lb.15.00

Parallel Interface. Provides 32 latched input/output lines, 16-bit word transfers and an LSI-11 interface, as well as control logic for interrupt processing and vectored addressing. Control status registers are compatible with PDP-11 software routines. Includes four control lines, data ready and accepted operations. Maximum data transfer rate, 90K words per second. Drives cable to 25 feet. Compatible with TTL and DTL devices.

Kit H-11-2, Shpg. wt. 2 lbs.95.00

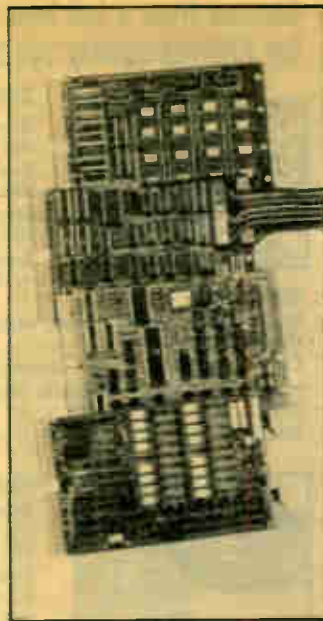
Factory Assembled and Tested Version of Above.

WH-11-2, Shpg. wt. 1 lb.150.00

Versatile acoustic modem — ideal for any telephone

Designed especially for the small computer, the Cat Acoustic Modem by Novation lets your computer system talk to other computer systems over standard telephone lines. Also communicates with any Bell 103 compatible modem. Selectable originate and answer modes, LED display of unit status, and special acoustic self-testing. Order yours today.

WH-13, Assembled, 3 lbs. Was \$195.00 in Cat. 848, NOW ONLY 175.00



SAVE \$20⁰⁰



H-8 Accessories give your computer more capability

NEW! Boot up faster than ever with PAMGO ROM. Boot with 1 button on power-up/3 on reboot, instead of the usual eleven. PAMGO ROM is a 2078-compatible masked, programmed ROM. On power-up or reset, it sets the program counter to a 030 000 split octal default address. PAMGO ROM makes booting up a breeze.

H-8-9, Shpg. wt. 1 lb.20.00

NEW! Extender Board allows easy access for servicing, prototyping or debugging.

HA-8-1, Shpg. wt. 1 lb.40.00

NEW! Music Synthesizer System. Synthesizer board connects to stereo system with two shielded cables (included). True D/A converter provides excellent 27.5-3300 Hz frequency response, with up to 9 harmonics. 4-part harmony (voices) in stereo. Enter any song, right from conventional sheet music — even if you've never read music before. Software on 5.25" disk. Requires min. 24K memory, H-17 Floppy, terminal.

HA-8-2, Shpg. wt. 3 lbs.159.00

SAVE on the 16K Wired Memory Board. Assembled, factory burned-in.

WH-8-16, Assembled, 2 lbs. Was \$395.00 in Cat. 848, NOW 299.00

Four-Port Serial Interface. Interface H-8 to H-14 Printer, H-19 Terminal. RS-232C interface with modem controls. One port switch programmable for 20 mA loop. Software programmable baud rate. Solderless addressing, vector interrupt jumpers for easy setting. Connector for DCE, DTE modes. With WH-8-41 Cable.

Kit H-8-4, Shpg. wt. 2 lbs.175.00

WH-8-4, Assembled, 3 lbs.250.00

Adapter Cable connects H-8-4 Interface with peripherals.

WH-8-41, Assembled, 1 lb.15.00

Serial I/O and Cassette Interface. Cassette interface with 1 serial I/O port for control terminal. Connects H-8 to cassette mass storage devices (like ECP3801A), as well as serial devices. 110-9600 baud rates. Byte/Manchester cassette interface runs at 1200 baud. I/O interfacing includes RS-232C, 20 mA current loop. NOTE: A second H-8-5 cannot be used to connect the H-8 to the H-14 Printer. H-8-4 Serial Interface recommended for H-8 systems without cassette storage.

Kit H-8-5, Shpg. wt. 3 lbs.95.00

WH-8-5, Assembled and Tested, Shpg. wt. 2 lbs.120.00

Adapter Cable connects H-8-5 Interface with peripherals.

WH-8-51, Assembled and Tested, Shpg. wt. 1 lb.15.00

Parallel Interface. Connects the H-8 to any parallel device, such as printers. Three independent ports, each with 8 bits input and output, universal handshaking capability. Compatible with all Heathkit software.

Kit H-8-2, Shpg. wt. 3 lbs.150.00

Circuit Design Breadboard Card. Custom design your own analog or digital circuits for the H-8 Computer. 5 VDC power supply included. Reuseable.

Kit H-8-7, Shpg. wt. 2 lbs.90.00

NEW! Wire Wrapping Card for H-8. Similar to H-8-7 above, but much greater capacity. Includes punched, etched PC board with room for 80 16-pin wire wrapping sockets (also 96 14-pin, or other combinations of 14, 16, 24 or 40-pin sockets). Provisions for three 50-pin flat cable connectors. Includes bus connectors, heat sink, 5 V regulator and miscellaneous hardware. Uses HCA-6, HCA-7 below.

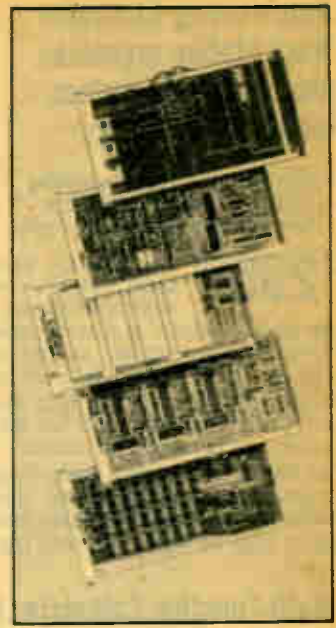
Kit H-8-10, Shpg. wt. 1 lb.30.00

NEW! Wire Wrapping Kit. With wire wrapping tool, 50 ft. roll of wire, pre-cut wire in 1" 4" lengths (50 wires per package), pre-stripped 1" on both ends.

Kit HCA-6, Shpg. wt. 2 lbs.12.95

NEW! Wire Wrapping Socket Kit. Total of 36 three-level wire wrapping sockets (12# 14-pin, 10# 16-pin, 8# 18-pin, 3# 20-pin, 2# 24-pin, 1# 40-pin).

Kit HCA-7, Shpg. wt. 1 lb.29.95



Space-saving Computer Work Station organizes your computer system, increases efficiency



- Gain attractive, rugged operating efficiency. The PD-11 organizes your computer system in less space

\$295⁰⁰ This Computer Work Station 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. The lower shelves hold the computer and disk systems. The upper shelf measures 8.5" H x 20" W x 19.75" D, while the lower shelf is 7" H x 20" W x 19.75" D.

Rugged steel legs and sheet metal shelving are designed to last under constant use. Casters make it easy to roll the work station from place to place, while casters lock to prevent your computer system from rolling away by accident.

The PD-11 Computer Work Station keeps your operator comfortable and efficient — puts every component in easy reach — and makes an attractive addition to every office environment. Partially assembled; not a kit.

PD-11, Shpg. wt. 95 lbs., Mtr. Frt., FOB El Segundo, CA 295.00

Multi-Function Calculator for computer hobbyists



\$59⁹⁵

- Factory assembled and tested
- 3-key independent memory
- Special computer logic operation

Designed especially for the computer hobbyist, this fully assembled Texas Instruments 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 for complex, involved calculations; constant mode to simplify repetitive calculations; and an eight-digit LED display. Lightweight for easier handling, this product is ideal for any computer application. Rechargeable battery and AC adapter/charger are included.

Dimensions, 5.5" H x 3" W x 1.25" D (13.97 x 7.62 x 3.18 cm.)

PC-11, Shpg. wt. 2 lbs. 59.95

Assembled Cassette Recorder/Player — ideal for program and data storage

\$60⁰⁰

- Counter to locate data quickly and easily
- Separate volume and tone controls
- Factory assembled and tested



This Heath-recommended General Electric Cassette Recorder/Player is a quality unit that's the ideal choice for data storage use with computers. Ruggedly constructed, it features separate volume and tone controls, pushbutton selection of record, play, rewind, fast forward, stop and tape eject. It also features a convenient built-in 3-digit counter with a reset button that enables you to locate specific information on a tape quickly and easily. Built-in microphone and quality speaker also make it perfect for general recording and playback use. Factory assembled and tested.

ECP-3801A, Shpg. wt. 4 lbs. 60.00

Heath-recommended high-output, low-noise, premium-grade audio recording tape. ECP-3802, Pack of Three 30-Minute Cassettes, Shpg. wt. 1 lb. 6.00

Choose from a full line of computer system supplies for highest-quality system performance

Choose from these Diablo printwheels



Courrier 10 (Diablo 38100), Pica w/slashed zero. HCS-20, Shpg. wt. 1 lb. 8.00
 Courrier 72 (D. 3E107), 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. 8.00

HCS-23, Shpg. wt. 1 lb. 8.00
 APL-10 (Diablo 38150). Special character set for APL computer language. HCS-24, Shpg. wt. 1 lb. 8.00
 OCR-A (Diablo 38144). ANSI Standard OCR Type A font. HCS-25, 1 lb. 8.00
 Prestige Elite Legal 12A (Diablo 38105). Elite w/legal symbols, incl. ©, ® & ™. HCS-26, Shpg. wt. 1 lb. 8.00
 Courier Legal 10 (D. 38104), Pica w/legal symbols. HCS-27, 1 lb. 8.00

Ribbons for clear printouts



NEW! Ribbon for the H-14 Line Printer. Also fits ASR-33 printers.

HCS-52, Shpg. wt. 1 lb. Pkg. of 3, 8.00

Cloth Ribbons for 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 ribbon makes dark, crisp impressions.

HCS-53, Shpg. wt. 1 lb. Pkg. of 3, 15.00

Ribbon Cartridges for the WH-34 DECwriter IV Computer Teleprinter. Eliminates messy ribbon changes. When old ribbon wears out simply remove old cartridge and insert new ribbon cartridge.

HCS-54, Shpg. wt. 1 lb. Pkg. of 3, 25.00

Top-quality fan-fold printer paper



NEW! Premium 8.5" x 11" Paper. For WH-24/TI-810, WH-34, WH-44 Printers. 2800 sheets of premium, one-part fan-fold paper, approx. 20 lb. bond.

HCS-1, Shpg. wt. 28 lbs. 30.00

Standard 8.5" x 11" Paper. Recommended for the H-14 Line Printer. 3200 sheets of standard, one-part fan-fold paper, approx. 15 lb. bond.

HCS-2, Shpg. wt. 31 lbs. 30.00

14.875" x 11" Paper for WH-24, WH-34, H-36 and WH-44 Printers. Box contains 3200 fan-fold sheets of white/green lined paper.

HCS-3, Shpg. wt. 47 lbs. 35.00

Floppy disks for mass data storage



Save \$5 on Blank 5.25-inch Floppy Diskettes. For use with all Heath 5" disk systems, as well as North Star and some other personal computer systems. Hard-sectored with 40 tracks per diskette, 10 sectors per track. Max. data storage capacity, 100K bytes. Sold in pkgs. of 5.

HCS-61, Shpg. wt. 1 lb. Was \$25.00, NOW ONLY 20.00

8-inch Floppy Diskettes. For H-27 Floppy Disk System, and virtually all other computers using 8" soft sector diskettes. Store ¼ Meg bytes per disk. IBM 3740 standard format. Package of 5.

HCS-62, Shpg. wt. 2 lbs. 25.00

Paper tape storage supplies for your computer system

Three 900-foot rolls of Blank Paper Tape. Each roll is eight inches (20.32 cm) in diameter. Paper tape is 1" (2.54 cm) wide. Just load the roll of tape onto your paper tape punch/reader — and you're ready to begin writing or reading programs. Rolls are easier to store, easier to use than fan-fold boxes of paper tape. At this price, why not stock up on paper tape today? Make sure you have enough on hand, when you need it.

HCS-10, Shpg. wt. 6 lbs. 10.00



NEW

Zenith Electronic Typing — word processing that cuts your paperwork

problems down to size

\$395⁰⁰

- Quick to learn — easy to use
- Special training disk
- Straightforward and uncomplicated — you're up and running quickly

You would undoubtedly be happy if you could speed up paperwork — or reduce errors — or trim costs — or get cleaner, more professional-looking typing. With Zenith Electronic Typing, you get it all.

Zenith Electronic Typing makes word processing practical for the small, single-secretary office — as well as for large secretarial staffs. Firms where error-free documents are a must — such as legal, architectural and insurance offices — can look to Zenith Electronic Typing to significantly reduce paperwork costs and speed up work flow.

Anyone who can turn on a TV and type on a standard keyboard can increase their output by 50 percent or more, practically on the first day. You don't have to know a computer from a coffee cup. All you need is common sense and standard secretarial skills.

No longer do you have to take a computer programmer's course to learn electronic typing. Zenith Electronic Typing shortens the learning curve to just a few hours, so you can enjoy the many benefits of computerized word processing right away.

There's nothing to program, no complicated computer programs to understand. A specially-developed self-instruction course, contained on a single floppy disk, shows you how to use the system — in as little as two hours. All training is done in your office, at your own pace — with the system itself.

All documents can be typed at rough draft speed, with corrections made electronically — producing near-perfect documents in a fraction of the time required by conventional typing. All with no white-outs, strike-overs or erasures.

Now you can type, make alterations, insert, rearrange, combine documents, correct errors and do much more — quickly, easily and accurately — to increase the speed and efficiency of even the best secretary:

Automatic Carriage Return at the end of each line of text eliminates concern about margins, so typing can continue at top speed.

Forward and Reverse Scrolling (rolling forward or backward through a document), along with **two Search Modes**, quickly locate the precise area where editing or revisions are needed.

Insertion Capabilities let you insert any word, sentence or paragraph — anywhere on the document. And you can still see the next 60 characters of text, displayed at the bottom of the screen.

Append Capability allows you to join separate paragraphs and sub-documents together, to create a new document.

Deletion Capabilities mean you can rapidly delete from any desired point to the end of the document. You can even make different revisions on different copies of the same document.

Automatic Replacement of a word, name or phrase with any other word, name or phrase — wherever it is repeated throughout a document — provides excellent ability to produce customized form letters or documents.

Automatic Realignment of the entire text after additions, alterations or deletions saves hours of retyping time.

Automatic Centering on command means no counting or guessing.

Automatic Justification provides flush left and/or right margins, if desired.

Automatic Character Count tells you exactly how many characters of space are left on a disk, so you can decide when and where to begin a new disk.

Automatic Margins and Spacing are provided for most documents, with simple resetting for special parameters.

Horizontal Pitch Selection allows you to vary horizontal spacing between 6 and 12 characters per inch.



You can see your work and make corrections BEFORE one word is printed on paper. And by only retyping those characters, words or paragraphs that require changing — not the entire document — an enormous savings of time is achieved.

As changes are being made, Zenith Electronic Typing automatically respaces words, lines or paragraphs at the touch of a key. Once you're satisfied that the document is letter perfect, the touch of another key automatically prints a clear copy of the document — on a separate printer (not included) — at an error-free rate of up to 450 words per minute.

The systems software supports copying of files and the Zenith Electronic Typing system itself, storing individual documents up to approximately 30 pages (maximum total of 60,000 to 70,000 characters) in length.

Documents can have names up to 24 characters long and may be created, copied, duplicated or deleted at will.

For rapid manipulation of text, documents are stored on low-cost, lightweight 5.25-inch floppy diskettes. Up to forty documents can be stored on a single diskette, with an automatic index to keep track of each document.

Zenith Electronic Typing is your solution to impossible deadlines, soaring clerical costs, overflowing files and laborious re-typing. Requires an H-89 Computer with 48K and a printer. You can also use equivalent Heathkit H-88/H-88-4 or H-8/H-17/H-19 Systems. Although any printer we offer will interface with the system, the WH-44 Diablo 1640 RO Letter-Quality Printer is recommended. Dual-drive floppy disk capability is also recommended.

H-8-40, Shpg. wt. 6 lbs. **395.00**

Save with complete Word Processing packages

We make Zenith Electronic Typing an even better value, with discounts on word processing packages:

SAVE A BIG \$200! Just buy a complete word processing system. Purchase Zenith Electronic Typing, any Heathkit computer and any printer in this catalog. Then, subtract \$200.00 from the total (not including shipping and handling charges).

SAVE A BIG \$100! Buy Zenith Electronic Typing and any printer in this catalog. Just subtract \$100 from the total of your order (not including shipping and handling charges).



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

COMPUTERS/45

Operate your H-11 more efficiently

Operating System Software for the H-11A Computer/H-27 Floppy Disk System. Immediately enjoy the full benefits of the H-11A and the H-27. You get seven easy-to-use programs, including:

ASMBLE, EXPAND AND CREF: Assembly Language processing and cross-reference listings. Utility programs for macro-expansion. Supports the entire PDP-11 instruction set, as well as several pseudo-operators.

EDIT: A text editor to create or modify files for programs and documentation.

LINKER: Converts object modules produced by the assembler, or the FORTRAN compiler, into a run-time format. Services include: relocation of code, linking of global references and the creation of a runnable program file for use by the rest of the system.

LIBRARIAN: Creates and maintains subroutines for use by the linker.

PIP: The Peripheral Interchange Program is the file maintenance and transfer utility program of the HT-11. It has commands for moving, copying and renaming files, plus other commonly-used file operations.

ODT: On-line Debugging Technique aids in debugging user programs by providing commands to display and alter the state of a running program.

BASIC INTERPRETER: Offers access to the HT-11's I/O system and file structure through the BASIC language. Extensions include variable-length strings, sequential files, virtual memory arrays, chaining and overlay capability. A desk calculator mode can perform once-only calculations or serve as an aid in debugging programs.

MISCELLANEOUS PROGRAMS: Prints file contents in any of several useful formats. SRCOM compares two files, prints summary of differences.

MINIMUM REQUIREMENTS include an H-11 or H-11A Computer with a least 16K words of main memory, a console terminal and interface, the H-27 Floppy Disk System, controller and interface.

HT-11, Shpg. wt. 12 lbs. **350.00**

FORTRAN Language for HT-11 Operating System. Binary software features complete ANSI Standard 1966 FORTRAN IV with extensions for increased speed. Some extensions include: relaxation of statement ordering, use of expressions nearly anywhere, direct access I/O, TYPE ACCEPT and PRINT I/O statements, ENCODE and DECODE statements, END and ERR parameters, random number generator and more.

HT-11-1, Shpg. wt. 9 lbs. **250.00**

NOTE: HT-11 Operating System, HT-11-1 FORTRAN compatible only with H-27 Floppy. To obtain software, Sublicense Grant below (including make, model and serial no. of CPU) must be signed and returned with order.

CUSTOMER SOFTWARE SUBLICENSE GRANT

HEATH COMPANY (HEATH) for itself and on behalf of the licensors listed below (referred to individually or together as LICENSOR) grant to CUSTOMER a non-transferable and non-exclusive sublicense to use the software programs (referred to individually or together as SOFTWARE) listed under the respective LICENSOR under the terms and conditions stated in this Sublicense Grant.

This form **MUST** accompany your SOFTWARE order for:

Digital Equipment Corporation:

HT-11 Operating System with BASIC HT-11-1 FORTRAN

Check box for each software program purchased with this order only. Sign and return to HEATH another Sublicense Grant form with future SOFTWARE orders.

Write in the blank your CPU make, model and serial number:

(Fill in blank)

(If CPU is purchased with this order, Heath will fill in the blank.)

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

CUSTOMER

By

(Customer's Signature)



H-8/H-88/H-89 Cassette Software for more uses from your system

Heathkit Cassette Software can form a solid base for future computer programming. Cassette-based software is supplied on audio cassettes, in 1200 baud form. Begin programming right away; cassette interfaces are standard with the H-88 and H-89 Computers. Interfacing is available with the H-8 (see p. 43) and the WH-89-CA (see p. 35). Use with Heath-recommended ECP-3801A Cassette Recorder/Player (p. 44), or with your recorder.

Cassette Operating System Software. Designed especially for Heathkit 8-bit computers used with cassette storage, this software helps you get ready to program easily and quickly — with features that make it easier to use and more practical than other systems. Automatic command completion simplifies typing; dynamic syntax checking instantly alerts you to errors; and a special user configuration lets you personalize your system.

This operating system includes: Benton Harbor BASIC, a conversational programming language which uses simple English statements and familiar algebraic equations to perform operations and solve problems; 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. It assembles the source program into a listing and an object program in an executable binary format.

Also included are: the TED-8 Text Editor, which converts your computer and terminal into a powerful typewriter for generating and editing text. It prepares the source code for HASL-8 Assembly Language and can be used to prepare reports, write letters and edit manuscripts; and BUG-8 Console Debugger, an enhanced and extended version of the front panel monitor which allows entry and debugging of user machine language programs via an external terminal. It features single or multiple stepping through programs, breakpointing, load and dump from tape storage; and a full set of utility programs, including Dynamic File Allocation to permit unlimited file size and prevent squeezing of disks, file manipulation, and device independence for direct communication between any program and any device.

A minimum of 8K memory is required to run this software. Requires an H-8-5 Serial I/O and Cassette Interface to load with H-8; H-88-5 Cassette Interface is required to load with WH-89-CA. Interfacing standard with H-88, H-89.

H-8-18, for H-8, Shpg. wt. 11 lbs. **30.00**

H-88-18, for H-88, H-89, WH-89-CA, Shpg. wt. 5 lbs. **30.00**

Extended Benton Harbor BASIC™ Language. An easy-to-learn, easy-to-use conversational computer language. This enhanced version of Dartmouth BASIC includes strings and files. It provides even faster operation and includes character strings, additional convenience commands and math functions, dynamic storage allocation, access to 2 mS clock, keyboard interrupt processing, expanded error messages and recovery ability, LED display control and keypad support for your computer system.

Extended Benton Harbor BASIC features numeric data with over six digits of accuracy, and Boolean values which permit logical operations. It also features free format programs, enhanced expressions, math functions and conditional statement facilities.

A minimum of 12K memory is required to run Extended Benton Harbor BASIC. 16K memory is preferred if full use is to be made of its capabilities. Extended Benton Harbor BASIC supports the H-14 Line Printer and the H-8-4 Interface

HC-8-14, Shpg. wt. 13 lbs. **30.00**

Have fun with exciting H-8 Computer Games

Games supplied in 1200 baud audio cassette form, which requires H-8 Computer and H-8-5 Interface to load. Won't work with H-89 or H-8-4.

Biorhythm plots your body's biorhythm. Know when to face the world, when to stay in bed. Runs under Extended BASIC, requires 16K RAM.

PA-82, Shpg. wt. 1 lb. **10.00**

Space War lets you command the starship Enterprise through the galaxy, fighting Klingons and solving problems. Requires 24K of RAM to run.

PA-83, Shpg. wt. 1 lb. **10.00**

Game Set #1 includes games like Craps, Orbit Tic-Tac-Toe, Nim, Hexapawn, Hangman, Hamrabi and Derby. 8K or more RAM required.

PA-84, Shpg. wt. 1 lb. **10.00**

Heathkit Disk-Based Software gives your system new versatility — in hobby or business applications

Heathkit software, designed especially for the H-8, H-88 and H-89 Computers, helps you do your work — or have fun — faster and easier than before. And when you buy any of our disk-based software packages, we'll supply you with any changes that are incorporated into the program for the next year — free of charge, when you sign and return the Software Sublicense Grant on page 46.

Heath Disk Operating Software (HDOS) for the H-17 Floppy System. Specially engineered to help get your system running fast. Loaded with convenience features, HDOS includes all of the following programs:

Extended Benton Harbor BASIC — an easier conversational programming language;

ASM Assembly Language — a two-pass absolute 8080 assembler that lets you create source programs using letters, numbers and symbols to generate efficient machine language code. It assembles the source program into a listing and an object program in binary format executable by your computer;

EDIT Text Editor, which converts your computer and terminal into a powerful typewriter for generating text and editing. It prepares the source code for H-8 Assembly Language and can be used to prepare reports, write and edit;

DEBUG Console Debugger, an enhanced and extended version of the front panel monitor which allows the entry and debugging of user machine language programs via an external terminal. This console debugger features single or multiple stepping through programs, breakpointing, load and dump from tape storage. A user program is required to use the Console Debugger;

PIP — a file utility to copy, concatenate or transfer files between devices;

INIT — to format new or magnetically damaged diskettes;

SYSGEN — a utility to place the operating system itself on a diskette;

TEST — a diagnostic to help check out and maintain your floppy disk system.

HDOS features fully dynamic non-continuous allocation and de-allocation, for fast and efficient use of disk space. Its structure consists of a resident nucleus with two non-resident relocatable overlays, plus non-resident relocatable device drivers for efficient memory utilization. Utilities are included to make the system useable in a 16K single-drive system, although 32K (or more) of memory and two disk drives are highly recommended — and may be required for operation of some other software products used in conjunction with HDOS.

Get the most from your H-8 Computer and H-17 Floppy Disk System.

H-8-17, on 5.25" diskette, Shpg. wt. 14 lbs. 150.00

Operating Systems Software Designed Especially for the Heathkit H-89 Computer. Diskette with features above.

H-89-17, Shpg. wt. 6 lbs. 150.00



MICROSOFT™ BASIC™ — the most popular computer language. MICROSOFT BASIC is one of the most versatile languages available for the personal computer. Scores of practical programs are written in this BASIC. This version of MICROSOFT BASIC is specially written for use with Heathkit 8-bit systems, including the H-8, H-88 and H-89 Computers.

MICROSOFT BASIC features these capabilities:

Direct access to CPU ports and memory locations (INP, OUT, PEEK, POKE); an IF-THEN-ELSE control structure, which allows more highly structured programming — including editing during programming and random or sequential filing capabilities; a full range of mathematical and logical operators; and a DEF statement which allows user-defined func-

tions which are not listed as intrinsic functions.

MICROSOFT BASIC also features powerful program edit facilities, including insertion, deletion, character change and search capabilities; versatile file management facilities, which include random files, sequential files and file manipulation; powerful string processing functions, including LEFT, RIGHT, MID, ASC, CHR and concatenation; extended statements, operators, functions and commands which are not available in most other BASICs — ERASE to eliminate arrays from a program, LINE INPUT to add lines to string variables without delimiters, SWAP to exchange the values of two variables, the TRON and TROFF debugging aids which help trace the execution of program instructions, and WIOTH to set the width of the printing terminal line; automatic line numbering and renumbering; branching, loops and subroutines to change the order of program line execution in various ways; PRINT USING for control of output formats; ON ERROR command for error trapping routines.

This software includes a variety of mathematical and logical functions as well, including double precision floating point number and double precision mathematics. Algebraic and trigonometric capabilities are also included.

MICROSOFT BASIC requires H-8-17 or H-89-17 Disk-Based Operating Systems Software, as well as a minimum of 32K memory.

H-8-21, Shpg. wt. 3 lbs. 150.00



MICROSOFT™ FORTRAN™ System

- Powerful ANSI-66 FORTRAN IV Language Compiler
- Macro-Assembler, Linkage Editor, Cross-Reference Generator
- Linkable library of math, I/O, utility routines

Designed especially for Heathkit disk-based computer systems, the MICROSOFT FORTRAN Programming System features the powerful ANSI-66 FORTRAN IV Computer Language, a cross-reference generator, the MACRO-80 Relocating Assembler, the LINK-80 Linkage Editor and MICROSOFT FORTRAN Library, filled with floating point mathematical routines, plus I/O and utility routines.

The MICROSOFT FORTRAN-80 Compiler is a true native-code compiler which supports the full ANSI-66 FORTRAN IV Language, except for complex numbers. The compiler also includes many extensions to the FORTRAN language, to increase the utility and efficiency of the system — and it performs some object code optimization. An option to list the generated object code in 8080 Assembly Language is available.

MICROSOFT'S MACRO-80 Relocating Assembler generates relocatable object modules for use with the LINK-80 Linkage Editor. It accepts both Intel 8080 and Zilog Z-80 mnemonics, features macros and conditional assembly, and will generate a sorted cross-reference listing — when used with CREF (included).

MICROSOFT'S LINK-80 Linkage Editor converts relocatable libraries or modules (such as those produced by MICROSOFT FORTRAN, COBOL, BASIC and Pascal languages — as well as by the MACRO-80 Assembler and Digital Research's PL/I Compiler) into runnable load modules for direct execution, or for disk storage. Capabilities include options to specify prommable code, and the ability to separately specify the origin address for code and data segments. An absolute symbol table listing of the generated load module may also be obtained.

MICROSOFT'S FORTRAN Library includes all FORTRAN mathematical, I/O and utility functions. Routines in the Library may be called by — and linked with — mathematical programs created by the MACRO-80 Assembler.

MICROSOFT FORTRAN-80 is one of the most powerful, sophisticated and impressive programming systems available to micro-computer users. Your computer system must have dual-drive floppy disk capability and minimum of 40K memory.

H-8-20, Shpg. wt. 4 lbs. 150.00

031.264	013	340X			
031.265	011	341H	DEL	B	
031.266	345	342N	DEL	N	
031.267	353	343J	PURM	N	
031.268	011	344F	LDG	B	
031.269	011	345E	IND	B	
031.271	345	346J	FUSH	N	
		347I			
031.272	174	348N	MOV	A-N	
031.273	022	349Z	STAR	D	
031.274	013	350K	SCR	I	
031.275	008	351H	CR	H	
031.276	013	352I			
031.277	170	353X	MOV	A-B	
031.280	247	354F	MOV	A	
031.281	362	355C	JP	MOV	
031.282	321	356P	POP	I	
031.283	341	357F	POP	H	
031.284	023	358D	INH	B	
031.287	043	359Z	INH	H	
031.288	311	360Z	RET		
031.289	311	361Z			



Heathkit Software Source Listings give you more flexibility

Modify Heathkit software to suit most special applications. Learn the techniques used by professional programmers in developing systems software. In Assembly language. NOTE: No support — updates not supplied without charge.

Source Listings for Heath Disk Operating System. Includes all utilities and device drivers. HOS-1-SL, 11 lbs. 195.00

Source Listings for the Read-Only Memory (ROM) of the H-17 Floppy Disk System. H-8-51, Shpg. wt. 1 lb. 25.00

Source Listings for the ROM of the H-19 Professional Video Terminal. H-19-1, Shpg. wt. 1 lb. 25.00

Listing for Cassette Extended Benton Harbor BASIC Language. H-8-60, 2 lbs. 25.00

Listing for Cassette Assembly Language. H-8-54, 2 lbs. 25.00

Listing for Cassette Text Editor. H-8-53, 2 lbs. 25.00

Listing for Cassette Console Debugger. H-8-52, 1 lb. 25.00

(NOTE: All source listings are copyrighted. Reproduction prohibited.)



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

Heath Computer owners and buyers: join HUG



Join the Heath User's Group (HUG) and keep up-to-date on the latest computer hardware/software developments, while you expand your software capabilities!

Here's what a HUG Membership gives you:

- 1) A one year's subscription to REMark Magazine — an exclusive periodical for HUG members only. It provides you with two important services: a) Sneak previews on the newest Heath peripheral computer products and b) A written medium where you and other members of HUG can share new hardware modifications, software enhancements, application programs, and other ideas.
- 2) Special access to The HUG Software Library — where you can order over 500 low-cost programs for your H-8, H-88, H-89, or H-11 computer. The programs are stored on cassettes and disks, and written by HUG members (see list at right).
- 3) The HUG Software Library Catalog — listing each program in the library by program name, program description, program language, version, equipment required to run the program, and HUG author.
- 4) A chance to win valuable prizes by competing in HUG Software Contests — a great way to further your program-writing expertise and have fun at the same time. Besides valuable gifts, winners have their names printed in REMark.
- 5) A vinyl-covered, three-ring binder — with inside pocket containing the HUG handbook. It explains more about the group: why it was started, how members participate (some members have even formed local groups to increase the benefits of belonging to HUG), plus hints on making the most of your membership.

HUG Membership Rates (per year)

	U.S.	Canada & Mexico	International
New Members:	\$18	\$20	\$28
Renewal	\$15	\$17	\$22

Send to: HUG Membership, Hilltop Rd., St. Joseph, MI 49085

Yes, I want to become a member of HUG and take advantage of keeping up-to-date on the latest Heath computer developments, while I increase my software library.

I've enclosed \$ _____ (U.S. Funds only) to cover my membership.

Name: _____

Street: _____

City: _____ State: _____ ZIP: _____

(check one) U.S. Citizen Canada or Mexico Other Country

Signature: _____



Here's a quick peek at just some of the different program titles available from the HUG Software Library to its members...

- Create-A-Program
- Basic Tutor
- Basic Renumbering Programs
- 8080 Emulator
- Octal/ASCII Dump
- Modem Drivers
- Disk Transfer Systems
- Interactive Data Base
- Word Processor
- Chi Square Multisort
- File Maintenance
- Small Business Package
- Accounts Receivable
- Accounts Payable
- Payroll
- Inventory
- Finance
- Peak Budget Demand
- Depreciation Calendar
- Declining Interest
- Loan Amortization
- Real Estate Depreciation
- Home Budget Maintenance
- Checkbook Programs
- Credit Card Management
- Tax Program
- Home Budget Maintenance
- Handy Ham Problem Solvers
- Morse Code Review
- Loop Antenna Designer
- Antenna Designer
- Power Supply Design
- Op-Amp Circuit Design
- RTTY Send/Receive
- Solid-State Amplifier Design
- QSL File Maintenance
- Stock Market Games
- Football
- Star Trek
- Space Wars
- Blackjack
- Weather Forecasting
- Pilot
- Biorhythms

With every Heath Computer you purchase, you'll find a HUG membership application enclosed. But if you missed out on that opportunity to join HUG, why not fill out the application left? Or write: HUG Membership, Hilltop Road, St. Joseph, MI 49085.

Get more out of your computer with these books



Introduction to Microprocessors, Volume 1. Introduces you to the basic microprocessor. EDP-224 9.50

Getting Acquainted With Microcomputers. A 228-page guide explaining what microcomputers can do. EDP-275 8.95

8080 Machine Language Programming For Beginners. A guide to 8080 machine language for new computerites. EDP-272 7.95

PDP-11 Programming Fundamentals. How to program your PDP-11 computer with assembly language and get the most out of it. EDP-239 10.00



Fortran IV Self-Teaching Guide. Teaches you High-level computer programming in FORTRAN. EDP-279 ... 5.95

101 Basic Computer Games. 250-page book describes new computer games that the entire family can play. It's the only collection containing a complete listing, sample run, and description of each game. EDP-237 7.50

The Software Gourmet Guide and Cookbook. This 218-page publication offers you new ideas for your 8080A computer. Ideas include: general purpose routines, programming time delays, random number generators, and six appendices. EDP-228 10.95



Basic Software Library, Vol. I. Covers business and recreational programs. EDP-240 24.95

Basic Software Library, Vol. II. Basic programs in engineering and statistics. EDP-241 24.95

Basic Software Library, Vol. III. Advanced business programs help cut clerical costs. EDP-242 ... 39.95

Basic Software Library Vol. IV. General purpose programs for many applications. EDP-243 9.95

Basic Software Library, Vol. V. A collection of experimental programs. EDP-251 9.95

(Book ordering information on page 52).





COBOL Programming introduces you to this popular business language

\$119⁹⁵

- Priced much lower than most other COBOL instruction courses
- COBOL — the language used in most all commercial data processing systems

Learn about COBOL — one of the most popular business computer languages. Most all commercial data processing systems, as well as all computer mainframes used by the Federal Government, use COBOL Language. COBOL is especially useful in any repetitive application which uses large quantities of reduplicative data. It's more efficient in these applications than BASIC, and gives the programmer far greater productivity than Assembly Language.

You'll find COBOL used in accounting functions, inventory control and other business applications. It's more self-documenting; you can see each step of each operation, because of the language's structure.

Now, it's easier than ever to learn about COBOL Language with the newest self-instruction course in this catalog. COBOL Programming, from Heath/Zenith Educational Systems, is designed for beginning programmers. And it also costs less than ever to learn about COBOL — the Heath/Zenith COBOL Programming Course is priced far below the competition.

This COBOL Course covers the basics of encoding, input characteristics, program hierarchy, identification, environment, data and procedure divisions. Both the ANS 74 and ANS 68 versions of COBOL are used in the program.

COBOL Programming uses the effective audio-tutorial learning method. You get a clearly written student handbook with diagrams, tables, illustrative programs and unit tests. The text covers these aspects of COBOL: a simple COBOL program; program variations; the structure and syntax of COBOL; simple arithmetic statements, comments and diagnostics; advanced arithmetic and control statements; additional data concepts; magnetic tape and disk concepts; and an applied COBOL program. A set of nine audio cassettes complements the student workbook, allowing you to see AND hear each concept as it's presented in this Heath/Zenith Educational Course.

Gain the basic knowledge needed to begin a computer hobby with the Personal Computing Program

\$39⁹⁵

- Do you own a computer — or are you considering buying one? The Heath/Zenith Personal Computing Program can help. It introduces you to the fundamental concepts, capabilities and terminology of personal computing. With our new program, you'll learn some of the ways you can benefit from a computer

Designed for the curious, motivated individual who is uninitiated to computing, the Personal Computing Program shows you how a computer can serve you.

You'll be able to determine if your particular problem can be solved by a computer, because you will understand what a computer can do. You'll be able to cut through the technical fog, and understand what different computer system components do — in easier, simpler terms.

The Heath/Zenith Personal Computing Program is divided into five easy-to-understand units, which explain different parts of the personal computing system and put the system into perspective, so you can make an informed decision. Among the many things you will learn:

The Fundamentals of Computers: You'll examine the types of problems that can be solved by a computer, and how to apply the capabilities of a computer to your specific problems. You'll find out how computers "understand" electronic data. Then, you will learn how to convert written words into electronic data.

Computer Hardware: When you complete this section, you won't be intimidated by long lists of specifications when you shop for computer system components. You'll be able to easily and simply compare different computers — because you will understand how each performs.

Interfacing: You'll learn how the computer communicates with other components. You will also be able to distinguish between analog and digital data.

Personal Computing Systems: You will learn how to evaluate various types of small computer systems, by understanding how different combinations of components function.

Computer Software: When you read this section, you'll learn about the different types of computer software, and how each can solve different problems.



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 program — or you may prefer to complete all of the exercises at the end of the program. A master COBOL coding sheet is also included. Use it as an aid in writing COBOL programs.

When you complete COBOL Programming, you'll be able to write COBOL programs, encoding arithmetic logic and control statements. The Heath/Zenith COBOL Programming package should take about 20 hours to complete. When you pass the optional final examination, with a score of 70 percent or better, you will earn 3.0 CEUs and a Certificate of Achievement.

Learn the programming language that thousands of businesses use world-wide. Order the Heath/Zenith COBOL Programming course today. A computer with a COBOL compiler is recommended; the H-8, H-88 and H-89 do not have COBOL compilers at this time.

EC-1105, Shpg. wt. 7 lbs. 119.95



Instructing the Machine: The final section shows you how you can control the computer system, by introducing you to BASIC Language Programming.

You don't need an extensive math, electronics or computer background to learn about personal computing with our program. The easy-to-read text, supported and reinforced by three audio cassettes, makes personal computing clear and understandable to most individuals with high school backgrounds.

Upon completion, pass the optional final exam with a 70% or better score, and earn 1 CEU and a Certificate of Achievement.

EC-1000, Shpg. wt. 5 lbs. 39.95

**MONEY-BACK
GUARANTEE**

If you're not satisfied with any Heath/Zenith Self-Instruction Program, we'll completely refund the purchase price. Just return all program materials and your receipt.



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

The most powerful programming language is yours with the Assembly Language Program

\$49⁹⁵

- Use your computer system's entire capacity
- Store more information in less space
- Execute your computer programs much faster

Assembly Language is the most powerful language that can be used on any computer. Anything that can be done in any other language can be done in Assembly. It's a true programming language, not just a convenient notation for machine code. The use of labels, computed operands, comments and assembler directives allows creation of a source code that is adaptable to the system and easily read. No need for programmed memory; no time wasted interpreting. So your programs run much faster.

You can use your computer system's memory more efficiently when you use Assembly Language. It stores more data in less space because codes are shorter and more explicit. By using computed origin statements and other assembler directives, you can make an Assembly Language program operate wherever the computer has space. The use of meaningful labels for subroutines, along with as many remarks or comments as you desire, make a program listing quite readable in Assembly Language.

One of the most important and useful requisites of a programming language is that it be flexible, not dependent upon specific addresses and hardware of the computer. In an Assembly Language program, hardware specifications can be made at the beginning of the program and referred to symbolically through the rest of the program. In this way, changes can be located together — easily.

The Heathkit Assembly Language Self-Instruction Program teaches you to program your computer in Assembly. You learn the details at your own pace, using a special 400-page text designed for self-study. An exercise workbook provides hands-on experience with programming exercises — you perform each exercise on your own computer. To perform the optional experiments, which are necessary to gain full benefit from the Assembly Language Program, you must have a computer. This Program is designed for computers using the popular 8080/8085 microprocessor series and Heathkit Z80 CPU. This includes the Heathkit H-8, H-88 and H-89 Computers.

The Assembly Language Program includes text, workbook and a special Reference Placard with all 244 assembly instructions for easy reference. The other side of the Placard contains the ASCII code chart.

Passing the optional final examination with a score of 70 percent or better will earn you a Certificate of Achievement and 6.0 Continuing Education Units (CEUs). Classroom version of the Assembly Language Program is listed on page 80.

EC-1108, Shpg. wt. 7 lbs. 49.95



Learn to communicate with your computer in BASIC Language using this proven Program

\$39⁹⁵

- BASIC is the easiest of all programming languages to write
- Now BASIC has become one of the easiest languages to learn
- Hundreds of computer programs are available in BASIC

More computer programs are written in BASIC™ than any other computer language. It's the easiest computer language to write — and the easiest to learn. BASIC uses familiar English words, which cause the computer to perform standardized operations. When a number of these words are strung together to form a program, the computer performs each of the specified operations in turn to complete the task the operator desires. When you know BASIC, you can adapt and run hundreds of existing programs to meet your specific needs. You can exchange computer programs with others. And you can write your own original programs.

The Heathkit BASIC Language Self-Instruction Program covers all BASIC Language versions, formats, commands, statements and procedures, plus special problem-solving tips you can use when you write your own programs. This program is divided into 14 easy-to-follow programmed instruction segments which will teach you all of the standardized words of the BASIC Language, and the operation that each word causes the computer to perform. You will get a grasp of the tools of BASIC Language programming, including numbers, statements, functions, loops, lists, arrays and strings.

You will understand the importance of proper syntax in BASIC programming, and why the computer needs another program to interpret the words it reads and perform the desired operations. It also teaches you the creative aspect of writing a computer program. Using the tools you learn, you'll participate in the decision-making factors that are part of writing a meaningful computer program. You will learn useful techniques, such as how to define and plan a program, how to format and write it in BASIC, and how to adapt existing programs to suit your needs.

The course material includes a programmed instruction text explaining BASIC, a special workbook of programming instructions, and experiments you can perform on your own computer. Also included are handy reference cards for Benton Harbor BASIC Statements, ASCII number codes, BASIC direct command statements and a reference chart for math and Boolean algebra operations. Passing the optional final exam with 70% or better will earn you a Certificate of Achievement and 3.0 Continuing Education Units (CEUs).

While the BASIC program is keyed to Heathkit computers, it's equally applicable to any computer system using BASIC. And with our BASIC Language Program, learning a computer language has never been easier or more fun.

EC-1100, Shpg. wt. 7 lbs. 39.95

MONEY-BACK GUARANTEE

If you are not completely satisfied with any Heathkit Self-Instruction program, we will refund the purchase price upon return of materials and proof of purchase.

Does your business need a computer? This Program helps you decide

The Heathkit Computer Concepts for Small Business Program is designed to give you the information and understanding you need to evaluate the usefulness of a computer in your business.

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. Our program gives you everything you need to intelligently evaluate how a computer can benefit your business. It covers:

The Computer and How It Works: Types of memory; capabilities of different types of storage media and I/O; and applications software, covering the typical tasks a computer can perform in a small business.

