Kits to bring your family convenience and enjoyment
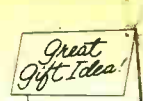
One-Button Phone Dialer
helps you respond fast in emergencies when speed counts!

- Microprocessor-based unit stores up to 16 numbers for quick dialing
- Converts your standard dial telephone to a push-button model

An emergency is no time to be searching 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. If the number is busy, you can redial automatically at the push of a single button. Stores up to 16-full 15-digit numbers (enough for area codes, etc.). Easy programming to change numbers. Memory-save circuit maintains stored numbers during power failures (9V battery not included). Converts your standard dial phone to a push-button model (also works with push-button phone). Connects easily to any modular phone jack. Complies with all FCC interconnect regulations. Easy assembly and operation. 120 VAC, 60 Hz. 2" H x 8¾" W x 5¾" D.

Kit GT-1217, Shpg. wt. 3 lbs. **89.95**

Digital Alarm Clock with rich AM/FM sound and beautiful styling

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

Loaded with convenient features: 24 hour set'n forget alarm, built-in 3" x 5" oval speaker for truly fine sound, and style that fits anywhere. The GR-1075 displays time in the conventional 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 FM or AM radio station of your choice. High quality electronics and 5 μV FM and 300 μV/M AM sensitivities make sure you'll "pull-in" a large selection of stations day-or-night. And for the sleepyhead, the clock's 7-minute snooze cycle will give you up to an hour of relaxing catnaps. Two 9-volt batteries (not supplied) take over during power interruptions and keep the clock counting. For 120/240 VAC, 50/60 Hz. 4½" H x 13⅝" W x 8⅛" D.

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

Telephone Amplifier lets you talk and listen with hands free

- Answer the phone by pressing a button, without lifting receiver
- Built-in microphone lets you talk from up to 10 feet away

To answer the phone, press the Power Button; to hang up, press it again. Voice-activated switch changes instantly from talk to listen. Easy-to-use slide control adjusts listening volume. Built-in microphone lets you talk from up to 10-ft. away. Requires external phone for operation. Comes with ¼" diameter phone plug, 1¾" square four-pin phone plug and 6' of 4-conductor cable for easy installation. Operates on 9V battery (not included). 2½" H x 8½" W x 5¾" D.

Kit GD-1112, Amplifier, Shpg. wt. 4 lbs. **54.95**
Kit GRA-43-1, AC Converter, Shpg. wt. 1 lb. **4.95**
Customer-owned equipment connected to telephone lines may be subject to local tariff.

Dazzling Musical Light Show adds more 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 low-midrange, 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. 22¾" H x 22¾" W x 4½" D. For 120/240 VAC. Input is 1 volt RMS min. to 22 volts max. Line isolation provides protection.

Kit TD-1006, Shpg. wt. 37 lbs. **99.95**

Convenient kits for your health and your home

Now get this digital scale for your home at a reduced price!

Big, bright LED digital readout

$99⁹⁵ Kit

Handsome burled-grain vinyl finish platform

Rugged cast-aluminum base can even be used on most carpeting without affecting readout accuracy.

Has electronic strain-gage mechanism that eliminates the mechanical weights and springs that can go out of adjustment. And with the custom mounting option you can place the readout at eye level. It's battery operated so it's safe to use, even after a shower.

Kit GD-1186, 9 lbs. **99.95**

Factory assembled and adjusted GD-1186 Digi-Scale. Readout non-detachable. Reads in pounds only in increments of ⁷⁄₁₀ of a pound.

GDW-1186, 9 lbs. **129.95**

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

Manual adjustment for accurate weighing of smaller items

Weigh the baby without weighing the blanket

The GD-1186 Electronic Digi-Scale is an ideal "companion" when you're dieting. As you exercise and watch your calories, the digital readout electronic scale shows you your weight right to 2/10ths of a pound. And since the scale is battery operated, you can even bring it along so you can weigh yourself immediately after any exercise or activity. It's a real weight loser's helper! And at the low price of $99.95, the GD-1186 is a great buy! Get a scale with electronic accuracy at a build-it-yourself kit price. Order now.

Authentic Casablanca Fan operates on pennies a day
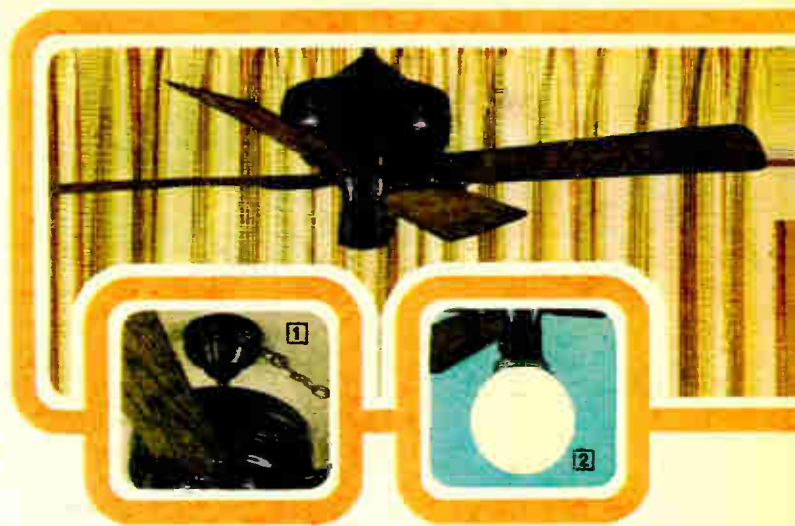
The decorative way to keep heating costs down, and assure your comfort for all seasons. Brings whisper-quiet cooling to your home for just pennies a day. Can also be used to bring heat down from high ceiling areas during heating season. With its fan motor done in a warm baked bronze enamel, the GD-1238 features chain pull switch operation, variable speed adjustment from 145 to 180 rpm, and 52 inch blades (tip to tip). For an even more charming effect add the optional Lamp or Swag-Chain kits. (Not for ceilings under 8-ft. high.)

Kit GD-1238, Shpg. wt. 24 lbs. **119.95**

Slow-Speed Accessory. Lowers fan speed to 50-100 rpm. Ideal for smaller rooms, lower ceilings. **GDA-1238-3, 1 lb.** **15.95**

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**

Deluxe FM Wireless Intercom brings you clear voice communications

- PLL circuit for quiet operation
- Automatic Squelch
- Call, Talk and Dictate Switches

- Uses your present house wiring so there's no bothersome wiring hookups

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. Order as many as you like for complete communications — solid-state circuitry consumes so little power 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 when the unit is in the talk mode. 3" speaker. The GD-1114 is a power miser, too. Power consumption on standby is less than 2 watts, and it uses less than 5 watts when you are talking. You can operate it for just pennies a month. Plastic cabinet, 3" H x 8⅝" W x 5¾" D, may be wall mounted. For 120 VAC, 60 Hz.