The Data Processing Department and Personnel: Organization of a typical data processing (DP) department;

roles of the data processing manager, data processing engineer, systems analyst, operator and other personnel.

Alternatives in Computer Services: A comparison of the advantages of owning your own computer system versus a time-sharing arrangement or computer service bureau.

How To Select a Computer: How to define your data processing requirements. Shows you how to put together the computer system that's right for you, including the right combination of hardware, peripherals and software.

The program includes a 160-page self-instruction text with three appendices. Two audio cassettes are included to reinforce the text material. Completion of the optional final exam with 70% or better will



earn you 1 CEU and a Certificate of Achievement.

A computer is a big investment. Our Computer Concepts for Small Business Program is a small investment to get the understanding you need to make an informed decision. Classroom version on page 80.

EC-1103, Shpg. wt. 5 lbs. 49.95



Quality Heathkit navigational aids make flying safer

Color-coded areas of keyboard pre-flight, in-flight and navigation functions

14-digit multi-function display (distance and bearing angle shown)



Easy-to-use, positive action keyboard

Versatile scientific calculator functions

Save \$30 on the Heathkit Air Navigation Computer

\$139.95
Kit

- Three built-in microprocessors for extra power
- Accepts data for up to nine flight leg entries
- Automatically computes in-flight wind

You would have to have an on-board computer to match the versatility, precision and quality of the Heathkit OC-1401 Hand-Held Air Navigation Computer.

One of the most sophisticated and useful instruments of its type, the OC-1401 accepts preflight data and vectors for up to nine separate flight legs. It computes magnetic heading, ground speed, true air speed, time to next checkpoint or destination, and estimated time of arrival — all with single-keystroke callups. And it automatically computes in-flight wind, updating ETAs in flight.

Your Navigation Computer features a multi-function 14-digit display, 36-key keyboard with a built-in clock/timer and a fuel warning indicator. Converts English measures to metrics and statute miles to nautical miles. Also operates as a versatile scientific calculator.

Designed for years of trouble-free service, built-in checks help assure proper operation. Rechargeable batteries included. Complies to FAA Advisory Circular No. 60-11.

Kit OC-1401, Shpg. wt. 3 lbs. Was \$169.95, Now 139.95

Save \$75 on assembled and tested Air Navigation Computer.

OCW-1401, Shpg. wt. 4 lbs. Was \$274.95, Now 199.95

Save 12% on Custom Carrying Case Kit

For OC-1401 and accessories. Rechargeable battery power supply operates on 120 VAC, fully charges in 15 hours. Handy pocket for operating guide. 3 1/8" H x 12 3/4" W x 8" D.

Kit OCA-1401-1, 5 lbs. Was \$39.95, Now 34.95

Save 26% on Factory Assembled and Tested Deluxe Case.

OCW-1401-1, 5 lbs. Was \$74.95, Now 54.95

Leatherette Carrying Case for OC-1401 only.

OCA-1401-2, 1 lb. Was \$4.95, Now 3.95



OC-1401 SPECIFICATIONS: Basic Architecture: RPN-5 level stack, Auxiliary Storage-9 addressable registers, last X register. Display Modes: Variable round-off, fixed point, or scientific notation, 9-digit mantissa and 2-digit exponent. Flight Functions: True airspeed, wind triangle, up to 9 flight leg calculations, navigation by two VORs and ETA. Dynamic Displays: Clock, elapsed time, fuel remaining, distance and time to checkpoints. Dimensions: 1 3/4" H x 3 3/8" W x 6 3/8" D (4.5 cm H x 7.9 cm W x 16.2 cm D).

Strobe Light/Beacon for Aircraft/Boats/Emergency Vehicles

A truly unusual kit-form value, the Heathkit OL-1155 Aircraft Strobe Light is designed for use as an anti-collision or supplemental beacon — or directly replaces a standard 3 3/4" rotating beacon. Operates from a 12 VDC negative ground supply, drawing 1.5 amps nominal current, and includes a built-in line filter. An internal trimmer lets you adjust the flashing frequency.

Use the OL-1155 in most emergency applications. Mount on your boat cabin-top or masthead for marine protection. Mount atop antennas or other tall structures. Meets FAA Reg. No. 23.1401 anti-collision lighting requirements.

FAA Design Approved under STC SA2719WE for all Cessna 182 aircraft prior to S/N 53599, STC SA2720WE for all Cessna 210 aircraft prior to S/N 57481.

Kit OL-1155, 3 lbs. 89.95



NOTE: For the FAA/PMA certification necessary for aircraft installation, return your completed Light to your Heathkit Electronic Center or the Heath factory.

Save 23% on high-accuracy, rugged Aircraft Clock/Timer



Gives you the accuracy and reliability you need for any flight timing function at about half the cost of competitive models! Quartz-crystal-controlled timing functions provide exceptional accuracy. Upper display shows 24-hour GMT/ZULU time, lower display shows local time, acts as 24-minute timer, 24-hr. trip timer and has alarm function for fuel management and check-point notification. Both clocks run continuously, but trip timer runs only when plane's master power switch is on. Displays dim automatically for night flying. Fits standard 3 1/8" panel mount, can be easily mounted in almost any aircraft. Operates on either 14 or 28 VDC. draws only 0.5A.

Kit OI-1154, Shpg. wt. 3 lbs. Was \$129.95, Now 99.95

Note: FAA approved for Cessna 172N, STC No. STC SA1686L (requires FAA Form 337). Field approval on FAA Form 337 required for other aircraft. Completed kit must be returned to a Heathkit Electronic Center or factory for DMIR inspection (at no additional charge), before installation by an A & P mechanic (or supervised pilot installation). Heath will adjust for maximum accuracy. Meets DO-160 environmental requirements.

EASY ORDERING INFORMATION



BY PHONE: NOW YOU CAN CALL TOLL-FREE! 800-253-0570

NOW ORDER TOLL-FREE: 800-253-0570 using your Visa or MasterCard credit cards or Heath Revolving Charge. 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 or 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.
- Always 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 below.
- Please use separate sheet to order parts, manuals or for any correspondence.

TERMS: Here are some credit options for your order

- 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.
- 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 your monthly payments and finance charges. Follow the instructions on reverse side of order form. Please be sure to sign charge agreement.
- 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: CT, MA, ME, NH, NJ, RI, VT. Zone B covers: AZ, CA, FL, ID, MT, NV, NM, OR, UT, WA, WY.

Shpg. Wt.	Zone								BLUE LABEL AIR SERVICE CHARGE		
	Zone 1 & 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone A	Zone B	\$1.78	\$1.79
1	\$1.20	\$1.27	\$1.39	\$1.58	\$1.64	\$1.72	\$1.83	\$1.78	\$1.78	\$1.78	\$1.79
2	1.35	1.39	1.56	1.72	1.82	1.98	2.22	2.50	2.58	2.58	2.58
3	1.45	1.53	1.73	1.86	2.04	2.24	2.61	3.22	3.31	3.22	3.31
4	1.56	1.65	1.82	2.00	2.23	2.50	3.00	3.94	4.07	3.94	4.07
5	1.66	1.77	1.92	2.14	2.43	2.77	3.39	4.66	4.82	4.66	4.82
6	1.71	1.84	2.01	2.28	2.62	3.03	3.78	5.39	5.58	5.39	5.58
7	1.76	1.90	2.11	2.41	2.82	3.29	4.17	6.11	6.34	6.11	6.34
8	1.80	1.97	2.20	2.55	3.02	3.56	4.56	6.83	7.10	6.83	7.10
9	1.85	2.03	2.29	2.69	3.21	3.82	4.95	7.58	7.86	7.58	7.86
10	1.89	2.10	2.40	2.83	3.41	4.08	5.34	8.27	8.61	8.27	8.61
11	1.94	2.20	2.54	3.00	3.65	4.42	5.73	9.00	9.37	9.00	9.37
12	2.03	2.31	2.68	3.11	3.77	4.57	6.12	9.71	10.13	9.71	10.13
13	2.12	2.42	2.83	3.29	3.96	4.72	6.41	10.43	10.89	10.43	10.89
14	2.20	2.53	2.97	3.46	4.18	4.94	6.62	11.15	11.65	11.15	11.65
15	2.29	2.63	3.11	3.64	4.42	5.22	6.80	11.87	12.40	11.87	12.40
16	2.37	2.75	3.25	3.82	4.64	5.50	6.98	12.60	13.16	12.60	13.16
17	2.46	2.86	3.39	3.95	4.87	5.78	7.15	13.32	13.92	13.32	13.92
18	2.54	2.97	3.54	4.17	5.10	6.07	7.31	14.04	14.68	14.04	14.68
19	2.63	3.08	3.68	4.35	5.33	6.35	7.54	14.76	15.44	14.76	15.44
20	2.71	3.18	3.81	4.52	5.55	6.63	7.83	15.48	16.19	15.48	16.19
21	2.81	3.29	3.95	4.70	5.78	6.91	8.28	16.21	16.95	16.21	16.95
22	2.89	3.40	4.09	4.87	6.01	7.19	8.57	16.93	17.71	16.93	17.71
23	2.98	3.52	4.23	5.05	6.24	7.48	8.91	17.65	18.47	17.65	18.47
24	3.06	3.63	4.38	5.23	6.46	7.76	9.26	18.37	19.23	18.37	19.23
25	3.15	3.73	4.52	5.40	6.70	8.03	9.60	19.08	19.98	19.08	19.98
26	3.23	3.84	4.66	5.58	6.92	8.32	9.95	19.81	20.74	19.81	20.74
27	3.32	3.95	4.80	5.75	7.15	8.60	10.29	20.53	21.50	20.53	21.50
28	3.40	4.06	4.94	5.94	7.37	8.88	10.64	21.25	22.26	21.25	22.26
29	3.49	4.17	5.09	6.11	7.61	9.17	10.98	21.97	23.02	21.97	23.02
30	3.58	4.27	5.22	6.28	7.83	9.44	11.33	22.69	23.76	22.69	23.76
31	3.67	4.39	5.36	6.46	8.06	9.72	11.67	23.42	24.52	23.42	24.52
32	3.75	4.50	5.50	6.64	8.29	10.01	12.01	24.14	25.28	24.14	25.28
33	3.84	4.61	5.64	6.82	8.52	10.29	12.36	24.86	26.04	24.86	26.04
34	3.92	4.72	5.78	6.99	8.74	10.58	12.70	25.58	26.80	25.58	26.80
35	4.01	4.82	5.93	7.16	8.98	10.85	13.05	26.30	27.55	26.30	27.55
36	4.09	4.93	6.07	7.34	9.20	11.13	13.39	27.03	28.31	27.03	28.31
37	4.18	5.04	6.21	7.52	9.43	11.42	13.74	27.75	29.07	27.75	29.07
38	4.26	5.16	6.35	7.70	9.65	11.70	14.08	28.47	29.83	28.47	29.83
39	4.36	5.27	6.49	7.87	9.89	11.98	14.43	29.18	30.59	29.18	30.59
40	4.44	5.37	6.63	8.04	10.11	12.26	14.77	29.90	31.34	29.90	31.34
41	4.53	5.48	6.77	8.23	10.34	12.54	15.11	30.63	32.10	30.63	32.10
42	4.61	5.59	6.91	8.40	10.57	12.82	15.46	31.35	32.86	31.35	32.86
43	4.70	5.70	7.05	8.58	10.80	13.11	15.80	32.07	33.62	32.07	33.62
44	4.78	5.81	7.19	8.75	11.04	13.39	16.15	32.79	34.38	32.79	34.38
45	4.87	5.92	7.33	8.92	11.25	13.67	16.49	33.51	35.13	33.51	35.13
46	4.95	6.03	7.48	9.11	11.48	13.95	16.84	34.24	35.89	34.24	35.89
47	5.04	6.14	7.62	9.28	11.71	14.23	17.18	34.96	36.65	34.96	36.65
48	5.13	6.25	7.76	9.46	11.93	14.52	17.52	35.68	37.41	35.68	37.41
49	5.22	6.36	7.90	9.63	12.17	14.80	17.87	36.40	38.17	36.40	38.17
50	5.30	6.46	8.03	9.81	12.39	15.07	18.21	37.12	38.92	37.12	38.92
Add'l lbs	.08 lb	.10 lb	.13 lb	.18 lb	.22 lb	.27 lb	.34 lb	.72 lb	.75 lb		

ZONE CHART

Your zone is indicated by the first three numbers of your ZIP Code

IMPORTANT: 1. Shipping weights listed for model numbers shipped in more than one carton have been adjusted to provide correct postage.

Zip Code	Zone	Zip Code	Zone	Zip Code	Zone	Zip Code	Zone	Zip Code	Zone
096-009	8	260-261	3	363-369	5	476-477	4	598-599	7
010-069	5	262-278	4	370-386	4	478	3	823-826	6
070-089	4	279	5	387	5	479-489	2	827	5
090-099	5	280-283	4	388	4	490-491	1	828-832	6
		284-285	4	389-397	5	492	1	833	7
		286-293	4	493-495	2	493-495	2	834	6
100-08	5	294-295	5	496-499	3	629-668	4	835-838	7
109	4	296-297	4	407-409	4	669-679	5	840-847	6
*10-119	5	298-299	5	410-412	3	500-516	4	850-864	7
*120-123	4	300-303	4	413-422	4	520-524	3	865-884	6
*124-126	5	304	5	423	3	525	3	890-898	7
*127-128	4	305-307	4	424-426	4	526-528	3		
129	4	308-329	5	427-432	3	530-534	2	900-921	8
130-152	4	330-334	6	433-436	2	535-539	3	922-928	7
153	3	335-338	6	437-457	3	540	3	930-934	8
*154-160	4	339	5	458	2	541-546	3	935	7
*161	3	340	6	460-462	3	547-548	4	936-960	8
*162-163	4	350-352	4	463-464	2	549	3	961	7
*164-165	3	353	5	465-466	1	550-566	4	962-976	8
166-199	4	354	5	467-469	2	567	5	977-979	7
		355-359	4	470-472	3	570-572	4	980-987	7
200-232	4	360-361	5	473	2	573-588	5	988-994	7
231-237	5	362	4	474-475	3	590-597	6	995-999	8
238-259	4								

BOOK ORDERING INFORMATION — There is a \$10 MINIMUM for a book-only purchase. No minimum if books are ordered with kits. Do not calculate shipping on books, simply add 50¢ for each book to the shipping charges column on the order blank.

MONEY-BACK MANUAL PREVIEW

MONEY-BACK MANUAL OFFER. All kits come with manuals, but if you'd like to see how easy kitbuilding is, you can order the manual first. And we'll deduct the price of the manual when you buy the kit. Simply include a copy of your manual invoice with your order.

Be sure to send manual orders on a separate sheet of paper. Manuals are \$5 each except for the following: color TV's, organ, H-8-18, WH-8, WH-11A, HW-101, AR-1515, AA-1515, AA-1515, AJ-1600, AP-1800, AA-1640, AR-1650, WH-17, SO-4105, SO-4235, IP-2711, and ET series, which are \$8 each. Assembly and operations manuals for the following are \$15 each: GR-4000, H-9, H-88/89. Manuals not available for Educational Programs. Add 50¢ shipping and handling for each manual ordered. Write Heath Company, Parts Dept., Benton Harbor, MI 49022.

HEATH PHONE DIRECTORY FOR ASSISTANCE AND INFORMATION

Product Orders (TOLL FREE except Alaska, Hawaii & Michigan) 800-253-0570	
Product Orders for Alaska, Hawaii & Michigan (sorry, toll free service not available)	616-982-3411
Replacement Parts Orders: (please have Heath part number available when you call)	616-982-3571
Overseas Orders: International Division	616-982-3512
Computer Sales Information	616-982-3285
General Office (non-order calls)	616-982-3200
Technical Assistance:	
● Stereo, Electronic Organs, R/C	616-982-3310
● Amateur Radio	616-982-3296
● Test Equipment, Weather Instruments, Home Clocks	616-982-3315
● Television	616-982-3307
● Home Products, Aircraft, Appliances, Marine, Automotive, Scanners, Security	616-982-3496
● Computers	616-982-3309

8:00 A.M.-Noon and 1:00-4:30 P.M., Eastern Time, Weekdays only.

INTERESTING & CHALLENGING CAREER OPPORTUNITIES AT HEATH: We have positions available for qualified engineers, technicians and technical customer service representatives. If your expertise is in instrumentation, audio, communications or computer equipment (hardware or software), send resume and salary requirements to:

Heath Company, Personnel Department, Benton Harbor, MI 49022
We are an Equal Opportunity Employer M/F.

NOTE: From time to time we make our mailing lists available to reputable businesses with offers we think would be of interest to you. If you do not wish to receive such offers, please send us the address label from your catalog with your request to: Heath Company, Dept. 597-999, Benton Harbor, MI 49022.

Copies of the Heathkit warranty or warranties for any other consumer product in this catalog costing more than \$15 may be obtained free of charge by writing the Manager of Marketing Services, Heath Company, Benton Harbor, MI 49022.

The following notice is required by the Fair Credit Billing Act:

IN CASE OF ERRORS OR INQUIRIES ABOUT YOUR BILL

The Federal Truth in Lending Act requires prompt correction of billing mistakes.

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:

- Do not write on the bill. On a separate sheet of paper write (you may telephone your inquiry but *doing so will not preserve your rights under this law*) the following:
 - Your name and account number (if any).
 - A description of the error and an explanation (to the extent you can explain) why you believe it is in error.
- If you only need more information, explain the item you are not sure about and, if you wish, ask for evidence of the charge such as a copy of the charge slip. Do not send in your copy of a sales slip or other document unless you have a duplicate copy for your records.
- The dollar amount of the suspected error.
- Any other information (such as your address) which you think will help the creditor to identify you or the reason for your complaint or inquiry.

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



The President's Corner

Dear Friends,

It is certainly one of the more interesting periods in history to operate a business. Inflation has seen some of our component prices increase by up to 30% in a few weeks; a recession looms over us that is so unlike previous downturns in the economy that there is little agreement as to whether one has actually started or not; a substantial strengthening of the dollar has been experienced, only to have it drop back to previous levels in a matter of days; and interest

rates are so high they influence every business consideration. If there was ever a time to practice the fundamentals of "old fashioned" business philosophy, it is now.

In this catalog we have introduced more new products than at any time in recent history. Additional education courses, more test instruments and marine products appear on many pages. We are offering a toll free telephone number to make it easier for you to place orders, and you can now use Visa and MasterCard credit cards in addition to our own credit plan. Although our assembly manuals are considered the standard by which all similar documents are judged, we have made even further improvements. We are intensifying our efforts to provide you with the prompt, courteous service you want and deserve, when you want it. Our surveys of customer desires have been increased in quantity and frequency to provide even greater assurance that our new products are what you want in every respect. Several new stores are in the active planning state, again to provide you with improved service.

Yes, we may be a bit old fashioned — however, if that means measuring our success by our ability to retain long-time customers while adding new friends, then we are quite happy with the idea.

D. W. Starnes

President, Heath Company

SEE HEATHKIT PRODUCTS ON EXHIBIT AT THE FOLLOWING SHOWS:

Aug. 21-24	PC-80 Personal Computing Show	Philadelphia, PA
Sept. 16-18	Wescon	Anaheim, CA
Sept. 18-21	Rockville Computer Show	Rockville, MD
Sept. 21-25	AFSM Field Service Show	Phoenix, AZ

Free Plant Tour when you visit our Factory Store in Michigan

A Heath Customer Center is located alongside our production facility on Hilltop Road in St. Joseph, Michigan. Stop in and take advantage of our 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 on Saturdays. Free Plant Tours given Monday thru Friday at 10 AM and 1:30 PM through August 29 (special group tours arranged upon written request). From Interstate 94, take Exit 23 (Business Loop 94, Red Arrow Highway) North to Hilltop Road. Take Hilltop ¼ mi. East to Heath Company.

to the amount in dispute; but periodic statements may be sent to you, and the disputed amount can be applied against your credit limit. You cannot be threatened with damage to your credit rating or sued for the amount in question, nor can the disputed amount be reported to a credit bureau or to other creditors as delinquent until the creditor has answered your inquiry. However, you remain obligated to pay the parts of your bill not in dispute.

- If it is determined that the creditor has made a mistake on your bill, you will not have to pay any FINANCE CHARGES on any disputed amount. If it turns out that the creditor has not made an error, you may have to pay FINANCE CHARGES on the amount in dispute, and you will have to make up any missed minimum or required payments on the disputed amount. Unless you have agreed that your bill was correct, the creditor must send you a written notification of what you owe; and if it is determined that the creditor did make a mistake in billing the disputed amount, you must be given the time to pay which you normally are given to pay undisputed amounts before any more FINANCE CHARGES or late payment charges on the disputed amount can be charged to you.
- If the creditor's explanation does not satisfy you and you notify the creditor in writing within 10 days after you receive his explanation that you still refuse to pay the disputed amount, the creditor may report you to credit bureaus and other creditors and may pursue regular collection procedures, but the creditor must also report that you think you do not owe the money, and the creditor must let you know to whom such reports were made. Once the matter has been settled between you and the creditor, the creditor must notify those to whom the creditor reported you as delinquent of the subsequent resolution.
- If the creditor does not follow these rules, the creditor is not allowed to collect the first \$50 of the disputed amount and FINANCE CHARGES, even if the bill turns out to be correct.
- If you have a problem with property or services purchased with a credit card, you may have the right not to pay the remaining amount due on them, if you first try in good faith to return them or give the merchant a chance to correct the problem. There are two limitations on this right:
 - You must have bought them in your home state or if not within your home state within 100 miles of your current mailing address; and
 - The purchase price must have been more than \$50.

However, these limitations do not apply if the merchant is owned or operated by the creditor, or if the creditor mailed you the advertisement for the property or services.

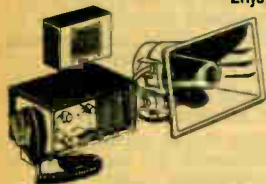
LIMITED QUANTITIES

First come, first served as we close out these popular products from Heathkit inventory. Don't be disappointed — order now.

LIMITED QUANTITIES

Safer boating is yours with the Automatic Foghorn/Hailer

Enjoy your time on the water with greater peace of mind



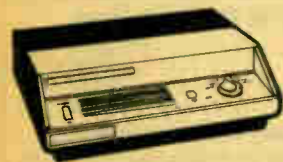
This Automatic Foghorn/Hailer is a must for the safety-minded skipper. It features a husky 55-watt amplifier, foghorn rate and duration controls, separate "listen" and "hail" gain controls. It includes a low-profile, weather-resistant deck horn, 20 feet of speaker cable, and gimbal mount. Operates on your boat's 12 VDC power system, positive or negative ground. Amplifier cabinet measures 4 3/4" H x 9 3/4" W x 9 3/4" D.

For safer boating, order your Automatic Foghorn/Hailer Kit before our inventory is sold out.

Kit MD-19A, Shpg. wt. 15 lbs. 137.95

Kit MDA-19-1, Optional Remote Speaker for intercom use, 2 lbs. 14.95

Set the dial and your phone is answered — in your voice — automatically 24 hours a day with Record a Call®



The fully-assembled Record-a-Call VOX 70 has all the features you need in a telephone answerer. Voice actuation allows your callers to speak for as long as they wish, without artificial time limits. After a caller has stopped speaking, the unit will sense the absence of voice and hang up. However, you still have the option of switching to 30-second fixed time. Records on standard cassette tape. Other features include silent monitor (only the caller's voice is heard), announce only (gives message to caller and then hangs up), fast forward, rapid rewind, rapid erase, message light, twin integrated circuit amplifiers, high quality dynamic microphone. The Record-a-Call can even be used as a dictation machine, giving you double duty. Complies with FCC Regulations for direct connection to a phone company jack. The Record-a-Call VOX 70 is powered by 120 VAC. The attractive unit measures 9" H x 11 1/2" W x 3 3/8" D. Order yours now while supplies last and never miss an important phone call again.

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

Save time and steps by building these handy Heathkit Intercoms for basement, garage, workshop, office or factory



Two-Station Master

Six-Station Master

Two-Station Intercom

This master station allows you to talk and listen to two remote units anywhere in your home or business. Remotes can initiate "private" calls to Master. Master can call either or both remote stations. Master controls include Sta. 1, Sta. 2, Talk, Dictate, Volume. Remotes have Talk and Dictate controls. Price includes one Indoor Remote (GD-120). Order second Remote and cable below. Each unit 3 3/4" H x 6" W x 5 3/4" D.

Kit GD-140, Master and Remote, 4 lbs. 49.95

Six-Station Master

Talk and listen to six remotes (order separately below). 4 1/2" H x 8 1/2" W x 7" D.

Kit GD-110, 6-Station Master, 5 lbs. 59.95

Accessories

Kit GD-120, Indoor Remote, Shpg. wt. 2 lbs. 19.95

Kit GD-130, Outdoor Remote. Do not use with GD-140, 2 lbs. 15.95

GDA-110-2, 100 ft. 4-cond. cable for GD-110, GD-140, 3 lbs. 9.95

GDA-110-4, 100 ft. 2-cond. outdoor cable for GD-130, 1 lb. 4.95

54/LIMITED QUANTITIES

Rest assured with these Smoke and Gas Detectors in your home



First Alert™ Smoke Alarm Center uses built-in radio receiver with 50 ft. range to Remotes. Completely wireless. 120 VAC. Order extra remotes (not shown) below. First Alert Gas Detector (not shown) warns of gas. 120 VAC. Assembled.

GDP-1423, Center, 1 Remote Detector, 6 lbs. 79.95

GDP-1424, Extra Remote Detector, 2 lbs. 39.95

GDP-1425, Gas Detector, Shpg. wt. 3 lbs. 39.95

Ultrasonic Auto Intrusion Alarm is on duty when you're away



Very easy assembly and installation. Protects your automobile and its contents with ultrasonic sound. This alarm detects any interior motion and sounds your vehicle's horn. It's designed for use on cars, trucks, vans, motor homes, cruisers, etc. 1 3/8" H x 4 3/4" W x 3 3/8" D.

D. Uses car's 12-V battery. Optional horn relay kit adapts cars without relay. Get yours now while supplies last.

Kit GD-1558, Shpg. wt. 2 lbs. 49.95

Kit GDA-1558-1, Horn Relay Kit, Shpg. wt. 1 lb. 4.95

Mobile Security System protects your car and valuables



Protect your car and valuables against theft with the Heathkit Mobile Security System. An optional horn relay adapts the kit to cars whose horns do not use a relay or use a plug-in relay. Optional siren accessory provides attention-getting "yelp" sound instead of car horn. Includes all switches and hardware. Alarm unit measures 2 1/2" H x 4 3/4" W x 5" D. For automobiles with 12 VDC negative ground only. Easy assembly and installation. Avoid disappointment — order today.

Kit GD-1157, Shpg. wt. 3 lbs. 29.95

Kit GDA-1157-1, Optional Siren Accessory, 2 lbs. 19.95

GDS-1157, GD-1157 and Siren together, 12 lbs. If pur. sep. \$49.90 39.95

Kit GDA-1157-2, Optional Horn Relay, 1 lb. 2.95

Save 33% on this handy Heathkit Cab-to-Camper Intercom



When you're rolling down the highway in your camper and there's somebody in the back, nothing beats this handy Cab-to-Camper Intercom for talking with your passengers. No more distracting yelling or notes or hand signals — just good, clean audio. The Master unit for your cab features a 3-position switch for selecting "Standby," "Monitor" or "Talk" modes. The Remote can initiate calls to the cab, and even has a "Radio" position for bringing music or news into the camper from your cab

radio. The Cab-to-Camper Intercom requires a 12 volt, 250 mA power source for operation. So make your next trip more enjoyable for everyone by installing the handy Heathkit Cab-to-Camper Intercom. But order soon — supplies are limited.

Kit GD-160, Master, Remote and Cable, 5 lbs. Was \$29.95, Now only 19.95

GDA-160-1, Accessory Plug. Allows quick disconnect when camper and cab must be separated. Shpg. wt. 1 lb. 4.95



Trap Filter keeps CB from ruining TV, FM

Most effective single device to cut out CB interference. Assembled. 300 ohm impedance. GD-1239, 1 lb. 6.95



Credit Card Orders Call TOLL-FREE: 1-800-253-0570

Build your own test bench—and save—with our 5280 Series

The 5280 Series of test instruments is designed for the beginning hobbyist, student or serviceman. It's an excellent way to assemble a truly versatile test bench, without spending a lot of money. The 5280 Series will let you work on many types of electrical and electronic equipment. Whether you're doing service work or just experimenting, each 5280 Series instrument represents real value for your test equipment dollar.

1 Multimeter for volts/ohms/DC current

The Heathkit IM-5284 high performance solid state multimeter gives you 4 different functions and a large easy-to-read panel meter. Features include AC and DC voltage measurement to 1000 volts and DC current measurement to 1000 mA full scale. The ohmmeter function is divided into four ranges, X1, X100, X10k, and X1M Ω . Power requirements are met by internal batteries or by the optional IPA-5280-1 power supply and 1 "C" cell. Includes test probes.

Kit IM-5284, Shpg. wt. 5 lbs. 42.95

IM-5284 SPECIFICATIONS: DC Voltmeter: Ranges: 0-1, 0-10, 0-100, 0-1000 volts full scale. Accuracy: $\pm 3\%$ of full scale. AC Voltmeter: Ranges: 0-1, 0-10, 0-100, 0-1000 volts full scale. Accuracy: $\pm 5\%$ of full scale. DC Milliammeter: Ranges: 0-1, 0-10, 0-100, 0-1000 mA full scale. DC Input Resistance: 10 megohms. AC Input Resistance: 1 megohm. Ohmmeter: Ranges: X1, X100, X1k, X1M Ω . Power requirements: Two 9-volt batteries and 1 "C" cell or IPA-5280-1 Power Supply and 1 "C" cell. Dimensions: 5 $\frac{3}{4}$ " H x 11" W x 7 $\frac{3}{4}$ " D (14.6 cm H x 27.9 cm W x 19.7 cm D).

2 RF Oscillator for radio/TV alignment

This unit, which includes probes, is suitable for use in alignment of tuned stages in AM, FM, and television receivers. Output is divided into five bands, from 310 kHz to 110 MHz, and features an extra 100 to 220 MHz band of calibrated harmonics. An added feature of the IG-5280 is its 1000 Hz audio output. This signal, available at a front panel jack, is ideal for tracing and isolation of circuit defects in receiver audio stages and also serves as a source of internal AM modulation. Includes test leads.

Kit IG-5280, Shpg. wt. 5 lbs. 42.95

IG-5280 SPECIFICATIONS: RF Output: Frequency Range: 310 kHz to 110 MHz in five bands, 100 MHz to 220 MHz on harmonics. Output voltage: 100 mV approx. Internal Modulation: 1000 Hz. AF Output: Frequency: 1000 Hz. Output Voltage: 2.0 volts rms (open circuit). Power Requirements: Two 9-volt batteries or IPA-5280-1 power supply. Dimensions: 5 $\frac{3}{4}$ " H x 11" W x 7 $\frac{3}{4}$ " D.

3 Sine/Square Wave Audio Oscillator

The IG-5282 Audio Oscillator is an instrument that you'll find useful in many audio test applications. Frequency output is in four ranges, from 10 Hz to 100 kHz, in either sine or square wave modes. Use the IG-5282 as an audio signal source during signal tracing or, with the appropriate associated equipment, use the sine wave output for audio stage gain and distortion analysis. If you're interested in determining frequency response, you'll find the IG-5282's square wave output ideal for your purposes (with appropriate associated equipment). Construction is rugged and assembly time is greatly reduced by single circuit board assembly. A great addition for your test bench.

Kit IG-5282, Shpg. wt. 5 lbs. 42.95

IG-5282 SPECIFICATIONS: Frequency Output: 10 Hz to 100 kHz in four ranges. Sine Wave Output Voltage: 0-3 volts rms. Square Wave Output Voltage: 0-3 volts peak. Power Requirements: Two 9-volt batteries or the optional IPA-5280-1 Power Supply. Dimensions: 5 $\frac{3}{4}$ " H x 11" W x 7 $\frac{3}{4}$ " D (14.6 cm H x 27.9 cm W x 19.7 cm D).

4 RCL Bridge ideal for design work

The IB-5281 RCL Bridge is priced right for your pocket book and has the features that you can appreciate. Solid-state circuitry lets you easily determine unknown values of resistance, inductance and capacitance. Resistance is indicated in three ranges from 10 Ω to 10M Ω , inductance in three ranges from 10 μ H to 10H and capacitance, also in three ranges, from 10 pF to 10 μ F. Easy single circuit board construction speeds assembly. Housed in a tough 5280 Series cabinet. With component clips.

Kit IB-5281, Shpg. wt. 5 lbs. 42.95

IB-5281 SPECIFICATIONS: Resistance Ranges: 10 Ω to 10M Ω in three ranges. Inductance Ranges: 10 μ H to 10H in three ranges. Capacitance Ranges: 10 pF to 10 μ F in three ranges. Oscillator Frequencies: 1 kHz, 10 kHz, 100 kHz. External Standard Range: 1:1 to 10:1. Power Requirements: two 9-volt batteries, or IPA-5280-1 power supply. Dimensions: 5 $\frac{3}{4}$ " H x 11" W x 7 $\frac{3}{4}$ " D.

5 Signal Tracer for audio circuits

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

Kit IT-5283, Shpg. wt. 5 lbs. 42.95

IT-5283 SPECIFICATIONS: Functions: Substitute speaker, AF signal tracing, RF signal tracing, Audible volt/ohmmeter. Speaker: 3" permanent magnet. Power Requirements: Two 9-volt batteries and/or IPA-5280 power supply. Cabinet Dimensions: 5 $\frac{3}{4}$ " H x 11" W x 7 $\frac{3}{4}$ " D (14.6 cm H x 27.9 cm W x 19.7 cm D).

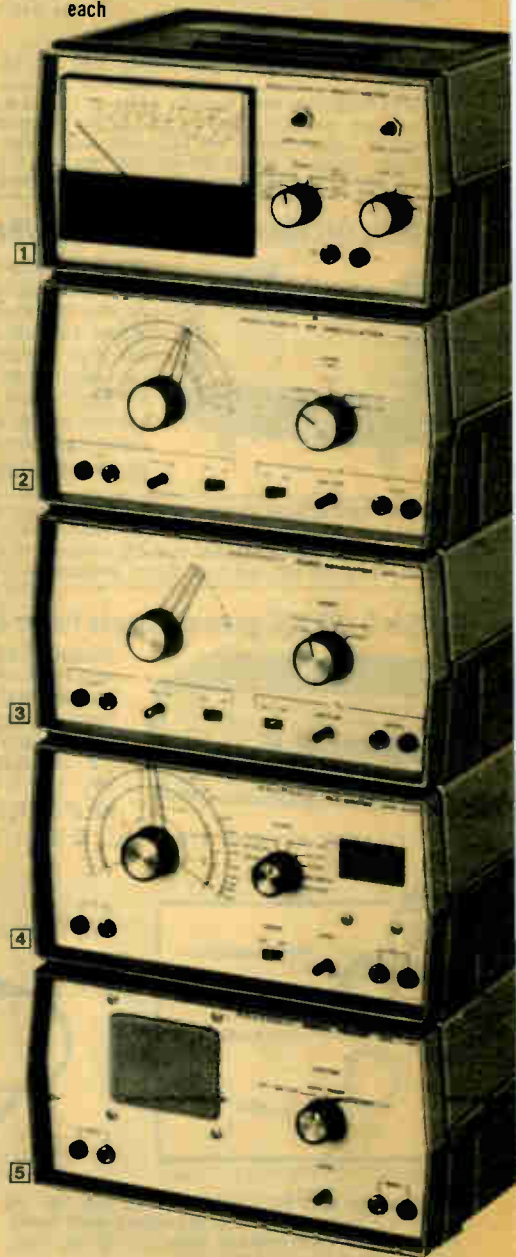
5280 Series 120/240 VAC Power Supply

Not shown. Provides all voltages required by 5280 Series instruments from 120 or 240 VAC, can power all five instruments simultaneously.

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

your choice
\$42⁹⁵
each

5280 Series instruments —
designed to work together



Use our top-value starter test instruments
to set up your test bench, using the IPA-5280-1
Power Supply to power your 5280
Series instruments

Tri-Output Power Supply is ideal for design or experimentation



This Tri-Output Power Supply combines fixed 5 VDC output with two continuously adjustable 0-20 VDC outputs for circuit designs requiring more than one voltage supply. The outputs of the two 20 V supplies and the 5 V output can be interconnected in any combination. Measures 4½" H x 10¾" W x 9" D.

Kit IP-2718, Shpg. wt. 12 lbs. 99.95
 SP-2718, Factory assembled and tested, Shpg. wt. 12 lbs. 185.00

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

You'll like this Heavy-Duty Power Supply/Battery Eliminator



This Heavy Duty Power Supply provides you with a clean, accurate voltage source necessary for the reliable service of Ham, CB and Marine communications gear. It's ideal for any high current DC voltage application. Two easy-to-read front panel meters monitor both current and voltage. Continuously variable voltage selection from 9 to 15 VDC. Zener diode assures output accuracy.

Kit IP-2715, Shpg. wt. 31 lbs. 149.95

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

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



Provides 0-400 VDC at 0-100 mA continuous (125 intermittent) with excellent line and load regulation. Features front panel voltage and current meters, and built-in circuit protection. Binding posts are insulated from chassis. 120/240 VAC. 5¼" H x 13¼" W x 11" D.

Kit IP-2717, Shpg. wt. 19 lbs. ... 139.95

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

Variable Isolated AC Supply gives you more service versatility



Provides complete isolation between the AC power line and any electrical equipment plugged into its front panel variable output socket. Full 360 volt-amps of AC power is available. Continuous full-rated output capability. Ability to start from zero voltage is helpful in trying to locate circuit faults. Switch-selected 1 A and 3 A ranges are individually fused. 5.5" H x 15" W x 10.5" D.

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

General-purpose Power Supplies to fill your service needs

Accurate source of voltage and current for all your testing and design requirements. Both feature remote programming and voltage sensing.

Kit IP-2710, 30V@3A analog, Shpg. wt. 34 lbs. 169.95
 SP-2710, Assembled & tested analog, 34 lbs. 280.00
 Kit IP-2711, 30V@3A digital, Shpg. wt. 36 lbs. 229.95
 SP-2711, Assembled & tested digital, 35 lbs. 350.00



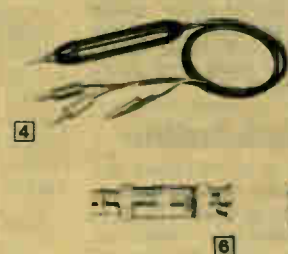
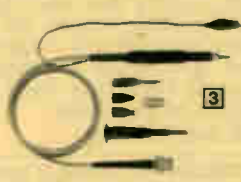
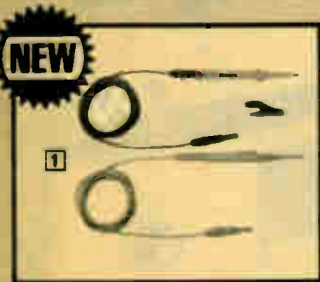
SP-2700 Series Model Specifications

Model	Readout	Maximum Rated Output		Readout Range		Regulation	
		Voltage	Current	Voltage	Current	Load	Line
IP/SP-2710	Analog	30V	3.0A	0 to 30	0 to 3.0	(all models) voltage: 0.05% + 1 mV	(all models) voltage: ±0.05% + 1 mV
IP/SP-2711	Digital	30V	3.0A	0.00 to 19.99 20.0 to 30.0	0.000 to 1.999 2.00 to 3.00	current: 0.10% + 3.5 mA	current: ±0.10% + 1 mA

Versatile continuously variable 1-15 VDC Regulated Supply

This supply is perfect for servicing, testing or designing transistor radios, portable tape recorders and other low-voltage solid-state devices. Continuously adjustable 1-15 VDC at 500 mA output, 500 mV line and load regulation and fully adjustable current limiting. AC or DC programming capability. 120/240 VAC. 4¾" H x 5½" W x 5¾" D.

Kit IP-2728, Shpg. wt. 5 lbs. 28.95



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

2 RF Probe provides RF voltage measurement for any 10 or 11 megohm DC input voltmeter. Linear frequency response from 1000 Hz to over 100 MHz. Includes 10 MΩ banana plug, 11 MΩ phone plug.
 Kit PK-3A, Shpg. wt. 1 lb. 9.95
 PKW-3A, Assembled & Tested, 1 lb. 14.95

3 Low capacitance Scope Probe for direct or X10 attenuated operation; options for 3.3 or 1 megohm input resistance. Banana plug/BNC wiring option.
 Kit PK-1, Shpg. wt. 1 lb. 9.95

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

5 Combination X1, X10 Scope Probe. DC to 15 MHz (X1) and DC to 80 MHz (X10) bandwidths. X10 rise-time. 3-position slide switch, 4.5' cable.
 PKW-105, Assembled & tested, Shpg. wt. 1 lb. 29.95

6 RF Fuse in UHF BNC-to-BNC connector. DC to 500 MHz; 50 ohms; 1.2:1 SWR (max.); insertion loss 1.80 dB max. at 500 MHz. SU-512-50, 1 lb. 50.00

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

Accessory Cables. For interconnecting scopes, counters, etc. All cable is RG-58/U, 50 ohm impedance.
 SU-501-3, 3 ft., BNC/BNC, assembled, 1 lb. 7.50
 SU-501-6, 6 ft., BNC/BNC, assembled, 1 lb. 7.50
 SU-503-3, 3 ft., BNC/Banana, assembled, 1 lb. 7.50



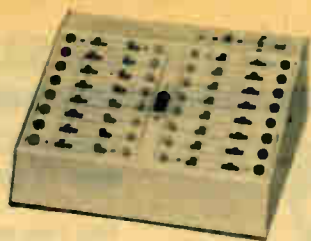


High-performance Heathkit Curve Tracer tests semiconductors quickly, easily

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

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

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



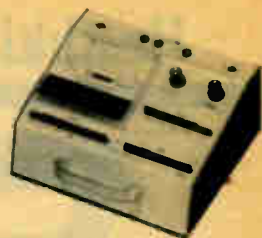
This deluxe Heathkit Digital IC Tester is designed to save you checking time

Quality "zero-force" insertion socket, exclusive "bounce-free," mercury stepping switch, input-output jacks for each pin, neon indicators. Install 14- or 16-pin ICs in any position. Ideal for use with Digital Techniques Program (page 73). A "must" for anyone working with digital integrated circuits.

Kit IT-7400, Shpg. wt. 6 lbs. 79.95

IT-7400 SPECIFICATIONS: Pull-up Resistors: externally connected, with patch terminals. Patch Terminals: one at each pin. Selector Switches: two at each terminal, one for +5, step, or off; the other for gas discharge or ground. Gas Discharge: allows direct driving of neon indicator lamp for high voltage decoder driver. Power Supply: 5 VDC regulated, $\pm 5\%$, 300 mA and 3.6 VDC, switch selected. Power Requirement: 120/240 VAC, 60/50 Hz.

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



- Tests diodes, FETs, transistors, SCRs, triacs

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

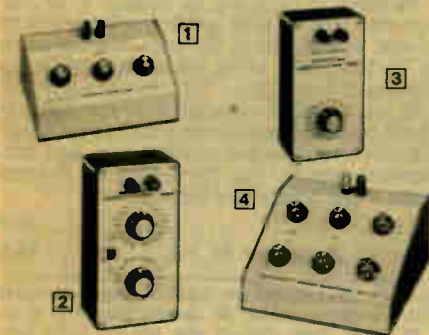
Kit IT-3120, Shpg. wt. 5 lbs. 69.95

IT-3120 SPECIFICATIONS: Out-of-circuit Accuracy: $\pm 5\%$ for DC beta and leakage. In-Circuit Accuracy: indicates good or bad transistor, FET, diode, SCR or triac. Diode Test: Tests for forward conduction and blocking. Unijunction Transistor Test: Measures I_{b2s} , I_{b2s} and emitter current. Power Requirement: Two 1½ V alkaline cells (not supplied). Dimensions: 5" H x 9¼" W x 8½" D.