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

3

# The convenience clock...with digital accuracy

Loaded with convenient features
- Snooze alarm
- Automatic brightness adjustment
- Power failure alert
- Value priced

Now a pleasant electronic tone can start your day out right — and at a very low price! The clock features a pleasant blue-green display that automatically adjusts to ambient light conditions and is easily wired to give you the time in either a 12- or 24-hour format. Also, in addition to hours and minutes, the GC-1107 indicates AM and PM, tells you when the alarm is set, and alerts you if the clock has been shut off during power interruptions. The alarm on/off switch is easily accessible at the rear of the cabinet. And a "snooze" button lets you take 9-minute catnaps for up to an hour! A Slow switch and Fast switch let you advance the time for easy, accurate setting. The GC-1107 has a built in speaker and is styled in a handsome simulated woodgrain finish. 2¼" H x 7" W x 4¾" D.

Kit GC-1107, Shpg. wt. 3 lbs. **29.95**
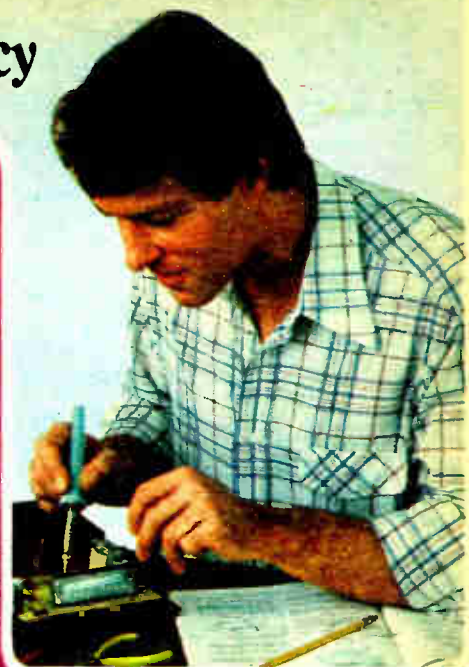
Digital Electronic "Super-Clocks" for floor or shelf display in your own home

- 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. 6½" H x 12½" W x 6¼" D.

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

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 annunciation 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**

Easy-to-build kits for your safety, health and convenience

## The Informer®: ultrasonic intrusion alarm at an affordable price

$59⁹⁵

- "Sees" intruders up to 25 feet away from the unit
- Built-in time delay lets you deactivate alarm
- Use anywhere — fits in with any collection of books

The GD-39 book-size alarm provides good protection. It alerts you to the presence of an intruder up to 25 feet away from the unit. When the GD-39's field of coverage is broken, the unit activates indoor lights, buzzers, bells, etc. A built-in time delay allows you to deactivate the alarm when you enter the room. You can also use the GD-39 as an automatic light switch for your garage, basement or attic. Use it when you want a light or buzzer to alert you to another's entry or to alert you to a child getting out of bed. Solid-state circuitry assures you of many years of reliable, trouble-free operation. Easy-to-build kit.

NOTE: Since the GD-39 operates in the same frequency range as some ultrasonic TV remote controls, interference between the two is possible. 10⅞" H x 2⅜" W x 7½" D. For 120/240 VAC, 50/60 Hz.

Kit GD-39, Shpg. wt. 5 lbs. 59.95
GDA-39-1, Indoor Buzzer Alarm, Shpg. wt. 1 lb. 11.95
GDA-39-2, Outdoor Bell, Shpg. wt. 5 lbs. 29.95
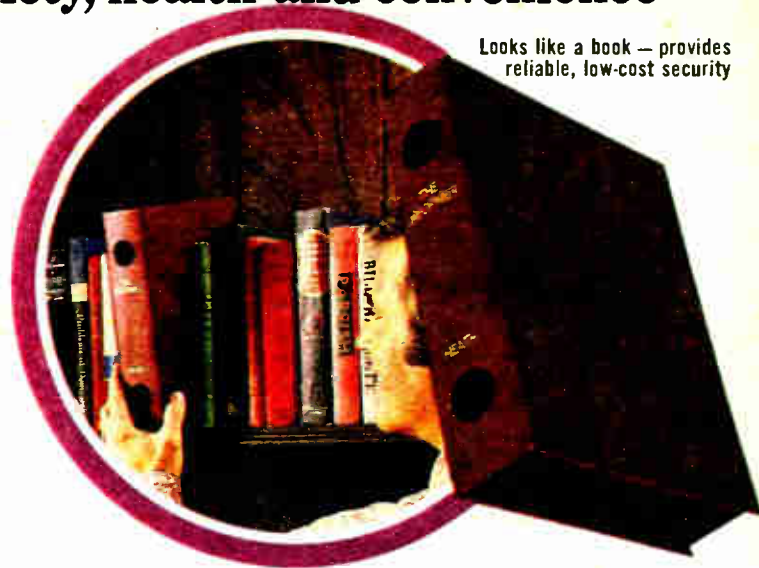
Eye Spy™ Photobeam for low-priced security

Consists of light source, mirror assembly and a photocell-controlled relay. When beam is broken, warning devices or lamps plugged into the photocell are activated. Works up to 25 ft. from reflecting mirror. Electronics, 5⅜" H x 4⅜" W x 5¼" D.
Kit GD-1021, Shpg. wt. 3 lb 16.95

Heath-Recommended Home Smoke and Gas Detectors

First-Alert™ Smoke Detector. Easy to mount, has built-in 85 dB horn, 100% solid-state circuit. U.L. Listed.
GD-1414, Assembled Shpg. wt. 2 lbs. 17.95
First-Alert™ Smoke Alarm with Remote Detector. Radio receiver center accepts alarm signals from remote detectors. Wireless.
GDP-1423, Center, 1 Detector. Assembled 6 lbs. 79.95
GDP-1424, Wireless Remote Detector. Assembled 2 lbs. 39.95
First-Alert™ Gas Detector with Electronic Horn. Gives early warning of propane or natural gas leaks. U.L. listed.
GDP-1425, Assembled Shpg. wt. 3 lbs. 39.95

Useful Heathkit Automatic Telephone Security Dialer

$179⁹⁵

Automatically calls a friend, relative or neighbor when alarm is triggered

When you can't reach the phone or don't have time to dial a complete number, press a button and the Security Dialer dials a preselected number. Has automatic redial if line is busy, three-digit location code and separate microphone. Battery-powered if AC fails (Batteries included). 4¾" H x 11" W x 6" D. Check with telephone company for any installation requirements.
Kit GD-1156, Shpg. wt. 8 lbs. 179.95

Digital Stopwatch lets you time any event, anywhere!
Quartz crystal accuracy with seven functions and bright readout

Reads hours, minutes, tenths and hundredths of seconds in a bright red digital readout that's easy to see in any light. Accurate to ±0.006%. Seven functions time any event, and special instructions let you convert the GB-1201 to read hundredths of minutes — perfect for time studies or car rallies. Includes AC adapter/charger, rechargeable batteries, sunscreen and lanyard. 5⅓" H x 2¼" W x 2" D.
Kit GB-1201, Shpg. wt.
2 lbs. 89.95
ICA-20D9-1, Felt-lined Naugahyde® carrying case, Shpg. wt. 1 lb. 4.95

## Electronic Flying Insect Killer keeps the bugs from bugging you

$74⁹⁵

- Self-cleaning grid
- Protects up to ⅓ acre from pesky flying insects

Mounts anywhere outdoors and looks handsome near your pool, porch or patio. Ten-watt black light attracts flying insects and electronically charged self-cleaning grid instantly, safely disposes of them. Protective outer screen keeps hands off grid. Attractive flat black and brass-colored housing is corrosion-proof. Operates for only pennies a day. For 120 VAC. 16" H x 11" W x 11" D.
Kit GD-2007, Shpg. wt. 11 lbs. 74.95
GDA-2007-1, Mounting Bracket, Shpg. wt. 2 lbs. 3.95
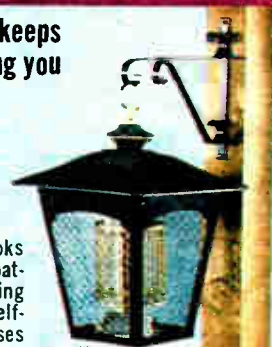
Kits to keep your family healthy and comfortable

Electronic Air Cleaner eliminates 99% of airborne pollen, 94% of all airborne particles in any room

- 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

$189⁹⁵

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. 26½" H x 17¼" W x 13½" D. For 120 VAC, 60 Hz.

Kit GD-1247, Shpg. wt. 59 lbs. 189.95
GDA-1247-1, 4 Deluxe Casters, Shpg. wt. 1 lb. 9.95
GDA-1247-2, Replacement Charcoal Filter, Shpg. wt. 2 lbs. 6.95

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

$199⁹⁵

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, 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 199.95
Kit GD-1196-2, 20" x 20" x 2", 800 cfm 199.95
Kit GD-1196-3, 16" x 25" x 2", 800 cfm 199.95
Kit GD-1196-4. 16" x 20" x 2", 640 cfm 199.95
Extra filters, use order nos. above, with GDA prefix (i.e., GDA-1196-1, 20" x 25" x 2", filter only), avg. shpg. wt. 11 lbs. ....each 1D9.95
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. 26.95

Save on both heating and cooling costs with automatically controlled Setback Thermostat

Programmable clock controls energy costs

$47⁹⁵

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.

A programmable clock provides up to 12 different setback periods each day. In the heating control, setback temperatures range from 2° to 15°F, and the higher the setback, the greater your savings. A switch lets you override the setback. The cooling portion shuts off your cooling system when your home is unoccupied and turns it on at a preset time. For use with electric cooling systems in combination with gas or oil furnaces. Works with either four- or five-wire furnace control systems. Thermostat, 5⅜" H x 3⅝" W x 2" D. Controller, 4⅜" H x 6½" W x 2¾" D. Transformer, 2⅜" H x 2¼" W x 1¾" D. Not for heat pumps.

Kit GD-1269, Shpg. wt. 3 lbs. 47.95

Home Heat Control saves up to 20%

A low-cost way to keep fuel bills down!
Reduces room temperature once or twice a day

$37⁹⁵

Automatically reduces room temperature during one or two preprogrammed periods. NOTE: For use with single-stage heating systems only. Some systems may require service by a licensed electrician. Check building codes.
Kit GD-1776, Shpg. wt. 5 lbs. 37.95

Add build-it-yourself security and convenience to your home

Deluxe Garage Door Opener puts an end to leaving your car in nasty weather to open a heavy garage door

$194⁹⁵

- For extra security, your garage door can't be opened by hand from outside the garage once it is closed
- For extra safety, clutch and safety switch return door to open position if it becomes obstructed during closing

Features powerful ⅓ hp motor plus automatic 75 watt dome light

The Heathkit Deluxe Garage Door Opener 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 drive late at night? Simply touch the button on the wireless transmitter in your car — your garage door opens automatically and a light turns on in the garage. Touch the button again, and the garage door closes behind you. The GD-3309 features a quiet but powerful ⅓ hp motor that opens the heaviest residential garage doors (up to 7½' maximum height). When the door is closing, the important adjustable slip clutch safety reverse feature 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, Mechanism.
Shpg. wt. 57 lbs. Motor Freight 194.95

Kit GD-3309D, Two Transmitters, Receiver, Mechanism.
Shpg. wt. 57 lbs. Motor Freight 209.95

Kit GDA-3309-1, Mechanism only. Shpg. wt. 44 lbs. Motor Frt. 159.95

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

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

GDP-3319A, Transmitter, 1 Receiver. (3-wire system) 1 lb. 54.95

GDP-3329A, 2 Transmitters, 1 Receiver. (3-wire system) 2 lbs. 69.95

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

GD-3309 SPECIFICATIONS: Overall Size: 12" H x 9" W x 120" L. Motor: 117 VAC ⅓ 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 TRANS-MITTER: 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.

Simple, no-solder assembly

Use separate switch from inside garage or transmitter unit you carry in your car

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Handy Heathkit Intercom saves you time and steps

2-Station Master
This master station lets you talk and listen to two remotes anywhere in your home. Price includes one indoor remote (GD-120).

Kit GD-140, Master and Remote,
5 lbs. 49.95

6-Station Master
This master station lets you talk and listen to six remotes anywhere in your home, office or factory. All remotes must be ordered separately. Both GD-110 and GD-140 operate for just pennies a month.

Kit GD-110, 6-Station Master, 5 lbs. 57.95

Accessories
Kit GD-120, Indoor Remote, 2 lbs. 19.95

Kit GD-130, Outdoor Remote. Don't use with GD-140. 2 lbs. 14.95

GDA-110-2, 100-ft. 4-cond. cable. For GD-110, 140. 3 lbs. 9.95

GDA-110-4, 100-ft. 2-cond. outdoor cable. For GD-130. 1 lb. 5.95

Portable Rechargeable Fluorescent Light for home and outdoors

$29⁹⁵

Great Gift Idea

Fishing, hunting, camping...or working in the yard, garden, attic or basement — the Portable Rechargeable Fluorescent Light gives you bright illumination without bothersome cords. Built-in rechargeable battery and separate preassembled charger let you use the GD-1246 for hours, then simply plug it into an AC outlet in your home (or into your car's lighter socket using the optional adapter listed below) to restore full power. 9⅜" H x 3⅛" W x 4⁵⁄₁₆" D. Recommended for use above 40° F.

Kit GD-1246, Shpg. wt. 6 lbs. 29.95

12V adapter. Kit GDA-1246-1, wt. 1 lb. 4.95

7

Special kits for a safer, more convenient home

"Programmable" Electronic Doorbell plays favorite 16-beat tunes

$49⁹⁵

- Now including song book with over 50 tunes
- Program it for any favorite tune up to 16 beats
- Change tunes easily for any special occasion

What a fun way for guests to announce themselves
...your favorite melody (or theirs) plays when
they touch the door button. Use as many as 16
beats to program your favorite tune. Change it
whenever you wish...program to celebrate a sea-
son, an anniversary, a birthday, even a special
party. New song book contains fifty pre-pro-
grammed tunes including many college songs.

Changing tunes is easy. Just rearrange the pro-
gramming leads in the "keyboard" behind the
front-panel access door. The assembly manual in-
cludes programming instructions for a variety of
tunes, or you can compose your own. Controls for
tuning, volume, speed, and decay characteristics
of the electronically synthesized sound also are
located inside the front-panel door.