Take this portable Transistor/Diode Checker with you anywhere

Checks high and low power transistors (NPN and PNP) for shorts, opens, leakage and current gain; diodes for forward and reverse current; tests continuity. Uses two 1.5 V "C" cells (not included). 3½" H x 3½" W x 3¼" D.

Kit IT-3127, 2 lbs. 12.95



1 Decade Capacitance Box functions as a wide-range capacitor for design work. Covers 100 pF to 0.111 μ F in 100 pF increments. Rated 400 VDC.

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

2 Resistor Substitution Box provides switch selection of 36 10% tolerance, 1-watt resistors from 15 ohms to 1 megohm.

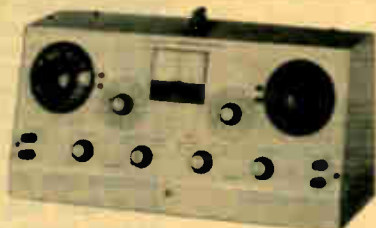
Kit IN-3137, Shpg. wt. 2 lbs. 17.95

3 Capacitor Substitution Box provides switch selection of 18 EIA standard capacitors from 100 pF to 0.22 μ F. All capacitors are rated at 600 VDC — except the three lowest and two highest values, which are rated at 500 and 400 V respectively.

Kit IN-3147, Shpg. wt. 2 lbs. 17.95

4 Decade Resistance Box is variable multiplier/shunt, variable resistor, or arm with AC and DC bridges. Covers 1 Ω to 999,999 Ω in 1-ohm steps.

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



High-accuracy Heathkit Impedance Bridge gives you easier, better measurements

The Heathkit IB-3128 Impedance Bridge features four separate bridge circuits to give you more accurate measurement of resistance, capacitance, low and high inductance, dissipation factor of capacitors and quality factor of inductors. It also has a direct reading 100-0-100 microammeter, front panel binding posts for easier test setups, a built-in DC power supply and a 1000 Hz AC generator. The kit requires headphones or an oscilloscope for alignment. For 120/240 VAC, 50/60 Hz. The IB-3128 is a quality instrument that belongs on your test bench. It's an easy-to-build kit, too.

Kit IB-3128, Shpg. wt. 11 lbs. 159.95

IB-3128 SPECIFICATIONS: Detector: Vacuum tube detector and amplifier, using built-in meter. Terminals for external detector. Resistance: 0.1 ohm to 10 megohms. Capacitance: 100 pF to 100 μ F. Inductance: 0.1 mH to 100 H. Dissipation Factor: (D) 0.002 to 1. Storage Factor: (Q) 0.1 to 1000. Accuracy: 0.5% decade resistors used. Dimensions: 8" H x 17" W x 6" D.

High-performance Logic Probe is ideal for TTL/CMOS digital circuits

Convenient memory reset

Logic "1" indicator

Logic zero indicator

LED shows power level

Detects and indicates high and low logic levels in TTL or CMOS circuitry. Detects logic signals to 100 MHz, polarity and presence of single pulses as short as 10 nSec. Includes power leads, mini-clips and ground clip. ¾" H x 1" W x 9¼" L.

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

ST-7410, Factory Assembled, Wt. 1 lb. 64.95



High quality instrument Test Probes

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

Kit IMA-100-10, Shpg. wt. 1 lb. 11.95

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

Kit IMA-100-11, Shpg. wt. 1 lb. 11.95

SMA-100-11, Factory Assembled, 1 lb. 17.95

30 kV Probe provides x1000 attenuation for meters with 1-megohm input impedance.

Kit IMA-1000-1, Shpg. wt. 1 lb. 11.95



Heathkit TV service instruments save you time and money



Low-Cost CRT Tester/Rejuvenator brings your old and worn TV picture tubes back to life — even in-line gun types!

Test, clean and rejuvenate almost all current CRT's including in-line-gun types. Positive action pushbuttons control all tests and processes for easy operation. Individual guns can be cleaned, tested and rejuvenated by using the front panel pushbuttons. And separate meters for each gun allow easy tracking of the individual grid currents. The main power control also sets control grid voltage level. A separate heater voltage meter allows monitoring of the heater voltage supplied to the cathode of the CRT. An indicator lamp gives visual confirmation of CRT short-circuits and the visual display restore indicator glows brighter as the rejuvenating current is increased. A separate cleaning process is applied after rejuvenation to assure proper tube operation. With 4' heavy-duty test cable.

Kit IT-5230, Shpg. wt. 9 lbs. 119.95
 Factory Assembled Version of above. 160.00
 ST-5230, Shpg. wt. 9 lbs. 160.00

IT-5230 SPECIFICATIONS: Sockets Supplied: 14-pin for 90° color tubes; 13-pin for in-line color tubes; 8-pin for black-and-white tubes; 7-pin for black-and-white tubes. Heater Supply Voltage: Variable from 2 volts to 12 volts at 1 ampere. Power Requirement: 120/240 VAC (ST-5230: 120 VAC.) Dimensions: 5.12" H x 13.5" W x 10" D.



Portable Color Alignment Generator for in-the-field service

The IG-5240 offers outstanding performance, with crystal-controlled carrier and color oscillator for real precision, accuracy and stability. Its convenient "shirt-pocket" size makes it the one to take along for in-the-field service calls every time. It's a versatile, low-cost service tool for hobbyists, too. The IG-5240 is really easy to operate. Simply connect its output cable to the VHF terminals of any color TV. The RF carrier frequency is calibrated for channel 4. An "on" pushbutton turns the IG-5240 on, four program slide switches select any of the 16 displays available. A color level control adjusts the color intensity of the three color patterns. A special "battery saver" timing circuit turns the display "off" automatically after a minimum of five minutes "on". This conserves battery power and lets you get the most efficient operation from your batteries. The unit uses two inexpensive 9-volt transistor batteries for a minimum of 8 hours continuous operation. For features, convenience and versatility, we don't think you can find a better color alignment generator in your service shop today!

Kit IG-5240, Shpg. wt. 2 lbs. 69.95
 SG-5240, Factory assembled version of above. Shpg. wt. 1 lb. 95.00

IG/SG-5240 SPECIFICATIONS: Chroma Carrier: 3563.795 kHz $\pm 0.005\%$ crystal-controlled. Master Timer: 377.616 kHz $\pm 0.005\%$ crystal-controlled. RF Carrier: Channel 4, 67.250 MHz $\pm 0.01\%$ crystal-controlled. RF Output Level: 5000 μ V min. into 300 ohms. Video Modulation: 50% (approx.) On-Time Interval: 5 minutes min. OFF pushbutton can override time out. Power Requirement: Two 9-volt transistor batteries; with 180 mA capacity (NEDA #1604). Dimensions: 5.4" L x 2.75" W x 1.15" D.



Easy to use and accurate — makes color TV service a breeze.

1 Color Bar and Dot Pattern Generator for easy service

Provides 12 patterns plus a clear raster for purity adjustments, and patterns are available in the exclusive Heath 3x3 display or the familiar 9x9. Has RF output for channels 2 through 6, variable up to 50,000 μ V, variable plus and minus going video, front panel gun shorting switches and lead piercing grid jacks, front panel sync output, 4.5 MHz sound carrier oscillator, two 500W AC receptacles. For 120/240 VAC, 50/60 Hz. 5½" H x 13½" W x 8" D.

Kit IG-5228, Shpg. wt. 8 lbs. 134.95

2 Versatile combination Vectorscope/Color Generator

Accurately shows the chroma signal being fed to the CRT to indicate missing or weak colors, proper adjustment of the burst phase transformer, 3.58 MHz oscillator, reactance coil, bandpass transformer, color demodulation angle. Provides 12 patterns plus a raster for purity adjustments in 9x9 or 3x3.

Kit IO-4101, Shpg. wt. 13 lbs. 189.95

Heathkit TV/radio test equipment gives you top quality

Get world-famous Heathkit reliability in a high-quality Yoke/Flyback Tester — and spend a lot less money — with the new portable IT-5235

\$89⁹⁵
Kit

- Simple good/bad ring test checks yokes, flybacks and coils
- Quick, reliable measurement of drive signals in horizontal circuits
- Portable and lightweight with easy one-knob tuning

Why spend twice as much for a comparable model when you can get world-famous Heathkit quality at an affordable price? The new IT-5235 Yoke/Flyback Tester offers simple and reliable performance in a portable, lightweight package designed for TV service technicians.

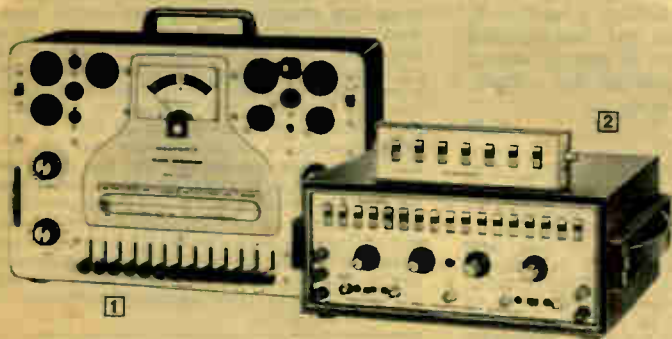
A dynamic good/bad ring test checks horizontal and vertical windings of yokes, flybacks, horizontal linearity coils, efficiency coils and general mid-frequency (10 to 100 kHz) coils. Testing can be conducted in or out of circuit. You can get measurements of drive signals in horizontal circuits, as well

as focus and anode voltage measurements with the optional IMA-100-10 HV probe (listed below).

Use the IT-5235 on solid-state and tube-type TV's anywhere! It's lightweight (just 6 pounds) and portable, and can be operated on 110 or 240 VAC. One-knob tuning with color-coded controls, jacks and inputs provide easy, accurate measurements. Calibration requires only an oscilloscope. Test leads and convenient storage compartment included.

Kit IT-5235, Shpg. wt. 8 lbs. 89.95
ST-5235, Assembled, Shpg. wt. 7 lbs. 130.00
IMA-100-10, High-Voltage Probe, 1 lb. 11.95

IT/ST-5235 SPECIFICATIONS: Yoke/Flyback Accuracy: ± 1 ring at 10 mark on highest reading range. Drive Voltage Scales: 0-30 V P-P AC, 0-300 V P-P AC. Drive Voltage Accuracy: $\pm 5\%$ of full scale, 100 Hz to 200 kHz. High-Voltage Scales: 0-10 k VDC, 0-40 k VDC. High-Voltage Accuracy: $\pm 3\%$ of full scale (including optional IMA-100-10 HV probe). Dimensions: 6 $\frac{7}{8}$ " H x 5 $\frac{3}{4}$ " W x 10 $\frac{3}{4}$ " D.



1 Low-Cost Heathkit Tube Checker. Essential for radio-TV servicing! Tests tubes on the basis of total emission, for shorts, leakage, open elements, and filament continuity. Has good/bad indicator to show relative quality, neon bulb indicator for filament continuity and leakage or shorts between elements.

Kit IT-3117, Shpg. wt. 12 lbs. 159.95

IT-3117 SPECIFICATIONS: Sockets: 4-pin, 5-pin, 6-pin combination and pilot light. 7-pin miniature, octal, 10-pin miniature, 9-pin novar, 9-pin miniature, 12-pin compactron, 5-pin nuvistor, 7-pin nuvistor. Power Requirement: 120 VAC, 50/60 Hz. Dimensions: 8 $\frac{1}{2}$ " H x 13" W x 5 $\frac{1}{2}$ " D.

2 Deluxe Post Marker/Sweep Generator. The IG-5257 makes receiver alignment fast and easy. It features 15 selectable markers, carrier markers for channels 4 and 10, a diode modulator for Video Sweep Modulation, a 400 Hz tone for FM receiver alignment.

Kit IG-5257, Shpg. wt. 16 lbs. 229.95

IG-5257 SPECIFICATIONS: Marker frequency: 100 kHz. Marker frequencies, crystal-controlled: 3.08, 3.68, 4.08, and 4.50 MHz $\pm 0.01\%$. 10.7, 39.75, 41.25, 42.17, 42.50, 42.75, 45.00, 45.75, 47.25, $\pm 0.005\%$; 67.25 and 193.25 MHz $\pm 0.01\%$. Modulation frequency: 400 Hz. Input impedance: 75 ohms. Trace in — 220 k ohms. Output impedance: 75 ohms. Scope Vert. — 1 k ohms. Bias voltage: Positive or negative polarity. Sweep frequency ranges: LO Band — 2.5 to 5.5 MHz ± 1 dB. IF Band — 39 to 49 MHz ± 1 dB. RF band — 64 to 72 MHz ± 1 dB. Attenuator: Total of 70 dB in seven steps.

FM Deviation Meter helps check FM transmitters

\$149⁹⁵
Kit

- Measures peak deviation of transmitters and signal generators
- Easy-to-read, easy-to-operate, accurate to ± 3 percent
- Two front panel jacks for easy oscilloscope hookup

Measures peak FM deviation of transmitters and signal generators between 25 and 1000 MHz Coarse and fine-tune controls for easy setup. Can be connected to a transmission line. Battery operated (batteries not included).

Kit IM-4180, Shpg. wt. 7 lbs. 149.95
SM-4180, Assembled and Tested, Shpg. wt. 6 lbs. 250.00
Kit IMA-4180-1, Battery Charger/Eliminator, 2 lbs. 29.95
SMA-4180-1, Assembled and Tested, Shpg. wt. 2 lbs. 40.00

IM/SM-4180 SPECIFICATIONS: Deviation Ranges: 0-2, 0-7.5, 0-20 and 0-75 kHz peak. Accuracy: $\pm 3\%$ of full scale. Input Impedance: 50 ohms. Maximum Safe Input: 5 volts. Scope Output: 13 mV/kHz peak. Dimensions: 5" H x 10 $\frac{1}{4}$ " W x 7 $\frac{3}{4}$ " D.



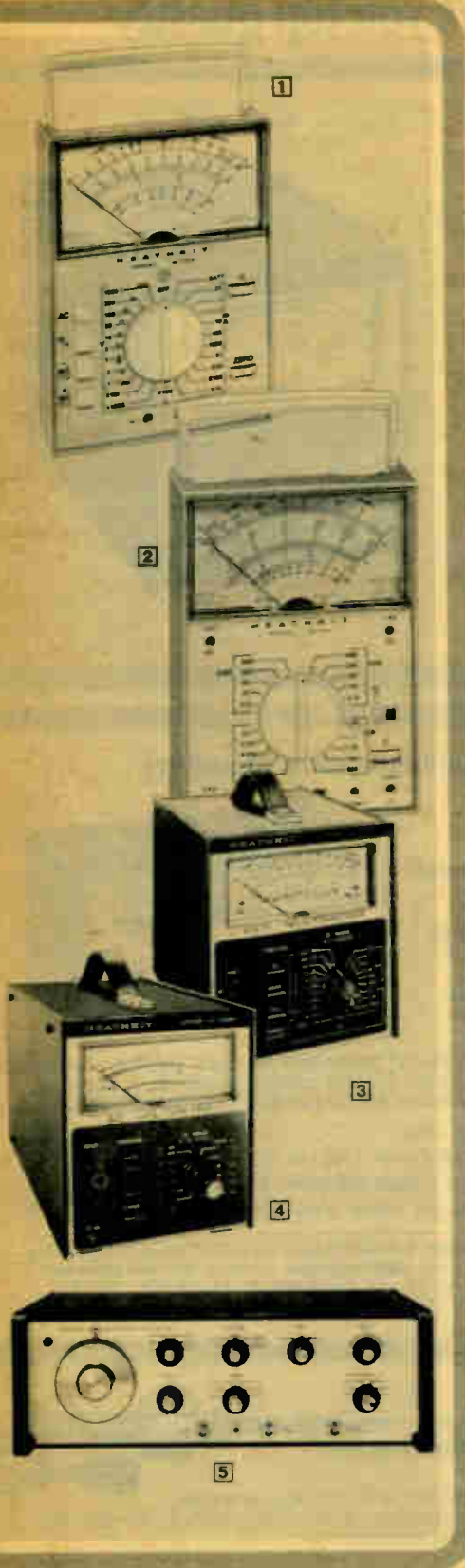
High-Voltage Probe Meter
for fast, easy TV Tube Measurements

Makes TV high voltage measurements fast and convenient. It's lightweight, portable and measures DC voltages up to 40 kV with $\pm 3\%$ accuracy. Easy operation and assembly.

Kit IM-5210, Shpg. wt. 2 lbs. 22.95



Heathkit test instruments offer top



1 Solid-State Taut-Band FET VOM. Provides the input characteristics and measuring capabilities of a VTVM with the versatility and portability of a VOM. The 4½" taut-band meter is diode-protected for outstanding ruggedness and reliability. Has 9 AC and DC voltage ranges; 6 current ranges; seven resistance ranges and 9 dB ranges. Extra-wide frequency response is useful for audio measurements and in many other applications where conventional VOMs can't be used. Easy kit assembly.

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

IM-1104 SPECIFICATIONS: Frequency Response: 0.1 to 30 volt ranges, $\pm 3\%$, 20 Hz to 20 kHz, $\pm 5\%$, 20 Hz to 50 kHz. 100-300 volt ranges, $\pm 3\%$, 20 Hz to 10 kHz, $\pm 5\%$, 20-Hz to 20 kHz. 1000 volt range, $\pm 3\%$, 20 Hz to 1 kHz. DC VOLTAGE RANGES: 0.1, 0.3, 1, 3, 10, 30, 100, 300, 1000 V. Accuracy: $\pm 2\%$ of full scale. AC VOLTAGE RANGES: 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, 1000 V. Accuracy: $\pm 3\%$ full scale. DC MILLIAMETER: 0-0.1, 0.1, 1, 10, 100, 1000 mA. Accuracy: $\pm 2\%$ to 100 mA, $\pm 3\%$ to 1000 mA. AC MILLIAMETER: Same as DC mA; accuracy, $\pm 3\%$ to 100 mA; $\pm 4\%$ to 1000 mA. OHMMETER: Rx10, Rx100, Rx1000, Rx10K, Rx100K, (10 ohm center scale). Rx1M (10 megohm center scale) dB: (0 dB = 1 mW into 600 ohms) -40 to -18, -30 to -8, -20 to +2, -10 to +12, 0 to +22, +10 to +22, +20 to +42, +30 to +52, +40 to +62. Operating Temperature: 0 to 50°C. Batteries (not supplied): one 1.5 V D-cell (NEDA #13); four 1.5 V AA cells (NEDA #15). Dimensions: 6.95" H x 4.95" W x 2.25" D.

2 General-Purpose VOM for easy service. The IM-105 is a high-accuracy VOM that's really designed to take it. Accurate enough for engineering, design and R & D work, the IM-105 features a low-friction, taut-band meter with diode and fuse-protected movement. Calibrated controls, DC polarity reversal switch, front panel ohms adjustment plus a strong, truly dropable case. Less batteries.

Kit IM-105, Shpg. wt. 3 lbs. 99.95

IM-105 SPECIFICATIONS: DC VOLTAGE RANGES: -0.25, 2.5, 10, 50, 250, 500, 1000 & 5000 V full scale. Accuracy: $\pm 3\%$ of full scale. Input resistance: 20,000 ohms/V full scale. AC VOLTAGE RANGES: -2.5, 10, 50, 250, 500 V, 1 kV & 5 kV full scale. Accuracy: $\pm 4\%$ of full scale. Input resistance: 5000 ohms/V. Input capacity: Less than 20 pF. Frequency response: 2.5, 10, and 50 V ranges. $\pm 5\%$, 10 Hz to 100 kHz; 250, 500 V ranges: $\pm 5\%$, 10 Hz. DC CURRENT RANGES: -0.05, 1.0, 10, 100, 500 mA & 10 A full scale. Accuracy: $\pm 3\%$ of full scale. RESISTANCE RANGES: $\times 1$ (20 center scale), $\times 10$, $\times 100$, $\times 1k$, $\times 10k$. Accuracy: ± 3 degrees of arc. DECIBEL RANGES: (0 dB = 1 mW in 600 ohms). -10 to +56 dB. Dimensions: 7" H x 5" W x 2¼" D.

3 Quality FET Multimeter. Measures AC and DC volts, current and resistance. Features auto-polarity for added convenience, high and low voltage/ohms functions for in and out of circuit checks of semiconductor devices and resistance measurements.

Kit IM-5225, Shpg. wt. 8 lbs. 129.95
SM-5225, Assembled, 8 lbs. 185.00

IM-5225 SPECIFICATIONS: DC Volts: nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 full-scale. AC Volts: nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 volts full-scale. DC Current: six ranges 0-0.1, 0.1, 1, 10, 100, 1000 milliamperes full-scale. AC Current: six ranges 0-0.1, 0.1, 1, 10, 100, 1000 milliamperes full-scale. Ohms: seven ranges X1, X10, X100, X10k, X100k, X1M. Power Requirement: 120/240 VAC, 50/60 Hz, 5 watts. Dimensions: 6¾" H x 5¾" W x 11¼" D.

4 Deluxe AC Voltmeter. Has excellent frequency response and sensitivity high-accuracy measurements. And it's one of the only instruments around to feature linear scales for both volts and decibels!

Kit IM-5238, Shpg. wt. 8 lbs. 99.95
SM-5238, Assembled, Shpg. wt. 8 lbs. 160.00

IM/SM-5238 SPECIFICATIONS: Voltage Range (full scale): 1 millivolt to 300 volts AC, 12 ranges. Decibel Range: -70 dB to +40 dB, 12 ranges in 10 dB steps with variable offset. Input: 10 megohms, 30 pF, negative input grounded to chassis. Frequency Response: Voltage Range, 10 Hz to 1 MHz, ± 2 dB. 10 Hz to 500 kHz ± 1 dB, dB range, 10 Hz to 250 kHz ± 1 dB. Outputs: DC (proportional to input volts), 1 volt full scale. DC (proportional to log of input volts), 3 volts full scale. AC (amplified output), 1 volt peak, full scale. Scales: 0-10 volts; 0-3.16 volts; -20 to +10 dB. Accuracy: Voltage Ranges, 4% of full scale at 1 kHz plus accuracy of calibration standard. dB ranges, ± 0.5 dB at 1 kHz plus accuracy of calibration standard. Power Requirement: 100-135 VAC, 200-270 VAC, 50/60 Hz, 20 watts. Dimensions: 6¾" H x 5¾" W x 10¾" D.

5 Lin/Log Swept Function Generator. The IG-1275 is a reliable lab-grade function generator that provides sine, square and triangle waveforms PLUS swept-function waveforms for convenient frequency response tests. This Lin/Log Swept Function Generator also has pen lift and chart control signals, for use with Heathkit chart recorders and others. The IG-1275 provides a 50 dB switch attenuator, variable between ranges, adjustable symmetry from 5 percent to 95 percent, and analog, sweep and sweep gate outputs for convenient system control. Start and stop frequencies are set independently; sweep modes can also be triggered externally.

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

IG/SG-1275 SPECIFICATIONS: Output: 50-ohm source - short circuit protected. ± 10 volts open circuit. ± 5 volts into 50-ohm load. Output Flatness: ± 0.1 dB to 300 kHz. ± 0.5 dB to 3 MHz. Frequency: 0.003 Hz through 3 MHz in 6 range steps on primary decade. Sine Distortion: Less than 1%, $\times 10^1$. Less than 0.5%, $\times 10^2$, 10^3 , 10^4 . Less than 0.75%, $\times 10^5$. Harmonics 30 dB down $\times 10^4$. Triangle Linearity: No deviation greater than 1% to 300 kHz. Square-Wave Rise and Fall: Less than 60 nS. Sweep Generator: 6 ranges, 10 μ s through 100 sec. Sweep Output: Supplies 0 to 4.5-volt linear ramp at sweep generator rate from a 1000-ohm source. *Applicable only on top decade of each frequency range. The IG-1275 requires a triggered sweep oscilloscope for calibration. Power Requirement: 100 to 135 volts, 50-60 Hz, 20 watts maximum. (200 to 270 volts, 50-60 Hz, switch selectable.) Dimensions: 5¾" H x 15" W x 11¾" D.



- Easy to Operate front panel controls
- Short-circuit-proof output amplifier
- Rugged case with carrying handle

performance, high reliability and build-it-yourself value

1 Popular, low cost VTVM. A single test probe that makes all measurements; seven practical AC, DC volts and ohms ranges; a precision $4\frac{1}{2}$ " color-coded 200 μ A meter. 1% precision network resistors provide excellent accuracy; wide ± 1 db, 25 Hz to 1 MHz frequency response permits a variety of AC measurements. Measures both rms and p-p AC volts. Separate full-scale ranges for 1.5 and 5 volts makes low-voltage readings really easy, ideal for work with solid-state and latest digital equipment. Can be wired for 120 or 240 VAC.

Kit IM-5218, Shpg. wt. 5 lbs. 59.95
SM-5218, Assembled, Shpg. wt. 5 lbs. 75.00

IM/SM-5218 SPECIFICATIONS: Meter Scales: DC & AC (rms): 0-1.5, 15, 50, 150, 500, 1500 V full scale. AC Peak-to-Peak: 0.4, 14, 40, 140, 1400, 4000 V full scale. Resistance: 10 ohm center scale x1, x10, x100, x1000, x10k, x100k, x1 meg. Measures 1 ohm to 100 megohms. Meter: $4\frac{1}{2}$ ", 200 μ A movement. Input Resistance: 11 megohms (1 megohm in probe) on all DC ranges; 1 megohm shunted by 35 pF on all AC ranges. Circuit: Balanced bridge (push-pull) using twin triode. Accuracy: DC $\pm 3\%$, AC $\pm 5\%$ of full scale. Frequency Response: ± 1 dB, 25 Hz to 1 MHz (600 ohm source). Battery Requirements: 1.5 V, size "C" cell (not supplied). Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: $7\frac{3}{8}$ " H x $4\frac{1}{4}$ " W x $4\frac{1}{4}$ " D.

2 Pro-feature bench VTVM. Bench-type version of IM-5218. All calibration controls are conveniently adjustable from the front panel. 120 or 240 VAC.

Kit IM-5228, Shpg. wt. 6 lbs. 69.95
SM-5228, Assembled, Shpg. wt. 7 lbs. 120.00

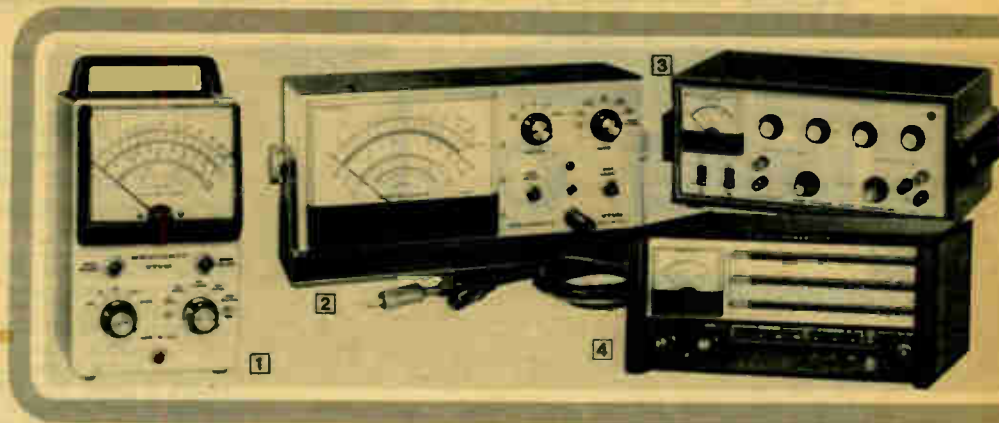
IM/SM-5228 SPECIFICATIONS: DC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 V full scale; up to 30,000 V with accessory probe. Input Resistance: 11 megohm (1 megohm in probe) on all ranges; 1100 megohms with accessory probe. Circuit: Balanced bridge (push-pull) using twin triode. Accuracy: $\pm 3\%$ of full scale. AC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 rms scales. Frequency Response (5 V range): ± 1 dB 25 Hz to 1 MHz (800 ohm source, referred to 60 Hz). Accuracy: 5% of full scale. Input Resistance & Capacitance: 1 megohm shunted by 40 pF measured at input terminals (200 pF at probe tip). OHMMETER — Ranges: Scale with 10 ohm center, X1, X10, X100, X1000, X10k, X1 meg. Measures 0.1 ohm to 1000 megohms with internal battery. Meter: $6\frac{1}{2}$ ", 200 μ A movement, polystyrene case. Battery: $1\frac{1}{2}$ V, "C" cell (not supplied). Power Requirement: 120/240 VAC, 60/50 Hz, 10 W. Dimensions: 5" H x $12\frac{1}{4}$ " W x $4\frac{3}{4}$ " D.

Versatile, low-cost Heathkit 1 Hz-1 MHz Function Generator

Generates highly accurate sine, square or triangle waveforms over a frequency range of 1 Hz to 1 MHz. The frequency multiplier and front panel tuning control set any frequency fast and easy. The output amplifier supplies a 10V (p-p) signal into a 50 ohm load. A calibrated step attenuator adjusts from 0 to 50 dB (10V p-p to 30 mV p-p) in 10 dB steps. An attenuator control provides up to 20 dB additional attenuation. A triggered scope is necessary for calibration.

Kit IG-1271, Shpg. wt. 7 lbs. 134.95
Assembled Version of the IG-1271.
SG-1271, Shpg. wt. 7 lbs. 195.00

IG-1271 SPECIFICATIONS: Frequency Range: 1 Hz to 1 MHz. Functions: Triangle Waveform: Nonlinearity, 5% maximum. Symmetry within 10% of 50% duty cycle. Square Waveform: 100 nanosecond maximum rise or fall time. Symmetry within 10% of 50% duty cycle. Sine Waveform: Harmonic distortion; 3% max., 5 Hz to 100 kHz. Attenuator: 0 to 50 dB in 10 dB steps. 0 to 20 dB minimum variable, ± 1 dB accuracy. Output: 10 volts peak-to-peak into 50 ohms. ± 1.5 dB flatness from 0.1 Hz to 1 MHz. 50 ohms impedance $\pm 5\%$. Power Requirement: 105-130 volts or 210-260 volts, rms, 60/50 Hz. 15 watts max. Operating Temperature: 0 to 40°C. Dimensions: 3" H x $7\frac{1}{4}$ " W x $8\frac{3}{8}$ " D (with handle removed).



3 Sine-square wave Audio Generator. Ideal for gain and frequency response measurements in audio amplifiers, as a signal source for harmonic distortion measurements or as an external modulator for RF signal generators. A meter, calibrated in both volts and dB, monitors the sine wave output.

Kit IG-5218, Shpg. wt. 10 lbs. 99.95
SG-5218, Assembled, 10 lbs. 185.00

IG/SG-5218 SPECIFICATIONS: Frequency Range: 1 Hz to 100 kHz. Sine Wave Output: Output Voltage: 8 ranges, 0.003 to 10 V rms (full-scale) with 10 k ohm or higher external load. 6 ranges, 0.003 to 1 V (full-scale) with 600 ohm internal or external load. dB Ranges: -62 dB to +22 dB, -12 dB to +20 dB on amplitude switch in 10 dB steps. +2 dB max. into 600 ohm load. (0 dB = 1 mW in 600 ohm). Output Variation: +1 dB 10 Hz to 100 Hz. Output Impedance: 10 V range: 0-1000 ohm, 3 V range: 800-1000 ohm; 1 V range and lower; 600 ohm. Square Wave Output: Output voltage (peak-to-peak): 0-1; 1, 10 V into 2000 ohm load or higher. Output Impedance: 0.1 and 1 V ranges: 52 ohm; 10 range: up to 220 ohm. Power Requirement: 105-125 or 210-250 VAC, 60/50 Hz, 6 watts. Dimensions: $5\frac{1}{8}$ " H x $13\frac{3}{4}$ " W x 7" D.

PKW-4, Wired Replacement Probe for IM-5228, 5218, 18 or 28. Wt. 1 lb. 10.95
Convert your IM-5228, 5218, 18 or 28 to instant-on solid-state operation.
IMA-18-1, Wt. 1 lb. 19.95

4 IG-1272 Audio Frequency Generator. The Heathkit IG-1272 provides a low-distortion sine wave output over a frequency range from less than 5 Hz to 100 kHz. Pushbutton select first 3 significant digits of desired frequency; also control frequency multiplier. Perfect for the serious audiophile, audio service shop or audio designer.

Kit IG-1272, Shpg. wt. 11 lbs. 159.95
SG-1272, Assembled, 10 lbs. 170.00

IG/SG-1272 SPECIFICATIONS: Output Voltage: 0.003 to 10 volts RMS. Output Load: 600 ohms. Hum and Noise: 0.01% or less. Frequency Accuracy: Pushbuttons; $\pm 4\%$, ± 1 Hz, typical $\pm 1.5\%$. Variable; Depends on accuracy of counter being used. Attenuation: 10 to 70 dB. Power Requirement: 120 VAC or 240 VAC, 50 or 60 Hz, 10 watts maximum. Dimensions: $5\frac{1}{2}$ " H x 11" W x $12\frac{1}{3}$ " D.



Solid-State portable VOM is ideal for fast, in-the-field checks

\$44.95

- Value-priced
- Easy-to-build

Our lowest-priced portable VOM is ideal for car buffs, boaters, campers — any away-from-the-bench situation. Has four AC, DC and ohms ranges for most common measurements, high impedance to minimize circuit loading, wide frequency response for audio measurements. A special $1\frac{1}{2}$ -volt ohmmeter is ideal for checking semiconductors. Function switch gives you both AC and DC readings without changing test lead connections. Less batteries.

Kit IM-5217, Shpg. wt. 4 lbs. 44.95

IM-5217 SPECIFICATIONS: DC VOLTMETER: Ranges: 0-1.5, 0-15, 0-150, 0-500 volts full scale. Input Resistance: 10 megohms on all ranges. Accuracy: $\pm 3\%$ full scale. AC VOLTMETER: Ranges: 0-1.7, 0-15, 0-150, 0-500 volts full scale. Input Resistance: 1 megohm on all ranges. Input Capacitance: approx. 100 pF (40 pF on 500-volt range). Accuracy: $\pm 5\%$ full scale. Frequency Response: 1 dB, 10 Hz to 1 MHz. OHMMETER: Rx1, Rx100, Rx10k, Rx1M (10 ohms center scale). Meter: $4\frac{1}{2}$ ", 100 μ A, 100 degree movement. Batteries: (not supplied): two 9-volt, one 1.5 V "C" cell. Dimensions: $5\frac{3}{8}$ " H x $9\frac{3}{8}$ " W x 9" D.

High-accuracy 3½-digit auto-ranging Multimeter



\$289⁹⁵

- Automatically selects proper voltage, current or resistance range for easier, more accurate measurements
- Bright, easy-to-read 3½-digit display
- Input protection on all functions prevents overloads

The IM-2212 is a laboratory-grade instrument featuring automatic range selection along with exceptionally high accuracy. It features five AC and DC voltage ranges to 1000 volts; five AC and DC current ranges to 2000 mA; and ten resistance ranges (low-voltage and high-voltage) up to 20 megohm. Basic DC accuracy is $\pm 0.2\%$; Basic AC accuracy is $\pm 0.4\%$ when calibrated to laboratory standards. Has automatic polarity indication, automatic decimal point placement, automatic k-ohms or megohms indication. Normal mode rejection of 80 dB assures highly

stable DC readings. A hold switch inhibits the auto-ranging function when measuring one range. Operates on 120/240 VAC, or with optional battery pack (order below). Compact low-profile cabinet with detent positions to hold the IM-2212 at the best viewing angle.

Kit IM-2212, Shpg. wt. 10 lbs. **289.95**
 IMA-2212-1, Optional Rechargeable Battery Pack for in-field use.
 Shpg. wt. 4 lbs. **39.95**

IM-2212 SPECIFICATIONS: DC Voltage Ranges: 0-0.2-2.0-20-200-2000. Maximum input: 1000 VDC on any range. Input Resistance: 10 megohm on all ranges. Accuracy: $\pm[0.05\%$ (.50%*) of reading, +0.10% of range]. AC Voltage Ranges: 0.2-2.0-20-200-2000. Maximum Input: 700 VAC (1000 volts peak) on any range. Accuracy (40 Hz to 10 kHz): $\pm[0.25\%$ (1.0%*) of reading, +0.15% of range]. Input Impedance: 10 meg shunted by 90 pF on all ranges. DC mA Ranges: 0.2-2.0-20-200-2000. Accuracy: $\pm[0.15\%$ (.50%*) of reading +0.10% of range]. AC mA Ranges: 0.2-2.0-20-200-2000. Accuracy (40 Hz to 10 kHz): $\pm[0.30\%$ (1.0%*) of reading +0.15% of range]. Ohmmeter Ranges: Low-voltage, 0.2K-2.0K-20K-200K-2 meg. High-voltage 2.0K-20K-200K-2.0 meg-20 meg. Overvoltage protection: 350 VDC (250 VAC) on all ranges. Accuracy: $\pm[0.10\%$ (.50%*) of reading +0.10% of range]. Display: 3½-digit (1999 maximum count), 0.5", 7-segment planar LED. Polarity Indication: Automatic + or - on VDC and mA DC range only. Display Rate: 3½ per second. Overrange Indication: flashing display on highest range, or when using RANGE HDLD switch. Power Line Isolation: CDM input may be floated 500 VDC/350 VAC from ground. Battery Operating Time: (with optional IMA-2212-1 battery pack) 5 hours typ., 4 hours minimum after 16-hour charge period with unit off. Operating Temperature Range: Line operation, 10° C to 40° C (50° F to 104° F). Portable Operation: 20° C to 40° C (68° F to 104° F). Power Requirement: 100-135 VAC or 200-270 VAC (internally selectable); 50/60 Hz, 10 watts. Dimensions: 3.1" H x 7.5" W x 11" D. Net Weight: 6 lbs., 8 lbs. with battery pack installed.

*Numbers in parentheses indicate built-in specifications. Other numbers indicate laboratory standard specifications.

Our low cost, high performance Digital Multimeter



- Overload protection on all ranges
- 120 or 240 VAC operation

\$69⁹⁵
Kit

Here's a low-cost, high performance DMM for hams, hobbyists and service techs. Its full-function capability includes AC voltage measurements up to 700 volts. Has four overlapping AC & DC voltage & current ranges and five resistance ranges. Features overload protection on all ranges, 120 or 240 VAC operation, isolated floating ground, attractive heavy-duty case to withstand rugged use, universal banana jack inputs for easy testing of electronic equipment.

Kit IM-1210, Shpg. wt. 5 lbs. **69.95**
 SM-1210, Factory assembled and calibrated, 5 lbs. **120.00**

IM-1210 SPECIFICATIONS: Ranges: (Full-Scale): DC volts: 0-2, 20, 200, 1,000 V; DC current: 0-2, 20, 200, 2,000 mA; AC volts: 0-2, 20, 200, 700 V rms (50 Hz to 10 kHz). AC current: 0-2, 20, 200, 2,000 mA rms (60 Hz to 10 kHz). Ohms: 0-200, 2K, 20K, 200K, 2M ohms. Overrange: 25% on all functions, within maximum input limits. Maximum Input: 3 amperes into AC or DC mA, and Ohms (fuse protected.) 700 VAC rms into Volts (except 2V range: 250 VAC rms). 1000 VDC into Volts (except 2V range: 350 VDC). "—" input may be floated 1000 VDC (700 VAC) above earth ground. Resolution (Low Range): Volts: 10 mV. Current: 10 μ A. Ohms: 1 ohm. Accuracy (Full Scale, ± 1 Digit): DC volts: $\pm 1\%$. DC current: $\pm 1.5\%$. AC volts: $\pm 1.5\%$. AC current: $\pm 2\%$. Ohms: $\pm 1.5\%$. Input Impedance: 1 megohm on all voltage ranges. Power Requirement: 100-135 VAC, 200-270 VAC 50/60 Hz, 8 watts. Dimensions (overall): 3.00" H x 8.69" W x 10.54" D. Weight: 3.3 pounds (1.5 kg). NOTE: Specifications are based on 30-minute warmup.



Portable Digital Multimeter — ideal for in-the-field uses

\$219⁹⁵

Lightweight, compact, highly accurate. Features 26 ranges — measures AC and DC volts, DC current and resistance. Has 100% overrange capability, separate voltage and current inputs for circuit protection. 2-volt full scale measurement on 1k, 10k and 1 meg ranges allow forward biased junction testing of semiconductor devices. Has 3½-digit display with leading zero suppression, automatic polarity indication and decimal placement.

Kit IM-2202, Shpg. wt. 8 lbs. **219.95**

IM-2202 SPECIFICATIONS: DC VOLTAGE — Overload Capability: 300 V on 100 mV & 1V ranges; 1000 V on 10 V & 1000 V ranges. Accuracy: $\pm 0.5\%$, ± 1 digit. AC VOLTAGE — Overload Capability: 250 V on 100 mV & 1 V ranges; 750 V on 10 V, 100 V & 750 V ranges. Accuracy: $\pm 1.5\%$, ± 3 digits; 50 Hz to 1 kHz (except 50 Hz to 10 kHz on 100 mV and 1 V ranges). DC CURRENT — Range/Voltage Drop: 100.0 μ A/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mA/150 mV, 1000 mA/300 mV. Accuracy: $\pm 0.5\%$, ± 1 digit (except $\pm 1\%$, ± 1 digit on 1000 mA range). AC CURRENT — Range/Voltage Drop: 100 μ A/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mV, 100.0 mA/150 mV, 1000 mA/300 mV. Accuracy: $\pm 1.0\%$, ± 3 digits except $\pm 1.5\%$, ± 3 digits on 1000 mA range; 40 Hz to 10 kHz. RESISTANCE — Range/Test Current: 100.0 Ω /1.0 mA, 1.000 k Ω /1.0 mA, 10.00 k Ω /0.1 mA, 100.0 k Ω /1.0 μ A, 1000 k Ω /10. μ A. Accuracy: $\pm 2\%$, ± 1 digit. GENERAL — Normal Mode Rejection: 35 dB. Common Mode Rejection: 80 dB. Power Requirement: 110 to 130 VAC, or 220 to 260 VAC (internally selectable); 60/50 Hz; (Accuracy specs use built-in references.) Size 3" H x 8¼" W x 8" D.

Heathkit test equipment gives you reliable measurements

Accurate, reliable Heathkit Strip Chart Recorder

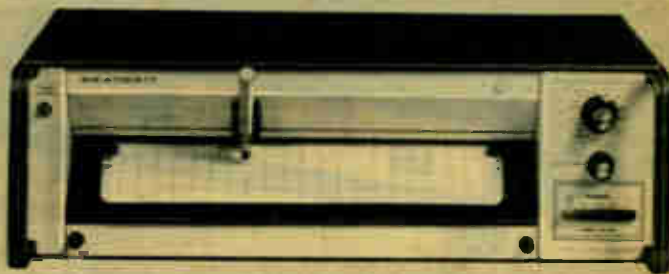
\$339⁹⁵
Kit

- Less than 0.5% error, full scale
- Rear panel connector for total recorder control from a remote location

Now available in both kit and assembled versions, the IR-5204/SR-204 belongs in your lab. Digital chart drive provides 10 chart speeds, English or Metric. Select four calibrated input spans. And you get extras that others charge more for — remote capability, pushbutton chart advance, electric pen lift with disposable pens, a built-in switchable input filter.

Kit IR-5204, Shpg. wt. 22 lbs.	339.95
SR-204, Assembled and tested, Shpg. wt. 22 lbs.	465.00
Dual-Pen Lab-Quality Recorder. Uses ONLY pens listed with IR-5207 below.	
SR-206, Assembled and tested, Shpg. wt. 39 lbs.	1450.00

IR-5204/SR-204 SPECIFICATIONS: Chart Width: 10 inches (25 cm with optional metric drive). Chart Speeds: 10, 5, 2, 1, 0.5, 0.2, 0.1, 0.05, 0.02, 0.01 in/min (cm/min with metric conversion installed). Balance Time: 0.5 sec for full scale (filter out). Overshoot: Less than 1% of full scale. DC Input Ranges: 10 mV to 100 V full scale (12.5 mV to 125V full scale, metric). Maximum Common Mode Input Voltage: 400 V. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 5 $\frac{1}{2}$ " H x 17 $\frac{1}{2}$ " W x 12 $\frac{3}{4}$ " D (13.5 x 44.2 x 31.3 cm).