Easy to build, even if you're a first-time kit build-
er. Installation is easy too — just connect with
your existing bell transformer.

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

Now have remote control of lights or small appliances

$16⁹⁵ only

- Sensor Plate mounts anywhere for instant on-off control
- Touch-Control light switch features half-brightness
- Add multiple touch plates

Single circuit
board assembly
cuts your con-
struction time

1 EVENING KIT
Fast, Easy Assembly

Turn lights and appliances on and off with a touch.
Place Touch-Control Switches throughout your
home, without adding extra outlets, wall boxes,
or rewiring. Simply plug lamp or appliance into
the control unit, and plug control unit into an AC
outlet. Remote touch plate mounts anywhere and
connects to the control unit by easily-concealed
wire. 20-ft. of wire included, or use your own for
longer runs. You can use more than one touch-
plate, too — or use door knob, rail or any other

metal as a touch plate. Both switches feature
fast, easy single-board construction. 120 VAC, 60
Hz. Touch-Control Light Switch for incandescent
lamps up to 150 W. On, off, half-brightness.

Kit GD-1187, Shpg. wt. 1 lb. 16.95

Touch-Control Appliance Switch for TV's to 225
W, fans to 180 W, lamps, heaters to 200 W. Not
for use with AM radios.

Kit GD-1287, Shpg. wt. 2 lbs. 16.95

Freezer Alarm guards your valuable food

$15⁹⁵ Sensor installs
in any freezer
to alert you to
power failures

Freezer Alarm signals if
freezer door is left open or
if freezer temperature rises
to 20°F even with door
closed. Uses two "C" batteries (not supplied).
Mounts anywhere with 20-ft. cable supplied.

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

Tabletop Lamp Dimmer saves energy, bulbs

$8⁹⁵ You can even
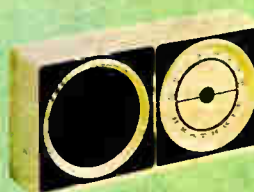add more lights
up to 300 watts

A great first-time kit. It ad-
justs brightness of lamps
up to 300 watts, giving your home a decorator touch.
Also saves energy and extends bulb life. Makes a
great heat control for pencil-type soldering irons.

Kit GD-1018, Shpg. wt. 2 lbs. 8.95

Take along your favorite radio programs everywhere you roam

$14⁹⁵

Great-first time kit,
this AM Pocket Radio
lets you take news,
music and sports
with you anywhere!

An ideal way to introduce yourself (or a friend) to
kitbuilding. 3½" speaker. Uses 9V battery (not sup-
plied). 4" H x 7⅞" W x 2" D.

Kit GR-1008, Shpg. wt. 2 lbs. Was $17.95, Now 14.95

Automatic Lamp Switch for home security

$5⁹⁵ Turns lamps on at
dusk, off at dawn
when you're away!

Easy one-evening kit turns lamps
on at sundown, off at dawn to
give your home a "lived-in" look
while you and your family are
away. Use with lamps up to 150W.

Kit GD-600, Wt. 2 lbs. 5.95

VOX 70 Automatic Telephone Answerer

Record-a-Call VOX 70 uses
standard cassette tape.
Voice actuation allows
caller to speak without
time limit on the record-
er. Use it for dictation, too. Fast forward, rapid
erase, silent monitor, announce without record,
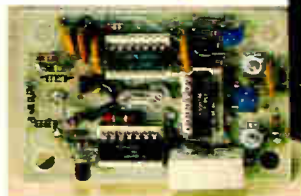more. Fully assembled. 120 VAC powered.

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

8

Join in the fun and excitement of Treasure Hunting!

① Groundtrack™ Metal Locator features VLF for accuracy in almost any kind of soil!

The Heathkit "Groundtrack™" metal locator is the finest we've ever offered! It will provide you with hours of fun-filled excitement every time you use it — searching for old coins, artifacts and treasure. It features a VLF (very low frequency) Ground Balance Mode for use in highly mineralized soil and adjustable discrimination for use in areas where high "junk" content makes the use of conventional locators all but impossible. Pushbutton tuning maintains maximum sensitivity. Fully shielded search coil prevents false signals and is waterproof for shallow water searching. Lightweight, adjustable shaft telescopes for easy storage. Uses a sophisticated induction balance search system — you don't hear anything until a piece of metal enters the search field, then the tone grows louder as you approach the metal. Operates on six "AA" cells (not included), or the optional GDA-1190-1 Rechargeable Battery Pack (order below).

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

GD-1290 SPECIFICATIONS: Sensitivity: Locates dime at 4″ to 6″ typical, may be less depending on soil conditions, mode of operation and amount of discrimination selected. Method of Detection: Induction-balance circuit. Detector Output: Meter, speaker, phone jack. Dimensions: Search Coil: 6″ diameter. Extended Height: 45½″. Collapsed height: 22½″. Power Requirement: Six AA dry cells or alkaline, or rechargeable Nickel-Cadmium Battery Pack (GDA-1190-1). Net Weight: 3.4 lbs.

② Cointrack™ Metal Locator designed for "coinshooting"

The GD-1190 is the locator to have when you're interested in coins and more coins. It features a search coil optimized for coin locating, and adjustable discrimination so incredibly good you'll be finding "treasure" in areas where high "junk" content makes operation with other locators all but impossible! Pushbutton tuning maintains maximum sensitivity — effortlessly. And for shallow water searching, the 1190's waterproof head won't leave you out of the action. Weight is minimal and to cut fatigue even more, an adjustable shaft is provided for maximum comfort.

The 1190 collapses for easy storage and transportation. And with its optional GDA-1190-1 Nickel-Cadmium battery pack installed, you can recharge the 1190 at home, or in the field from the cigarette lighter of your car! Or it operates on six ordinary AA cells (not included). An outstanding value, and an easy and fun kitbuilding experience too.

Kit GD-1190, Shpg. wt. 5 lbs. **159.95**
Rechargeable Nickel-Cadmium Battery Pack. For GD-1190 or GD-1290. Lets you recharge the GD-1190 or GD-1290 at home from an AC outlet or in the field from the cigarette lighter of your car.

GDA-1190-1 Shpg. wt. 2 lbs. **19.95**
GDA-1190-2, Headphones. For GD-1190, 1290. 2 lbs. **13.95**
GDA-1190-3, Carrying Case. For GD-1190, 1290. 1 lb. **13.95**

GD-1190 SPECIFICATIONS: Sensitivity: Typically 4″ to 6″, may be less depending on coin size, amount of discrimination and soil material. Method Of Detection: Off resonance type. Output: Meter, Speaker, Phone Jack. Dimensions: Search-Coil: 6″ diameter. Overall length: Shaft extended 45½″, collapsed 22½″. Power Requirement: Six—AA Dry Cells or Alkaline, or rechargeable Nickel-Cadmium battery pack (GDA-1190-1). Weight: 3.4 lbs.

③ Low-priced induction balance locator finds any metal
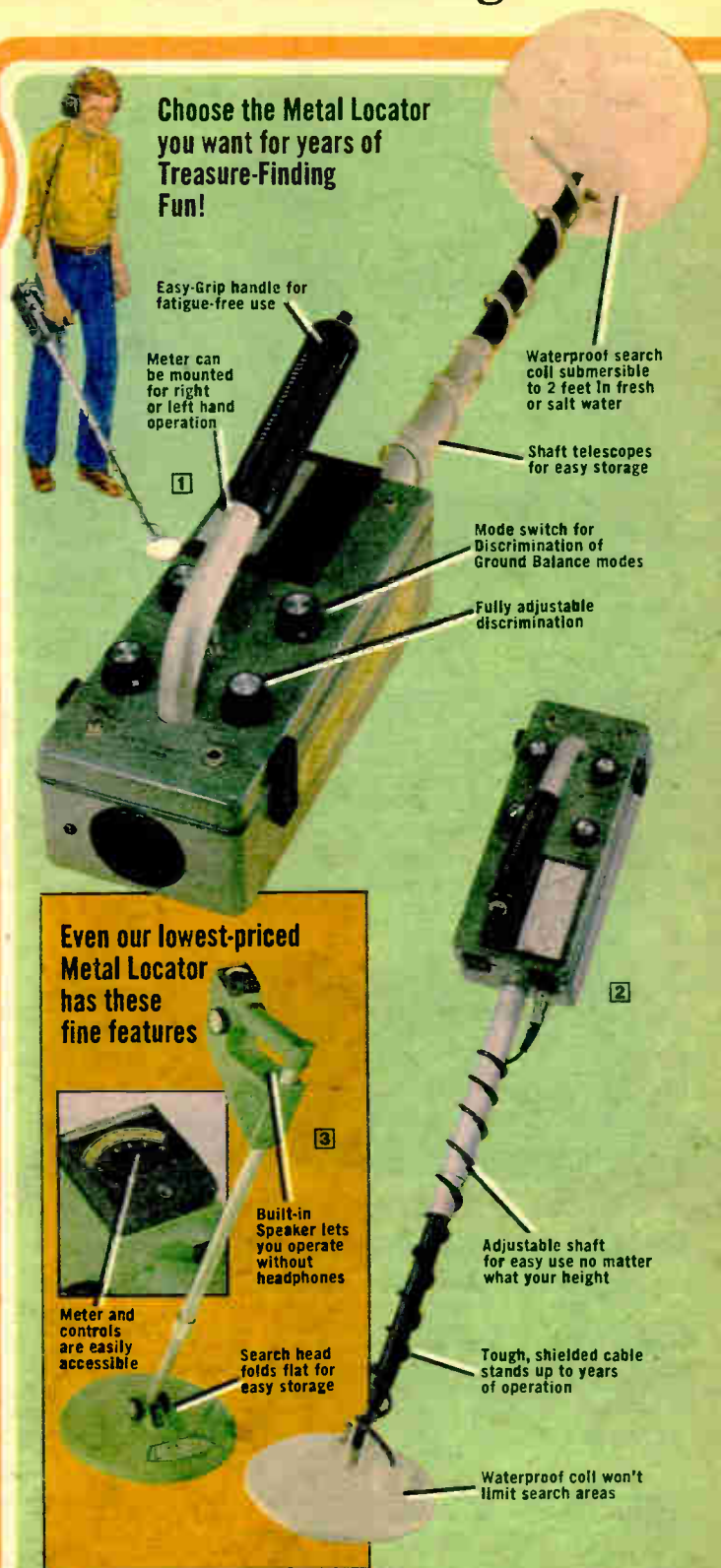
The GD-348 uses a sophisticated "induction-balance" system so you don't hear anything until a piece of metal enters the search field. Then the tone grows louder as you get closer to your quarry. You may listen through its built-in speaker, optional headphones or use the front-panel meter to pinpoint your find. The GD-348 has null and ten-turn sensitivity controls that let you adjust it to find smaller or larger objects, overcome ground effects, etc. These controls are conveniently located near the pistol grip handle. The shaft telescopes and the search coil folds flat for easy storage.

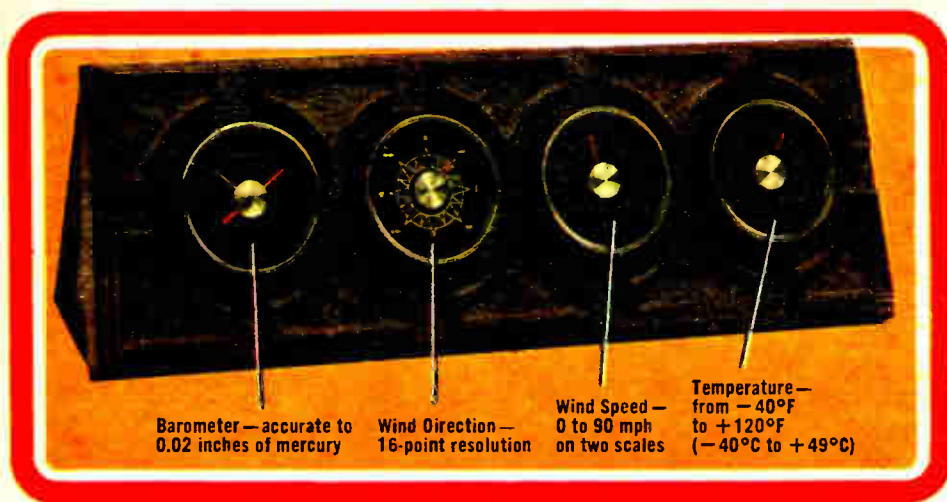Kit GD-348, Shpg. wt. 5 lbs. **89.95**
GDA-48-1, 9-volt battery, Shpg. wt. 1 lb. **3.25**
GD-396, 600-ohm Superex headphones, Shpg. wt. 2 lbs. **6.95**
GDA-348-1, Carrying case, Shpg. wt. 2 lbs. **14.95**

Choose the Metal Locator you want for years of Treasure-Finding Fun!

Easy-Grip handle for fatigue-free use

Meter can be mounted for right or left hand operation

①

Waterproof search coil submersible to 2 feet in fresh or salt water

Shaft telescopes for easy storage

Mode switch for Discrimination of Ground Balance modes

Fully adjustable discrimination

②

Even our lowest-priced Metal Locator has these fine features

③

Built-in Speaker lets you operate without headphones

Meter and controls are easily accessible

Search head folds flat for easy storage

Adjustable shaft for easy use no matter what your height

Tough, shielded cable stands up to years of operation

Waterproof coil won't limit search areas

Heathkit deluxe electronic weather instruments

Barometer — accurate to 0.02 inches of mercury

Wind Direction — 16-point resolution

Wind Speed — 0 to 90 mph on two scales

Temperature — from −40°F to +120°F (−40°C to +49°C)

Handsome wood-grain plastic cabinet mounts horizontally or vertically on wall, or use on desk

Remote transmitter clamps onto any 1" to 1½" TV antenna mast

Get instant, accurate weather readings anywhere!

Easy-to-read precision Five-Function Weather Station

Wherever instant, electronically accurate weather information is needed, the Heathkit ID-1290 Weather Station keeps track of indoor and outdoor temperatures, barometric pressure, wind speed and direction. The thermometer is calibrated in two-degree increments from −40°F to +120°F (−40°C to +49°C), with a switch to select indoor or outdoor readings. The barometer helps you keep abreast 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 temperature sensor) is included with the ID-1290. It clamps onto any 1" or 1½" diameter TV antenna mast, and is connected to the cabinet with optional eight-wire cable (below).