Pens for IR-5204/SR-204 Strip Chart Recorder. Disposable nylon tip.

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

Chart Paper for IR-5204/SR-204 and SR-206 Recorders. All 120' long. Inch-calibrated paper with 0.1" divisions, 0-100 R to L.

SU-445-17, Shpg. wt. 2 lbs.	4.75
Centimeter-calibrated paper, offset 4 cm on R, 0-100 R to L.	
SU-445-18, Shpg. wt. 2 lbs.	4.75
Centimeter-calibrated paper, 2 cm divisions, 0-250 R to L.	
SU-445-21, Shpg. wt. 2 lbs.	4.75

Precision X-Y Chart Recorder gives you extra versatility, extra accuracy for the most demanding uses

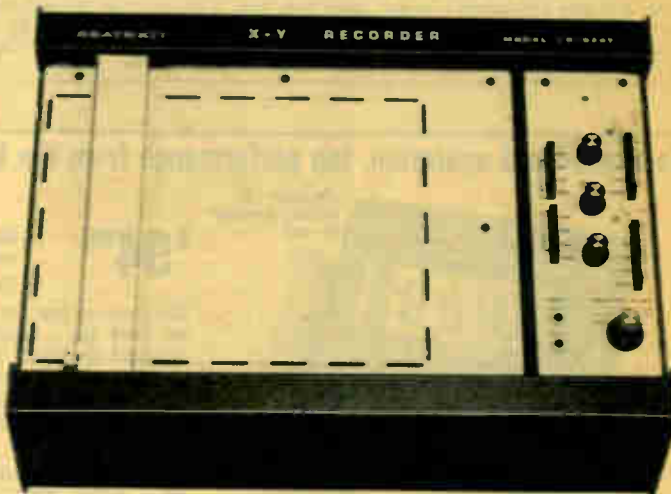
\$479⁹⁵
Kit

- Accurate to ± 0.5 percent of full scale
- Adjustable line frequency filtration
- Electric pen lift to zero coordinates
- Complete front panel controls for easy operation

Precise enough for your most demanding measurements, the IR-5207/SR-207 is easy to set up and operate. Front-panel controls assure easy-operating convenience in any application. Front panel input filters with pushbutton controls let you tailor filtering to your exact requirements. Select ranges from 1 mV to 10 V. The integral paper hold-down can be used in horizontal and vertical positions, and accepts any paper that fits the graph table. Electric pen lift. For 120/240 VAC, 50/60 Hz.

Kit IR-5207, Shpg. wt. 28 lbs.	479.95
SR-207, Assembled and tested, 30 lbs.	Was \$960, Now 795.00
Disposable Nylon Tip Pens for IR-5207/SR-207 Chart Recorder.	
Red Pen for chart speeds under 1 in/min. SU-205-6, 1 lb.	3.00
Blue Pen for chart speeds over 1 in/min. SU-205-7, 1 lb.	3.00

IR-5207/SR-207 SPECIFICATIONS: Chart Size: 8 $\frac{1}{2}$ " x 11" (21.59 x 27.94 cm). Sweep Speeds: 0.02, 0.1, 0.2, 1 and 2 in/S (0.04, 0.2, 0.4, 2 and 4 cm/S). Balance Time: >1 sec. for full-scale deflection. Range: 1 mV to 10 V. Maximum Common Mode Input Voltage: 400 V. Dimensions: 5 $\frac{5}{8}$ " H x 17 $\frac{3}{8}$ " W x 12 $\frac{1}{4}$ " D.



Professional-quality Heathkit Distortion Analyzers



Outstanding sensitivity and bandwidth to let you measure Total Harmonic Distortion at levels as low as 0.03%, from 5 Hz to 100 kHz, with 5% full scale accuracy. Can also function as an AC voltmeter, with 1 mV to 300 V full scale capability. Not for use in strong

RF fields. For 120/240 VAC, 50/60 Hz. 5 $\frac{3}{8}$ " H x 15" W x 11 $\frac{1}{2}$ " D.	
Kit IM-5258, Shpg. wt. 17 lbs.	229.95
Intermodulation Distortion Analyzer. Same as above, except measures IMD instead of THD. Also features dB measurement capability.	
Kit IM-5248, Shpg. wt. 14 lbs.	119.95
SM-5248, Assembled and tested, Shpg. wt. 15 lbs.	190.00

Rugged Heathkit Bi-Directional Wattmeter for servicing

\$99⁹⁵
Kit

- Covers 100 mHz to 1 GHz with-out costly slugs or elements
- Ideal for servicing radios and communications equipment

The Heathkit IM-4190 Bi-Directional Wattmeter can help you service two-way radios, as well as VHF and UHF communications equipment. This rugged meter measures forward and reflected power in transmission lines between 100 mHz and 1 GHz. Features easy-to-read front panel meter, N-type coax connectors for easy hookup and N to PL-259 adapters. Dimensions, 4 $\frac{1}{2}$ " H x 4 $\frac{1}{4}$ " W x 4 $\frac{5}{8}$ " D (11.4 x 10.8 x 11.8 cm). Requires 9-volt battery (not included).

Kit IM-4190, Shpg. wt. 3 lbs.	99.95
SM-4190, Assembled and tested, Shpg. wt. 3 lbs.	120.00





Another Heathkit instrument breakthrough — a truly versatile 10 Hz-225 mHz Digital Frequency Counter for this low price!

\$119⁹⁵

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

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

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

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

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

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

For even easier use, the IM-2410's pivoting stand places the counter at a more convenient viewing angle.

Additional features of the IM-2410 Frequency Counter include a rugged and compact cabinet — made of metal for greater durability and better RFI (Radio Frequency Interference) shielding — as well as a locking swing-down bail to elevate the front of the counter to a more desirable viewing angle. Complete voltage protection assures worry-free operation.

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

Kit IM-2410, Shpg. wt. 6 lbs. **119.95**

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

Easy one-hand operation, top performance from the Heathkit Hand-Held Digital Multimeter



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

\$94⁹⁵

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

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

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

Kit IM-2215, Shpg. wt. 2 lbs. **94.95**

Rugged Leather Carrying Case with belt loop.

IMA-2215-1, Shpg. wt. 1 lb. **14.95**

PS-2350, 120 VAC Outlet Cord, 1 lb. **4.95**

PS-2450, 240 VAC Outlet Cord, 1 lb. **14.95**

Get more with instrument books



Understanding and Using Oscilloscopes. A helpful guide covering functions, circuits and more. EOP-139 ... **5.95**

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

101 Ways to Use Your VOM/VTVM. Practical applications for your meter, presented in an easy-to-understand text. EOP-150 ... **4.95**

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

See page 52 for complete book ordering information.



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

\$139⁹⁵

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

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

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

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

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

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

For bench use, the IM-2400 includes a pivoting stand which supports the counter at a more convenient viewing angle.

Find out how portable a frequency counter can really be. Order the IM-2400 Hand-Held Frequency Counter today.

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

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

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

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

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

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

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

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

NEW

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



1 EVENING KIT
Fast, Easy Assembly

Shown with optional SMA-2400-1 Swiveling Telescopic Antenna



Performs as well on the service bench as in the field

Extra value is built into the IM-2400 Frequency Counter



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

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

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

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



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

Our finest scope—the IO-4235 Deluxe DC-35 MHz Oscilloscope



\$949⁹⁵
Kit

No other oscilloscope offers performance like this at such a low price:

- Dual-trace capability for simultaneous monitoring of two separate signals
- Single-sweep function to observe random signals
- Triggering to twice the specified vertical bandwidth
- Vertical delay lines to observe the leading edge of input signals
- Less than 10 nS rise time for complex fast-rise signals
- Sweep speeds from 50 nS/cm to 0.2 S/cm, plus 5 times expansion, for effective sweep speed of 10 nS/cm at the highest sweep rate
- Smooth rolloff for observation of signals above 50 MHz
- Algebraic ADD can invert either channel to observe differential signals
- Unique TV coupling triggers alternate fields for a steady display of VITS
- 8x10 cm mesh CRT with internal graticule for parallax-free measurements
- 10 kV post-acceleration voltage for our brightest scope display

This deluxe delayed-sweep dual-trace oscilloscope is one of the most versatile oscilloscopes anywhere!

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

The Heathkit IO-4235 is the most advanced oscilloscope we've ever developed! Nearly 10 man-years of development have produced a scope which is unmatched in performance, features and quality in its price range. You can compare the sophistication and versatility of the IO-4235 with other scopes that cost hundreds of dollars more.

This laboratory-quality oscilloscope fulfills the requirements of the service technician, electronics designer and serious hobbyist. It's the perfect addition to your service desk, at a price you can afford.

The IO-4235's delayed-sweep circuit uses a separate time base to generate 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.

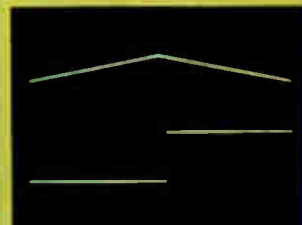
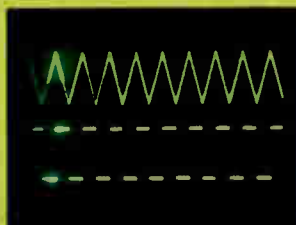
The 8 x 10 cm mesh CRT features 10 kV post acceleration voltage — 2½ times greater than any other scope we've offered — to give you greater writing speeds and a truly bright display. And the CRT has an internal graticule for parallax-free measurements.

The IO-4235 also has fully-regulated power supplies, a front panel 1-volt square wave output, a variable hold off control and much, much more. Calibration requires a precise source of square waves like the Heathkit IG-4505 (see page 67), and a DC voltmeter.

Kit IO-4235, Shpg. wt. 52 lbs. 949.95

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 waveform (intensified portion in the left picture) and magnifies it the desired number of times for closer examination (right picture).

IO-4235 SPECIFICATIONS: VERTICAL: Sensitivity: 2 mV/cm to 10 V/cm, 12 steps in 1-2-5 sequence. Variable: continuous between steps to approx. 30 V/cm. Accuracy: within 3% (20°C to 30°C); 5% (10°C to 50°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 meg shunted by 30 pF. Vertical Modes: Y₁, Y₂, Y₁ and Y₂ chopped, Y₁ and Y₂ alternate, algebraic add (±Y₁, ±Y₂). HORIZONTAL: Time Bases: Ranges, 0.2 S/cm to 50 nS/cm. Positions, 21 steps in 1-2-5 sequence. Variable: continuous between ranges to approx. 0.6 S/cm. Accuracy, within 3% (20°C to 30°C); 5% (10°C to 40°C) referred to 1 mS/cm. EXTERNAL: Sensitivity: approx. 0.1 V/cm. Impedance: 1 meg. Polarity: positive input causes right hand deflection. Frequency Response: DC to greater than 2 MHz (-3 dB). TRIGGER: Source, ±channel Y₁, ±channel Y₂, ±line, ±external. Coupling: AC, DC, AC Fast, TV (flip-flop). Modes: automatic baseline, normal, single-sweep. Hold Off: variable, including an "A" ends "B" position. External Trigger: Sensitivity: 100 mV at 50 MHz. Power Requirement: 120/240 VAC, 85 watts. Dimensions: 7¾" H x 13¾" W x 19¾" D (without handle).



This laboratory-quality Dual-trace, DC-15 MHz Oscilloscope gives you unmatched versatility and value

\$589⁹⁵

- Offers greater bandwidth
- Internal delay lines for complete waveform display

The Heathkit IO-4510 offers greater band and versatility at a low price. Vertical input sensitivity of 1 mV/cm over the entire bandwidth lets you read a x10 probe or waveforms to 10 mV — not 50 or 100 mV, as on other scopes.

Typically triggers on signals greater than 45 MHz and is guaranteed to 30 MHz, with only 1 cm deflection. Digitally-controlled trigger circuits, so no stability control is needed.

Use either normal or automatic sweeps, with 20 time bases to choose from. Internal delay lines insure the start of a horizontal sweep before the beginning of the vertical signal, insuring complete waveform display. And fully regulated power supplies ensure stable voltages. Calibration requires precise source of square waves (see IG-4505 below).

Kit IO-4510, Shpg. wt. 36 lbs. **589.95**

IO-4510 SPECIFICATIONS: VERTICAL: Sensitivity: 1 mV/cm to 5 V/cm in 12 steps. Variable: Continuous to approx. 15 V/cm. Rise Time: 24 ns. Overshoot: Less than 3%. Impedance: 1 megohm shunted by approx. 40 pF. HORIZONTAL: Time Base: Ramp: 0.2 sec/cm to 0.1 μ sec/cm in 20 steps. Variable: Continuous between ranges to approx. 0.6 sec/cm. External Sensitivity: Approx. 0.2 V/cm. External Impedance: Approx. 200 kilohms. Power Requirement: 120/240 VAC, 75 watts. Dimensions: 6.4" H x 12.9" W x 19.3" D (handle extended).

Dual-Trace DC-10 MHz Scope is ideal for TV service, design work

An excellent choice for TV service, electronics experimentation and design, the IO-4550 features brighter trace and faster writing speed.

\$399⁹⁵

- MU-metal shield eliminates error caused by electromagnetic interference
- Features fully-regulated high voltage supply
- Just four printed circuit boards mean easy assembly



If you are looking for a Dual-Trace Oscilloscope to round out your test bench, look no farther. The Heathkit IO-4550 is an excellent choice for TV and general servicing, digital experimentation and electronic design. Its extra-bright trace allows easy reading even in high ambient light; its two vertical input channels have a maximum sensitivity of 10 mV/cm to give you accurate measurements.

To maximize ease of operation, input channels are displayed, chopped or alternate, as selected by the time base switch — automatically! Exact X-Y operation assures you of precise phase measurements. A trigger select switch and level control allow the time base to be precisely triggered at any point along the positive or negative slope of the signal.

The 4550's digitally controlled time base provides automatic triggering, so no stability control is necessary and fewer adjustments are required. This high-quality Dual-Trace Oscilloscope also allows you to determine the frequency of a waveform.

Improved circuitry and just four printed circuit boards with plug-in IC's make the IO-4550 an easy kit to assemble. Calibration requires a precise source of square waves such as IG-4505 Deluxe

Calibrator or IOA-4510-1 Calibrator (below).

Kit IO-4550, Shpg. wt. 27 lbs. **399.95**
 SO-4550, Factory assembled and calibrated, 25 lbs. **650.00**

IO/SO-4550 SPECIFICATIONS: VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. Attenuator: 11 steps in 1-2-5 sequence. Variable: Continuous between steps to approx. 60 V/cm. Accuracy: Within 3%. Vertical Response: DC Coupling: DC-10 MHz. AC Coupling: 2 Hz-10 MHz. Rise Time: 35 ns. Overshoot: Less than 5%. VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. Attenuator: Vertical Input: Impedance: 1 M Ω shunted by 38 pF. Maximum Input: 400 V. HORIZONTAL: Time Base: Ramp: 0.2 s/cm to 200 ns/cm. Positions: 19 steps in 1-2-5 sequence. Variable: Continuous between ranges to approx. 0.6 s/cm. Accuracy: Within 3%. Magnifier: X5 (adds additional 2% to sweep accuracy). External: Sensitivity: 0.1 V/cm (approx.). Impedance: 100 k Ω (approx.). Frequency Response: DC to 1 MHz. Connector: BNC. TRIGGER: Internal: Automatic: Adjustable over 10 divisions. Normal: Adjustable over 10 divisions. Slope Selection: + or -. Impedance: 1 M Ω shunted by 40 pF. Connector: BNC. X-Y: Y Channel: Same as vertical. X Channel: Same as vertical except response is limited to 1 MHz. Power: 120/240 VAC switch selected, 70 watts. Dimensions: 6.9" H x 12.9" W x 19.3" D.

High quality accessories to make your scope even more versatile

[1] Scope Switch for dual-trace capability. Gives any single-trace scope with external trigger dual-trace versatility. Simultaneous display of two separate input signals for comparison, observing phase relationships or other uses. Also use as impedance coupler, preamp or square wave generator in experimental circuits. Sync output on each channel locks sweep to either signal. DC coupling adds versatility. The inexpensive way to get dual-trace.

Kit IO-4101, Shpg. wt. 5 lbs. **54.95**

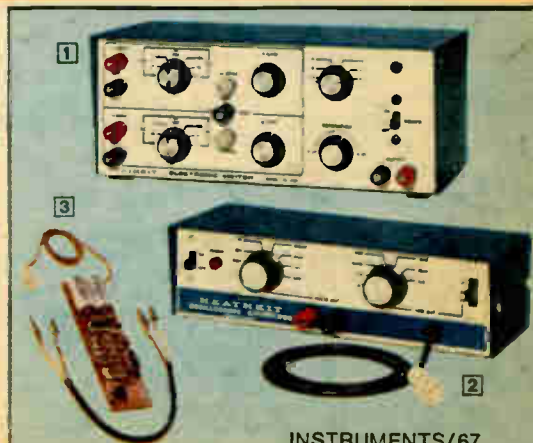
[2] Deluxe Calibrator for oscilloscopes to 35 MHz bandwidth. A practical oscilloscope calibrator at a sensible price. Provides all the waveforms necessary to adjust sweep speeds, vertical calibration,

delay line terminations, high-frequency compensation and attenuator compensation for oscilloscopes with bandwidth up to 35 MHz. Round out your test bench today with an accurate source of square waves — order the Heathkit IG-4505 Deluxe Calibrator for complete scope versatility.

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

[3] Low-priced Scope Calibrator for IO-4510 and IO-4530. Easy-to-build, easy-to-use crystal-controlled time base for oscilloscope calibration. Provides everything you need to accurately calibrate your IO-4510 or other scope to 15 MHz. Draws operating power from IO-4510 or external 6V source.

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



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

Better quality and value...because you build them yourself



\$279⁹⁵ Kit Heathkit DC to 5 MHz Oscilloscope offers dual-trace versatility at a single-trace price!

The Heathkit IO-4205 brings you controls and features not usually found in other scopes in this price range, plus dual-trace versatility! The dual-trace feature is essential for the sophisticated servicing required by many of today's modern electronic devices. It lets you compare two signals simultaneously for input-output comparisons, checking phase relationships and other timing functions. This dual-trace feature combined with the IO-4205's DC to 5 MHz bandwidth and excellent vertical input sensitivity of 10 mV/cm let you use it for nearly all waveform applications.

A stable triggering circuit is used for solid waveform displays — not the recurrent type sweep usually found on other scopes in this price range. A special TV position on the trigger selector control allows low frequencies to pass while high frequencies are rejected, so the IO-4205 will easily trigger on the vertical component of a complex TV signal. Any one of seven calibrated time bases, from 200 mS/cm to 0.2 μ S/cm, can be selected with the time/cm switch.

Vertical input sensitivity is 10 mV/cm, and 11 calibrated attenuator positions, up to 20 V/cm, will accommodate a wide range of input signals.

Accurate measurements can be easily made on the bright, easy-to-read 8 x 10 cm CRT screen. The fully-regulated low-voltage power supply provides accurate voltage and current even under varying line and load conditions. Power consumption is only 50 watts! Partial mu-metal shielding helps eliminate display errors caused by stray magnetic fields.

The dual-trace capability of the IO-4205 makes it ideal for any comparison or timing functions on solid-state digital equipment. Its easy-to-operate controls and front panel inputs make it one of the most versatile oscilloscopes you'll find anywhere. And when you build it yourself, you get the economy of kit value, too! Dimensions: 8" H x 13" W x 17" D.

Kit IO-4205, Shpg. wt. 29 lbs. 279.95
 SO-4205, Assembled and tested, Shpg. wt. 20 lbs. 450.00

IO-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: <5% at 1 kHz. Impedance: 1 megohm/38 pF. SWEEP: Type: Triggered. Range: 200 mS to 0.2 μ S in 7 steps, plus variable. Trigger Source: Y₁/Y₂ External/Line. Trigger Modes: AC/DC/TV/+/- Slope/Auto/Normal. HORIZONTAL: Sensitivity: 0.1 V/cm. Bandwidth: DC to 1 MHz. Impedance: 1 megohm/50 pF. External Horizontal Input: X1 and X10 attenuator and variable. GENERAL: CRT: 5DEP31F, 8 x 10 cm viewing area, blue-green medium persistence phosphor, 5" round flat-face tube. Accelerating Potential: approximately 1.6 kV. Graticule: screened, 8 x 10 centimeters. Power Requirement: 120/240 VAC, 50/60 Hz, 50 watts. Dimensions: 8" H x 13" W x 17" D.



\$199⁹⁵ Kit Heathkit professional DC-5 MHz Oscilloscope that's priced right for the hobbyist, too!

- 10 mV/cm vertical input sensitivity — ideal for most applications
- Built-in calibration circuitry
- Your choice of internal or external time bases for more versatility
- High-brightness CRT for easy reading, even on complex signals
- Fully-regulated low-voltage power supply for stability
- Partial mu-shielding to reduce display errors

The IO-4105 DC-5 MHz Single-Trace Oscilloscope puts professional capabilities on your bench at a price you can afford! A stable triggering circuit is used for solid waveform displays. And the IO-4105 can trigger on the vertical component of a television signal — thanks to a special feature of the trigger selector control that allows low frequencies to pass while high frequencies are rejected.

Either internal or external time bases can be used with the IO-4105. Internal time bases can either be variable or in one of seven steps from 0.2 μ S/cm to 200 mS/cm. External inputs from DC to 1 MHz are accepted by the horizontal amplifier. Excellent sensitivity — 10 mV/cm — combined with attenuation up to 20 V/cm in 11 calibrated steps — mean the IO-4105 accepts a wide range of input signals. And accurate control between settings is accomplished by a variable gain control. A bright, easy-to-read CRT screen provides clear displays.

The IO-4105 draws only 50 watts, and can operate on 120/240 VAC. A fully-regulated low-voltage power supply ensures accurate voltage and current — even under varying conditions. And partial mu-metal shielding helps eliminate display errors caused by stray magnetic fields.

The versatility and professional design of this scope make it ideal for virtually any single-trace scope application.

Kit IO-4105, Shpg. wt. 31 lbs. 199.95
 SO-4105, Assembled and tested, Shpg. wt. 19 lbs. 375.00

IO-4105 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: <5% at 1 kHz. Impedance: 1 megohm/38 pF. SWEEP: Type: Triggered. Range: 200 mS to 0.2 μ S in 7 steps, plus variable. Trigger Source: Y₁/Y₂ External/Line. Trigger Modes: AC/DC/TV/+/- Slope/Auto/Normal. HORIZONTAL: Sensitivity: 0.1 V/cm. Bandwidth: DC to 1 MHz. Impedance: 1 megohm/50 pF. External Horizontal Input: X1 and X10 attenuator and variable. GENERAL: CRT: 5DEP31F, 8 x 10 cm viewing area, blue-green medium persistence phosphor, 5" round flat-face tube. Accelerating Potential: approximately 1.6 kV. Graticule: screened, 8 x 10 centimeters. Power Requirement: 120/240 VAC, 50/60 Hz, 50 watts. Dimensions: 8" H x 13" W x 17" D.

Education that's right for you: Heath/Zenith Self-Instruction Programs



You save time and money when you choose a self-instruction program from Heath/Zenith Educational Systems. You save time because each subject is presented in bite-sized bits to help you learn more efficiently, with ease and enjoyment. You save money because you pay far less than a comparable adult education or vocational school course. But lower cost does not mean a sacrifice in quality — Heath/Zenith Programs use the latest multi-media techniques. Furthermore, technical consultants are on duty to answer your questions by phone or letter.

Such attention to detail and concern for the student are why thousands of Heath/Zenith Programs are used by individuals, schools, business and government. Heath/Zenith Programs combine proven techniques to help you succeed.

Saving time and saving money, while learning just as much — that's why courses from Heath/Zenith Educational Systems are your wisest choice.

Programmed learning texts make Heath/Zenith Self-Instruction Programs more effective. Read at your own pace in easy-to-understand, step-by-step segments. No facet of the material is omitted and nothing is assumed. Self-test reviews throughout the text let you check your progress, too, for complete understanding.

Audio-visual aids speed your learning of subject material. Large, illustrated visual materials make the text more interesting and effective. And audio aids for many Programs make your learning even easier.

Heath/Zenith Educational Systems offers a full line of self-instruction Programs for you. Including the Electronics Fundamentals Series, five complete programs that form a complete foundation in electronics; the new Electronics for Hobbyists Program, described below; Digital Techniques and Microprocessor Programs, including the new Introduction to Microprocessors Program on page 76; a series of five Advanced Electronics Programs; Math Programs ranging from metric conversion to algebra, trig and statistics; and Berlitz Foreign Language Programs.

Besides the Programs in this section, see Automotive Programs on page 21, Ham Radio on page 10 and Computer-Related Programs on pages 49 and 50.

You learn best by doing, so optional experiments in Heath/Zenith Programs help you get a better grasp of many concepts. Our optional Electronic Trainers, for use with our Electronics Programs, give you actual hands-on experience with components and circuitry. And later, the Trainers can serve as ideal experimental units so you can do your own breadboarding and circuit design work.

Score at least 70 percent on the optional final exam and earn a Certificate of Achievement plus Continuing Education Units, which certify non-credit adult education. Some of our Programs prepare you for professional examinations and for CLEP (the College Level Examination Program), which enables you to earn college credit outside the classroom.

The Heath/Zenith Guarantee: If, for any reason, you are dissatisfied with our Programs, we will refund the price of the text material (less Trainer).

IMPORTANT TAX NOTE: All the Heath/Zenith Educational Systems Programs and Trainers may qualify you for a Federal tax deduction. Treasury Regulation 162-5 permits an income tax deduction for educational expenses undertaken to: (1) maintain or improve skills required in one's employment or other trade or business, or (2) meet express requirements of an employer or a law imposed as a condition to retention of employment, job status or rate of pay.

Approved by recognized organizations



Accredited by
the National
Home Study
Council



Licensed
School —
State of
Michigan



Accredited
by the
Council of
the CEU

Electronics for Hobbyists — made simple with this Heath/Zenith Program

\$54⁹⁵

- Approved by the Electronic Industries Association (EIA)
- Optional experiments offer practical hands-on experience

NEW

Learn about the electronics you have day-to-day contact with. Understand the basic concepts that make home and hobby electronic products work — so you can gain more enjoyment from them.

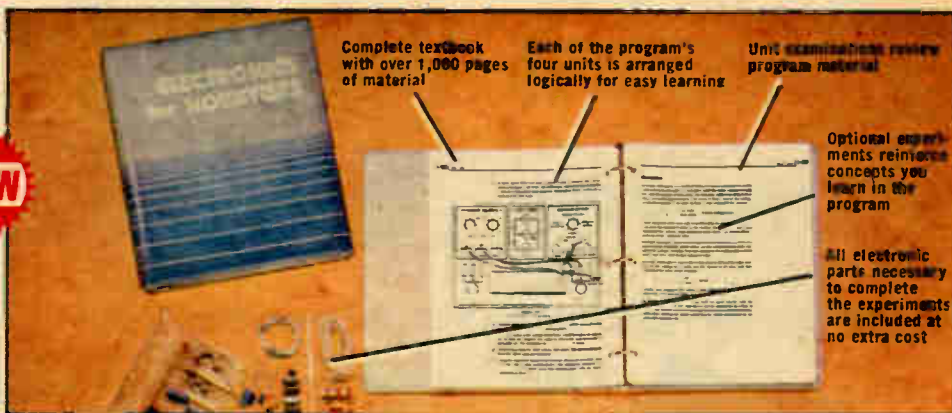
With the Electronics for Hobbyists Self-Instruction Program, you'll be able to understand those do-it-yourself electronic projects in popular magazines. While not as extensive as the Electronic Fundamentals Series, Electronics for Hobbyists provides a good introductory background.

No prerequisite is required to start. You proceed at your own pace, so you can take the time to thoroughly digest each concept. The program is arranged in a logical manner, so it's easier for you to learn.

Electronics for Hobbyists is divided into seven units, each covering a part of the foundation that electronics is built upon. The easy-to-understand text material is backed up by examinations at the end of each unit — as well as by 26 optional experiments, which provide hands-on experience with electronic devices.

When you successfully complete the program, you will be able to:

1. Define voltage, current, resistance and power.
2. Find the value of voltage, current, resistance



Complete textbook with over 1,000 pages of material

Each of the program's four units is arranged logically for easy learning

Unit examinations review program material

Optional experiments reinforce concepts you learn in the program

All electronic parts necessary to complete the experiments are included at no extra cost

3. State the basic law of magnetism.
4. Define Direct and Alternating Current.
5. Explain the operation of a transformer.
6. Define inductance, henry, mutual inductance, inductive reactance and impedance.
7. Explain the operation of diodes, transistors and ICs.
8. Properly use a voltmeter, ammeter and ohmmeter.
9. Explain the operation of rectifiers, filters, power supplies, amplifiers and oscillators.
10. Explain the operation of digital circuits.
11. Understand logic elements, flip-flops, counters, shift registers, clocks and one-shots.

12. Explain how a digital computer operates.
13. Understand the relationships between computers, programming and software.
14. Understand the major electronic hobbies: experimentation and construction, shortwave listening (SWL), amateur radio, radio control models (R/C), personal computing and high-fidelity audio.

Score 70% or better on the optional final exam, and earn a Certificate of Achievement and 4.0 CEUs.

Included with the Program are a complete text in two binders, and electronic components for completing the 26 experiments. The ET-3100 Trainer (page 70) is helpful for completing the experiments.

EE-3140, Shpg. wt. 11 lbs. \$49.95

Heathkit DC Electronics Program is the interesting, efficient way for you to build a solid foundation

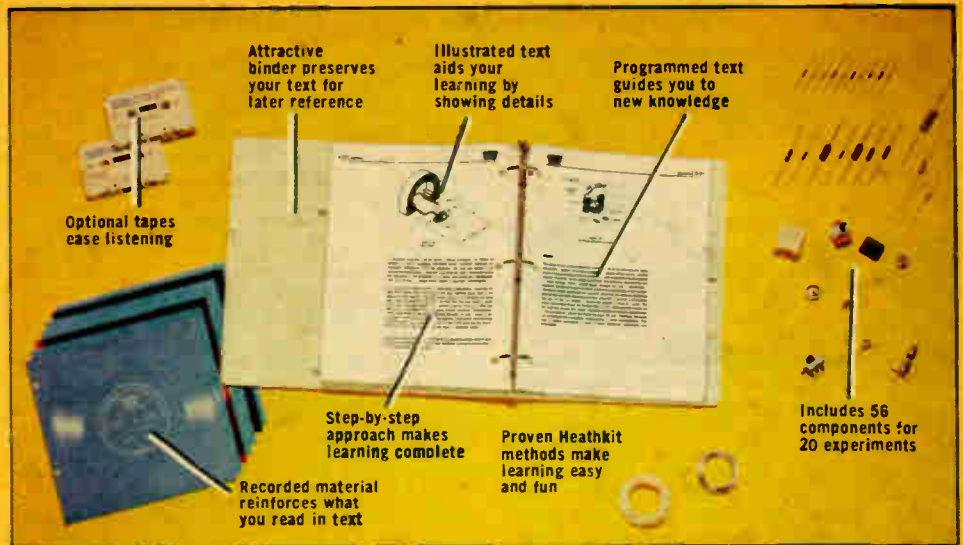
\$44⁹⁵

- Your key to the fascinating world of electronics is this proven, complete DC Electronics Program

The Heathkit DC Electronics Self-Instruction Program is your first step on the way to a complete understanding of electronics. You are introduced to the fundamentals of current, voltage, resistance, magnetism, Ohm's Law, electrical measurements, inductance and capacitance. This Program will take you through each new concept step by step to give you a solid foundation in electronics. Audio-visual treatment reinforces learning so you retain what you learn.

Hands-on experiments help you understand by giving you practical proof that the theory really works. You will acquire a detailed knowledge of DC electronics in a very short time. A knowledge of high school mathematics is assumed in the Program, however it even includes a review of the math you need, should you require a refresher. When you have successfully completed DC Electronics, you will be able to accomplish the following:

1. Solve problems of current, voltage, resistance and power.
2. Explain current, voltage, resistance and power.
3. Discuss the relationship between electricity and magnetism.
4. Using a schematic diagram as a guide, construct DC circuits with resistors, relays, switches, lamps, batteries and capacitors.
5. Given a wiring diagram of a circuit, draw an equivalent schematic.
6. Use a multimeter to measure current, voltage and resistance.
7. Work with powers and convert metric prefixes of ten.
8. Explain the construction, operation and purpose of resistors, potentiometers, switches, fuses, relays, capacitors and inductors.



9. Use safety procedures for both you and your test equipment.
10. Build and experiment with DC circuits of your own design.

Should you choose to take the optional final exam for DC Electronics, a passing grade of 70% or better will earn you 2.0 Continuing Education Units (a nationally-recognized way of acknowledging participation in non-credit adult education courses), and a Certificate of Achievement.

The DC Electronics Program 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 Program. The optional ET-3100 Experimenter/Trainer is desirable for use in completing the experiments in order to gain full benefit from the Program. Optional cassette tapes duplicate the material on records in convenient, easy-to-use cassette form. This Program is a complete introduction to the fascinating field of electronics, and will form a solid foundation for your advancement in the world of electronic knowl-

edge. You owe it to yourself to gain this knowledge, and there's no better time to begin learning than right now.

- EE-3101, Shpg. wt. 7 lbs. 44.95
- Save \$10.00! EES-3101, Includes EE-3101 and ET-3100 Kit Trainer. 13 lbs. 109.90
- EAA-3101, Optional Cassettes, Wt. 1 lb. 9.95
- Spanish Language DC Electronics Learning Program. (Less EB-6101-30 Parts for experiments. See pg. 80)
- EE-3101-S, Shpg. wt. 7 lbs. 54.95

Money-Back Guarantee

All Heathkit Self-Instruction programs carry a complete guarantee of satisfaction. If you are dissatisfied with the program, return all program materials and your receipt for a full refund.

Gain more from Electronics Programs with the Experimenter/Trainer

\$74⁹⁵



Make it easy to perform experiments or breadboard circuits

- Get hands-on experience building circuits, doing program experiments
- Use it later for "breadboarding"

Designed for use with the DC, AC, Semiconductor, Electronic Circuit and Test Instruments Programs. Features solderless breadboarding sockets for ease of component substitution, 2-range variable sine and square wave (200-20,000 Hz) signal source, dual-variable power supplies for positive and negative voltages (1.2 to 16 volts, 120 mA), 1 k and 100 k linear potentiometers. A center tapped transformer provides 30 volts rms, 60 Hz for line experiments. Get it with a program and save.

- Kit ET-3100, Shpg. wt. 6 lbs. 74.95
- Kit ET-3100S, Trainer with Spanish manual, Shpg. wt. 5 lbs. 79.95
- ETW-3100, Factory assembled Trainer, Shpg. wt. 6 lbs. 134.95

Heathkit Learning Dictionary is a complete short course in electronics

Having the language of electronics compiled in handy dictionary form is reason enough to put this book on your reference shelf. Better yet, the Heathkit Learning Dictionary includes a compendium of 16 topic outlines that turns this Dictionary into a low-cost self-instructional course. Each topic outline lists related terms, making your Dictionary an effective learning tool. 832 pages.

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

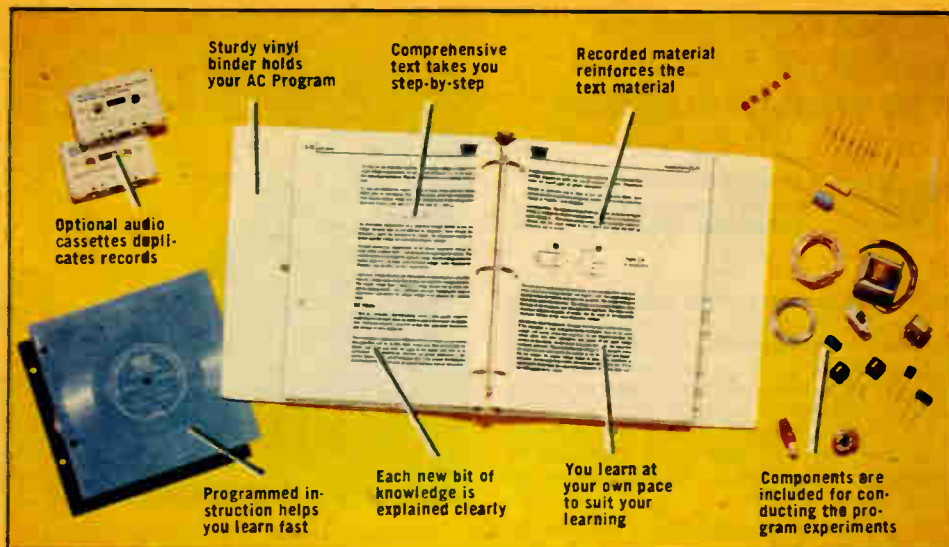
Give yourself a thorough grounding in AC Electronics using proven Heathkit methods of learning

\$49⁹⁵

- The logical arrangement of this program will help you master AC electronics easily and enjoyably

AC Electronics covers the fundamentals and theory of alternating current in a straight-forward, easy-to-understand manner. You move through programmed instruction material that teaches you a little bit at a time so you aren't overwhelmed by new concepts. Upon completion you will be able to:

1. Explain the difference between AC and DC.
2. Describe the operation of AC generators.
3. Determine average, peak, peak-to-peak, and effective values of an AC sine wave, and analyze its frequency, period and phase; then measure these values using an oscilloscope.
4. Use AC meters to measure current, voltage and power.
5. Analyze AC circuits which contain resistance.
6. Understand and describe capacitance and capacitive reactance.
7. Analyze AC circuits with capacitance or capacitance and resistance.
8. Understand mutual inductance, self-inductance and inductive reactance.
9. Analyze series and parallel resonant circuits.
10. Analyze AC circuits with inductance or inductance and resistance.
11. Determine the current, voltage and power



- relationships at the inputs and outputs of both ideal and practical transformer circuits.
12. Analyze and design RC, RL and LC filters.
 13. Understand the construction, specifications and characteristics of capacitors, inductors and transformers.

Scoring 70% or better on the optional final exam will earn you a Certificate of Achievement and 1.5 CEU's. The DC Program or equivalent knowledge is a desirable background for EE-3102. Included in this Program are a complete text and sturdy vinyl binder, records, and 16 electronic components for complet-

ing experiments. The ET-3100 Trainer is helpful for completing the experiments. Optional Cassettes duplicate the material on records.

EE-3102, Shpg. wt. 7 lbs. 49.95

Save \$10.00! EES-3102, Includes EE-3102 and ET-3100 Kit Trainer, 13 lbs. 114.90

EEA-3102, Optional Cassettes, Wt. 1 lb. 9.95

Spanish Language AC Electronics Learning Program. The same fine program translated to Spanish. (Less EB-6102-30 Parts for experiments. See page 80).

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

Advance to a knowledge of solid-state electronics with the Semiconductor Devices Program

\$49⁹⁵

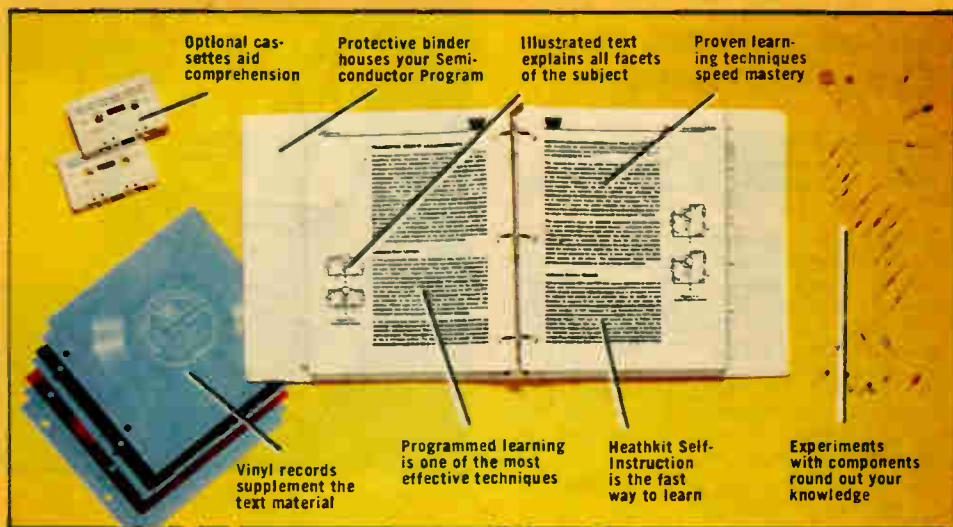
- Semiconductors have reshaped the world of electronics. This program brings you up to date

No education in electronics would be complete without including solid-state technology. The Heathkit Semiconductor Devices Program teaches you all about this comparatively-recent development. Audio aids help emphasize the comprehensive text material. And you get hands-on experience with the interesting experiments that are part of the program.

The Semiconductor Devices Program covers fundamentals, diodes, zeners, bi-polar transistor operation and characteristics, FET's, thyristors, IC's and opto-electronics. Included are texts, records and 27 electronic components for 11 different experiments. To gain full benefit from this program, the Heathkit DC and AC Electronics Programs or equivalent knowledge is recommended. If you choose to take the optional final exam and score a passing grade of 70% or better, you will receive a Certificate of Achievement and 3.0 Continuing Education Units. The optional Cassettes (listed right) duplicate the information on records included with the program in easy-to-use audio cassette form.

Upon completion of the Semiconductor Devices Program you will be able to:

1. Describe the electrical characteristics of semiconductors.
2. Name the primary advantages of semiconductor devices over vacuum tubes.
3. Explain how the most important semiconductor devices operate.
4. Describe how semiconductor devices are constructed.
5. Use semiconductor components properly to prevent damage.
6. Recognize semiconductor packages and their schematic symbols.
7. Design your own circuits using semiconductor devices.
8. Test various semiconductor devices for proper operating characteristics.



EE-3103, Shpg. wt. 6 lbs. 49.95

SAVE \$10.00! EES-3103, Includes EE-3103 and ET-3100 Kit Trainer. 11 lbs. 114.90

EEA-3103, Optional Cassettes, Wt. 1 lb. 9.95

Spanish Language Semiconductor Devices Program. Direct translation of this famous program. (Less EB-6103-30 Parts for experiments. See page 80).

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



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

EDUCATION/71

Electronic Circuits Program applies all your knowledge to actual modern circuit operation

\$59⁹⁵ • Apply the electronic knowledge you have learned to practical circuits used everyday

This Program shows you how to apply all the theory of your first programs in actual circuit operation. You should first complete DC and AC Electronics and Semiconductor Devices, or have equivalent knowledge. For experiments you should have an oscilloscope like the Heathkit IO-4105 on page 68, and the ET-3100 Trainer on page 70. Scoring 70% on the optional final exam will earn you a Certificate of Achievement and 4.0 CEUs. Upon completion you will be able to:

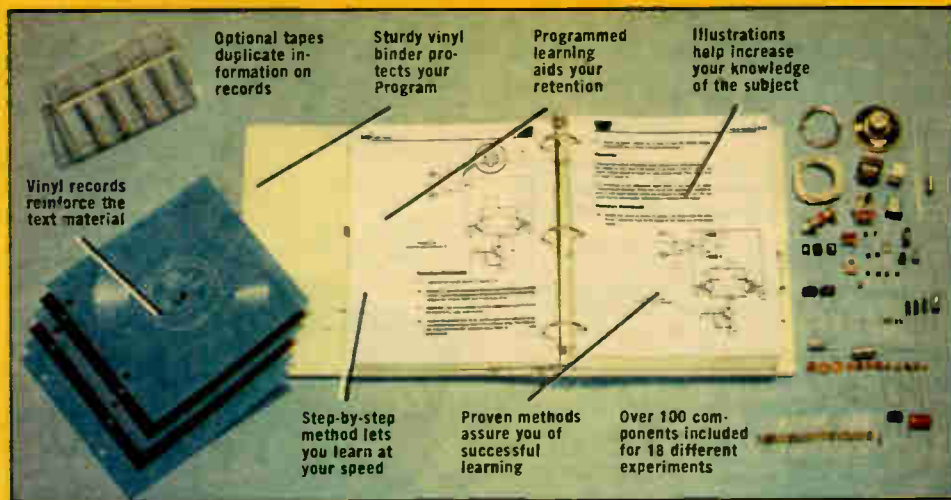
1. Identify basic amplifier circuits and describe their operation.
2. Discuss DC amplifiers, audio amplifiers, video amplifiers, intermediate frequency amplifiers, and RF amplifiers.
3. Explain operational amplifiers, differential amplifiers, comparators, active filters.
4. Analyze and design simple inverting and noninverting amplifiers.
5. Explain power supply rectifiers, filters, and regulation circuits.
6. Identify commonly used LC, RC, and crystal oscillators

Learn instrument operation, applications and specification with Electronic Test Equipment

\$59⁹⁵ • This Program gives you a solid foundation in a wide variety of modern electronic test instruments

Understand how to use electronic test equipment. This comprehensive Program provides you with excellent background, plus the ability to operate test instruments. It covers analog and digital meters, oscilloscopes, frequency generation and measurement, and special measuring instruments. The Basic Electronics Programs (EE-3101 through EE-3104) and Digital Techniques (EE-3201) or equivalent knowledge are necessary background to benefit fully from this Program. Upon completion of Electronic Test Equipment you will be able to:

1. Use analog and digital meters to make electrical measurements.
2. Explain the operation of integrating and nonintegrating.
3. Use an oscilloscope in electronic testing and servicing.
4. Explain operation of single and dual trace scopes, including sampling and storage types.
5. Understand operation and use of the three most popular passive frequency meters and four most popular active frequency meters.
6. Use a dip meter to calculate the value of an unknown inductor.