Kit ID-1290, Shpg. wt. 8 lbs. 119.95
8-Wire cable for remote transmitters. IDA-1290-1, 50 ft. cable, 2 lbs. 7.95
IDA-1290-2, 100 ft. cable, 4 lbs. . . .13.95   IDA-1290-3, 150 ft. cable, 6 lbs. . . .18.95

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, ±2°F (−18°C to +49°C, ±1°C). Typ. outdoor: −40°F to +120°F, ±2°F (−40°C to +49°C, ±1°C). Barometric pressure: 29 to 31 inches of mercury ±0.02 inch, accurate to 10,000 feet. Power requirement: 110 to 130 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 and 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 (miles per hour, kilometers per hour or knots). Switches select the mode and front panel lights show which mode is in use. The eight principal compass points are marked by lights, providing 16-point resolution. This easy to build kit will be a welcome addition to your home. Includes remote transmitter as above. Order 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 ±10%, whichever is greater. Direction response threshold: approx. 2 mph. Operating temperature: Receiver: 0°F to +150°F (−18°C to +65°C). Transmitter: −40°F to +120°F (−40°C to +49°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, hot house, basement, swimming pool and a variety of custom applications). Black Cycolac® plastic case with teak-grain vinyl inserts. A practical, easy-to-build kit that gives value year around.

Kit ID-139D, Shpg. wt. 5 lbs. 74.95

ID-1390 SPECIFICATIONS: Temperature range: −40°F to +120°F (−40°C to +50°C). Accuracy: ±2°F from −30°F to +1°F from +20°F to +120°F, ±2°C from −30°C to −15°C, ±1°C from −15°C to +50°C. Display: 2½-digit planar gas discharge with + and − signs. Power requirement: 110 to 130 VAC, 60 Hz, 4 to 6 watts approx. Dimensions: 2½" H x 7" W x 5" D.

Get instant weather reports with this computerized weather station

Digital Weather Computer

HEATHKIT

THE Electronic Weatherman

SAVE $100⁰⁰ on the factory assembled and tested version

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

Heathkit Digital Weather Computer gives 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. Micro-processor-based electronics put everything at your fingertips.

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
SAVE $100. Factory Assembled and Tested Version of above.
IDW-4001. Includes 100′ cable. Shpg. wt. 22 lbs. Was $595.00, Now 495.00

ID-4001 SPECIFICATIONS: DIGITAL CLOCK/4-YEAR CALENDAR. Time Accuracy: Determined by accuracy of AC line. No accumulative error. WIND VECTOR: Accuracy: ±5% or better. Direction Display: Accuracy: ±11.26% degrees. THERMOMETER: Temperature Range: −40° to 70° C; −40° to 158° F. Accuracy: ±1° on Celsius readings; ±2° on Fahrenheit readings. BAROMETER: Pressure Range: 28.00 to 32.00 in Hg (inches of mercury). 981.9 to 1050 millibars. Accuracy: ±0.075 in Hg plus ±0.01 in Hg/°C. Operating Temperatures: Outdoor assemblies, −40° C to +70° 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: 7¼″ H x 16″ W x 6″ D.
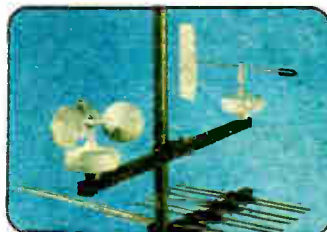
8-Wire cable for ID-4001 kit version
IDA-1290-1, 50 ft. cable, 2 lbs. 7.95
IDA-1290-2, 100 ft. cable, 4 lbs. 13.95
IDA-1290-3, 150 ft. cable, 6 lbs. 18.95

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.

Save energy—tune up with Heathkit auto instruments

NEW

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

Kit CM-1550, Shpg. wt. 5 lbs. **99.95**

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°, ±0.2%; 5 cylinders, 0° to 72°, ±0.2%; 6 cylinders, 0° to 60°, ±0.2%; 8 cylinders, 0° to 45°, ±0.2%. **Tachometer:** Two RPM ranges: 0.00 to 10.0 (x1000), ±0.1% of indication; 0 to 1999, ±10 RPM. **DC Voltmeter:** Two voltage scales: 0 to 19.99 V, ±1.5%; 0 to 199.9 V, ±1.5%. **Ohmmeter:** Three resistance scales: 0 to 199.9 ohms; 0 to 19.99 kilohms; 0 to 1.999 megohms, all ±1.5%. **Direct Current:** Two current ranges: 0 to 19.99 amperes, ±3% (standard); 0 to 400 amperes, ±5% (requires optional CMA-1550-1 Shunt Accessory). **Operating Temperatures:** 0° to 140°F (−18° to +60°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:** 3½" H x 12½" W x 8" D.

Affordable portable Engine Analyzer with digital accuracy!

$99⁹⁵

- Measures dwell, RPMs, DC voltage, resistance and direct current
- Battery-operated — fewer clumsy wires
- Large, clear liquid crystal display

Heath brings you the 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 ±0.2%; RPMs to 10,000 in two ranges, ±0.1%; DC Voltage, in two ranges, to 200 Volts, ±1.5%; and Resistance to 2.0 megohms, ±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 ±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.

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. 6½" H x 2" W x 10" L.

Budget-priced, yet powerful

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

Self-powered, professional-quality Timing Light and Tachometer

$64⁹⁵

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. 7¼" H x 2⅝" W x 11½" L.

Kit CI-1098,
Shpg. wt. 5 lbs. **64.95**

Save more with Heathkit professional-quality auto test equipment

Professional-quality Ignition Analyzer assures you of precision auto tuneup

$469.95

- 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
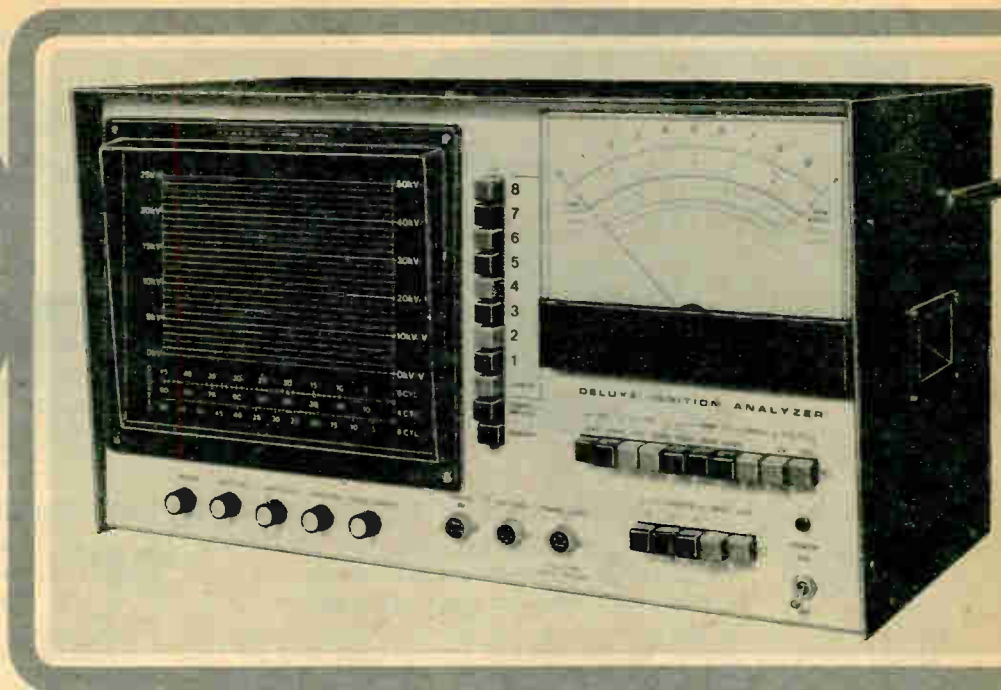
engine. Includes adaptor for GM HEI ignition systems. For use with 4, 6, or 8-cylinder (4-cycle) or 2-rotor Wankel engines and standard, transistorized or C-D ignition systems. With Heath's excellent manuals to guide you, you'll find assembly and operation of the CO-2600 to be a simple matter. Use with optional timing light below for a complete, economical home tuneup center.

Kit CO-2600, Shpg. wt. 83 lbs. 469.95
COA-2600-2, Alternator Test Adaptor. 1 lb. 9.95
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. All cables included.
3 lb. 49.95

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: ±3% of full scale on any range. Scope Vertical Expand: Min. 2 to 1. Operating Temp. Range: 32°F to 104°F. Tachometer: 1000 rmp, 3000 rpm, 6000 rmp. Voltmeter: 2 or 20 VDC. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 127/8" H x 251/4" W x 141/8" D.

Deluxe Scope Cart
Keeps CO-2600 at ideal viewing angle for easy reading.
COA-2600-3, Shpg. wt. 25 lbs. 39.95

Handy universal Tune-up Meter for most small engines

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

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 setup and use.
Kit CM-2045, Shpg. wt. 4 lbs. 49.95

CM-2045 SPECIFICATIONS: Voltmeter: 0-20 V DC. Ohmmeter: 0-100 kΩ (10 kΩ 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: 91/8" H x 93/8" W x 51/4" 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. 32.95

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: 41/4" H x 81/2" W x 71/4" D.

Get the best from your car with Heathkit auto instruments
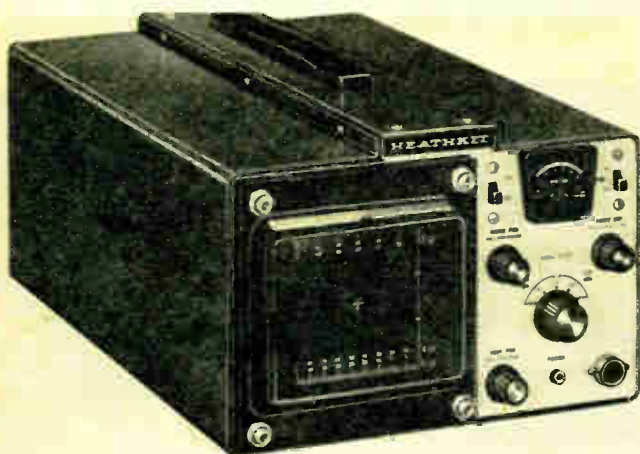
Versatile Heathkit Ignition Analyzer makes car tune-ups easier

$179⁹⁵

- 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. **179.95**
Kit COA-1015-1, 12-Volt Inverter. Lets you operate CO-1015 from your car's 12-volt lighter socket. Shpg. wt. 3 lbs. **37.95**

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

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

$84⁹⁵

- Works with any voltage, any 3, 4, 6 or 8-cylinder engine
- With all leads and accessories for complete tuneups
- Accuracy is excellent — ±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. **84.95**

CM-1050 SPECIFICATIONS: Voltmeter Ranges: 0-3.2 V DC, 0-32 V DC, ±3% of full scale. Ohm-meter: Two ranges: R x 1 (100 Ω center scale). R x 100 (10 Ω center scale), ±3° arc. Tachometer: Two ranges: 0-1200 rpm, 0-6000 rpm, ±3% of full scale. Dwell Meter: Two ranges: 0-45° (on 0-60° scale). 0-60°, ±3% of full scale. Amperes: −5 to +90 amperes DC, ±3% of full scale. Spark Output: 0-50. Point Resistance: Good/Bad. Alternator: Good/Bad. Condenser: 0.22 μF, 10%. Accuracy: ±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 the mercury plunges!

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 when freezing temperatures hit. 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. 6⅛" 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 winter weather

$49⁹⁵

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

Old Man Winter can't kill your battery with a freezing blast when you have 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 6⅜" D. For 110-130 VAC, 60 Hz.
**Kit GP-21**, Shpg. wt. 13 lbs. **49.95**

Learn about your car's electrical system and fix it yourself!

Avoid costly repairs. Save time and money. Learn to spot and fix electrical problems yourself with the new Heath Automotive Electrical Self-Learning Program. Keep your car running more reliably and reduce expensive "in-shop" repairs. (Photo shows Program plus optional Engine Analyzer and Tape Recorder).
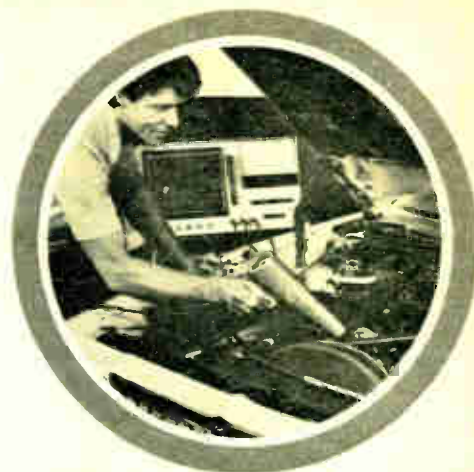
It's complete! This new 4-module program gives you a complete understanding of the principles of automotive electrical systems, as well as a practical guide to diagnosing and correcting common problems. You'll learn how to care for your battery, how to test each part in your starting and charging systems, how to trace the circuitry throughout your car and repair all lights and accessories. You'll learn how to read schematics, how to use a multimeter, and how to perform preventive maintenance that keeps your electrical system in peak condition and assures you of miles of trouble-free driving.

It's easy! This award-winning program uses proven audio-visual techniques for easy, thorough learning. Clear, color visuals are combined with audio cassette tapes, so you see and hear each step. This is reinforced by a programmed instruction written text and test questions and by optional experiments and projects which you perform on your own car.

It's fast! This program is carefully organized and professionally designed for efficient learning. You move at your own pace, as fast or as slow as you choose. For experienced mechanics, the Program is a valuable reference work.

Money-back guarantee. If you're not completely satisfied with your Automotive Electrical Self-Learning Program...or if, after completion of the program, you fail to pass the electrical systems exam given by the National Institute for Automotive Servicing Excellence...we will refund the purchase price.