7. Explain pulse shapers, multivibrators, Schmitt triggers, sawtooth generators, IC timers.
8. Understand AM, FM, heterodynes, modulation, and detection.
9. Construct, experiment with the above transistor and IC circuits.
10. Use a voltmeter and an oscilloscope to analyze electronic circuits

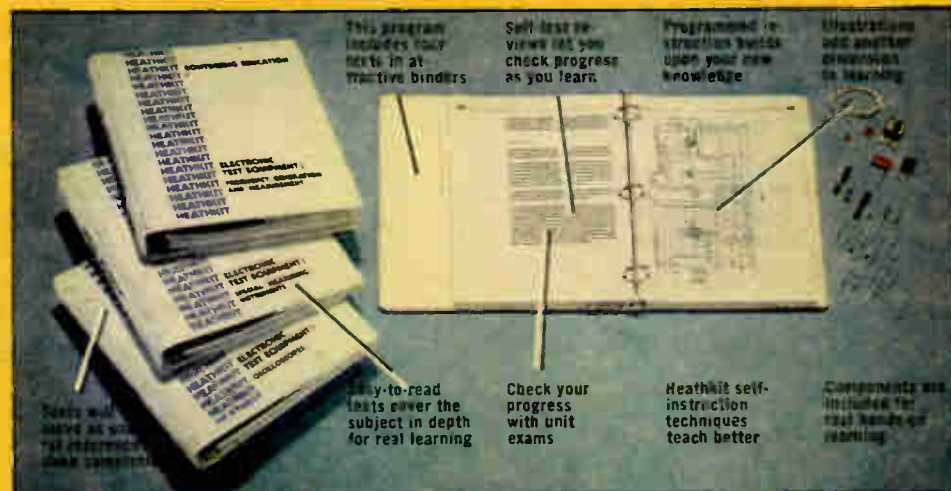
The Electronics Circuits Program includes text, an attractive vinyl binder, records and over 100 electronic components for 18 experiments. Optional tapes duplicate the material on records in convenient, easy-to-use cassette format.

As with all Heathkit Self-Instruction Programs, the ones on this page carry a complete money-back guarantee of satisfaction. So confident are we of your ability to learn using these proven programs that if, for any reason, you are not satisfied with either the Electronic Circuits Program or the Test Equipment Program, simply return all program materials (less Trainer) along with your receipt for a complete refund of your purchase price.

EE-3104, Shpg. wt. 7 lbs. 59.95

Save \$10.00! EES-3104, Includes EE-3104 and ET-3100 Kit Trainer, 13 lbs. 124.90

EEA-3104, Optional Cassettes, Shpg. wt. 1 lb. . . 9.95



7. Understand the operation and use of electronic counters.
8. Use appropriate bridge circuits to measure resistance, capacitance, inductance, and impedance.
9. Determine beta, leakage values of transistors and transconductance and leakage values of FETs using a transistor tester.
10. Understand curve tracers, spectrum analyzers and logic probes.

The Test Instrument Program includes four texts in attractive vinyl binders and electronic components for experiments. A digital meter, analog meter, os-

illoscope, frequency generator and frequency counter, as well as the ET-3100 Trainer are useful for completion of the optional experiments. See pages 57 through 68 for a wide selection of quality Heathkit test equipment. If you choose to take the optional final exam, a passing grade of 70% or better will earn you 6.0 Continuing Education Units, plus an attractive Certificate of Achievement. Begin today to get the knowledge you need with the complete Heathkit Test Instruments Program.

EE-3105, Shpg. wt. 18 lbs. 59.95

Save \$10.00! EES-3105, includes EE-3105 and ET-3100 Kit Trainer, 24 lbs. 124.90

Digital Techniques: everything from logic to ROMs — even an introduction to microprocessors

\$74⁹⁵

• The Heath/Zenith Digital Techniques Program enables you to study tomorrow's technology today

Using tried and tested Heath/Zenith self-instruction techniques, you can learn all about the latest advances in electronics. Learn at your own pace, with the freedom to cover the material quickly, or to review those areas that need re-emphasis. And, as with all Heathkit programs, your money will be refunded if you are not completely satisfied.

The Advanced Digital Techniques Program is a comprehensive treatment of the subject, beginning with fundamentals and theory, and guiding you through digital logic circuits, Boolean algebra, flip-flops and registers, sequential logic circuits, combinational logic circuitry and digital design.

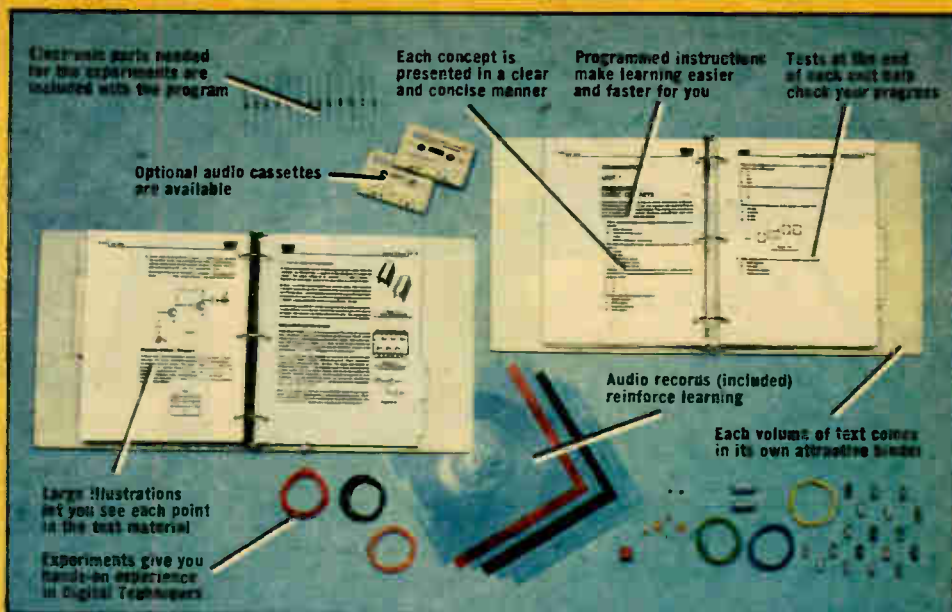
This well-organized approach to the subject of Digital Techniques combines the printed word and recorded sound for ease of learning, as well as greater comprehension and retention. It even incorporates programmed learning. As you complete each step-by-step section, hands-on experiments and tests will further aid your understanding of Digital Techniques.

You'll be getting the knowledge you need, at a fraction of the cost of a comparable college or technical school course on the subject. You'll be interested to know, in fact, that several American universities — as well as a federal agency — utilize the Advanced Digital Techniques Program.

This expertly-designed program shows you how to design digital circuitry for virtually any modern electronic application. It assumes a prior knowledge of electronics (the DC, AC, Semiconductors and Electronic Circuits programs or equivalent knowledge).

When you have successfully completed the Digital Techniques Program, you will be able to:

1. Understand the advantages and benefits of using digital techniques in electronics.
2. Name the major applications of digital techniques in electronics.
3. Convert between the binary and decimal number systems, and recognize the most commonly-used binary codes.
4. Name the major components used in implementing digital circuits, and explain how they operate.



5. Understand digital logic gates.
6. Identify the more commonly used integrated circuit families used in digital equipment and discuss their operation.
7. Use Boolean algebra to express logic operations and minimize logic circuits in design.
8. Understand the operation of flip-flops.
9. Understand the operation and application of binary and BCD counters, shift registers and other sequential logic circuits.
10. Name the most frequently used combinational logic circuits and explain their operation.
11. Design both combinational and sequential logic circuits for a given application, from definition and concept of the circuit to the selection of the integrated circuits.
12. Understand the operation and application of digital counters in the measurement of both time and frequency.
13. Understand how a digital computer is organized, and how it operates.
14. Understand microprocessors, explain their operation and applications.

The Digital Techniques Program includes a comprehensive text in two vinyl binders, records (or optional cassettes), and 44 electronic components for performing the 24 experiments. The ET-3200 Electronic Trainer (described below) is useful in performing the experiments in the Digital Techniques Program. Also recommended are a multimeter like the IM-5284 (page 55) and a single-trace oscilloscope like the IO-4105 (page 68).

Upon completion — if you choose to take the final examination included with the program, a passing grade of 70 percent or better will earn you 4.0 Continuing Education Units (CEUs) and a Certificate of Achievement. If you are not satisfied with the program, return all text materials (less trainer) for a refund of the purchase price.

EE-3201, Shpg. wt. 9 lbs. 74.95

SAVE \$15.00! Buy the Digital Techniques Program and the ET-3200 Trainer Kit together. \$164.90 if purchased separately.

EES-3201, Shpg. wt. 14 lbs. 149.90

EEA-3201, Optional Cassettes*, Shpg. wt. 1 lb. 9.95

*Optional cassettes duplicate material on records.

Use this versatile Electronic Trainer to get maximum benefit from the Digital Techniques Program

Learn by doing. Use the Heath/Zenith ET-3200 Electronic Trainer for the Digital Techniques experiments. Also build and test prototypes, verify circuit operation and check digital integrated circuits. Solderless breadboard sockets aid experimenting and design. They take up to eight 14-pin or 16-pin dual in-line ICs; also 24, 28 and 40-pin DIPs. Has four binary data switches, two no-bounce switches to pulse logic circuits, three-frequency pulse clock generator and four LEDs for visual indication of logic states.

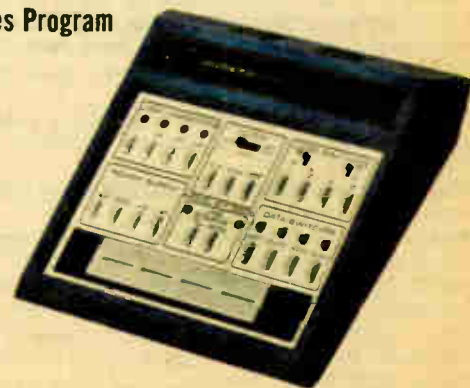
Regulated power supplies produce +12 VDC at 500 mA, -12 VDC at 100 mA and +5 VDC at 500 mA — all current-limited and overload-protected for greater safety. The ET-3200 Trainer is compatible with all commonly-used IC logic families, including RTL,

TTL, CMOS, ECL, NMOS, PMOS and Linear. The trainer can be wired for either 120 VAC or 240 VAC use.

Kit ET-3200, Shpg. wt. 5-lbs. 89.95

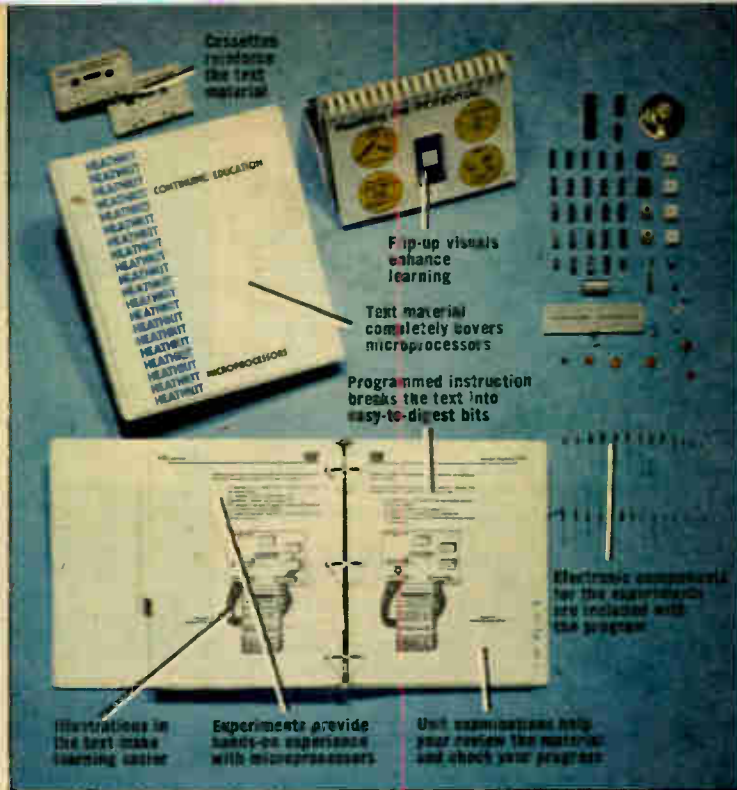
Factory Assembled and Tested ET-3200 Trainer.
ETW-3200, Shpg. wt. 6 lbs. 149.95

ET-3200/ETW-3200 SPECIFICATIONS: DATA SWITCHES: States: +5 V or 0 V. Maximum Current: 10 mA, each switch. Outputs: Four terminals, one for each switch. LOGIC SWITCHES: Type: Momentary contact, spring-loaded. Circuit: Two flip-flop latches for contact bounce buffering. Output States: Complementary, +5 V and +0.2 V. CLOCK: Output Frequency: 1 Hz, 1 kHz, 100 kHz, ±20%. Duty Cycle: 45%. Output Voltage: 5 V peak-to-peak. Overall Dimensions: 3.5" H x 12.13" W x 11.75" D (8.90 x 30.80 x 29.80 cm).



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EDUCATION/73



Learn about microprocessors, microcomputers, interfacing and programming with this program

Microprocessor Program completely covers the subject

WINNER

International Award
of Distinction —
Society of
Technical
Communicators

With the Microprocessor Self-Instruction Program from Heath/Zenith Educational Systems, you'll learn about microprocessors, microcomputers and programming in a complete, efficient and well-organized way. You'll learn microprocessor basics, computer arithmetic, programming, interfacing, perform optional experiments and more. Our proven multi-media approach, featuring programmed learning and audio-visual aids, will help you learn quickly.

The Microprocessor Program's concise self-study texts, colorful audio-visual presentations and optional hardware experiments make microprocessor theory, design and application simpler to understand.

Start by learning or reviewing the basics about number systems and codes. Then, apply that knowledge as our program takes students step-by-step through computer arithmetic, introductions to programming, explanation and examination of the 6800 microprocessor, and a study of interfacing and I/O operations.

The Microprocessor Program is organized into 10 learning units:

UNIT 1: NUMBER SYSTEMS AND CODES. Covers decimal, binary, octal, hexadecimal number systems; conversions and binary codes, positional notation.

UNIT 2: MICROCOMPUTER BASICS. Covers terms and conventions, computer words, executing a program, addressing.

UNIT 3: COMPUTER ARITHMETIC. Covers Binary addition, subtraction, multiplication and division; two's complement arithmetic; Boolean operations — AND, OR, Exclusive-OR, INVERT.

UNIT 4: INTRODUCTION TO PROGRAMMING. Covers branching, conditional branching, algorithms, additional instructions.

UNIT 5: THE 6800 MICROPROCESSOR — PART 1. Covers architecture, instruction set and addressing modes.

UNIT 6: THE 6800 MICROPROCESSOR — PART 2. Covers stack operations, subroutines, input/output (I/O) operations and interrupts.

UNIT 7: INTERFACING — PART 1. Covers interfacing fundamentals; interfacing with random access memory (RAM), interfacing with displays.

UNIT 8: INTERFACING — PART 2. Covers interfacing with switches; the Peripheral Interface Adapter (PIA), using the PIA.

UNIT 9: PROGRAMMING EXPERIMENTS. Covers experiments with binary/decimal, hexadecimal/decimal, and straight line programs; arithmetic and logic instructions, branches, additional instructions, new addressing modes, arithmetic operations, stack operations and subroutines.

UNIT 10: INTERFACING EXPERIMENTS. Covers memory circuits, clock, address decoding, data output, data input, Peripheral Interface Adapters, key matrix and parallel-to-serial conversion, digital-to-analog and analog-to-digital conversion.

Units 1 through 6, as well as Unit 9, assume no prior knowledge of electronics. Units 7, 8 and 10 assume a knowledge of electronics equivalent to the Heath/Zenith Digital Techniques Program (EE-3201, page 73).

It's not all book work — we get right down to the nuts and bolts of practical applications by giving you 19 different and fascinating experiments to perform. Through these experiments, and the optional ET-3400 Trainer (opposite page), you can take a close-up look at the internal workings of microprocessors.

The Microprocessor Self-Instruction Program comes complete with 62 electronic components required to complete the experiments. These components include two 2112 256 x 4-bit RAMs, 6820 PIA interface chip, 1406 digital-to-analog converter, 741 and 301 op-amps, and a variety of other microprocessor-oriented devices. The optional ET-3400 Microprocessor Trainer (page 75) is required for completing the experiments in the Microprocessor Program.

If you choose to take the optional final examination, a passing grade of 70 percent or better will earn you 8.0 Continuing Education Units (CEUs) and a Certificate of Achievement.

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

SAVE \$20.00! Order the EE-3401 Microprocessor Program and ET-3400 Microprocessor Trainer Kit together. If purchased separately, \$299.90.

ETS-3400, Shpg. wt. 19 lbs. ONLY 279.90

SAVE \$70.00! Order the EE-3401 Microprocessor Program, the ET-3401 Microprocessor Trainer Kit, the ETA-3400 Trainer Accessory Kit and the ETA-3400-1 3K Chip Set together. If purchased separately, \$496.90.

ETS-3401, Shpg. wt. 28 lbs. ONLY 426.90

Optional Slides duplicate the audio-visual flip charts in the EE-3401 Microprocessor Self-Instruction Program.

EE-3401-1, Shpg. wt. 2 lbs. 60.00

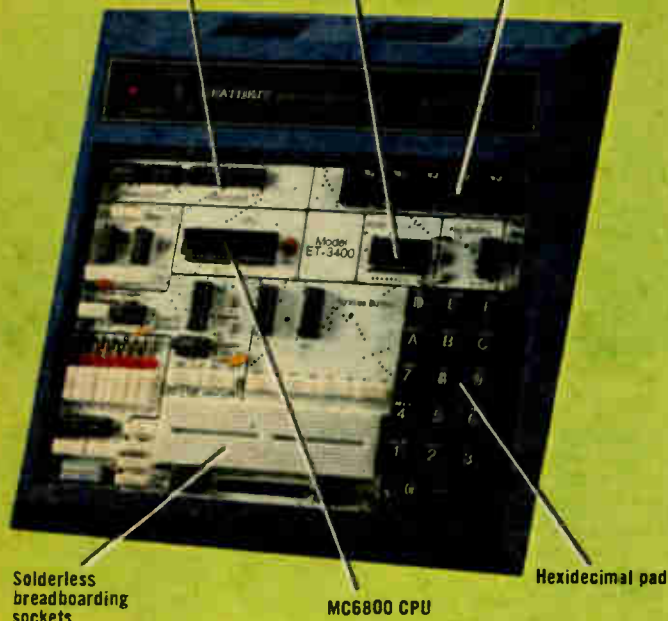
Optional 35mm Filmstrip. Same as slides above, in filmstrip form.

EE-3401-2, Shpg. wt. 1 lb. 20.00

See page 80 for classroom version of the EE-3401 Microprocessor Program.



Memory expandable to 512 bytes Powerful 1K monitor ROM Six 7-segment LED's



Solderless breadboarding sockets

MC6800 CPU

Hexidecimal pad

Shielded 110V section

Standard RS232 connector for terminal

Kansas City standard audio cassette I/O

Heath/Pittman Tiny BASIC ROM

Terminal monitor ROM

Connector cable for ET-3400

Add up to 4K user RAM



The ET-3400 Microprocessor Trainer Accessory converts the ET-3400 Microprocessor Trainer to a full personal computer system.

Learn computer architecture, interfacing and programming concepts with the Heathkit Computer Trainer

The ET-3400 Computer Trainer is designed for use with the EE-3401 Microprocessor Self-Instruction Program on page 74. Once you complete the EE-3401 experiments, add the ETA-3400 Trainer Accessory and a terminal such as the H-9 or H-19 for a complete system.

Functioning as a miniature digital computer, the ET-3400 Microprocessor Trainer is used with the experiments in the EE-3401 Self-Instruction Program. The ET-3400 features a built-in 1K ROM monitor program for controlling unit operation. It also has a 6-digit hexadecimal 7-segment LED display for address and data readout. The 17-key hexadecimal keyboard permits you to access memory location to examine contents, then step forward or backward from that memory location to examine more memory locations, to change a memory location, to examine and/or alter any of the MC6800 CPU's internal registers, to set break points for program debugging, or to reset the CPU. The flexible instruction set of the MC6800 permits relative addressing, and makes use of two accumulators.

The ET-3400 has 256 bytes of random access memory (RAM) built-in and is expandable to 512 bytes with the RAM's supplied in the EE-3401 Self-Instruction Program. It also features 8 buffered binary LED's for display of breadboard logic states, 8 SPST DIP switches for binary input to breadboarding circuits, and a breadboarding socket for prototyping, interfacing and memory circuits. All microprocessor address, control and data busses are buffered and terminated on the front panel for ease of connection to prototyped circuits. There's also provision for a 40-pin external connector to expand memory and I/O capacity. The Heathkit ET-3400 Microprocessor Trainer features built-in +5, +12 and -12 volt power supplies. Power requirement: 120/240 volts, 60/50 Hz, 30 watts maximum. The unit measures 3½" H x 12¼" W x 11¼" D.

All of the programming and hardware interface experiments supplied with the EE-3401 Microprocessor Self-Instruction Program are implemented on the ET-3400 Trainer. While designed primarily for use with the EE-3401 Program, the Trainer is a flexible, general purpose training unit and microprocessor breadboard. It can be used in many other applications that require a low-cost microprocessor-based software development system or as a design aid for developing special interfaces. Team it up with the ETA-3400 Trainer Accessory (description at right) for real computing power.

Kit ET-3400, Shpg. wt. 7 lbs. 199.95
ETW-3400, Factory assembled and tested, Wt. 6 lbs. 279.00

The ET-3400 Accessory turns Microprocessor Trainer into a complete system

When you add the ETA-3400 Trainer Accessory, you turn your ET-3400 Microprocessor Trainer into a complete computer system. The Accessory provides you with more computing power — an additional 1K bytes of memory — so you are able to run longer and more sophisticated programs through your ET-3400 Trainer. The Accessory's memory can even be expanded to 4K bytes by adding the optional 3K Chip Set (ET-3400-1). Order the Chip Set from the listing below.

A serial I/O with EIA or 20 mA loop format in the Accessory allows you to hook up a terminal such as the H-9 or H-19 (described on page 42), or a 20 mA ASCII teletype machine. It also provides an audio cassette interface enabling you to store programs on convenient audio cassettes. The ROM monitor/debugger program lets you implement the standard Trainer monitor functions through the external terminal. Memory locations can be examined or changed, break points can be initiated, and program debugging can be accomplished with a single instruction step feature.

A Tiny BASIC interpreter is provided in ROM allowing you to program using BASIC (see the EC-1100 BASIC Self-Instruction Program on page 50). Tiny BASIC features 26 variables (A-Z), integer math, 15 BASIC statements and two functions: random and user. User function allows you to run machine code routines from BASIC — the same machine code routines you learn to write in the EE-3401 Self-Instruction Program.

The ETA-3400 Accessory connects to the Trainer by means of a 40-pin ribbon cable supplied. Parts required to modify the Trainer are included. Since this modification changes the clock frequency of the Trainer, the experiments in the Microprocessor Self-Instruction Program using timing loops will be changed. It is recommended that all of the EE-3401 experiments be completed before adding this modification kit. The cabinet of the Accessory measures 3" H x 11" W x 12" D. Power requirement: 120/240 VAC, 60/50 Hz, 11 watts.

As with all Heathkit electronic kits, our step-by-step instruction manual even includes directions on soldering for the first-time builder.

Kit ETA-3400, Shpg. wt. 8 lbs. 150.00
EWA-3400, Factory assembled and tested, Wt. 8 lbs. 250.00
ETA-3400-1, Optional 3K Chip Set, Wt. 1 lb. 47.00

NOTE: A terminal such as the H-9 or H-19 (see page 42) is required to use the BASIC and monitor software with the Trainer Accessory.



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EDUCATION/75

NEW

Now microprocessor operation and programming is easy for anyone to learn — no electronics training needed

Microprocessors. An increasingly powerful part of our lives. Not only will you find microprocessors in computers — they can be found in many everyday products, from toys to typewriters. Do you want to know more about microprocessors? If you're eager to learn about microprocessors in the shortest, most effective way possible, the EC-6800 Introduction to Microprocessors Program — from Heath/Zenith Educational Systems — is for you. The Introduction to Microprocessors Self-Instruction Program will show you how to operate and program microprocessors. You'll learn what you need to know, without being swamped under by information you may never need or use.

Along with the optional ET-6800 Microprocessor Trainer, this Heath/Zenith program is the fastest, most economical way to learn about microcomputers and microprocessors.

The Introduction to Microprocessors is a sub-set of our popular EE-3401 program. It's much more economical — and much faster. That's because the EC-6800 Introduction to Microprocessors teaches only operation and programming, and skips the complex subject of digital interfacing.

Compare the Introduction to Microprocessors Program to the Microprocessor Programming and Interfacing Program with the chart below:

Area of Comparison	EC-6800 compared with EE-3401	
You learn:	Programming	Programming and Interfacing
No. of pages	600	1,000
No. of chapters	7	10
Flip Charts	No	Yes
Cassettes	No	Yes
Chapter Test Questions	Yes	Yes
Programming Experiments	Yes	Yes
Interfacing Experiments	No	Yes
Electronic Parts	No	Yes
Final Examination	Yes	Yes
Trainer Interfacing	No	Yes
CEUs	4.0	8.0
Price	\$29.95	\$99.95



The Introduction to Microprocessors Program is truly for the layman. No background in electronics is needed to learn about programming microprocessors. In fact, no prerequisites of any kind are required or assumed.

When you complete the program, you will know how to program a microprocessor by learning the following:

1. A firm foundation in number systems, codes and computer arithmetic, including binary arithmetic, two's complement arithmetic, Boolean operations, the decimal, binary, octal and hexadecimal numbering systems — as well as binary codes.
2. Microcomputer basics, including terms and conventions, operation, program execution and addressing modes.
3. Programming basics, including branching, conditional branching and algorithms.
4. The 6800 Microprocessor — including architecture, instruction set, new addressing modes, stack operations, subroutines, input/output (I/O) operations and interrupts.
5. Hands-On Programming, which includes programming experiments which cover the subjects taught in the other units.

The programming experiments, which can be performed on the optional ET-6800 Microprocessor Trainer described below, give you hands-on experience and make learning more fun.

If you choose to take the optional final examination, pass the exam with a score of 70 percent or better — and you will earn a Certificate of Achievement and 4.0 Continuing Education Units (CEUs).

EC-6800, Shpg. wt. 6 lbs. 29.95

NEW

Trainer makes learning microprocessor operation and programming easier than ever

\$129.95

• Never before has such a powerful microprocessor trainer been available at so low a price

The ET-6800 Microprocessor Trainer from Heath/Zenith Educational Systems helps you perform the experiments in the Heath/Zenith EC-6800 Introduction to Microprocessors Program, described above.

Functioning as a miniature digital computer, the ET-6800's built-in 1K Read-Only Memory (ROM) monitor program controls the trainer's operation. Address and data readout are provided by a six-digit hexadecimal 7-segment LED display.

A 17-key hexadecimal keyboard gives you access to memory locations to display contents, then step forward or backward to examine others, to change a location, to examine and/or alter any of the internal registers of the CPU, to set break

points for program debugging, or to reset the CPU. The keyboard includes keys from 0-F and Reset. The I-F keys are dual-function keys and also enter commands.

The ET-6800 employs an 8-bit parallel, NMOS, bus-oriented CPU — with 256 bytes of NMOS Random Access Memory (RAM).

A +5 volt DC power supply is built into the ET-6800, so no separate power supply is needed. And a rugged, attractive cardboard cabinet holds the price to an absolute minimum.

Everything you need to get hands-on experience in programming microprocessors is yours in the ET-6800 Microprocessor Trainer. For 120 VAC, 60 Hz. Draws only 12 watts. Overall Dimensions, 3.75" H x 8" W x 10" D (9.53 x 20.32 x 25.40 cm).

Kit ET-6800, Shpg. wt. 17 lbs. 129.95



Audio tutorial self-instruction teaches you math with cassettes, printed visuals, practice exercises

Math Tutorials for Science and Technology

Twelve programmed workbooks give a review of fundamentals you need every day. The program covers arithmetic and signed numbers, powers and roots, scientific notation, units and rounding, graphs, ratios and proportions, algebra, solving equations, triangle trigonometry, vectors, probability and statistics. Passing the optional final exam with a score of 70% or better will earn you 4.0 CEUs and a Certificate of Achievement.

EM-1, Shpg. wt. 9 lbs. 39.95

Now it's easier than ever to Think Metric, U.S.A.

Learning the metric system is fun and easy with Think Metric, U.S.A. The most common system of weights and measures, the metric system will soon become the official system in the U.S. The material is presented in a three-ring binder and includes an audio cassette that reinforces the text material. Passing the optional final exam with 70% or better earns you 1.0 CEU and a Certificate of Achievement.

EM-2, Shpg. wt. 4 lbs. 19.95

The organized way to learn college level algebra

Algebra Fundamentals reviews basic algebraic skills. Text and seven cassettes cover integer arithmetic, substance of algebra, proportional reasoning, graphs, divisions and multiples, fractions, roots, real numbers. Pass optional final exam for 2.5 CEUs and Certificate of Achievement.

EM-3, Shpg. wt. 6 lbs. 49.95

Algebra consists of eight units, workbook and 10 cassettes covering polynomial arithmetic, factoring, algebraic functions, exponents and radicals, linear equations, inequalities, quadratic equations and inequalities in one variable, probability, sets and operations. Pass the optional final exam for 3.0 CEUs and Certificate of Achievement.

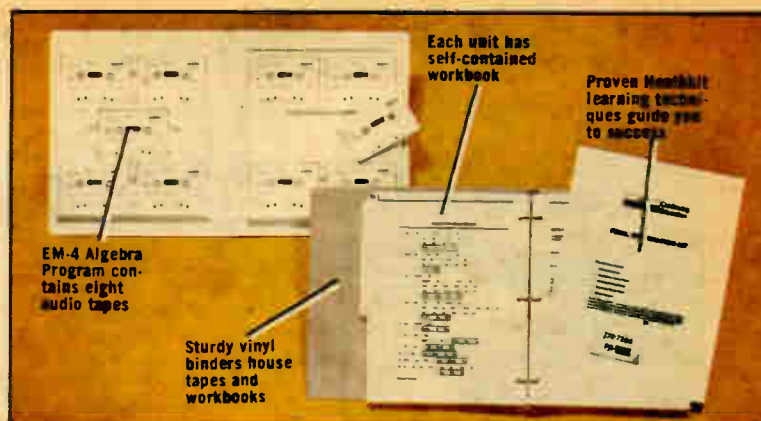
EM-4, Shpg. wt. 7 lbs. 49.95

Intermediate Algebra includes text and nine audio cassettes. Covers functions, relations and inverses, graphs and variation, linear relations, quadratic relations, systems of equations and inequalities, determinants, logarithms, sequences and series. 3.5 CEUs and Certificate.

EM-5, Shpg. wt. 7 lbs. 49.95

Save \$10.00 on your Algebra education. Order all three Programs — Algebra Fundamentals, Algebra and Intermediate Algebra — for a complete education in Algebra fundamentals. If purchased separately, \$149.85.

EMS-345, Shpg. wt. 20 lbs. Only \$139.85



Learn the fundamentals of trigonometry

Learn first-year college trigonometry in depth. Supplement what you learn in school — or prepare for the CLEP Trig exam, where you can earn college credit for learning outside the classroom. The Trigonometry Program includes binders for the text and the nine cassette tapes. Requires successful completion of EM-5 Intermediate Algebra (left) or equivalent knowledge. Basic knowledge of geometry is helpful, too. Covers circular functions, graphs of circular functions, identities and proofs, inverse functions, conditional equations, right triangle trigonometry, solution of right triangles, polar coordinates and parametric equations, vectors and complex numbers. Pass the optional final exam for 4.0 CEUs and Certificate of Achievement.

EM-6, Shpg. wt. 7 lbs. 49.95

Learn Statistics the professionals use to analyze data

Descriptive Statistics and Probability Distributions includes seven unit-text in binder and seven cassette tapes. Precede with EM-3 or equivalent. 3.0 CEUs.

EM-7, Shpg. wt. 6 lbs. 49.95

Inferential Statistics Program covers 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 \$10.00 on your Statistics education. Order EM-7 and EM-8 Programs together. If purchased separately, \$109.90.

EMS-78, Shpg. wt. 14 lbs. 99.90

Quality Cassette Tape Recorder/Player

The ECP-3801A Cassette Tape Recorder/Player is recommended for use with any of the Heathkit educational programs containing audio cassettes. Easy-to-reach push-buttons control play, rewind, fast forward, stop, eject and record functions. The ECP-3801A also features a built-in condenser microphone so you can make your own recordings or give dictation. A built-in three-digit counter with reset button lets you find specific information accurately and quickly. Factory assembled and tested; not a kit.

ECP-3801A, Shpg. wt. 4 lbs. 60.00



Advanced TI-50 Scientific Calculator

The powerful Texas Instruments TI-50 Slimline Scientific Calculator puts advanced capability and quality in an attractive package. It's a powerful scientific calculator with statistics — and the most commonly used logarithmic and trigonometric operations, making the TI-50 ideal for use with the EM-7 and EM-8 Programs above. Sixty functions handle a wide range of mathematical problems, including slide-rule functions such as roots, powers, reciprocals, logarithms and trig (in degrees, radians or grads). Assembled and tested.

EMA-10, Shpg. wt. 1 lb. 39.95



Powerful TI Programmable 59 Calculator

The Texas Instrument TI-59 Programmable Calculator is ideal for use with the mathematics programs on this page, or for computer or electronic design applications. 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 capability and flexibility. Includes a master library of 25 prewritten applications programs. Assembled and tested.

EMA-20, Shpg. wt. 7 lbs. 249.95



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EDUCATION/77

Heathkit Programs make learning electronics easier



Heathkit Advanced Electronics Self-Instruction Programs eliminate the legwork for you. They come complete with components so you can perform tried and tested experiments based on an easy-to-understand text. So, learning is faster, more fun... and more economical, too. Large, illustrated visual materials make learning even more effective. And the optional Heathkit ET-3300 Electronic Trainer gives you actual hands-on experience with the electronic components and circuits discussed in the Ad-

vanced Electronics programs. Whether you are a technician/engineer interested in self-improvement, a student seeking advanced electronics knowledge, or a hobbyist interested in new electronic developments, these programs are designed to meet your needs in the most economical way.

Learn about Op Amps, one of today's most important ICs



A 385-page text, reinforced by test questions and experiments, teaches you how to measure and compute common op amp parameters; how to design basic op amp linear circuits; how to design integrator and differential circuits; and how to design and predict the performance of op amp constant current sources; as well as current-to-voltage and voltage-to-current converters. Even the popular Norton and BiFET op amps are covered. Components are included for conducting experiments. Desirable options for the experiments are the ET-

3300 Lab Breadboard (below), and an oscilloscope like the Heathkit IO-4105 (page 68), a multimeter like the Heathkit IM-1104 (page 60), and a frequency generator like the IG-1271 (page 61). The Basic Electronics Series (EE-3101 through 3104, pages 70-72) or equivalent makes Op Amps easier. 3.0 CEUs.

EE-101, Shpg. wt. 5 lbs. 39.95
Kit ET-3300, Breadboard, wt. 6 lbs. 89.95
ETW-3300, Assembled Breadboard, 6 lbs. 149.95
SAVE \$10.00! EES-101, Program with Kit Breadboard, Wt. 11 lbs. 119.90

This in-depth program makes learning Active Filters easy



A 300-page text helps you learn 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, to design second-order and high-order filters, bandpass and state variable filters. It's helpful to complete EE-101 (above), or have equivalent knowledge first. Desirable are the ET-3300 Breadboard (at right) or the ET-3100 Trainer (page 70) (NOTE: The ET-3100 cannot be used with the other Advanced Programs), an oscilloscope like the IO-4105 (page

68), a multimeter like the IM-1104 (page 60) and a frequency generator like the IG-1271 (page 61). 70% or better on the optional final exam earns you 3.0 CEUs.
EE-102, Shpg. wt. 5 lbs. 29.95
Kit ET-3300, Breadboard, Shpg. wt. 6 lbs. 89.95
ETW-3300, Assembled Breadboard, Shpg. wt. 6 lbs. 149.95
SAVE \$10.00! EES-102, Program and Breadboard, Wt. 11 lbs. 109.90

SAVE \$40.00 on your Advanced Electronics Education!

Order all four Advanced Electronics Programs (Op Amps, Active Filters, IC Timers and Phase-Locked Loops) together with the ET-3300 Breadboard kit. If purchased separately, \$249.75.

EES-1014, Shpg. wt. 29 lbs. 209.75

Our newest program introduces you to the IC Timer



This new Heathkit Program helps you learn common IC timers, how each works, what they do and where to use them. You'll learn to use them for logic functions, in output drive circuits, time-delay relay circuits, wide-range pulse generators, voltage/frequency converters, free-wheeling, power-fail oscillators, sine-wave/square-wave oscillators, universal appliance timers, speed alarms, burglar alarms, alarm indicators, power monitor error detectors, phase-locked loops and precise clock sources. Included

are a 348-page text and parts for the optional experiments. Also useful for the experiments are the ET-3300 Breadboard (below), an oscilloscope like the IO-4105 (page 68) and a multimeter like the IM-1210 (page 62). It's helpful to complete EE-3201 Digital Techniques (page 73) or equivalent. 3.0 CEUs.

EE-103, Shpg. wt. 5 lbs. 39.95
Kit ET-3300, Breadboard, Shpg. wt. 6 lbs. 89.95
ETW-3300, Assembled Breadboard, 6 lbs. 149.95
SAVE \$10.00! EES-103, Program and Breadboard, Wt. 11 lbs. 119.90

Learn Phase-Locked Loops with this self-instruction program



You need to know about phase-locked loops to understand many state-of-the-art electronic devices. PLLs are widely used in television and FM receivers, CB and 2-meter transceivers. So this extensive 268-page self-instruction text helps you learn the general principles of PLLs and their building blocks — the phase detector, loop filter and voltage-controlled oscillator. Optional experiments at the end of each unit give you hands-on experience with PLLs. Necessary parts are included. Also helpful are the optional ET-3300 Breadboard (below), a DC voltmeter like the IM-5284 (page 55) and a single-channel oscilloscope like the IO-4105 (page 68). To get more from the program, we recommend a dual-channel scope like the IO-4205 (page 68) and an audio signal generator like the IG-5218 (page 61). Passing the optional final exam with 70% or better will earn you 3.0 CEUs.

EE-104, Shpg. wt. 5 lbs. 49.95
Kit ET-3300, Breadboard, Shpg. wt. 6 lbs. 89.95
ETW-3300, Assembled Breadboard, 6 lbs. 149.95
SAVE \$10.00! EES-104, Program and Breadboard, 13 lbs. 129.90

The Lab Breadboard makes learning electronics easier

Ideal for performing the experiments in the Programs on this page, or use it to do your own experimenting, to test electronic components, or to design prototype circuits.

\$89⁹⁵
Kit



The Heathkit ET-3300 Laboratory Circuit Breadboard is a great convenience tool for electronics learning or circuit design. Solderless sockets make breadboarding easier and simpler. Sockets are designed to accommodate any size dual in-line integrated circuit package. Reliable built-in power supply provides +5 VDC ($\pm 4\%$), +12 VDC (variable) or -12 VDC ($\pm 2\%$) power to the Breadboard, with fixed current limiting of each supply at rated current providing protection against shorts. Desirable with EE-101, EE-103 and EE-104. Can be used with EE-102. 120/240 VAC, 60/50 Hz. 3.5" H x 12" W x 12" D.

Kit ET-3300, Shpg. wt. 6 lbs. 89.95
Fully Assembled Laboratory Circuit Breadboard.
ETW-3300, Shpg. wt. 6 lbs. 149.95

Now learn a foreign language as if living where it's spoken with these Heath-recommended Berlitz® courses

\$95⁰⁰

- Six tapes cover several weeks of actual foreign conversation in 50 lessons
- You learn to hear what is said to you and how to reply to it
- As in a foreign country, you hear it over and over

The best way to learn a foreign language is to live where it is spoken. How many times have you heard that from people who found it to be true by actually living abroad? Because it is true, this new language learning kit involves you in actual conversations in Spanish, French, Italian and German — as if you were there in person. You hear words spoken in their proper accent. Your ear and tongue become attuned. You learn exactly as you would learn if you were in the country where the language is spoken.

And, exactly as if you were there, if you forget you can become involved again in the conversation simply by rewinding the tape — which you can play over and over again until you have everything down pat. Your memory can be instantly refreshed.

It's not unlike walking along a foreign street, sitting in a foreign restaurant, cashing a check in a foreign bank. You are there. It's a way of learning far different from traditional methods. You are exposed to "everyday" talk until, eventually, you "absorb" it. The important difference is you hear it, you don't just read it or have it told to you.

And one of the best things about this natural method of learning is that it is not limited to you. Your whole family — including the children — can listen and learn in the same way while you are learning. And if they do, of course, this can make everybody's learning faster because it will enable you to try conversing among yourselves.

Each of the six tapes of recorded foreign conversation comes with a handsome, illustrated 50-page book that lets you see what you are hearing so that you can read as well as converse in your chosen language. Signs, directions, labels in Spanish or French or Italian or German will no longer be a mystery to you — and neither will menus!

Of the six tapes you will receive, all are 60 minutes except one which is 90 minutes. This is called the Zero Cassette. This is a tape that "talks to you." It asks

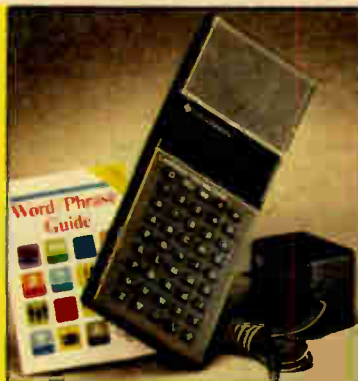


you questions and corrects your answers if you make a mistake. If you are about to journey to a Spanish-speaking, French-speaking, Italian-speaking or German-speaking country, you will find any of our four pocket-sized books to carry with you when you are out. Everything comes in a handsome brief case.

EL-201, French, Shpg. wt. 8 lbs.	95.00
EL-202, German, Shpg. wt. 8 lbs.	95.00
EL-203, Spanish, Shpg. wt. 8 lbs.	95.00
EL-204, Italian, Shpg. wt. 8 lbs.	95.00

Electronic Translator actually pronounces words in French, Spanish or German

An electronic breakthrough called Solid State Speech™ lets your Language Translator actually speak words, phrases and sentences in French, German or Spanish to aid you in your language studies or travels to foreign lands.



Amazing is the only word — in any language — to describe the exciting Electronic Language Translator from Texas Instruments. This hand-held marvel actually speaks and displays words, phrases and sentences in foreign languages and English, yet measures only 7.95" H x 3.4" W x 1.25" D. Plug-in modules (offered separately below) give you more than a thousand phrases in Spanish, French or German... and other language modules are on the way.

Your fully-assembled Translator comes complete with 110 VAC adapter. Or four AA batteries (not included) make it fully portable. Carrying case, earphone and instructions included. Needs at least one language module, below, for operation.

ET-200, Assembled Translator, Wt. 2 lbs.	299.95
ET-200-1, French Module, Wt. 1 lb.	59.95
ET-200-2, German Module, Wt. 1 lb.	59.95
ET-200-3, Spanish Module, Wt. 1 lb.	59.95



Learn to solder the correct way with this low-cost Program

\$15⁹⁵

The Heathkit Soldering Manual and Kit teach the proper techniques for high reliability soldering in electronics applications. Whether for industrial training use, kit building or experimenting, this self-instruction program is the perfect way to learn or brush up on soldering skills. Using a proven programmed instruction format, the step-by-step text begins with mechanical connection and progresses through tinning, temperature control, different types of solder, the advantages and disadvantages of various irons, guns and tips... and even includes a section on unsoldering. To give you real "hands-on" experience, a handy practice kit complete with circuit board, components and solder is included. When you complete it, you will have a two-transistor oscillator that you built yourself. Requires a soldering iron and small hand tools (see pages 82 and 83).

EI-3133, Shpg. wt. 2 lbs.	15.95
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EDUCATION/79



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

Teachers, training directors — Heath/Zenith Learning Programs available in classroom versions to fit custom training needs

Now you can apply famous Heath/Zenith Learning Programs to your own training needs. The programs below have been reformatted for more flexible classroom use. The teacher uses the instructor's guide to add his/her experience and guidance, providing fully rounded training.

The programs are organized in three separate publications, each designed for greater student and teacher convenience. The student text is the core of the learning material. The student workbook, with its examinations and laboratory experiments, is keyed to the text. The instructor's guide helps the teacher present the material in orderly fashion.

In addition, separate parts packs contain all the necessary components for implementing the workbook experiments. To complete the experiments in DC and AC Electronics, Semiconductor Devices, Electronic Circuits and Test Instruments, the ET-3100 Trainer, described on page 70, is useful. Experiments for the Digital Techniques Program require the ET-3200 Trainer, featured on page 73. Turn to page 75 for a description of the Heath/Zenith ET-3400 Trainer, required to complete the experiments in the Microprocessor Program.



NEW

Three more Heath/Zenith Learning Programs are now available in classroom versions for group learning situations. Broaden learning or training horizons with the new, larger selection of Heath/Zenith Classroom Learning Programs.

Heath/Zenith Classroom Programs are the ideal answer for industry, government and schools who want to cover subject matter efficiently at minimum cost. These well-conceived programs use multi-media instruction — a variety of teaching methods, such as self-study textbooks, helpful instructor's guides, programmed instruction, audio-visual reinforcement, self-checking examinations, kits and hands-on experiments.

Application oriented — with just the right amount of theory and a maximum emphasis on real-world use, Heath/Zenith Classroom Programs incorporate the most recent, up-to-date technical material available.

Free brochures are available, detailing each Heath/Zenith Classroom Program. Contact Heath Company, Contract Sales Department, Benton Harbor, MI 49022 — or call the Contract Sales Department at (616) 982-3519 — for more information. They'll be happy to provide you with descriptive, fully detailed literature — as well as current price schedules.

Classroom version of Heath/Zenith Automotive Programs

Heath/Zenith Automotive Programs are available in classroom format, too. See page 21 for full descriptions. For additional information, contact Heath's Contract Sales Department at (616) 982-3519, or distributors serving the vocational education market (listed at right).

NEW

EB-20, Auto Tune-Up Program Textbook, Shpg. wt. 4 lbs.	17.95
EB-20-30, Parts Pack, Shpg. wt. 1 lb.	14.95
EB-20-40, Student Workbook, Shpg. wt. 2 lbs.	9.95
EB-20-50, Instructor's Guide, Shpg. wt. 1 lb.	8.95
EB-20-60, Cassette Tapes, Shpg. wt. 1 lb.	9.95
EB-20-70, Filmstrips, Shpg. wt. 1 lb.	14.95

EB-10, Auto Electrical Program Textbook, 3 lbs.	12.95
EB-10-30, Parts Pack, Shpg. wt. 2 lbs.	17.95
EB-10-40, Student Workbook, Shpg. wt. 3 lbs.	9.95
EB-10-50, Instructor's Guide, Shpg. wt. 1 lb.	8.95
EB-10-60, Cassette Tapes, Shpg. wt. 1 lb.	17.95
EB-10-70, Filmstrips, Shpg. wt. 1 lb.	29.95

Program	Test Shpg. wt. 2 lbs.	Price	Workbook Shpg. wt. 2 lbs.	Price	Instructor's Guide Shpg. wt. 1 lb.	Price	Parts Shpg. wt. 1 lb.	Price	Cassettes Shpg. wt. 1 lb.	Price
DC Electronics	EB-6101	17.95	EB-6101-40	7.95	EB-6101-50	8.95	EB-6101-30	17.95	EEA-3101	9.95
AC Electronics	EB-6102	17.95	EB-6102-40	7.95	EB-6102-50	8.95	EB-6102-30	12.95	EEA-3102	9.95
Semiconductor Devices	EB-6103	17.95	EB-6103-40	7.95	EB-6103-50	8.95	EB-6103-30	12.95	EEA-3103	9.95
Electronic Circuits	EB-6104	19.95	EB-6104-40	8.95	EB-6104-50	8.95	EB-6104-30	27.95	EEA-3104	9.95
Test Instruments	EB-6105 (4 lbs.)	19.95	EB-6105-40	8.95	EB-6105-50	8.95	PARTS, CASSETTES NOT USED			
Digital Techniques	EB-6201 (3 lbs.)	24.95	EB-6201-40	10.95	EB-6201-50	8.95	EB-6201-30	24.95	EEA-3201	9.95
Microprocessors*	EB-6401 (4 lbs.)	24.95	EB-6401-40	10.95	EB-6401-50	8.95	EB-6401-30	54.95	EB-6401-60	12.95
BASIC Programming	EB-6100 (4 lbs.)	12.95	EB-6100-40	7.95	EB-6100-50	8.95	PARTS, CASSETTES NOT USED			
Assembly Programming	EB-6108 (4 lbs.)	17.95	EB-6108-40	8.95	EB-6108-50	8.95	PARTS, CASSETTES NOT USED			

*Also available for Microprocessor Program:

EE-3401-1, Slides, Shpg. wt. 2 lbs.60.00
EE-3401-2, 35 mm Filmstrip, Shpg. wt. 1 lb.20.00

ATTENTION EDUCATORS: Heath products for education in fully assembled form are available from distributors serving the vo-ed market in the following states. More information and assistance are available at the telephone number listed below for your area.

Alabama	205-822-1326	Missouri	913-722-4713
Alaska	907-456-1872	Montana	503-635-3544
Arizona	602-945-6605	Nebraska	402-345-2797
Arkansas	205-822-1326	Nevada	702-358-0829
California (So.)	714-493-8040	New Hampshire	617-285-9028
California (No.)	415-651-6720	New Jersey	201-528-5637
Colorado	303-795-1450	New Mexico	602-945-6605
Connecticut	617-285-9028	New York	516-538-1569
District of Columbia	804-741-2580	North Carolina	919-776-9841
Florida	305-647-5373	North Dakota	612-533-2133
Georgia	305-647-5373	Ohio	513-424-4621
Hawaii	808-536-0243	Oklahoma	214-361-8665
Idaho	503-635-3544	Oregon	503-635-3544
Illinois (So.)	309-343-6135	Pennsylvania	717-533-4038
Illinois (No.)	312-960-0363	Rhode Island	617-285-9028
Indiana	317-293-5704	South Carolina	704-366-4824
Iowa	309-343-6135	South Dakota	612-533-2133
Kansas	913-722-4713	Tennessee	205-822-1326
Kentucky	205-822-1326	Texas	214-361-8665
Louisiana	205-822-1326	Utah	702-358-0829
Maine	617-285-9028	Vermont	617-285-9028
Maryland	804-741-2580	Virginia	804-741-2580
Massachusetts	617-285-9028	Washington	503-635-3544
Michigan	313-585-2300	West Virginia	804-741-2580
Minnesota	612-533-2133	Wisconsin	612-533-2133
Mississippi	205-822-1326	Wyoming	303-795-1450

LAST CALL!



Last call on VHF/UHF Scanner that lets you monitor three bands

\$89⁹⁵

- Built-in antenna for each band
- Automatically scans channels
- AC and 12 VDC power supplies

Monitor fire calls, police, marine, Amateur 2-meter, ambulance, gov't weather and more. Automatically scans each channel, stopping on any signal; resumes scan after broadcast. Priority features — checks priority channel every 4 seconds. 4-pole crystal filter (for better selectivity order optional 8-pole filter below); channel lockout buttons; lighted channel indicators. Telescoping antennas. Built-in speaker, volume and squelch controls. Order crystal certificates below.

Kit GR-1132, Shpg. wt. 9 lbs. 89.95

Crystal Certificate. You send one to crystal mfr. for each specific frequency. Crystal returned postpaid. GRA-1100-1 each 6.95

Outdoor Scanner Antenna (Antenna Specialists MONR 31). Tri-band base- and center-loaded base station ground plane antenna. For masts to 1½" dia. SO-239 receptacle. GRA-1132-1, 2 lbs. ... 29.95
 GRA-1131-1, Mobile Mounting Bracket, 1 lb. ... 4.95
 GRA-1100-2, 8-pole crystal filter, 1 lb. 11.95

GR-1132 SPECIFICATIONS: Scanning Range: LO-VHF, any 10 MHz segment of 30-50 MHz frequency range. HI-VHF, any 8 MHz segment of 146-174 MHz frequency range. UHF, any 8 MHz segment of 450-500 MHz frequency range. Sensitivity: Lo and HI VHF: 0.5 µV or less for 12 dB SINAD. UHF: 0.7 µV or less for 12 dB SINAD. Adjacent Channel Rejection: (30 kHz channel spacing) —40 dB typ. (—55 dB typ. with optional 8-pole filter). Antenna Impedance: 50 ohms. Power Requirement: 120 VAC, 60 Hz. 12 watts or 13.8 VDC, 300 mA squelched; 500 mA at full output. Dimensions: 3¾" H x 8½" D x 11¼" W.



4-Band Shortwave Receiver — just right for the beginning kit builder — your introduction to the fascinating world of shortwave listening

\$99⁹⁵

- A great introduction to the fun of kit-building — and great listening, too
- Complete coverage from 550 kHz to 30 MHz in four bands
- Built-in AM rod antenna plus connection for external shortwave antenna
- Built-in speaker plus front panel jack for external speaker or headphone

If you're looking for a great first-time radio kit — or simply a great low-priced shortwave receiver — the SW-717 is for you. It's an ideal introduction to the fun and fascination of electronic kit construction.

Tunes foreign broadcasts from all over the globe — amateur and CB radio bands — local and marine weather reports — ships at sea — plus standard AM — it's a world of exciting listening at your fingertips! Features wide slide-rule tuning dial with logging scale; bandspread tuning for easy separation of crowded stations, variable BFO for code reception; built-in speaker; front panel jack for external speaker or headphone; switchable automatic noise limiting; signal-strength tuning meter; built-in AM rod antenna plus connection for SWL antenna.

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. Alignment of the receiver can be performed without instruments.

The SW-717 manual includes instructions for oper-

ation, and a reception guide listing bands, frequencies, zones and times of best shortwave reception. Easy-to-follow instructions and careful engineering make this a receiver you'll be proud to tell your friends you built yourself.

Kit SW-717, Shpg. wt. 10 lbs. 99.95

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

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

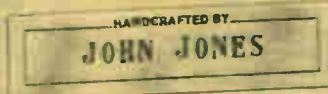
Superox Headphones. Ideal for use with the SW-717 and other shortwave receivers. Feature dual coils for excellent sensitivity, wide headband for comfortable listening. 600 ohms impedance.

GD-396, Fully assembled, Shpg. wt. 2 lbs. 7.95

SW-717 SPECIFICATIONS: Frequency coverage: 550 kHz - 1500 kHz, 1.5 - 4 MHz, 4 - 10 MHz, 10 - 30 MHz. Meter: Indicates relative signal strength. Headphone Jack: Accepts low impedance headphone or external speaker. Loudspeaker: Built-in. Power Requirement: 120/240 VAC, 60/50 Hz, 8 W. Dimensions: 5½" H x 14½" W x 8" D.

Personalize your kits with this Engraved Brass Name Plate

\$2⁰⁰ for one



\$1⁶⁰ each for 2 or more

Personalize each Heathkit project with one of these handsome, engraved name plates. Made of solid brass with brushed jeweler's finish, the name plate is a great way to show the world your pride in the kit you built yourself. Self-adhesive backed for easy application. To order, simply complete order form and include with any regular kit order from this catalog.



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

PLEASE PRINT YOUR NAME PLAINLY IN CAPITAL LETTERS USING THE MAXIMUM 14 CHARACTER (INCLUDING SPACES) BOXES PROVIDED BELOW.

Please ship GDP-1225 Name Plates as shown below at \$2.00 for one, \$1.60 each for two or more (including postage and handling). Name Plates are shipped 1st class mail under separate cover. My total remittance of \$_____ is included with regular Heathkit order form (p. 53) attached.

Name _____

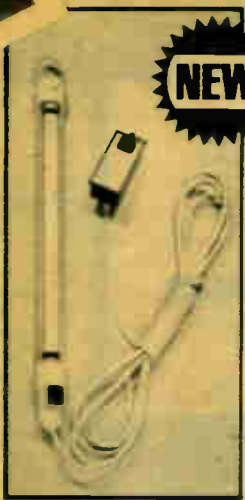
Address _____

City _____

State _____ Zip _____

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

SHORTWAVE RADIO/81



NEW

Portable plug-in fluorescent light lets you get into cramped areas

Use in most any cramped area—attic, basement, car or anywhere else you can hang the trouble light from its swivel hook.

This assembled trouble light will provide plenty of light—even at night—so you can see your way through most any trouble. Just plug into any 120 VAC outlet—the long 25-foot line cord lets you get to most any hard-to-reach area. Costs less to operate, too—draws just 25 watts.

There's no walking back and forth to the wall to turn this light on—the starter switch is right in the handle. And the ballast box is part of the 3-conductor grounded wall plug assembly, so you don't have to drag ballast around.

With the Heathkit GDP-206 Fluorescent Trouble Light, you'll never have to be in the dark again. For 120 VAC. 26" L x 2.5" W x 2.5" D

GDP-206, Assembled, Shpg. wt. 4 lbs. 19.95

Multi-Outlet Boxes eliminate messy extension cords



1 **NEW!** Six-Socket Multiple Outlet Box puts power where you need it. Has 6 three-hole outlets—five switched for killing power to equipment, one unswitched to leave clock running. Maximum 10 amp load. Includes fuse, fuse holder and 6-foot long cord. For 120 VAC.

Kit HD-1360, Shpg. wt. 2 lbs. 12.95

2 Twelve-Socket Multiple Outlet Box. Same as six-socket multiple outlet box described above, but has eleven switched outlets and one unswitched outlet to double your convenience while working in workshop or garage. With fuse, fuse holder and 12-foot long cord. For 120 VAC.

Kit HD-1274, Shpg. wt. 4 lbs. 17.95



Motor Speed Control is ideal for any universal motor, rated 15 amps or less. Saves power, blades, bits. Use large drills on metal, at slow speeds, to keep motor cool. Not for use with Dremel tools. 120 VAC. 3.5" H x 3.25" W x 6" D.

Kit GD-973A, Shpg. wt. 2 lbs. 29.95



NEW

3-D Binocular Magnifiers let you see sub-miniature objects

Save yourself from eye strain when kitbuilding, or when working with sub-miniature objects. The Heathkit GDP-201 Binocular Magnifiers provide close-up magnification, while leaving your hands free. These Binocular Magnifiers make objects appear two and a half times larger than normal.

Focal distance is normally 8.5 inches (21.59 cm), but depends on user's vision. All parts American made. Ground glass lenses inserted in a durable plastic frame. GDP-201, Assembled, Shpg. wt. 1 lb. 12.95

Heat-Controlled Solder Station for easier soldering



This Heath-recommended, transformer-powered Weller WTCPN Soldering Station has closed-loop control of the tip temperature. Also features heat shield, indicator lamp and sponge. Tip heats up to 700 deg. F (371 deg. C). Assembled. GDP-1108, Shpg. wt. 5 lbs. 69.95

Set of Replacement Tips for the Weller WTCPN Soldering Station (all rated at 700 deg. F—371 deg. C). Set includes: $\frac{1}{16}$ " screwdriver, $\frac{1}{8}$ " screwdriver, $\frac{3}{64}$ " screwdriver, $\frac{3}{64}$ " long screwdriver and $\frac{1}{32}$ " long conical tips.

GDP-1109, Shpg. wt. 1 lb. 12.95

Three-Heat Soldering Iron Kit for kitbuilding versatility



Stand with metal case keeps the soldering iron secure. Three heat settings (high, medium and low) make the GH-17A Soldering Iron Kit ideal for most any electronic application. Soldering iron has 6-volt, 25-watt element—includes $\frac{3}{16}$ " chisel tip. Six-foot long heavy-duty power cord. Grounded wall plug adds an extra measure of safety. For 120 VAC, 50/60 Hz. Draws only 24 watts maximum. Cabinet dimensions are 5.13" H x 3.56" W x 5.5" D (13.03 x 9.04 x 13.97 cm). Soldering iron, 8" L (20.32 cm).

Kit GH-17A, Shpg. wt. 5 lbs. 39.95

Visit your Heathkit Electronic Center (Units of Veritechnology Electronics Corporation) and see our complete product line.

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

ARIZONA — Phoenix, 85017
2727 W. Indian School Rd. 602-279-6247

CALIFORNIA — Anaheim, 92805
330 E. Ball Rd. 714-776-9420

El Cerrito, 94530
6000 Potrero Ave. 415-236-8870

Los Angeles, 90007
2309 S. Flower St. 213-749-0261

Pomona, 91767
1555 N. Orange Grove Ave. 714-623-3543

Redwood City, 94063
2001 Middlefield Rd. 415-365-8155

Sacramento, 95825
1850 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 (Mialeah, 33012)
4705 W. 16th Ave. 305-823-2280

Tampa, 33614
4019 West Hillsborough Ave. 813-886-2541

GEORGIA — Atlanta, 30342
5285 Roswell Rd. 404-252-4341

ILLINOIS — Chicago, 60645
3462-66 W. Devon Ave. 312-583-3920

Chicago (Downers Grove, 60515)
224 Ogden Ave. 312-852-1304

INDIANA — Indianapolis, 46220
2112 E. 62nd St. 317-257-4321

KANSAS — Kansas City (Mission, 66202)
5960 Lamar Ave. 913-362-4486

KENTUCKY — Louisville, 40243
12401 Shelbyville Rd. 502-245-7811

LOUISIANA — New Orleans (Kenner, 70062)
1900 Veterans Memorial Hwy. 504-467-6321

MARYLAND — Baltimore, 21234
1713 E. Joppa Rd. 301-661-4446

Rockville, 20852
5545 Nicholson Lane 301-881-5420

MASSACHUSETTS — Boston (Peabody, 01960)
242 Andover St. 617-531-9330

Boston (Wellesley, 02181)
165 Worcester Ave.

(Rt. 9 just west of Rt. 128) 617-237-1510

MICHIGAN — Detroit, 48219
18645 W. Eight Mile Rd. 313-535-6480

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

MINNESOTA — Minneapolis (Hopkins, 55343)
101 Shady Oak Rd. 612-938-6371

St. Paul, 55106
1645 White Bear Ave. 612-778-1211

MISSOURI — St. Louis (Bridgeton) 63044
3794 McKelvey Rd. 314-291-1850

NEBRASKA — Omaha, 68134
9207 Maple St. 402-391-2071

NEW JERSEY — Fair Lawn, 07410
35-07 Broadway (Rte. 4) 201-791-6935

Ocean (Asbury Park), 07712
1013 State Hwy. 35, 201-775-1231

NEW YORK — Buffalo (Amherst, 14226)
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 Road 512-341-8876

UTAH — Salt Lake City (Midvale, 84047)
58 East 7200 South 801-566-4626

VIRGINIA — Alexandria, 22303
6201 Richmond Hwy. 703-765-5515

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

WASHINGTON — Seattle, 98109
505 8th Ave. N. 206-682-2172

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



Complete, quality Tool Set designed for the kitbuilder



Just beginning your kitbuilding hobby? Here's a high quality Kitbuilder's Tool Set selected especially for your building enjoyment. You will receive a wire stripper/diagonal side cutter; small long-nose pliers; three screwdrivers ($\frac{3}{32}$ ", $\frac{1}{8}$ ", $\frac{3}{16}$ ""); a Weller WP-25 soldering iron; five nut drivers ($\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ""); a nut starter; a soldering aid, and a generous supply of solder. The set comes packaged in its own, attractive carrying case with molded individual compartments for handy storage of each item. This top-line, Heath-recommended Tool Set is the ideal way to begin your kitbuilding hobby. Order yours today.

GHP-1270, Shpg. wt. 3 lbs. 34.95

Nut Driver Set — great building aid

Seven nut drivers in popular sizes for most kitbuilding projects: $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ ".

GDP-204, Shpg. wt. 2 lbs. 13.95

① PanaVise Circuit Board Holder. Holds almost any size circuit board. Spring loaded for quick change. Tilts 220 degrees. Fits vacuum or standard base.

GDP-1254, Shpg. wt. 2 lbs. 18.95

② PanaVise Vacuum Base. Attaches to any smooth, non-porous surface. Powerful rubber suction pad holds without marring. Perfect where permanent mounting is not practical. Height, $3\frac{3}{8}$ ". Base, 5" x $4\frac{1}{4}$ ". Use with GDP-1253, -1254, -1255.

GDP-1252, Shpg. wt. 2 lbs. 17.95

③ PanaVise Vertical Jaw Vise Head. Nylon jaws open to 2 $\frac{3}{4}$ " to provide a firm grip without marring. GDP-1253, Shpg. wt. 2 lbs. 14.95

④ PanaVise Vertical Vise Head. Holds bulkier items. Jaws open to 6 $\frac{1}{2}$ ". Pads replaceable.

GDP-1255, Shpg. wt. 2 lbs. 13.95

⑤ PanaVise Standard Height Base. For permanent installation. Attaches securely to work surface with three lugs. Choose desired vise heads above.

GDP-1251, Shpg. wt. 2 lbs. 13.95



This Illuminated Magnifier Kit makes kitbuilding easier

Easy-on-the-eyes fluorescent lighting and a 5" diameter 3 diopter lens combine to take the strain out of close work at your bench. The illuminated Magnifier clamps securely to any horizontal work surface. The extension arm is jointed for full 360° movement and a generous 45" reach for extra ease in adjusting the unit for awkward working angles. Bright, bright illumination is provided by an energy-sparing 22-watt T-9 Circline fluorescent tube (not included). The Heathkit Illuminated Magnifier is a must for the serious kitbuilder who takes real pride in his or her hobby, and wants to get maximum enjoyment.

Easy mechanical assembly only. 120 VAC. Kit GDP-200, Shpg. wt. 7 lbs. 69.95



Extension Lamp Kit for happy eyes

This bargain-priced kitbuilding aid will pinpoint bright illumination on your work area for greater ease and enjoyment. The convenient extension arm comes already assembled. All you do is attach socket, shade and cord. 34" reach, 360 degree sweep, vented shade, movable base clamp. Uses incandescent bulb (not included). Makes your kitbuilding easier.

Kit GDP-202, Shpg. wt. 4 lbs. 24.95



Quality soldering irons for a "professional" kitbuilding job

① Heath-recommended Weller 25-Watt Pencil Soldering Iron. $\frac{1}{8}$ " chisel tip. 860° heat.

GDP-207, Shpg. wt. 1 lb. 13.95

② Solder/de-Solder Set. Like above, but includes de-solder bulb for easy removal of components from circuit boards.

GDP-1009, Shpg. wt. 1 lb. 17.95

③ Wall 25-W Pencil Iron for high-density boards.

GDP-1231, Shpg. wt. 1 lb. 7.95

④ Heath-approved 40-W Iron. Standard tip.

GDP-1105, Shpg. wt. 1 lb. 7.95



Order a book along with your kit and learn more about the world of electronics



Transistor Substitution Handbook. Replacements for over 19,000 American and foreign bipolar transistors. Includes computer-selected and manufacturers-recommended replacements. Handy reference. 544 pages.

EDP-175 5.95

The 555 Timer Applications Source Book. Explains the 555 timer and 556 dual timer. Includes 17 simple experiments to give you a basic practical knowledge in using the 555 timer. Good source book. 160 pages.

EDP-249 6.95



The TTL Data Book. Design and specification data, pin outs, test data and applications of transistor-transistor logic. Indexes are designed for ease of circuit selection. Section on IC sockets and interconnection panels is handy reference for the design engineer.

832 pages. EDP-220 7.50

Electrical Soldering. Excellent book for beginners and good review for technicians. Functions and requirements of soldering equipment for manufacturers. 144 pages. EDP-178 3.95

Tube Substitution Handbook. Lists 12,000 replacements for all types of American and foreign receiving, picture tubes. Tube basing diagrams. 112 pages.

EDP-174 2.95



TTL Cookbook. What transistor-transistor logic is, how it works, how to use it. From basic to advanced designs, gate and timer circuits, clocked logic, JK and D-type flip-flops, etc. Practical applications such as digital counter, electronic stopwatch, voltmeter, tachometer. Includes projects. 336 pages.

EDP-183 8.95

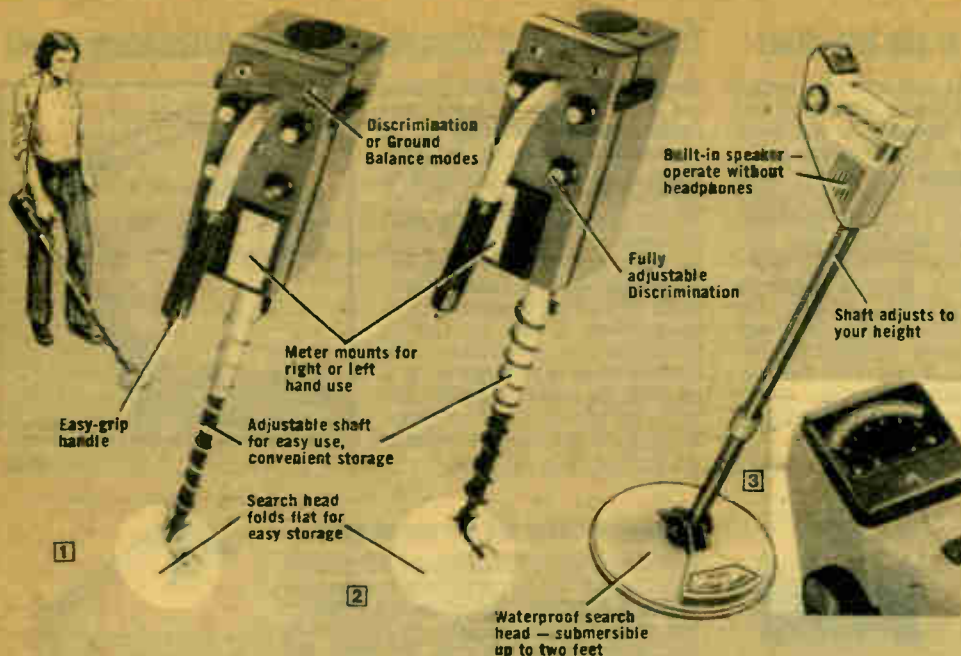
Building and Installing Electronic Intrusion Alarms. Written for both the novice installing his own system or for the technician planning to enter the lucrative field of security electronics. Includes electromechanical television, proximity alarms, telephone attachments, and auto protection alarms. 128 pages.

EDP-135 4.50

(See book-ordering information on page 52).



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



Join the excitement of treasure hunting with a Heathkit Metal Locator

Search for old coins, artifacts, treasure — any metal object you want to find. Our finest Locator features a Very Low Frequency (VLF) Ground Balance Mode. You can use it anywhere for finding almost anything in any kind of soil — even in highly mineralized soil where conventional metal locators are useless. And our lowest-priced model uses an induction balance system to pinpoint your find. Order yours now and join the fun of treasure hunting.

① Groundtrack™ Metal Locator

Useable in most soil conditions. Our finest Metal Locator will give you hour after hour of fun-filled excitement. Whether searching for buried treasure, antique artifacts or old coins, you'll be a step ahead of the others because the Groundtrack's adjustable discrimination lets you look in areas where high "junk" makes conventional locators useless.

A fully-shielded search coil prevents false signals and is waterproof, so you can even look for buried metal in up to two feet of salt or fresh water. The GD-1290 features a sophisticated induction balance system so you hear nothing until a piece of metal enters the search field; then the tone grows louder as you approach the metal object.

Use the lightweight Groundtrack anywhere — it's lightweight — and the adjustable shaft telescopes for easy storage. Uses 6 AA cells (not included) — or with the optional GDA-1190-1 Nickel-Cadmium Battery Pack installed, you can recharge your Groundtrack at home or from your car lighter socket. Kit GD-1290, Shpg. wt. 5 lbs.189.95
GDA-1190-1, Rechargeable Battery Pack, 2 lbs. 19.95

GD-1290 SPECIFICATIONS: Sensitivity: Locates dime at 4" to 6" typical, may be less depending on soil conditions, mode of operation and amount of discrimination selected. **Method of Detection:** Induction-balance circuit. **Detector Output:** Meter, speaker, phone jack. **Dimensions:** Search Coil: 6" diameter. Extended Height: 45½". Collapsed height: 22½". **Power Requirement:** Six AA dry cells or alkaline, or optional rechargeable Nickel-Cadmium Pack (GDA-1190-1, see above). **Net Weight:** 3.4 lbs.

② Cointrack™ Metal Locator finds coins

The GD-1190 is designed for coinshooting. It features a search coil optimized for coin locating, and adjustable discrimination so good you'll be able to find treasure in areas where operation with other locators is all but impossible! Pushbutton tuning maintains maximum sensitivity. The 1190's waterproof head allows underwater searching.

The GD-1190 collapses for easy storage and transportation. And with its optional GDA-1190-1 Nickel-Cadmium Battery pack installed, you can recharge your Cointrack at home or in the field from your car's cigarette lighter socket. Can also be operated on six ordinary AA cells (not included).

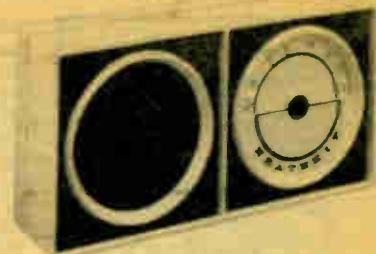
Kit GD-1190, Shpg. wt. 5 lbs.119.95
GDA-1190-1, Rechargeable Battery Pack, Shpg. wt. 2 lbs.19.95
GDA-1190-2, Headphones for GD-1190 or GD-1290, Shpg. wt. 2 lbs.11.95
GDA-1190-3, Carrying Case for GD-1190 or GD-1290, Shpg. wt. 1 lb.11.95

GD-1190 SPECIFICATIONS: Sensitivity: Typically 4" to 6", may be less depending on coin size, amount of discrimination and soil material. **Method of Detection:** Off resonance type. **Output:** Meter, Speaker, Phone Jack. **Dimensions:** Search-Coil: 6" diameter. Overall length: Shaft extended 45½", collapsed 22½". **Power Requirement:** Six AA Dry Cells or Alkaline, or GDA-1190-1 Rechargeable Nickel-Cadmium battery pack. **Net Weight:** 3.4 lbs.

③ Low-priced Induction Balance Locator

The GD-348 uses a sophisticated induction-balance system. Pinpoint finds through built-in speaker, optional headphones or use the front-panel meter. Null and ten-turn sensitivity controls let you adjust to find larger or smaller objects or to overcome ground effect. Less battery (order below).

Kit GD-348, Shpg. wt. 5 lbs.79.95
GDA-48-1, 9-Volt Battery, Wt. 1 lb.4.95
GD-396, 600-ohm Superex Headphones, 2 lbs. ...7.95
GDA-348-1, Carrying Case, Shpg. wt. 2 lbs. ...11.95



Great first-time kit — AM Pocket Radio is fun to build and use

\$16⁹⁵ • Large speaker for fine sound
• Practical start to kitbuilding

This pocket Portable is a practical first kit and a first rate performer. Take it camping, to the beach, use it around home. It's fast and easy to build — an ideal way to introduce someone else (or yourself) to kitbuilding. Famous Heathkit step-by-step instructions assure success. Features 3½" speaker. 4" H x 7⅞" W x 2" D. Uses 9V battery (not included). Kit includes necessary solder as do all our kits.

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

Tabletop Dimmer controls lighting A great first-time kit

\$8⁹⁵

Smoothly adjusts the brightness of table or floor lamps to 300 watts. Eliminates annoying burned-out elements in 3-way bulbs, even helps bulbs last longer. Makes a great heat-control, too, for pencil-type soldering irons. 3¼" H x 3¼" W x 3¼" D. Get several — many uses! Solder included.

Kit GD-1018, Shpg. wt. 2 lbs.8.95

Freezer Alarm protects your costly food when freezer temperature rises

\$14⁹⁵

Freezer Alarm signals if the kids leave the freezer door open, or if freezer temperature rises to 20° F even with the door closed. This easy-to-build

kit uses two "C" batteries (not included). It mounts anywhere with 20-ft. cable supplied. Measures 1¾" H x 3⅝" W x 4⅞" L.

Kit GD-1183, Shpg. wt. 2 lbs.14.95

Automatic Lamp Switch for home security

\$6⁹⁵ Easy kit turns lamps on at night, off at dawn for "lived-in" look when you're away. Lamps to 150 W. 3½" H x 2⅛" W x 2⅛" D.
Kit GD-600, Wt. 2 lbs.6.95





First-time builder? Try one of these easy-to-build kits

Kit-building is fun... and easy. Our world-famous instruction manuals guide you every step of the way. But if you should have questions, technical help is as close as your phone. Everything you need, including solder, comes with your kit. Just add simple hand tools... and enjoy! See pages 82 and 83 for recommended hand tools.



"Programmable" Doorbell plays your favorite tune

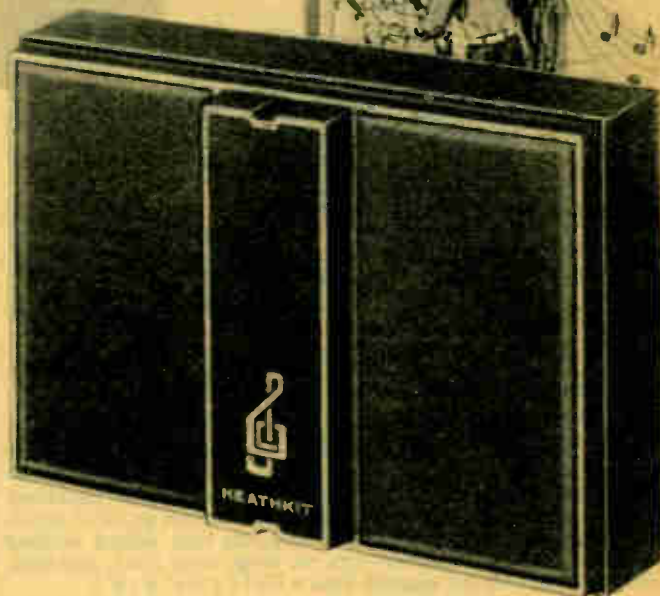
\$49⁹⁵

- Now includes a song book with more than 50 songs
- Program it to play favorite tunes up to 16 beats
- Change tunes easily for any special season or day

This easy-to-build kit is fun for the whole family, too! It's great when guests play your favorite melody (or theirs) as they touch the door button. Use as many as 16 beats to program your tune. Change it whenever you wish... to celebrate a birthday, an anniversary, a season, your favorite team or a party. The song book with the kit gives simple directions for 50 different tunes, including many college songs. Or program your own. It's easy, and such fun. Imagine the looks of surprise and pleasure on the faces of your neighbors and friends when they come to call.

Changing tunes is easy, too — just rearrange the programming wires in the "keyboard" behind the front-panel access door. Controls for the electronically synthesized sound also are located inside the front-panel so you can adjust volume, tempo or tone. Easy to build, even if you're a first-time kit builder. The Heathkit instruction manual also explains installation. Measures 5 $\frac{3}{4}$ " H x 8 $\frac{5}{8}$ " W x 2 $\frac{5}{8}$ " D (14.6 x 21.9 x 6.7 cm). The Electronic Doorbell is a great introduction to the fun and satisfaction of kitbuilding.

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



Rechargeable Fluorescent puts light where you need it

\$34⁹⁵

- Ideal for attic, workshop or basement
- Rechargeable, so it's always ready
- Keep one at home, another in the car

Fishing, camping... or working in the attic, garden, yard or basement — the Heathkit Portable Rechargeable Fluorescent Light gives you bright illumination without bothersome cords to get in your way. Built-in rechargeable battery and separate preassembled charger let you use the GD-1246A for hours. Then simply plug it in to an AC outlet in your home (or into your car's lighter socket using the optional 12V adapter listed below) to restore full power. This easy-to-build kit measures 9 $\frac{3}{8}$ " H x 3 $\frac{3}{8}$ " W x 4 $\frac{5}{16}$ " D. Kit GD-1246A, Shpg. wt. 6 lbs. 34.95

Kit GDA-1246-1, 12V Adapter, Shpg. wt. 1 lb. 4.95



For the time of your life, begin your kit building hobby with the easy-to-build Heathkit Digital Alarm Clock

\$29⁹⁵

- Fast, easy, one-evening kit
- Button lets you catnap
- Choose 12 or 24-hour time



What makes it tick? You'll know when you finish this easy-to-build, practical Digital Alarm Clock. The clear, step-by-step Heathkit manual guides you through this one-evening kit. And when you're finished... you've built an attractive digital alarm clock with a pleasant electronic tone to start your day out right. It even has a button to let you take a 9-minute doze. The pleasant blue-green fluorescent display automatically adjusts to changing light conditions. You can also choose 12 or 24-hour time format. Set time accurately, too. This clock even alerts you to power failures.

Get started in kit building today with this fun and easy electronic clock. Kit includes built-in speaker, handsome simulated woodgrain cabinet and more than enough solder to finish the project. The attractive Heathkit Digital Clock measures 2 $\frac{1}{4}$ " H x 7" W x 4 $\frac{3}{4}$ " D.

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

Remote Control kit for lights or small appliances

\$16⁹⁵

- only Light Switch
- Easy-to-build — mounts anywhere for instant control
- No rewiring — simply plug in lamp or appliance
- Add multiple touch plates



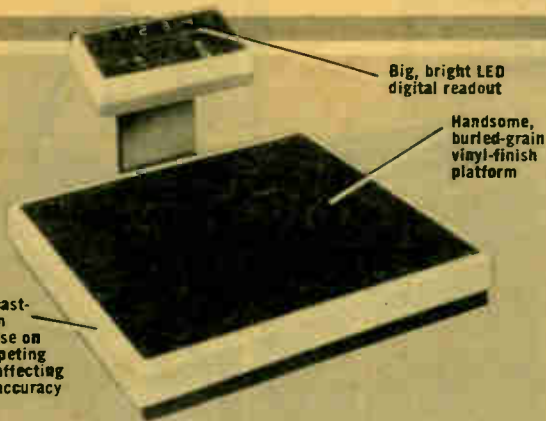
Touch-Control for incandescent lamps to 150 W. On, off, half-brightness. Kit GD-1187, Shpg. wt. 1 lb. 16.95

Touch-Control for TV's to 225 W, fans to 180 W. Not for AM radios. 1 $\frac{7}{8}$ " H x 2 $\frac{3}{8}$ " W x 3 $\frac{3}{8}$ " L. Kit GD-1287, wt. 2 lbs. 17.95



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

Easy-to-build kits make life more convenient



Big, bright LED digital readout

Handsome, burled-grain vinyl-finish platform

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

Digital Scale is a real weight-loser's helper!

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

The GD-1186 is an ideal companion, wherever you go. Because the scale is battery-operated, you can take it everywhere. You can even use the GD-1186 safely after a shower. And an electronic strain-gage mechanism eliminates the mechanical springs and weights that can go out of adjustment. Electronic accuracy so you can weigh the baby, without weighing the blanket. Manual adjustment lets you weigh small items accurately. Requires 6 "C" cells (not supplied). Base is 1½" H x 3½" W x 6" L.

Kit GD-1186, Shpg. wt. 9 lbs. 94.95

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

GDW-1186, Shpg. wt. 9 lbs. 129.95



Ultra-convenient Heathkit Ultrasonic Cleaner

- Tackles those almost-impossible cleaning chores
- Won't interfere with radio or TV reception

The Heathkit GD-1151 Ultrasonic Cleaner makes short work of most hard-to-clean projects. Deep clean watch parts, most jewelry, dentures or any delicate item that could be damaged or otherwise harmed by hard scrubbing, harsh cleaning agents or abrasives. 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 tank, set the timer and the Ultrasonic Cleaner does the rest. The GD-1151 won't hurt radio or television reception — it meets FCC interference suppression requirements. Tank measures 6" L x 4" W x 2¾" D. Overall dimensions, 4¾" H x 5¾" W x 11" L (including lid). For 120 VAC, 60 Hz.

Kit GD-1151, Shpg. wt. 5 lbs. 89.95

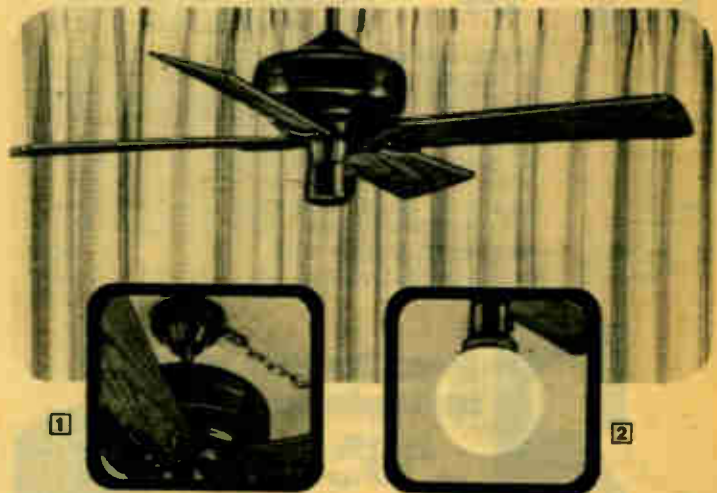


Deluxe FM Wireless Intercom brings you clear communication

- Phase-locked loop circuit assures quiet operation
- No bothersome wiring hookups — uses your present house wiring

Here's a two-way intercom you can use anywhere indoors — as long as the units are on the same AC power transformer. After assembly simply plug each unit into an AC outlet and you're ready to communicate. You can even leave them on all the time at very low cost. Phase locked loop circuitry provides quiet, clear operation. Automatic squelch assures noise-free operation; a pleasant call tone alerts other units. A dictate switch locks the intercom in the "talk" mode for hands-free operation. A transmit indicator lights in the talk mode. 3" speaker. 3" H x 8¾" W x 5¾" D, may be wall mounted. For 120 VAC, 60 Hz. Order each unit separately. You must have at least two units to operate.

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



Cut heating/cooling costs with an authentic Casablanca Fan

Cuts heating costs by bringing warm air down from high ceiling areas. Helps cool by circulating stagnant air. Variable speed adjustment. For charming effect, add optional kits below. Not for ceilings under 8 ft.

Kit GD-1238, Shpg. wt. 24 lbs. 119.95

Slow Speed Accessory. GDA-1238-4, 1 lb. 14.95

1 Swag-Chain Kit. Mount your Casablanca fan most anywhere. Includes: 18' antique brass swag chain, gold electrical cord, hardware. GDA-1238-1, 4 lbs. 14.95

2 Light Kit. Adds old world charm and dual purpose to your fan. Includes glassware, glassware holder and mounting accessories. GDA-1238-2, 3 lbs. 16.95

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



NEW \$37⁹⁵

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

Designed to provide years of dependable listening enjoyment, the Zenith Model R-70 Table Radio features solid-state design for low energy usage. 10 tuned circuits, 2 ceramic filters for excellent performance. Shadow Taupe/Black cabinet with bright aluminum/chrome trim. Uses 120 VAC or 3 "C" cell batteries (not included). Dimensions, 5.75" H x 9" W x 2.75" D (14.6 x 22.9 x 7.0 cm). GRZ-70, Factory assembled and tested, Shpg. wt. 4 lbs. 37.95

Assembled, rich-sounding Zenith AM/FM Table Radio



NEW
\$74⁹⁵

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

Tuned RF stage, AFC, AGC, external antenna connection for great reception. Lighted, easy-to-see convex tuning dial. Slide bass, treble controls. Simulated Walnut cabinet, black grille. 120 VAC. 9.5" H x 16" W x 6.5" D. GRZ-430, Factory assembled and tested, Shpg. wt. 14 lbs. 74.95

Zenith Multi-band Radio keeps you in touch



NEW \$99⁹⁵

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

Stay in touch with police, fire, aircraft — just about everything in town. Covers 30-50, 108-135, 144-174 and 450-470 mHz, as well as AM and FM. High-impact black cabinet. Includes convenient carrying strap. 8.88" H x 11.88" W x 3.88" D. Operates on 120 VAC or 4 "D" cells (not included). SWZ-1000, Factory assembled and tested, Shpg. wt. 6 lbs. 99.95



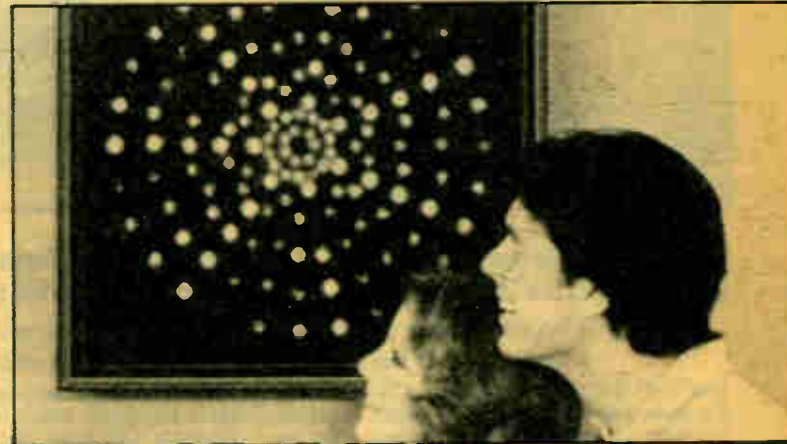
Alaska, Hawaii and Michigan Residents: Call 616-982-3411



Digital Alarm Clock Radio with rich AM/FM sound

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

Loaded with convenient features: 24-hour set-and-forget alarm, built-in 3" x 5" oval speaker for truly fine sound, and a style that fits anywhere. The GR-1075 displays time in the convenient 12-hour format. Shows AM and PM, too. A lighted decimal pulsates to indicate seconds, and also shows that the alarm is properly set. The 24-hour alarm cycle can wake you with a gentle, pulsating electronic beep — or with soft music from the AM or FM radio station of your choice. High-quality electronics, along with 300 μ V/M AM and 5 μ V FM sensitivities, make sure you'll pull in a large selection of stations, day or night. And for the sleepyhead, the clock's 7-minute alarm delay cycle will give you up to an hour of relaxing catnaps. Two 9-volt batteries (not included) take over during power failures and keep the clock counting perfect time. For 120/240 VAC, 50/60 Hz. Dimensions, 4.5" H x 13.63" W x 8.13" D (11.43 x 34.62 x 20.65 cm). Kit GR-1075, Shpg. wt. 10 lbs. 149.95



Musical Light Show adds to your sound system

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

The Heathkit Light Show adds exciting sights to your sound system. Just connect it to the speaker leads of any sound source (except AM radio). Without affecting the sound, active filters separate the audio signal into four frequency bands, each with 35 brilliantly colored lights — red for bass, blue for lower mid-range, green for upper midrange and amber for treble (140 lights total). It's wild — the lights pulsate in time to the music, creating spokes of swirling color. Add new color and dimension to your sound system today. Buy the Heathkit Light Show. Operates on 120/240 VAC. Input is 1 volt RMS min. to 22 volts max. Line isolation provides protection. Dimensions, 22.75" H x 22.75" W x 4.5" D. Kit TD-1006, Shpg. wt. 34 lbs. 109.95



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

\$89⁹⁵

- Microprocessor-based unit stores up to 16 numbers
- Converts standard dial telephone to push-button model
- Can be used with push-button telephones, too!

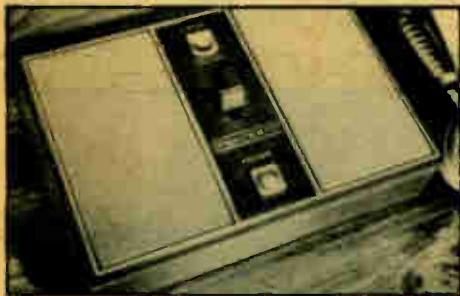
A fire or other emergency is no time to be looking for the fire department or police phone number. The Heathkit One-Button Phone Dialer comes to the rescue by dialing a vital number with the push of one button. And if the number is busy, the automatic re-dial feature lets you call the last number dialed with the push of a button. The One-Button Phone Dialer stores up to 16 full 15-digit phone numbers (enough for all access or area codes). So you can program emergency numbers and still have memory enough for numbers of frequently-called neighbors, businesses, friends and relatives.

Easy programming lets you change telephone numbers on your Dialer quickly. A special memory-save circuit maintains stored numbers if your electrical power should be interrupted (9V battery not included). The GT-1217 One-Button Phone Dialer converts any telephone into a push-button model compatible with both standard and Touch Tone® telephone service. Connection to any modular phone jack is easy, too. However, it cannot be used on party lines or pay telephones. The GT-1217 complies with all FCC interconnect regulations.

Assembly is easy, and so is operation and programming. Housed in an attractive 2" H x 8 3/4" W x 5 3/4" D case, the One-Button Phone Dialer features a convenient two-color, heavy-duty label that allows you to write in the numbers you have programmed. Want to change numbers? The label is easily erasable. Designed for 120 VAC operation, this Dialer uses a low, low 2 watts of power.

The famous Heathkit assembly manual will guide you step-by-step from opening your package when it arrives to final plug-in. Even if you've never built anything before, you'll enjoy putting the One-Button Phone Dialer together.

Kit GT-1217, Shpg. wt. 3 lbs. **89.95**



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

\$44⁹⁵ • Talk without lifting the receiver
• Talk from up to 10 feet away

Save time! Work with your hands while you talk on the phone when you build the Heathkit Telephone Amplifier. To answer the phone, simply press the Power Button; to hang up, just press it again. A voice-activated switch changes instantly from talk to listen. Talk from up to 10 feet away from the phone. The Heathkit Telephone Amplifier requires an external phone for operation. It comes complete with 1/4" diameter phone plug, 1 3/4" square four-pin phone plug and 6' of 4-conductor cable for easy installation. The Telephone Amplifier operates on one 9V battery (not included). This attractively styled unit measures 2 1/2" H x 8 1/2" W x 5 3/4" D.

Kit GD-1112, Shpg. wt. 3 lbs. **44.95**

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

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

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



This all-purpose Digital Thermometer gives super accurate temperatures

\$44⁹⁵ • High accuracy for medical use
• Get readings in just 10 seconds

Get fast, accurate temperatures for medical uses, photo processing, baby's bath and many other applications. The Digital Thermometer reads temperatures from +32° F to +230° F (0° C to +110° C) with ±0.2° F (±1° C) accuracy in the biomedical range and 0.5% accuracy overall. And it never needs calibration! Solid-state microprocessor technology gives you accurate, four-digit readings in as little as 10 seconds. This digital marvel weighs a mere 5 1/2 ounces and fits comfortably in your hand for maximum versatility. A shock-resistant high-impact plastic case protects it from damage. Operates from one 9-volt battery (not included) for up to one year under normal use conditions. Features a flashing decimal low battery warning. Fully assembled, not a kit. The Digital Thermometer measures 2" H x 2 1/2" W x 5" L. Resolution, 0.1° F or 0.1° C. Get your Digital Thermometer now.

GD-1226, Shpg. wt. 2 lbs. **44.95**



Keep the bugs from bugging you this year with the Electronic Flying Insect Killer

\$69⁹⁵ • Features a self-cleaning grid
• Protects up to 1/3 acre

The Heathkit Electronic Flying Insect Killer mounts anywhere outdoors, and looks handsome anywhere near pool, porch or patio. The ten-watt black light attracts flying insects to its electronically charged self-cleaning grid, where they are instantly and safely disposed of. The protective outer screen insures that hands will not accidentally touch the grid. The attractive flat black and brass-colored housing is corrosion-proof. The Electronic Flying Insect Killer operates for just pennies a day. So enjoy the great outdoors this year when you build the Heathkit Electronic Flying Insect Killer. For 120 VAC, this easy-to-build kit measures 16" H x 11" W x 11" D. And the famous Heathkit instruction manual will guide you every step of the way, assuring you of success even if it's your first kit. Order yours today and enjoy the outdoors more.

Kit GD-2007, Shpg. wt. 11 lbs. **69.95**

6DA-2007-1, Mounting Bracket, Wt. 2 lbs. **3.95**





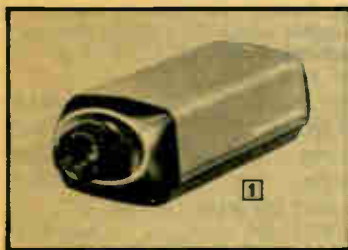
The Informer®: Ultrasonic Intrusion Alarm protects at a low price

- "Sees" intruders up to 25 feet away
- Use anywhere — fits with any book collection

The GD-39 book-size alarm alerts you to the presence of an intruder up to 25 feet from the unit. When field is broken, unit activates lights, buzzers, bells, etc. Built-in time delay to deactivate alarm when you enter room. Also use as automatic light switch for garage or basement. Easy-to-build kit. 10 $\frac{1}{2}$ " H x 2 $\frac{3}{8}$ " W x 7 $\frac{1}{2}$ " D. For 120/240 VAC, 50/60 Hz.

NOTE: Since the GD-49 operates in the same frequency ranges as some ultrasonic TV remote controls, interference between the two is possible.

Kit GD-39, Shpg. wt. 5 lbs.	59.95
GDA-39-1, Indoor Buzzer Alarm, Shpg. wt. 1 lb.	9.95
GDA-39-2, Outdoor Bell, Shpg. wt. 5 lbs.	26.95



TV Camera and Monitor for tight security

1 Sanyo VC-1600X High-Sensitivity Video Camera. This quality camera produces a high-resolution black-and-white TV picture that's ideal for security and surveillance uses. It also allows you to make video tapes when used with a video cassette recorder with video input. Excellent in businesses, stores, factories, anywhere remote monitoring is effective. Includes 50 ft. cable and connectors. Power requirement: 120 VAC, 60 Hz. Fully assembled.

GDP-1850, Shpg. wt. 9 lbs.	259.95
GDP-1852, Mounting Bracket for Camera. Wt. 2 lbs.	19.95

2 Sanyo VM-4209 High-Performance Video Monitor. Use with the Sanyo camera above for an outstanding monitoring and security system. Has 9" diagonal viewing area, high-resolution black-and-white picture. Rugged steel cabinet measures 9 $\frac{1}{2}$ " H x 8 $\frac{5}{8}$ " W x 9 $\frac{3}{4}$ " D. For 120 VAC, 60 Hz. Fully assembled.

GDP-1851, Shpg. wt. 17 lbs.	189.95
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COMBO OFFER — SAVE \$49.95! Camera and Monitor together. Includes all cables and connectors. If purchased separately \$449.90.

GDS-1850, Shpg. wt. 42 lbs.	399.95
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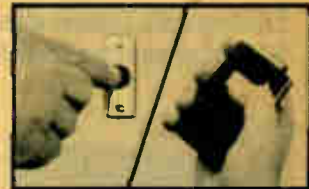
Eye Spy™ Photobeam gives you low-priced security

When beam is broken, warning devices or lamps are activated. Works up to 25 ft. from mirror. Includes light source, mirror assembly, photocell-controlled relay. 5 $\frac{3}{8}$ " H x 4 $\frac{3}{8}$ " W x 5 $\frac{1}{4}$ " D.

Kit GD-1021, Shpg. wt. 3 lbs.	15.95
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Garage Door Opener ends leaving your car until safely inside your garage



Use separate switch inside garage or transmitter in car



Has powerful 1/2 hp motor plus automatic 75 watt dome light

Compare with other screw-type openers and see the savings when you build-and-install-yourself. Screw-type openers are quieter, more dependable!

- For extra security, door can't be opened by hand from outside
- For extra safety, re-opens if obstructed during closing

Save money by building and installing the Heathkit Deluxe Garage Door Opener. The GD-3309 is an investment that pays off in convenience and security. Is the weather bad? Or is it dark as you pull into your driveway late at night? Simply touch the button on the wireless transmitter in your car — and your garage door opens automatically and a light turns on in the garage. Touch the button again when you're inside, and the garage door closes behind you. The GD-3309 is a quiet, dependable screw-type opener — no chain to wear out. It features a quiet but powerful 1/2 hp motor that opens the heaviest residential garage doors (up to 7 $\frac{1}{2}$ ' maximum height). When the door is closing, an important feature — the adjustable slip clutch safety reverse — takes over. If the door encounters any obstruction, it stops and reverses instantly, and returns to full open position. A separate doorbell-type switch and 20 ft. of cable let you operate the unit from inside the garage or anywhere you choose. The transmitter and receiver are both solid-state and are digitally coded with 256 code combinations so you can set and change your own code anytime. Both the transmitter and receiver are FCC-approved and fully assembled. Use with standard NEC 3-wire systems.

Kit GD-3309C, Transmitter, Receiver, Door-opener mechanism. Shpg. wt. 57 lbs.	179.95
Kit GD-3309D, Two Transmitters, Receiver, Mechanism. Shpg. wt. 57 lbs. Motor Freight	194.95
Kit GDA-3309-1, Mechanism only. Shpg. wt. 44 lbs. Motor Freight	149.95
Kit GDA-3209-2, Adapter for jamb and pivot doors. 3 lbs.	9.95
GDP-3309A, One Transmitter only. Shpg. wt. 1 lb.	24.95
GDP-3319A, Transmitter, 1 Receiver. (3-wire system) 1 lb.	49.95
GDP-3329A, 2 Transmitters, 1 Receiver. (3-wire system) 2 lbs.	64.95
GDA-3309-3, Power Transformer. Allows use of new transmitter and receiver with 2-wire system door openers. Shpg. wt. 1 lb.	5.95

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



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

Choose from a wide variety of Heathkit products

Electronic Air Cleaner eliminates 99% of airborne pollen, 94% of all airborne particles in any room



\$189⁹⁵

- Easy to assemble — absolutely no soldering!
- For rooms to 25' x 30'
- Adjusts to "quick-clean" a room
- Portable — use anywhere you need it!
- Room-sized unit works for pennies a day

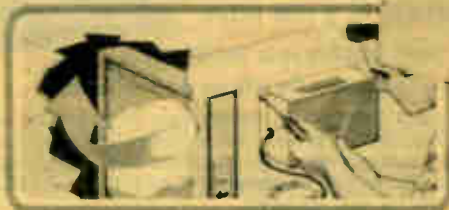


The Heathkit GD-1247 Electronic Air Cleaner is the ideal way to keep air fresh and clean, especially after parties, smoking, etc. Adjusts from approximately 100 cfm (cubic feet per minute) to 250 cfm — lets you "quick-clean" a room, then turn back the speed to maintain a fresh air level. The removable charcoal filter needs periodic replacement (order below). The other filters are removable and easy to clean. There's no soldering — the power supply and variable speed fan control are fully assembled. The assembled particle board cabinet has a Southern Pecan vinyl finish. The GD-1247 saves you money. Cleaner air reduces the need for cleaning, painting and redecorating caused by airborne pollution that stains and soils your furniture, rugs, walls and drapes. Dimensions, 26½" H x 17¼" W x 13½" D. 120/240 VAC, 60/50 Hz.

Kit GD-1247, Shpg. wt. 56 lbs. **189.95**
 GDA-1247-1, 4 Deluxe Casters, Shpg. wt. 1 lb. **8.95**
 GDA-1247-2, Replacement Charcoal Filter, Shpg. wt. 2 lbs. **5.95**

Electronic Air Cleaner keeps your air fresh and clean, installs easily in any furnace

- Simple installation without changing ductwork
- Traps particles as small as 2.5 millionths of an inch
- Completely automatic — works with your heating/air conditioning system



\$189⁹⁵

Removes most dust, dirt, pollen and other allergenic contaminants so your family can breathe fresh, clean air. Helps remove smoke and reduce odors, too. Filter is removable and easy to clean; pads are easy to replace. Note: Installation may require service by a qualified electrician. Check local building codes. Kits below differ in size of filter panel. Check your furnace filter size/capacity before ordering. Installs on standard furnaces or air conditioners directly in place of present filters, usually without cutting or altering ductwork. For two-zone homes, two filters may be used with a single power supply. Air cleaning efficiency, 70%, nominal. Power supply dimensions: 8" H x 12" W x 4" D. For 120 VAC, 25 watts max. Shpg. wt. 24 lbs. each.

Kit GD-1196-1, 20" x 25" x 2", 1000 cfm **189.95**
 Kit GD-1196-2, 20" x 20" x 2", 800 cfm **189.95**
 Kit GD-1196-3, 16" x 25" x 2", 800 cfm **189.95**
 Kit GD-1196-4, 16" x 20" x 2", 640 cfm **189.95**
 Extra Filters, use order nos. above, with GDA prefix (i.e., GDA-1196-1, 20" x 25" x 2", filter only), avg. shpg. wt. 11 lbs. each **99.95**
 Accessory Air Flow Switch, allows air flow to automatically start air cleaner. For 120 VAC outlet, required with 24 VAC systems.
 Kit GDA-1196-5, Shpg. wt. 2 lbs. **24.95**

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

\$49⁹⁵

- Saves you up to 20% on heating and cooling bills. Pays for itself in no time. Provides automatic control and savings for air conditioners, too.

It makes good sense to replace your perfectly good thermostat with the new Robertshaw Convertible Automatic Set-Back Thermostat. Once set, it never wastes heating or cooling at night when you're sleeping or, when you're away. Automatically increases when you need it. Choose either one or two energy-saving periods in a 24-hour time span. Self-charging, battery-powered timing device increases/decreases temperature from 1° to 10° F at times you select. Uses same wiring as your old thermostat. Easy installation. For use with four- or five-wire 24 VAC furnace control systems. Not for use with heat pumps. Measures 3¾" H x 5½" W x 2¾" D. Fully assembled.

GDP-1369, Shpg. wt. 2 lbs. **49.95**

Home Heat Control saves up to 20%



- A low-cost way to keep fuel bills down!
- Reduces room temperature once or twice a day

\$39⁹⁵

Automatically reduces room temperature during one or two preprogrammed periods. NOTE: For use with single-stage 24 VAC heating systems only. Some systems may require service by a licensed electrician. Check building codes. 120 VAC.

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



New T-2M Deck takes metal tapes

B-I-C's T-2M two speed tape deck with Dolby™ gives you the added frequency response you need for non-metal and metal tapes. Especially if you like songs with soaring highs such as Mangione's trumpet solos. Flip a switch and the T-2M goes from 1 7/8 ips (30-18,000 Hz freq. resp., S/N of 62 dB with dolby on) to 3 3/4 ips with a freq. resp. of 30-21,000 Hz and a S/N of 66 dB — that covers the high end frequency response of most amplifiers.

With wow and flutter at .04% at 3 3/4 ips (.06% at 1 7/8 ips), six position bias and equalizer controls, you can match the T-2M with the recommended spec of most tape brands.

Dimensions: 6" H x 16 3/4" W x 9 3/4" D. Shipped fully assembled.

ATP-1482, Shpg. wt. 15 lbs. 329.95

T-4 Metal compatible deck puts more response into your recordings

\$699⁹⁵ • Distinguish highs & lows better with 20 Hz-23 kHz freq. resp.
• High 71 dB S/N reduces hiss, lets you hear more music

Take full advantage of metal's higher frequency response with B-I-C's T-4M metal compatible tape deck. With features including: 2 tape speeds, three head configuration, pitch, bias and equalization controls, plus Dolby, you get more music, less distortion, and cleaner, life-like recordings out of your taping efforts.

With T-4M's reel to reel speed of 3 3/4 ips, you'll hear the difference between those clashing cymbals and that thundering bass. It enables the deck to expand its frequency response for metal tape from 20-23,000 Hz with S/N of 71 dB, with Dolby (20-20,000 Hz with a S/N of 68 dB at 1 7/8" ips, Dolby on).

Three head design offers you: 1) clean, high frequency response recordings due to optimum head performance in the design of both record and playback heads, and 2) instant "off the tape monitoring" that enables you to know exactly how your music is going on tape.

Two separate motors extend tape deck's life. One



does fast forward, rewind duties; the other drives the capstan. Tach-feedback capstan motor has pitch control switch that can be adjusted ±5% and abates wow and flutter down to .035% WRMS at 3 3/4 ips (.05% WRMS at 1 7/8 ips). Add six-position bias and equalization controls and the T-4M will take full advantage of brand-name recommended tape specs for clean, low distortion recordings.

Switchable Dolby™ drowns background noise from tape sources. Switchable FM multiplexer filter mutes interfering signals that can hamper broadcast recording. Smart-looking rosewood vinyl case makes the T-4M fit into any color scheme nicely.

ATP-1484, 22 lbs. Was \$799.95, Now 699.95

Optional Rack mount to affix ATP-1484 on Pro-Series Rack.

ATA-1484-1, Shpg. wt. 2 lbs. 24.95

High Power Stereo/Cassette



Put a full 12 W RMS per channel into 4 ohms stereo deck into your car or van with the Clarion PE-751B FM/AM cassette deck.

Wide 40-20 kHz frequency response with 1% THD (wow & flutter: .13% WRMS) plays your favorite music sharply and clearly. Unit features UTC auto reverse, locking fast forward and rewind for easy tape handling.

Magi-tune™ FM circuitry grabs your favorite station's signal and blocks out annoying noise from weak signals. Local DX FM switch locks on station signal, preventing other area stations from interfering with your music.

Measures 9.6" H x 7.09" W x 6.3" D. Assembled. Adapts CAP-1392 and CEP-1394.

CRP-1391, Shpg. wt. 7 lbs. 299.95

Assembled Clarion Graphic Equalizer

EE-115 5 band tone equalizer adjusts highs and lows. 12 VDC neg. grnd. 1.97" H x 7.09" W x 6.3" D. Use with CCP-1393 or CRP-1391.

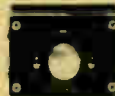
CEP-1394, 2 lbs. 44.95



Clarion High-Power Fader

Gives front-rear balance control for 4 speaker systems. For CCP-1393 or CAP-1392 amps. Assembled.

CDP-1395, Shpg. wt. 1 lb. 19.95



Clarion GA-302E Power Amplifier



Gives car speakers homelike sound. Delivers 30 W RMS, 24 W per channel into

4 ohms. 1.0% THD from 40 Hz-20 kHz. S/N of 80 dB. Assembled. Measures: 2" H x 5.6" W x 6" D.

Kit CAP-1392, Shpg. wt. 5 lbs. 79.95

Digital FM/AM Stereo Cassette



Bring home stereo sound to your van or car with Clarion's PE-958A.

Cassette unit has a steep 62 dB S/N with Dolby on metal tapes. Frequency response is 30 Hz-15 kHz for full sound. Wow and flutter less than .13%. Features UTC auto reverse, locking rewind and fast forward.

Special seek and scan buttons hunt your favorite FM/AM stations. Five FM and five AM memory buttons put stations at your fingertips. Synthesized tuning traps radio signal for "on the nose" reception. Magi-tune™ FM circuitry. Local DX FM switch.

Digital display shows FM and AM frequencies, tells time with quartz precision. Measures: 2.36" H x 7.06" W x 6.61" D. Comes with CAP-1392 30W amp; adapts CEP-1394 and CDP-1395 units.

CCP-1393, Shpg. wt. 12 lbs. 399.95

Matching EQ/15 W RMS Amp



100EQB3 tailors CRP-1266 & CRP-1267 sound to your tastes. 12 VDC, neg. grnd. 1.85" H x 5.51" W x 6.5" D.

CAP-1264, Shpg. wt. 4 lbs. 89.95

Clarion In-Dash Cassette Stereo

AM/FM stereo/cassette 4 W per channel system. FET front end, rewind, fast forward, automatic reverse. 12 VDC, neg. grnd. 2" H x 7 1/4" W x 5 1/2" D.

CRP-1267, 6 lbs., Mfr.'s price \$252.95 169.95

Clarion In-Dash 8-Track Cassette

PE623B, similar to CRP-1267, except 8 track.

CRP-1266, 5 lbs., Mfr.'s price \$163.95 119.95

Clarion Speakers liven your music

1 SK-103 8" x 10" 3-way Deck Mount Systems install with no special tools. Mfr.'s price: \$174.50. CSP-1396, 15 lbs. our price 129.95

Save \$20. Same as above, size: 4" x 10".

CSP-1397 (SK-102), 12 lbs. .. Was \$119.95, Now 99.95

2 SK-89. An 8" x 10" 2-way air suspension speaker system with 3" tweeter. Flush mount.

CSP-1261, Shpg. wt. 10 lbs. 59.95



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

STEREO HIGH FIDELITY/91

NEW

Compact speakers with great home/car sound



The economical, incredibly compact LS-ONE 2-way speaker system can stand up to systems many times its size in home or car stereo applications. Just 7.13" H x 4.5" W x 4.56" D, the 8-ohm LS-ONE features 100-20,000 Hz frequency response and handles up to 40 watts peak. A 4" long-throw woofer and 1" softdome tweeter produce true high-fidelity sound. ASP-1442, Assembled, 12 lbs. each **119.95**

Universal Mounting Bracket allows installation of LS-ONE compact speaker systems in your car or truck. Install speakers under dash for forward mounting, or secure speakers to the rear package shelf (or rear deck in lift-back cars) for aft mounting. ASA-1442-1, Shpg. wt. 3 lbs. each **9.95**

High-efficiency 2-way reflex speaker for lower-power audio systems

Provides excellent high-fidelity music reproduction, yet requires a comparatively low-powered amplifier to efficiently drive it. For normal operation, as little as five watts of continuous power per channel — or as much as 25 watts per channel — can properly drive the AS-1342. This medium-sized speaker can be placed in just about any position — vertically or horizontally, at any point 12 inches or more above the floor. Wherever you place it, the AS-1342 has a good 60 to 14,000 Hz frequency response. And a continuous tweeter level control lets you adjust the output level of the 2-inch by 6-inch horn-type tweeter to suit the acoustics of almost any listening room.

Buy the perfect complement to your low-power stereo system today. 8 ohms impedance. Dimensions, 22.25" H x 12" W x 10.5" D.

Kit AS-1342, Shpg. wt. 32 lbs., UPS each **89.95**
SAVE \$9.95 when you buy the pair!
 Kit AS-1342-2, Shpg. wt. 78 lbs., UPS . . . pair **169.95**



2-way Sound Column — designed for omnidirectional sound

Here's a speaker that sounds outstanding, no matter where you sit in the room. Two 6.5-inch full-range drivers and two 1-inch dome tweeters are mounted in separate arrays on adjacent sides of the cabinet, to produce omnidirectional sound.

The woofers are located well above the floor, so bass response is solid and well-defined. With no mid-bass boom or resonance, mid-range frequencies come through loud and clear. The tweeters deliver a full 10 to 20 dB more off-axis response for bright, clean highs. Tweeter level controls let you tailor sound to each particular setting. Only 4 ohms impedance, so most amps deliver up to TWICE their rated 8-ohm power. Handles 5-100 watts/channel. 40" H x 11" W x 11" D.

Kit AS-1344, Shpg. wt. 57 lbs., UPS each **149.95**
Save \$19.95 when you buy the pair!
 Kit AS-1344-2, Shpg. wt. 122 lbs., UPS. . . pair **279.95**



Whatever your audio system, we have the turntable/changer and cartridge that fits your needs. Choose from these quality turntables and changers. Base, dust cover included.

MODEL	FUNCTION	DRIVE	RUMBLE, DIN-B (dB)	WOW AND FLUTTER, WRMS (%)	MFR.'S SUGG. PRICE	HEATH PRICE
Dual 714Q ACP-1466, 22 lbs.	Auto-stop only. DC quartz PLL control	DC Gapless	-78	0.015	\$479.95	449.95
Dual 622 ACP-1465, 19 lbs.	Single play, auto start/stop, continuous repeat	DC Direct	-75	0.03	\$319.95	299.95
Dual 1264 Chgr. ACP-1464, 17 lbs.	1 to 6 records, cont. repeat, anti-resonance filter	Belt	-70	0.04	\$275.00	Save \$75.05! 199.95
B-I-C 80Z Chgr. ACP-1463, 21 lbs.	Microprocessor control, 4-digit display, 1-6 records	Belt/Quartz Dig. Servo	-70	0.06	\$239.95	209.95
B-I-C 40Z Chgr. ACP-1462, 19 lbs.	1-6 records, repeat play, 9" static-bal. tone arm	Belt	-68	0.08	\$149.95	129.95

Sound better with a famous-brand cartridge. Save to \$85.00 when ordering with turntable/changer.

MODEL	RESPONSE (Hz)	OUTPUT	SEPARATION	STYLUS	TRACKING FORCE	MFR.'S PRICE	HEATH PRICE	WITH TURNTABLE
Shure V-15 Type IV ADP-1259, 1 lb.	10-25,000	4.0 mV	25 dB	Elliptical 0.2 x 0.7	3/4 to 1 1/2 gm.	\$165.00	109.95	89.95
Audio-Tech. AT-14SA ADP-1139, 1 lb.	5-45,000	2.7 mV	25 dB	Shibata	3/4 to 1 1/4 gm.	\$150.00	89.95	69.95
Audio-Tech. AT-30E ADP-1294, 1 lb. Needs preamp like AP-1800 (page 95).	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 V-15 Type III AD-1059, 1 lb.	10-25,000	3.5 mV	25 dB	Elliptical 0.2 x 0.7	3/4 to 1 1/4 gm.	\$103.00	89.95	69.95
Shure M95HE ADP-1298, 1 lb.	20-20,000	4.7 mV	25 dB	Hyperelliptical Nude Diamond	3/4 to 1 1/2 gm.	\$ 97.50	59.95	39.95
Empire 2000E/III ADP-1147, 1 lb.	20-20,000	4.5 mV	28 dB	Elliptical 0.2 x 0.7	1/2 to 1 1/2 gm.	\$ 85.00	59.95	19.95

Ortofon Cartridge for Dual Turntables and Changers. The latest in cartridge technology. Ultra-low 0.35 gm moving stylus mass protects your records from damage and wear. Use with all Dual turntables and changers above, except ACP-1466. Manufacturer's suggested retail price, \$110.00.

ADP-1293, Shpg. wt. 1 lb. Our Price **79.95**
 With Dual turntable or changer **ONLY 59.95**

Keep your records clean and static-free



test light, precision stylus cleaner.
 ADP-1286, Shpg. wt. 4 lbs. **49.95**

The Discit™ by Discwasher keeps your records and phono cartridge clean, for better sound and longer life. Includes record brush, fluid, anti-static pistol,

Whatever you're looking for in a turntable or changer — and whatever your budget — we have a turntable or changer from the B-I-C and Dual lines that's exactly what you're looking for.

An unbeatable combination of quality and price, our selection of B-I-C changers provide more quality and features for your audio dollars.

Dual designs turntables and changers for one purpose — to provide the finest sound available from your records. Dual turntables and changers are built to exacting specifications and provide uncompromising performance for years to come.



Get truly beautiful sound from this three-way floor/shelf speaker system

\$189⁹⁵ • A great first-time kit
 each • Custom-build for placement
 on either shelf or floor

A truly outstanding speaker system for the best component systems. Get solid, well-defined bass from a 10" woofer. The 500 Hz woofer-midrange crossover minimizes IM distortion and insures smoothness. The 4.5" midrange has its own polyester-damped subenclosure to prevent distortion caused by woofer vibrations and reflections. The 1" dome tweeter provides excellent power handling and definition, and features full 120-degree horizontal dispersion, even at 12,000 Hz.

All of the drivers in the AS-1373 Speaker System are flush-mounted, with no rails around the baffle to limit dispersion of high frequency sound. And for the best possible stereo imaging, the tweeter can be positioned directly above the midrange driver, whether you decide to position the speaker system horizontally or vertically.

While the AS-1373 can be used with almost any audio

amplifier, a high-power amplifier like the new Heathkit AA-1800 (shown on page 94) reveals this speaker system's awesome dynamic range and clarity. Two high-frequency switches let you match high-frequency response to your particular listening environment. And each driver is individually fused for extra protection.

A fully assembled walnut-finish veneer cabinet with deluxe, acoustically transparent foam grille, make this speaker system look as good as it sounds.

Kit AS-1373, Shpg. wt. 68 lbs., UPS 189.95

Save \$19.95 when you buy a pair.

Kit AS-1373-2, Shpg. wt. 141 lbs., UPS 359.95

AS-1373 SPECIFICATIONS: Frequency Range (-10 dB): 30 Hz to 22 kHz. Frequency Response: +3 dB, 40 Hz to 20 kHz. Impedance: 8 ohms. Recommended Amplifier Power: 10 watts min. to 200 watts (fused for larger amplifiers). Crossover Frequencies: 500 and 3000 Hz (12 dB/octave). Fuses: Woofer, 1.25 amp slow-blow; Midrange, 0.75 amp slow-blow; Tweeter, 0.5 amp regular. Switches: 3 kHz shelf/flat, 10 kHz rolloff/flat. Dimensions: 26" H x 14.5" W x 12.125" D (66.04 x 36.83 x 30.80 cm).



High-power three-way speaker system — ideal for disco and rock music

\$349⁹⁵ • Extra-wide dynamic range
 each • Massive 15" slot-loaded woofer
 • Handles up to 200 watts

Designed for use with the finest stereo components, the AS-1348 offers the bass power and extra-wide dynamic range you need to reproduce any type of music realistically. It combines a massive 15" slot-loaded woofer, two 4.5" midrange speakers and three 1" dome tweeters in a precision-designed cabinet. Has frequency range from below 22 Hz to above 22 kHz. The woofer is mounted in the rear of the cabinet to improve low-frequency response. The two midrange drivers radiate directly forward for excellent presence and realism. The three tweeters face forward, angle right and angle left for high-frequency response with outstanding dispersion.

While most conventional speaker systems produce maximum sound levels only at upper bass and mid-range frequencies, this speaker system produces very high sound levels, without distortion at ALL audible frequencies. This makes the AS-1348 ideally

suitable for rock and disco music, which produce high sound levels.

Three switches provide 14 combinations of attenuation and response shaping that adjust response characteristics to any listening area. A fully assembled acoustic-suspension enclosure features a walnut and oak veneer finish. Acoustically transparent grille cloth is removable for extra convenience.

This fine three-way speaker system is a kitbuilding experience that will bring you years of enjoyment.

Kit AS-1348, 110 lbs., Mtr. Frt. 349.95

Save \$39.95 when you buy a pair of AS-1348s.

Kit AS-1348-2, 220 lbs., Mtr. Frt. pair 659.95

AS-1348 SPECIFICATIONS: Frequency Range (-10 dB): 22 Hz to 22 kHz. Frequency Response: +3 dB, 28 Hz to 20 kHz. Impedance: 8 ohms nominal. Recommended Amplifier Power: 10 to 200 watts (fused for larger amplifiers). Crossover Frequencies: 500 Hz (12 dB/octave) and 3000 Hz (6 and 12 dB/octave). Fuses: Woofer, 1.5 amp slow-blow; Midranges, 0.375 amp slow-blow; Tweeters, 1 amp regular. Dimensions: 38" H x 24" W x 15" D (96.52 x 60.96 x 38.10 cm).



Save \$50 per pair! Linear phase speaker system with reduced diffraction

\$199⁹⁵ • Aligned drivers for
 each minimum transient distortion
 • Rich rosewood
 veneer cabinet

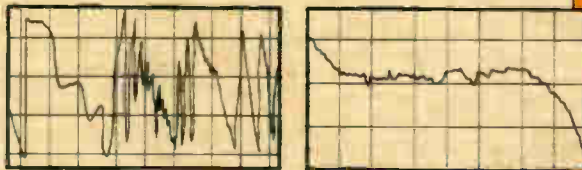
The ultimate Heathkit speaker system — now an even better value. Aligned drivers improve imaging. Contoured surfaces reduce diffraction for smooth frequency, phase response.

Specially selected 10" woofer, 5" midrange and 1" soft dome tweeter, with constant-voltage crossover network, for flat response and linear phasing. Brazilian rosewood veneer cabinet, acoustically transparent grille.

Compare with other speaker systems. You'll agree that they match up in every respect... and beat their prices. Sold in matched pairs only.

Kit ASX-1383, Shpg. wt. 114 lbs.,

Motor Freight . . . Pair Was \$449.90, NOW ONLY 399.90



Graph at left shows phase response of a non-aligned speaker system. Graph at right shows how our linear phase Speaker System makes sound arrive at your ears — at the same time — to reduce distortion.

ASX-1383 SPECIFICATIONS: Frequency Range (-10 dB): 30 Hz to 30 kHz. Impedance: 8 ohms. Recommended Amplifier Power: 10 to 200 watts (fused for larger amplifiers). Crossover Frequencies: 750 Hz, 4000 Hz. Fuses: Separate fuses for woofer, midrange and tweeter. Dimensions: 36" H x 13.5" W x 13.25" D (96 x 34.3 x 33.7 cm).



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

STEREO HIGH-FIDELITY/93

NEW

New higher-power Pro-Series Amplifier — the most powerful Heathkit amp ever!

\$599⁹⁵

- More power at a budget-pleasing price
- Dynamic head room of more than 2.5 dB for better dynamic range
- Complete speaker protection (patent pending)

250 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.025% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

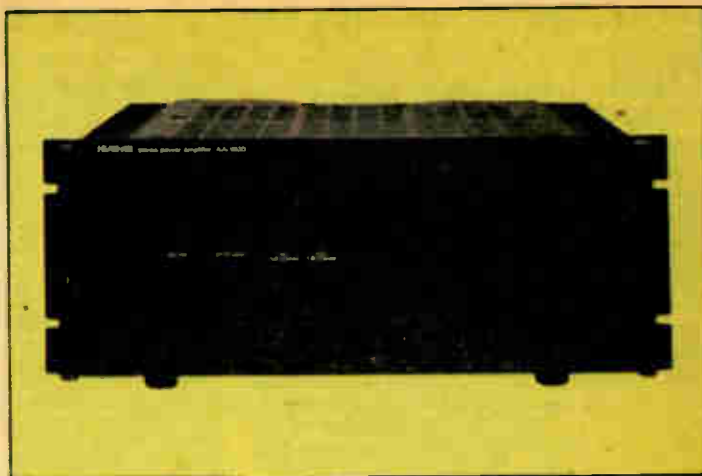
Heath Company helped pioneer the field of high-power amplifiers. Now, advances in high-power output devices, new design technology and extensive listening tests make the Heathkit AA-1800 Pro-Series Audio Amplifier one of the best high-power amps available. The wider dynamic range achieved by new recording techniques requires power and headroom to reproduce the full sound spectrum, without clipping peaks. People who listen to the AA-1800 find accurate, clearly defined music — at a wallet-pleasing price.

From the power cords to the speaker outputs, more value is built into the AA-1800. A wire-frame chassis, similar to those used in computers, makes the AA-1800 a more durable unit in a smaller package, with excellent ventilation. This new chassis simplifies the easy 24-hour kitbuilding experience, too. Two line cords with remote AC switching relieve your preamp from the need to switch high currents. Convection cooling means no fans and quieter operation. Individually fused power supply lines, along with rugged output devices, eliminate electronic dissipation limiters — which can cause tweeter-damaging clicks and pops. LEDs for each channel indicate full power output.

Input level controls let you attenuate the input signal to balance your system, and reduce output noise. Inputs, level controls, speaker outputs and line fuse are all mounted on the rear panel for easy access.

Complete speaker protection includes a speaker turn-on delay — which keeps power-up and power-down transients away from the speakers. In fact, the AA-1800's speaker protection system is so effective, we've applied for a patent. Thermal circuit breakers protect the system from excessive heat.

Designed in the striking Pro-Series style, the AA-1800 can be mounted in any



EIA Standard 19-inch rack, such as the AE-1705 Pro-Series Rack (see opposite page). Large side handles are provided for easy rack mount installation.

Kit AA-1800, Shpg. wt. 69 lbs. 599.95

AA-1800 SPECIFICATIONS: Frequency Response: 20 Hz-20 kHz, ± 0.1 dB; 3 Hz-100 kHz, ± 1 dB (at 1 watt). Total Harmonic Distortion plus Noise: Less than 0.025%, from 250 mW to 250 Watts, into 8 ohms. IM DISTORTION (SMPTE Method): Less than 0.02% from 250 mW to 250 Watts. TIM (DIM 100): Less than 0.03% (3.18 kHz square wave and 15 kHz sine wave mixed 4 to 1, f(c)=100 kHz), measured at rated output. Hum and Noise (Unweighted): -85 dB (1 watt ref.). Full Power Trip Frequencies of Speaker Protection Circuit: Less than 16 Hz, more than 30 kHz. Low Frequency Damping Factor: Greater than 100. Input Sensitivity: 110 mV (for 1 W @ 8 ohms). Input Impedance: 20 kilohms, shunted by less than 50 pF. Channel Separation: 60 dB min., 20 Hz to 20 kHz. Power Requirement: 120 VAC, 60 Hz, 1200 Watts. Dimensions: 7" H x 19" W x 16.75" D (17.75 x 47.26 x 41.55 cm). Net Weight: 50 lbs. (22.68 kg).

NEW

Pro-Series Active Audio Processor expands dynamic range, reduces noise without introducing distortion

\$249⁹⁵

- Increases dynamic range by up to 17 dB
- Expanded tape monitoring facilities
- Beautiful Pro-Series Styling

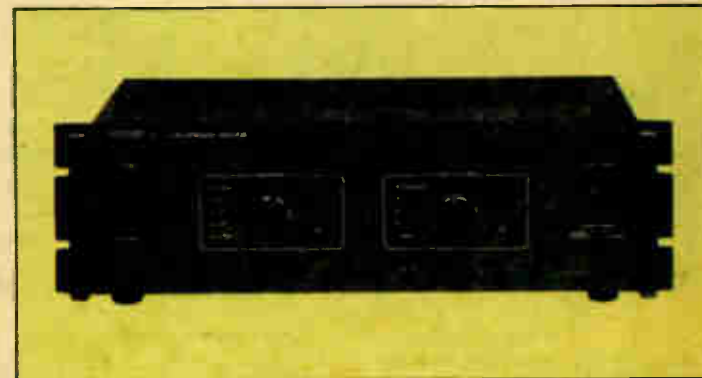
Declare war on noise in your audio system! The new Heathkit Pro-Series Active Audio Processor reduces high-frequency noise and increases the dynamic range of source material. Its single-ended design makes it compatible with any program source, because it does not require pre-processing.

The AD-1706 incorporates a dynamic range expander and a noise reduction circuit to increase the dynamic range of program sources as much as 17 dB. Your music comes through with added realism, better definition and lower background noise, while maintaining full frequency response and low distortion, even at live-performance volume levels.

Any program source can be processed through the unit to gain up to 7 dB of dynamic range expansion, restoring dynamic range lost in recording and broadcasting — and up to 10 dB of noise reduction to drastically reduce hiss and surface noise. The expander circuit decreases low-level signals, and amplifies louder signals proportionately to achieve a wider dynamic range. A front panel switch turns on a 7 kHz, linear phase, 12 dB per octave rolloff high-frequency filter. This filter helps reduce noise from AM radio, TV, 78 rpm recordings and 8-track tapes.

More front panel LEDs indicate both relative noise reduction and dynamic range expansion more precisely. The AD-1706 connects between the tape output and tape monitor jacks of your preamplifier, integrated amplifier or receiver. Its tape monitor replaces your current tape monitoring facilities. And expanded capabilities of the built-in tape monitor mean you can apply processing before OR after recording.

Kitbuilding is fast and easy, with printed circuit boards and a color-coded wiring harness to simplify assembly. And when you're finished, the AD-1706's striking black cabinet makes it a perfect addition to your Heathkit Pro-Series Audio



System. Or, order the AEA-1800-2 Oak-Finish Cabinet and make your Audio Processor an integral part of your component system.

With rugged construction and dependable solid-state circuitry, the Active Audio Processor can greatly improve any stereo system, for years to come.

Kit AD-1706, Shpg. wt. 18 lbs. 249.95

Oak-Finish Cabinet for AD-1706 Pro-Series Active Audio Processor.

AEA-1800-2, Shpg. wt. 6 lbs. 29.95

AD-1706 SPECIFICATIONS: Rated Input: 200 mV. Input Impedance: 100K ohms. Gain: Expander off, 0 dB (unity gain), +0.25 dB. Expander on, -4 dB to +4 dB (dependent on program level and control setting). Frequency Response: 20 Hz to 20 kHz. High Filter: 7 kHz, 12 dB/octave rolloff, linear phase. Noise Reduction: 3 dB typical at 2 kHz, 10 dB typical between 4 kHz and 15 kHz. Sensitivity: 500 μ V for notch to open. Hum and Noise: -70 dB, 20 Hz-20 kHz (200 millivolt reference). Channel Separation: 50 dB at 1 kHz (5 kilohm input termination). Output Impedance: 500 ohms. Input Overload: 5 VRMS minimum at 1 kHz. Total Harmonic Distortion: 0.1% from 20 Hz to 20 kHz. Power Requirement: 120/240 VAC, 50/60 Hz, 15 Watts. Dimensions: 5.75" H x 19" W x 14" D (14.6 cm H x 48.3 cm W x 35.6 cm D). Net Weight: 12.5 lbs. (5.7 kg).



Heathkit Pro-Series Audio Components put beautiful, studio quality sound in your living room

1 Save \$100 on 2-speed metal-tape capable cassette deck

Get reel-to-reel quality in a cassette deck — and save \$100. Records, plays top-quality metal tapes. Compare with units costing hundreds more. See complete description on page 91. Mfr.'s sugg. price \$750.

ATP-1484, Assembled, 22 lbs. Was \$799.95, now only 699.95
ATA-1484-1, Rack Adapter for ATP-1484, Shpg. wt. 2 lbs. 24.95

2 Outstanding Pro-Series Stereo FM/AM Tuner

One of the world's finest. It's loaded with features that add up to better reception with less noise and distortion. Super-sensitive 5-gang FM front end and FM IF/Stereo Demodulator are factory assembled and aligned for easier kitbuilding. Bandwidth can be extra-wide for less noise, better separation — or narrow for minimal interference in crowded signal areas. Multipath switch lets you meter multipath distortion. For 120/240 VAC. 5.75" H x 19" W x 14" D.

Kit AJ-1600, Shpg. wt. 25 lbs. 399.95
AJA-1600-2, Dolby™ FM Noise Reduction Module, Shpg. wt. 1 lb. 49.95
AEA-1800-2, Oak-Finish Cabinet, Shpg. wt. 6 lbs. Was \$39.95, now only 29.95

AJ-1600 SPECIFICATIONS: FM: Sensitivity: 1.8 μ V mono, 3.5 μ V stereo. Selectivity: 80 dB. S/N Ratio: 83 dB mono, 75 dB stereo. Harmonic Distortion: 0.1% @ 1 kHz. Image Rejection: 100 dB. Capture Ratio: 1.2 dB. Stereo Separation: 45 dB @ 1 kHz. AM: Sensitivity: Ext. Antenna, 30 μ V. Selectivity: Alt. Channel, -70 dB. Image Rejection: 70 dB.

3 Preamplifier with quality design, special features

Dual turnover tone controls. Built-in infra-sonic filter reduces rumble and low-frequency noise. 3 phono inputs, including one for moving coil cartridges like our ADP-1294 below. Selectable cartridge capacitance for flatter frequency response. Record from one deck to another while listening to another source or tape. Adapter switch for equalizer, noise reducer. 3 switched, 3 unswitched outlets handle up to 1500 watts. 120/240 VAC. 5.22" H x 19" W x 11.25" D.

Kit AP-1800, Shpg. wt. 27 lbs. 349.95
AEA-1800-2, Oak-Finish Cabinet, Shpg. wt. 6 lbs. Was \$39.95, now only 29.95

AP-1800 SPECIFICATIONS (in accordance w/IMF-A-202): Phono Input Sensitivities: Moving Coil or Magnet, 33/67/130 μ V; High-Level, 87 mV. Hum and Noise: Moving Coil Phono, -70 dB; Magnet Phono, -75 dB; High-Level, -85 dB. Input Impedance: Moving Coil, 100 ohms; Phono, 47K ohms; High-Level, 50K ohms. Frequency Response: Phono (RIAA), +0.2 dB, 20 Hz to 20 kHz; High-Level, +0, -0.2 dB, 20 Hz to 20 kHz. Total Harmonic Distortion: Phono, 0.03%; High-Level, 0.02%, 20 Hz to 20 kHz. Intermodulation Distortion: 0.02% maximum. Crosstalk: -90 dB. Stereo Separation: 50 dB @ 1 kHz.

4 Save \$30 on accurate Graphic Output Indicator

Monitors peak power with LEDs to help avoid overloads and speaker damage. 6-position range switch for a wide range of sensitivities. Extremely fast response time. For 120/240 VAC. Dimensions, 2" H x 19" W x 13" D.

Kit AD-1701, Shpg. wt. 15 lbs. Was \$189.95, now only 159.95
AEA-1800-3, Oak-Finish Cabinet, Shpg. wt. 2 lbs. 14.95

5 Proven Heathkit Pro-Series Stereo Amplifier

125 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.05% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

Clearly, accurately reproduces music. THD, less than 0.05%. Speaker turn-on delay, thermal circuit breaker assure full protection. Amplifier, power supply are fully assembled. 120 VAC, 60 Hz. 7.125" H x 19" W x 13" D.

Kit AA-1600, Shpg. wt. 51 lbs. 329.95
AEA-1800-1, Oak-Finish Cabinet, Shpg. wt. 5 lbs. Was \$39.95, now only 29.95

AA-1600 SPECIFICATIONS (IMF-A-202): Freq. Response: +1 dB, 7 Hz-50 kHz @ 1 watt. Hum and Noise: -90 dB. Separation: 70 dB min. Input Impedance: 30K ohms, shunted by 50 pF.

Pro-Series Rack combines function and beauty

Bring Pro-Series components together. Easy access to all controls. Locking swivel casters. Accepts EIA Std. panels, in any height. With walnut veneer side panels, record dividers, extra shelf. 43.5" H x 21.5" W x 18" D.

Kit AE-1705, Shpg. wt. 74 lbs. 249.95

Heath-recommended AT-30E Moving Coil Cartridge

Audio-Technica Cartridge requires AP-1800 or similar preamp.

ADP-1294, Shpg. wt. 1 lb. Mfr.'s price \$125.00, Our Price 79.95
With turntable or changer purchase from page 92 59.95



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



Heathkit Pro-Series Audio Components are also available with optional oak-finish wood cabinets. Handsome cabinets are listed and sold separately for each Heathkit Pro-Series Component.

Introducing the finest Heathkit Stereo Receiver ever

\$740⁰⁰

Silver
front
panel

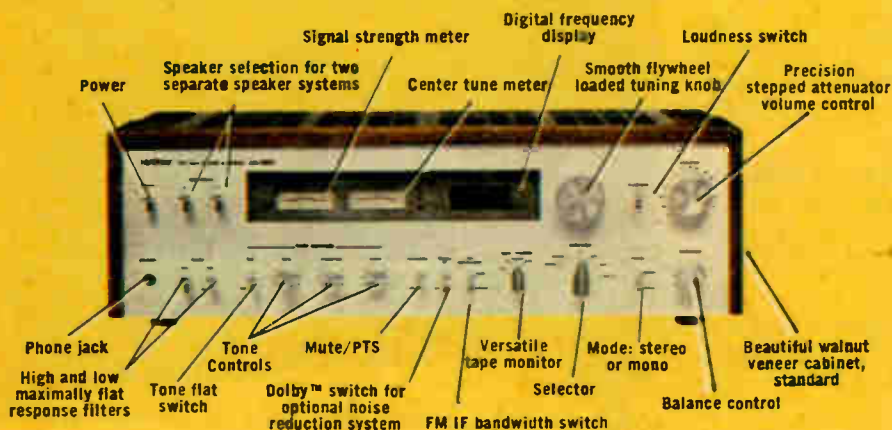
Superbly defined stereo sound
plus all the luxury features
that put you in total control

Beautiful specs, beautiful sound

- 125 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.05% TOTAL HARMONIC DISTORTION FROM 20 TO 20,000 HZ
- 1.8 μ V FM sensitivity for reception of weak stations
- 80 dB FM signal-to-noise ratio for wide dynamic range
- -90 dB amplifier hum and noise for backgrounds of total silence
- 45 dB FM stereo channel separation for excellent imaging

Spare-nothing design

- Digital readout displays frequencies more accurately than tuning dial
- Precision Tuning System (PTS) automatically corrects mistuning
- Stepped attenuator volume control for more accurate tracking between channels
- Convenient phono jacks permit separation of preamp and power amp for insertion of equalizer or for bi-amping
- Tri-band tone controls let you equalize your room for the most natural sound
- Complete speaker and circuit protection includes speaker turn-on delay and thermal circuit breaker and fuses
- Center tune meter indicates exact center of channel for best separation and lowest distortion and noise
- 5-section tuning capacitor gives maximum rejection of unwanted signals for lower noise and cleaner sound
- Optional Dolby noise reduction for those in areas where it is available



For a variety of listening options

- Source selection includes two phonos, two auxiliary sources, FM or AM or tape monitor
- A unique tape monitor system lets you monitor 2 decks or add a signal processor or other accessory
- Accommodates two separate speaker systems, so you can have music in two different areas of your home
- Phone jack lets you listen privately by headphones



New Heathkit AR-1650 Stereo Receiver

Power is more than just a number of watts. Every receiver has a particular quality in the power it delivers. That's why receivers of the same power rating, played with the same source and speakers, can sound so different. The AR-1650 not only has all the raw power you'll ever need, it also delivers a sound quality unlike any you've ever heard before. The designers of the AR-1650 were striving for more than just power. They were striving for precisely defined musical peaks, solid bass, fully-detailed midrange. They were striving for power infused with clarity. And the result is one of the most remarkable stereo receivers to be introduced to you in a long time, the Heathkit AR-1650.

Remarkable signal reception

The AR-1650 Receiver has a 5-section FM tuning capacitor that gives you maximum rejection of unwanted signals for lower noise and cleaner sound. Interference is further minimized by an attenuator switch which reduces strong signals from the antenna. And a special narrow FM bandwidth switch lets you switch out unwanted signals in crowded areas for more precise reception.

Digital readout gives you a clear, handsome display of your frequency to the nearest two-tenths. It shows you exactly the frequency you're on.

Center tune meter indicates the exact center of the channel for best separation and lowest distortion and noise. Signal strength meter shows you when your signal is strongest. And a special Precision Tuning System (PTS) automatically corrects mistuning and makes it easier to find exact center tune.

Controls that let you hear your music just the way you like

The AR-1650 gives you total control to adjust the sound to your specific preference. Tone controls include separate bass, midrange, and treble for adjusting the entire frequency range. A special tone flat



The AR-1650 is available with a choice of front panels: black anodized aluminum shown above (order AR-1650B) or natural silver anodized aluminum at right (order AR-1650S).



- Kit AR-1650S, Silver front panel, Shpg. wt. 66 lbs. 759.95
- Kit AR-1650B, Black front panel, Shpg. wt. 66 lbs. 779.95
- Kit AJA-1600-2, Dolby FM Module, Shpg. wt. 1 lb. 49.95

SPECIFICATIONS: FM Section Stereo: Sensitivity: 3.5 μ V (16.1 dBf) usable; 36 μ V (36.1 dBf) @ 50 dB signal-to-noise. Frequency response: * \pm 0.5 dB, 20 Hz to 15 kHz. Signal-to-noise ratio*: 73 dB. Total Harmonic Distortion*: 50 dB S/N; 0.5%. FM Section Mono: Frequency response: \pm 0.5 dB, 20 Hz to 15 kHz. Sensitivity*: 1.8 μ V (10.3 dBf) usable; 2.5 μ V (13.2 dBf @ 50 dB signal-to-noise). Selectivity*: Wide IF bandwidth: 40 dB; Narrow IF bandwidth: 80 dB. Image Response Ratio*: 100 dB. AM Section: Sensitivity*: External antenna: 30 μ V; radiated: 250 μ V/Meter. Signal-to-noise Ratio*: External antenna: 50 dB; Radiated 45 dB. Total Harmonic Distortion: 400 Hz, 90% Mod: 0.5%. Frequency response*: +1 to -3 dB from 40 Hz to 3.5 kHz. Preamp*: Frequency response: Phono: RIAA \pm .2 dB from 20 Hz to 20 kHz; Aux: +0 to -.2 dB from 20 Hz to 20 kHz. Total Harmonic Distortion: Phonos: .1%; Aux: 0.05%. Input Sensitivity: Phonos: 0.67 mV; aux 67 mV. Maximum Input Signal: Phonos: 150 mV; Aux: 10 V. Intermodulation Distortion: .05%. Amplifier*: Total Harmonic Distortion: less than .05%. Intermodulation Distortion: less than .05%. Frequency Response: 0 dB to -.2 dB, 20 Hz to 20 kHz. Input Sensitivity: 0.12 V. Hum & Noise: -90 dB. Dimensions: 7" H x 21 3/4" W x 16 7/8" D. *IHF Standards

switch bypasses tone controls to provide the flattest possible frequency response. High and low, maximally flat response filters with 12 dB per octave roll-off minimize signal reduction in the passband and maximize attenuation of undesired signals beyond the 3 dB frequency. They are among the best response filters you can find at any price.

Versatile source accommodation

The AR-1650 accommodates two phonos, two auxiliary sources, AM or FM, or tape monitor, for a more-than-adequate variety of source options.

The record mode lets you record from deck 1 to deck 2 while you monitor deck 2.

Two speaker systems can be separately driven from the AR-1650, so you can have music in two different areas of your house.

Built-in protection

Fused B+ and B- power supply lines for each channel provide protection and eliminate the need for dissipation limiters that can cause tweeter-damaging clicks and pops. Complete speaker protection includes turn-on delay and thermal circuit breakers.

Hidden features found only in the finest receivers

Like any fine equipment, the AR-1650 has features you can only feel as you operate it. The special fly-wheel loaded tuning knob passes smoothly through the frequency spectrum. Stepped attenuator volume control gives you more accurate tracking between channels, even at low levels.

Not all extra features are hidden. A beautiful walnut veneer cabinet is standard with every AR-1650. And you have your choice of front panels: dramatic black anodized aluminum (AR-1650B) or elegant silver (natural) anodized aluminum (AR-1650S).

Heathkit Tech Consultants assure your satisfaction

Like all Heathkit projects, the AR-1650 comes with a detailed, easy-to-follow assembly manual. And experienced service technicians are just a phone call away should you need them. You have their assurance that your AR-1650 will produce the beautiful sound it was designed to produce. To ensure performance to specifications, the amplifier, tuner and IF multiplex circuit boards are factory assembled and tested. The AR-1650 is a ten-evening kit. Order yours today. It's a beautiful receiver in appearance and performance.

5% discount on complete Heathkit stereo systems

Choose: 1. a receiver like the AR-1650 and a pair of speakers like the ASX-1383's. Or: 2. an amplifier, pair of speakers and a program source (tape deck, tuner or turntable). Add up the cost of the individual components, then deduct 5% (excluding shipping and handling).

The same big 5% discount also applies to any accessories you order with your system — extra speakers, cabinets, tapes, phono cartridges, etc. — No limit!
It's just another way we give you great sound for less money.

Superbly designed receivers give you thrilling sound



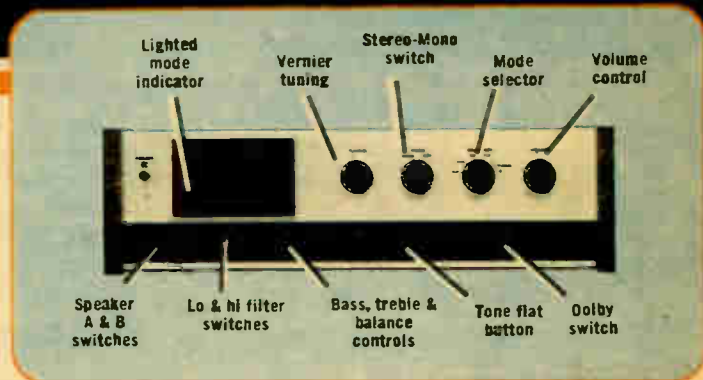
Now Only
\$399⁹⁵
 SAVE \$230
 from Catalog 848

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

The Heathkit AR-1515 is an exceptional stereo receiver. Digital readout lets you tune to the frequency you want far more accurately than dial-type tuning. Signal strength and center-channel meters help you zero in on the strongest signal and lowest FM distortion. There's even an oscilloscope output to monitor multipath distortion. The FM section features great 1.8 μ V sensitivity. Optional AD-1504 Dolby Module (below) reduces noise, gives greater dynamic range. Dual-gate MOSFETs and a computer-designed 9-pole filter make the AM section one of the finest in any receiver. Preamp out/amp jacks allow use of an audio equalizer or noise reducer. Modular design, color-coded wiring harnesses and Heathkit test meter make the AR-1515 easy to assemble.

Kit AR-1515, Shpg. wt. 47 lbs. Was \$629.95, Now 399.95
 Kit AD-1504, Dolby FM Module, Shpg. wt. 1 lb. 44.95

Save \$20 on the high-performance amplifier section of the AR-1515 Stereo Receiver. The AA-1515 gives you the low-distortion power you need to drive most speakers to "live performance" volume levels. Same specifications as the AR-



1515 amplifier. 120/240 VAC. 6 $\frac{1}{4}$ " H x 17 $\frac{1}{2}$ " W x 14 $\frac{1}{4}$ " D.

Kit AA-1515, Shpg. wt. 40 lbs. Was \$299.95, Now only 279.95

AR-1515 SPECIFICATIONS: AMPLIFIER: Frequency Response: +0, -1 dB, 8 Hz to 45 kHz; +0, -3 dB, 4 Hz to 80 kHz. IM: Less than 0.08%, 0.25 to 70 watts. Damping Factor: Greater than 60. Input Sensitivity: Phono 1 & 2, 2 mV; Aux., Tape & Dub, 200 mV. Hum and Noise: Phono (2 mV ref.), -65 dB; Aux., Tape, Dub (200 mV ref.), -80 dB. FM Sensitivity: 1.8 μ V IHF. Selectivity: 100 dB IHF. Image Rejection: 90 dB IHF. Stereo Separation: 40 dB or greater at mid-frequencies. AM Sensitivity: 5 μ V with 50-ohm direct input. Selectivity: 20 dB at 10 kHz.



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

AR-1219 SPECIFICATIONS: AMPLIFIER: Frequency Response: \pm 1 dB, 7 Hz to 100 kHz. IM: Less than 0.5%, full power; less than 0.2% at 1 W. Damping Factor: Greater than 30. Input Sensitivity: Phono, 2 mV; Tape, 190 mV. Hum and Noise: Phono, -60 dB; Tape, -65 dB. FM Sensitivity: 2 μ V IHF. Selectivity: 60 dB IHF. Image Rejection: 50 dB IHF. Stereo Separation: 40 dB typical, 35 dB minimum. Signal-to-Noise Ratio: 65 dB (65 dB). Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 3 $\frac{3}{8}$ " H x 17" W x 13" D.

**This value-priced AM/FM stereo receiver delivers
 clean, clear sound for your system at an affordable price**

\$229⁹⁵ • High-performance tuner sections
 • 40 dB typical separation for spacious stereo sound

When it comes to giving you high quality, enjoyable stereo performance, the Heathkit AR-1219 is hard to beat! We've taken years of audio engineering excellence and packed them into a straight forward receiver that really performs! Just 15 watts per channel! — but careful engineering makes sure the AR-1219 has none of the annoying colorations and imperfections of most low-cost systems. Intermodulation distortion is less than 0.5% at full power and less than 0.2% at 1 watt. Hum and noise? — imperceptible. —60 dB for phono, and 65 dB down for tape. High-performance tuners give you excellent sensitivities of 100 μ V/M on AM and 2 μ V on FM. Includes headphone jack and speaker disconnect for private listening, tape monitor switch for extra convenience. Easy kit assembly. Kit AR-1219, Shpg. wt. 18 lbs. 229.95

Now save \$80 on the heart of a beautiful sound system



Now only
\$299⁹⁵

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

Here's a medium-power stereo receiver with specs that you'll find only on units costing a great deal more. It provides enough low-distortion power for almost any listening area. And specifications that mean true professional performance! FM sensitivity is an excellent 1.8 μ V and stereo separation is 40 dB. Two 4-pole ceramic filters are used in the AM section for superb, distinct station selection. Two 8-pole ceramic filters in the FM section ensure excellent FM selectivity. An improved FM-PLL stereo demodulator provides excellent stereo reception with minimum distortion.

There are two high-level inputs, a magnetic phono input and pre-amp out/power-amp in jacks for audio accessories. A tape monitor lets you make professional style recordings. Attractive tuning scale has large, easy to read numbers. Signal and tuning meters make tuning easy and accurate. Complete controls include bass, treble and balance, FM mute and blend switches, loudness and tape-flat switches, so you can tailor the sound to your listening preference. For private listening, a headphone jack is provided on the front panel.

You can build and install the optional AD-1504 Dolby™ FM Module for the reduced noise and increased dynamic range of Dolby FM broadcasts now offered

by many FM stations. Compare this combination of features and specifications with any other similarly classed receiver. This is one of the finest medium-power receivers you can buy.

Kit assembly is easy with modular circuit board construction and color-coded wiring harnesses. Like all Heathkit electronic kits, the AR-1429 comes complete with its own comprehensive easy-to-follow assembly manual that takes you step-by-step from unpacking to final assembly. You'll enjoy listening to your favorite music on a quality stereo receiver you built with your own hands. Handsome cabinet with brushed-aluminum front panel and solid-walnut end panels included.

Kit AR-1429, Shpg. wt. 32 lbs. Was \$379.95, Now 299.95

Kit AD-1504, Optional Dolby FM Module, Shpg. wt. 1 lb. 44.95

AR-1429 SPECIFICATIONS: AMPLIFIER — Frequency Response: -1 dB, 5 Hz to 45 kHz. Damping Factor: 60. Input Sensitivity: Phono, 2 mV; Aux. Tape and Tape Mon., 200 mV. Hum and Noise: Phono, -65 dB (-79 dB for 10 mV input); Aux., Tape and Tape Mon., -75 dB. Phono RIAA* Equalization: ± 1 dB (30 Hz to 20 kHz). FM SECTION — Sensitivity: 1.8 μ V* (10.3 dBf) usable, 4.0 μ V (17 dBf @ 50 dB signal to noise). Selectivity: 65 dB. Capture Ratio*: 1.8 dB; AM Suppression*: 48 dB; Image Rejection: 90 dB*. Stereo Separation: 40 dB, typ. at 1000 Hz. Frequency Response: ± 1 dB from 20 to 15,000 Hz. AM SECTION — Sensitivity: 10 μ V. Selectivity: 20 dB. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 4 $\frac{3}{4}$ " H x 20" W x 13 $\frac{1}{2}$ " D (12.06 cm H x 50.8 cm W x 34.29 cm D). *Rated IHF (Institute of High Fidelity) Standards. Dolby is a trademark of Dolby Labs.

Value-priced Heathkit amplifier and tuner — good first-time kits for the beginning builder!



\$149⁹⁵

- Excellent sound that fits your pocketbook

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

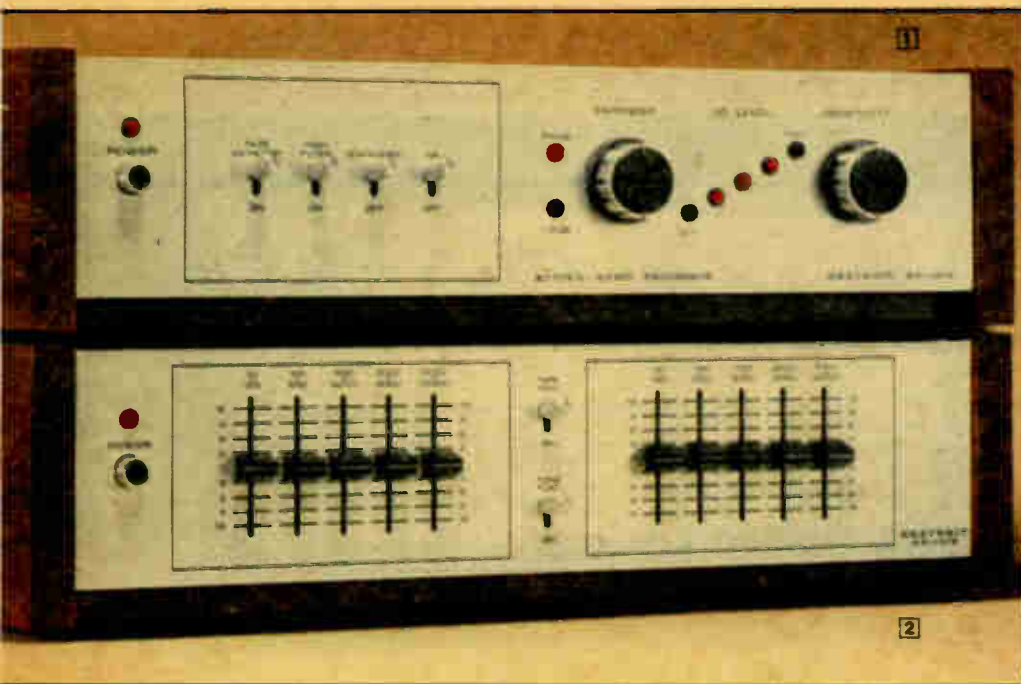
The Heathkit AA-1219 Stereo Amplifier features the same excellent specifications found in the amplifier section of the AR-1219 Receiver. Delivers 15 watts, minimum RMS, per channel. Intermodulation distortion is less than 0.5% at full power, less than 0.2% at 1 watt. Phono hum and noise are -60 dB, channel separation 55 dB — which adds up to beautiful sound! Styled to match AJ-1219. Kit AA-1219, Shpg. wt. 15 lbs. 149.95



\$149⁹⁵

- AM/FM Stereo Tuner with great sensitivity and PLL circuitry

The AJ-1219's pre-assembled and aligned FM front end provides 2 μ V sensitivity with extremely low cross modulation and no overload, even on strong FM signals. A phase lock loop (PLL) multiplex circuit provides excellent stereo separation with minimum distortion. Stereo separation is typically 40 dB, 35 dB minimum. The AJ-1219 also delivers excellent AM performance. Pushbutton band selection, stereo light. Inputs for FM antenna, built-in AM antenna. Handsome metal case with stained walnut veneer end panels. Kit AJ-1219, Shpg. wt. 12 lbs. 149.95



1 Active Audio Processor cleans stereo's sound, boosts dynamic range

\$199⁹⁵

- Sifts out background noise and tape hiss, while it expands dynamic range

Tape deck playback heads and phono cartridges not only send your music to the amplifier, but also the annoying background noise and hiss. And some of the dynamic range gets strangled during the broadcasting and recording process of your music. The AD-1304 is designed to overcome these two problems. First, it has three dynamic filters to sponge away noise and hiss, without injuring your music. In fact, the AD-1304 will eliminate over 10 dB of high frequency noise from 4 kHz to 15 kHz.

Second, the AD-1304 contains a separate dynamic range expander. This restores some of the dynamic range lost during broadcasting and taping. You get an increase of 7 dB, so your ears will catch the light

sound of a brush sweeping a drum, or a trumpet screaming its way up the musical scale.

And you can easily control both expander and the filters with finger slide controls and LED indicator lights located on the front panel. Unit connects between tape output and tape monitor jacks on most amplifiers.

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

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

2 5 Band, 2 Channel Audio Equalizer enhances frequency response

\$134⁹⁵

- Tailors your treble, midrange, and bass to fit your musical tastes — regardless of room arrangement or input source

Room furniture, phono cartridges, tapedecks, and speakers sometimes smother your music's frequency response unintentionally. Result: you can't quite hear those cymbals clash in the background, or the bass overrides the voice of your favorite singing artist.

Our AD-1305 Audio Equalizer eliminates that problem. Five individual controls for each channel let you control your highs through your lows, step by step, from 30 Hz to 32 kHz with no overlapping. So you'll hear those sizzling cymbals, that thundering bass, and the crisp sound of your vocalist's voice. Everytime, all the time.

And the AD-1305 plugs into any receiver or amplifier equipped with a pre-amp output and power input, or tape monitor.

It's fun to build, and first-time kit builders will appreciate how the parts mount onto three simple circuit boards. Price includes case.

Kit AD-1305, Shpg. wt. 11 lbs. 134.95

AD-1305 SPECIFICATIONS: Input Impedance: 100k ohms. Output Impedance: 100 ohms. Rated Output: 1.5 V rms. Overload: 5 V rms. Signal-to-noise Ratio: 90 dB below 1.5 V. Total Harmonic Distortion: 0.05% from 20 Hz to 20 kHz at 1.5 V output. IM Distortion: 0.05% at 1.5 volts. Frequency Control Range: (separate controls for each channel), 30-125 Hz, 125-500 Hz, 500-2000 Hz, 2000 Hz to 8 kHz, 8 kHz-32 kHz. Overall Gain (flat): Zero dB (unity gain). Slope of Filters: 12 dB per octave. AC Outlets: one switched, one unswitched. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 4¾" H x 17½" W x 8" D.



Solid-state mono amplifier puts life into AM-FM tuners

3.25 WATTS, MIN. RMS, INTO 8 OHMS WITH 4.5% THD FROM 40-20,000 HZ.

The AA-18 takes the signal from a record player with ceramic cartridge, a tape player, or mono AM or FM tuner and cleanly amplifies it.

Makes a perfect beginner's kit — takes just a few evenings to assemble. Walnut-colored metal case. Fits on table-top. Measures 2¾" H x 7¼" W x 5¾" D.

Kit AA-18, Shpg. wt. 4 lbs. 29.95



Audio unit reads amp output

Peak-responding meters watch each channel's output from .2 to 200 watts. Easy-to-read meters are: 1) calibrated from -30 dB to +3 dB and 2) back-lighted for dusk or night reading. Four switched and four unswitched AC outlets give you finger tip control of other stereo system components. For 120/240 VAC, 50/60 Hz. Measures 4½" H x 17½" W x 8½" D.

Kit AD-1307, Shpg. wt. 11 lbs. 99.95



Stereo Mixer for studio-quality tapes

Whether you're recording tapes for audio-visual presentations, public address announcements, auditions, or personal use, the TM-1626 makes your voice come on crisp and clear.

Four mike and two auxiliary inputs allow you to mix music with voice. 60 dB gain permits use with 150 or 47K ohm mike. For 120/240 VAC, 50/60 Hz. Case with walnut-veneer panels. Measures 5¾" H x 16" W x 9¾" D.

Kit TM-1626, Shpg. wt. 12 lbs. 179.95



The convenience clock...with digital accuracy



1 EVENING KIT Fast, Easy Assembly

Loaded with convenient features

- 9-minute reset button
- Automatic brightness adjustment
- Power failure alert
- Value priced

The Digital Alarm Clock is a great way to get into the hobby of kitbuilding. This low-priced clock takes only one evening to build, following the clear, step-by-step instructions of the Heathkit manual. When you finish, you've built a digital alarm clock with a pleasant electronic tone to start your day out right. A special button lets you take 9-minute catnaps for up to an hour. A pleasant blue-green LED display automatically adjusts to changing light conditions. You can easily switch between 12 and 24-hour formats, and accurately set time. And this clock even alerts you to power failures.

Get started today with this value-priced electronic clock. Includes built-in speaker and handsome simulated woodgrain cabinet. Dimensions, 2¼" H x 7" W x 4¾" D.

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



Digital electronic "Super-Clocks" for floor or shelf display in your own home

- Automatic dimming circuit adjusts to room light for a charming pleasant glow
- Hour and minute readout can be seen from anywhere in the room
- Handsome glass shelves provide nice display for flowers, knick-knacks, etc.

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

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

The clock displays hours and minutes, with the center colon pulsing each second. A special power failure indicator circuit pulses the display brightness to show that power has been interrupted and clock must be reset. Time setting is accomplished by easy-to-use fast and slow time advance switches located on the bottom of the clock chassis.

The GC-1195 is an excellent and truly useful selection for the first time kit builder. The manual is clearly written and guides you step-by-step through construction in a manner which is both easy to understand and easy to follow.

The GC-1195 is a handsome addition to most any decor, and a great conversation piece. For even more charm and "Old World" distinction, add our electronic clock chimes accessory (described at right).

Kit GC-1195, Shpg. wt. 58 lbs. 199.95

GC-1195 SPECIFICATIONS: Format: 3½-digit (12-hour) time readout. Power requirement: 120 VAC, 50/60 Hz, 30 watts. 240 VAC, 50/60 Hz, 30 watts. Dimensions: 60½" H x 14" W x 9½" D.



Our "Super-Clock" in a shelf case

Uses the same electronics and display as the GC-1195 floor clock, but is housed in a good-looking walnut-veneer cabinet suitable for shelf, table or desk-top use. Accepts optional GCA-1195-1 electronic chimes described below. 5½" H x 12½" W x 6¼" D. Kit GC-1197, Shpg. wt. 13 lbs. 109.95

Add a super sound to your Super Clock with these synthesized chimes that give you an authentic "Big Ben" chimes sound

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

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



Find fish, know water depth with the deluxe Dual-range Depth Sounder

\$99⁹⁵ • Deluxe Sounder lets you explore depths to 240-ft. for boating safety and more successful fishing

This deluxe Dual-range Depth Sounder means improved fishing and navigation. Shows water depth; type of bottom, schools of fish, individual fish. A high-pitched "beep" alerts you to shoals or objects projecting above any preselected depth from 5 to 240 ft. Has switch-selected 0-60 and 0-240 ft. ranges, fixed noise rejection circuit, polarity protection and bright neon indicator. Includes quick disconnect power and transducer leads, gimbal mount and sturdy Cyclocac® case, glare-free bezel and sun shield.

Kit MI-1031-1, with thru-hull transducer, 15' coax, Shpg. wt. 8 lbs. 99.95

Kit MI-1031-2, with transom transducer, 25' coax, Shpg. wt. 8 lbs. 99.95
 Heathkit Single-Range Depth Sounder. Most of the same fine features as our Dual-range Sounder but single 0-240 ft. range, no alarm.

Kit MI-1030-1, with thru-hull transducer and 25' coax, Shpg. wt. 8 lbs. 69.95

Kit MI-1030-2, with transom transducer and 25' coax, Shpg. wt. 8 lbs. 69.95

MI-1030 and MI-1031 SPECIFICATIONS: Frequency: approx. 200 kHz. Accuracy: Within 2% of actual depth. Transducer: Barium titanate ceramic element enclosed in waterproof housing. Power Requirement: 0-60' range, 225 mA @ 11-15 VDC (MI-1031 only), 0-240' range, 125 mA @ 11-15 VDC with one return pulse. Dimensions: 6½" H x 5¾" W x 7¼" D.



1 Heathkit Seeker™ shows exactly where to find fish

Chart Recording Depth Sounder features extra-wide beam transducer for greater coverage, so you get a wider "picture" of what's below. Three ranges: 5-200', 200-400', and 400-600'. Roll of paper lasts 13 hours. Two lamps light chart for easy night operation. Universal gimbal mount. Operates on boat's 12-V system. 8" H x 11" W x 7" D. With one roll chart paper.

Kit MI-2910-1, with thru-hull transducer, 30' cable. 17 lbs. 289.95

Kit MI-2910-2, with transom mount transducer, 30' cable. 17 lbs. 289.95

MIA-2910-1, two rolls Chart Paper. Shpg. wt. 2 lbs. 9.95

MIS-2910-1, Save \$9.75! 12 Rolls Chart Paper. If pur. sep. \$59.70. 12 lbs. 49.95

2 Protect your hull with the Heathkit Digital Depth Sounder

Don't run aground or risk puncturing your hull. The Heathkit Digital Depth Sounder's dual-range display automatically reads depth in 0.1 foot increments from 2.5 to 19.9 feet, and in 1 foot increments from 20 to 199 feet. Red light signals clearance of 10 feet or less. Includes rugged Cyclocac® case; gimbal mounting bracket and 25 feet of cable.

Kit MI-101-1, with thru-hull transducer, wt. 7 lbs. 149.95

Kit MI-101-2, with transom transducer, wt. 6 lbs. 149.95

3 Catch more fish with the economy Fish Spotter™ Sounder

Fish between the surface and any preset depth up to 240 ft. trigger audible alarm. Uses two 6-V batteries (not included). 7" H x 6" W x 11" D.

Kit MI-2901, Shpg. wt. 8 lbs. 109.95

Kit MIA-2900-1, Scanning Transducer bracket, wt. 4 lbs. 29.95

Don't get lost! Boat safely with the Heathkit Radio Direction Finder



In William F. Buckley, Jr.'s book, "Airborne," he reminisced that, "The most satisfactory radio direction finder I ever had was out of Heathkit."

thanks to the big azimuth ring marked in 2 increments and a generous 7-inch rod antenna. Lighted meter provides accurate null indications, and a control adjusts meter sensitivity for weak or strong stations. The telescoping sense antenna eliminates 180° ambiguity. Bearing accuracy is an impressive ±3°. Use with your boat's 12-15 VDC electrical system, or becomes completely portable with six "D" cell flashlight batteries (not included). To prolong battery life, digital readout display automatically shuts off after approximately 20 seconds — but can be recalled instantly. Measures 7¼" H x 11½" W x 12" D. Can be aligned without instruments.

Kit MR-1010, Shpg. wt. 14 lbs. 259.95

This low-cost, easy-to-build kit is a must for any boater venturing onto large bodies of water

Stay on course. The MR-1010 keeps you informed on 190-410 kHz longwave beacon band or standard AM. Easy-to-read digital display is bright in direct sunlight, and dims automatically at night for safety and convenience. Finding your bearings is easy, too,

Thermo Spotter® gets you more fish



Shows water temperature to 100-ft. Lower line, press meter button for readout, check depth on cable. Charts (included) indicate kinds of fish likely to be at that level. Completely self-contained take-up reel case. Uses one 1.5 V AA battery (not included). 10¼" H x 5¾" W x 3¼" D.

Kit MI-104, Wt. 3 lbs. 44.95

Power Inverter gives boating fun



Operates small appliances such as TV (to 175 W) from 6 or 12 V. Not for high starting current or sine wave AC equipment.

Kit MP-10, 8 lbs. ... 49.95



NEW

Digital Depth Sounder protects your boat and passengers

\$159⁹⁵

Transom-mount transducer

- Detects depth changes from 2' to 499'

Prevent costly boat repairs and personal injury with the new Heathkit Digital Depth Sounder. Automatic range selection constantly monitors water depths from 2' to 499'. Crystal oscillator in unit sends depth changes to display every .9 second. Display tells you depth in .1' increments from 2' to 9.9', and reads in 1' intervals from depths 10' to 499'. Automatic gain control self-adjusts the signal sensitivity for precise, accurate depth readings.

Five alarm settings insure your boat's and passengers' safety in harbors, rivers, and open water. You can set sounder to warn you visually and audibly of unexpected depth changes at the following levels: 2', 4', 10', 20', and 40'. Helps you avoid running aground and puncturing your hull.

Built-in keel offset automatically subtracts the keel depth, so you know the exact distance between keel and lake floor when sailing in the shallows.

Easy-to-read, 3 digit, LCD display with backlighting informs you of water's depth day or night, giving you clear readings on fishing and diving trips.

Won't crowd your dash — measures 2½" H x 7.0" W x 5½" D. Gimbal mount lets you place unit on dash or overhead, and permits you to adjust it to a comfortable reading position.

Made from non-corrosive, weather-resistant materials of stainless steel, plastic, and aluminum for years of outdoor service. Parts mounted on glass-epoxy circuit board for easy assembly. Assembly time: about 8 hours. Back connector lets you use the MI-2917 or MI-2918 kits with this unit.

Digital Depth Sounder with Thru-Hull Transducer.

MI-2916-1, Shpg. wt. 8 lbs. 169.95

NEW

Digital Remote adds another alerting station to the MI-2916 Depth Sounder

\$119⁹⁵

- Independent alarms and depth settings
- Same type of display and accurate calibrations

Place the Digital Readout Remote unit in your boat's cabin, flying bridge, or any other location on board. Provides an additional depth reading station that audibly and visually warns you of unexpected changes in depth. A 25' cable carries power and depth sounder signals from the MI-2916 above to the remote for accurate depth readings and easy placement.

Remote has automatic range selection to show changes in depth from 2' to 499' every .9 second. Depth is displayed in increments of .1' for depths of 2' to 10', and read in 1' intervals for depths of 10' to 499'. You can set the unit's warning levels at 2', 4', 10', 20', and 40'. Built-in keel offset automatically subtracts keel depth to tell you the exact distance between keel and lake bottom. (Note: does not affect the warning depth and keel settings on MI-2916).

Easy-to-read, 3 digit, LCD display with backlighting is also featured on this unit, telling you the water's depth day or night.

Fits just about anywhere — measures 2½" H x 7.0" W x 5½" D. Gimbal mount makes installation easy, and lets you adjust the remote's angle from comfortable viewing.

Made to withstand all kinds of weather. Built with non-corroding stainless steel, plastic, and aluminum. Parts mounted on glass-epoxy circuit for fast assembly. Takes about 6 hours to assemble.

Kit MI-2917, Shpg. wt. 4 lbs. 119.95



Transducers for Depth Sounder Systems listed at left. 25' cable included.

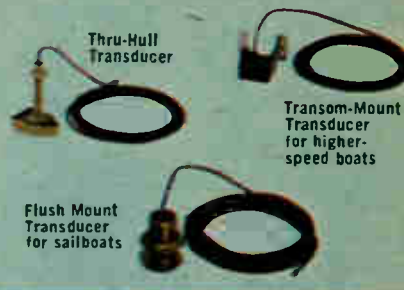
Digital Depth Sounder with Transom-Mount Transducer.

MI-2916-2, Shpg. wt. 7 lbs. 159.95

Digital Depth Sounder with Flush-Mount Transducer.

MI-2916-3, Shpg. wt. 8 lbs. 179.95

SPECIFICATIONS: Depth Ranges: 2.0' to 9.9' and 10' to 499'. Autoranging. Display: LCD with auto night light. Frequency: 200 kHz. Accuracy: ±.5% +1 count. External Control: Off-On switch. Alarm settings: 2', 4', 10', 20', 40'. Internal Controls: Keel offset 0' to 7'. Operating Temperature Range: 32°F to 122°F (0° to 50°C) Power: 10 to 17.7 VDC. Average current: 25 mA, 110 mA with night light. Alarm: Audible and Visual.



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Sure you can build a kit! These easy-to-build, first-time kits are not only fun to build...but they're practical too!

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