After completing the Heathkit Automotive Electrical Systems Program (Modules 1 through 4), you should have a thorough understanding of your car's electrical system, along with the experience and confidence to correct almost any auto electrical system problem that arises.

Upon passing the final exam with a grade of 70% or better, you will receive 4.0 Continuing Education Units — a nationally-recognized way of acknowledging participation in non-credit adult education — and a Certificate of Achievement. The Heathkit Automotive Electrical Systems Program includes all four modules, cassette holder, binder, clip leads, parts for experiments and hydrometer.

(See the optional Engine Analyzers on page 14).

Electrical Principles of the Automobile:

In Module 1 you learn basic electrical principles, including an understanding of positive and negative charges, the relationship between voltage, current and resistance (Ohm's Law), and series and parallel circuits. You'll learn to:

- Apply the principles of electricity to your car's electrical system.
- Diagnose and troubleshoot basic circuit problems.
- Measure headlamp current and battery leakage.
- Use a VOM to measure voltage, current and resistance.

The Automobile Starting System:

In Module 2 you learn about the major components of your starting system, how they work to start your car, how to keep your starting system in good working order, and how to correct common starting problems. You'll learn to:

- Troubleshoot starter relay, neutral safety switch, starter solenoid and starter motor.
- Describe relationship between battery voltage and starter motor current.
- Measure starter current draw.
- Test voltage drop on your car's starter motor.
- Repair or replace components in your starting system.
- Locate open or short circuits.
- Avoid cold weather starting problems.

The Automobile Charging System:

In Module 3 you learn about the components of your car's charging system, including the alternator and regulator. You'll learn to:

- Understand the functions of the components of your car's alternator.
- Energize the alternator field.
- Compare advantages of the alternator vs. the DC generator.
- Identify and test the condition of your car's voltage regulator.
- Examine the voltage regulator and alternator for correct operation.
- Trace the charging system's wiring.
- Measure charging voltage.
- Take necessary safety precautions when working on your charging system.
- Use an engine analyzer (such as the CM-1050 on page 14) to test engines.
- Repair or replace components.

Body and Accessory Electrical Circuits:

In Module 4 you learn about the circuitry that powers the lights and accessories of your car. You'll learn to:

- Read wiring diagrams and apply them to your own car.
- Test and correct circuitry defects.
- Isolate shorts in a lighting circuit.
- Test and repair seat belt warning system, hazard and turn-signals, and power window malfunctions.
- Determine if charging system is adequate to add accessories.
- Use correct replacement wires.
- Identify common problems of thermo-electrical and electro-magnetic gauge systems.
- Test and replace the instrument voltage regulator of your car.

The **Automotive Electrical Program** consists of Modules 1 through 4, cassette holder, binders, clip leads, electrical parts for experiments and a professional hydrometer. (Order optional auto test instruments on pages 12 through 14).

EAC-1, Shpg. wt. 23 lbs. **79.95**

NOTE: This Program prepares you to pass the National Institute for Automotive Servicing Excellence professional auto mechanic certification exam on auto electrical systems. Contact NIASE, 1825 K Street, NW, Washington, DC 20006 for information on the exam.

Digital readout car accessories from Heath

1 Car Thermometer shows inside and outside temperatures

$99⁹⁵ Easy-to-read digital display shows two temperatures — interior and outside temperatures for vehicle or boat

It's ideal for R-Vs, campers, motor homes, any 12-volt vehicle. Two temperature sensors, one for outside your vehicle and one for inside, give you outside and inside temperatures. Outside sensor can alert you to frozen roads. You can even use it in your boat with a sensor placed outside at water level to indicate the surface temperature of the water. The 2½-digit readout indicates temperatures from −20°F to 140°F (−30°C to +60°C). Special IC sensors and a dual-slope A/D converter combine to give you a readout accuracy of ±3%. A button automatically changes the readout from Fahrenheit to Celsius, and you can alternate inside or outside readings or hold either one. Has automatic brightness adjustment for easy reading in any ambient light.

Includes inside and outside temperature sensors, each with 9½-ft. cable. Sensors are submersible. Easy mounting with sticky-backed tape or with special gimbal bracket, both included. You also get solid-state design for long, reliable performance. 3.12″ H x 4.71″ W x 3.12″ D. For 12 VDC negative ground.
Kit CI-1525, Shpg. wt. 2 lbs. 99.95

2 Car clock/timer with digital quartz precision

$39⁹⁵ Clock for accurate time in your car
Timer keeps track of driving time

SAVE $10⁰⁰

Display turns off with the car ignition to preserve battery power, but clock continues to keep accurate time. It's compact enough for easy mounting on or under the dash of your car, boat, camper or motorcycle — anywhere a source of 12 VDC negative ground is available (not approved for aircraft use). Display dims automatically for easy and safe viewing at night.

GC-1415 Digital Quartz Clock/Timer displays the time to the minute in easy-to-read fluorescent digits, also includes switch-selectable timing ranges for 0-24 hours for timing trips in hours and minutes and 0-10 minutes for timing minutes and seconds for use as a stopwatch. Timer accumulates for 24 hours and can be stopped to allow actual driving time to be calculated without including stops. Clock and timer functions can be switched back and forth without affecting accuracy of either function. 1.80″ H x 4.71″ W x 3.12″ D.

It's a handsome addition to any car, as well as a useful driving aid.
Kit GC-1415, Shpg. wt. 2 lbs. .... Was $49.95, Now 39.95
GC-1406 Digital Readout Quartz Clock (Not Shown). Same as GC-1415, but does not include timing functions.
Kit GC-1406, Shpg. wt. 1 lb. 29.95

3 Tachometer/Speedometer shows speed and engine rpm

As low as
$49⁹⁵ Now get instant digital readout of your car's speed and engine RPM as you drive. Styled to match CI-1525

As a digital readout speedometer, the CI-1265 instantly and continuously monitors your car's speed. The continuous digital readout provides a better degree of accuracy than most conventional speedometers and maintains its accuracy over its entire speed range. Push a front panel button, and the CI-1265 instantly switches to show your engine rpm. The CI-1265 is sensitive enough to indicate changes in speed as little as 1 mph (or 1 kmph) and rpm variations of 100. A single calibration control on either mph or kmph ranges automatically calibrates the other range, so conversion between English and metric speed units is unnecessary. Features an automatic dimming circuit which adjusts display to ambient light, front panel speed/tach switches. For use with any 4, 6, or 8-cylinder, 4-cycle engine with spark ignition. With hardware and mounting bracket for installation in or on your car's dash. For 12 VDC negative ground. Easy kit assembly.

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

Now! Theft security for all vehicles with this burglar alarm

Protects with ultrasonic sound. Detects any interior motion and sounds your vehicle's horn. Designed for use on cars, trucks, vans, motor homes, cruisers, etc. Very easy assembly and installation.
Kit GD-1558, Shpg. wt. 2 lbs. 54.95
Kit GDA-1558-1, Horn Relay Kit, Shpg. wt. 1 lb. 2.95

Windshield Wiper Delay prevents "slapping" in rain or mist

For most single and 2-speed electric wiper systems. Most GMs, AMCs, Fords (except '72-'76 Montego, Torino & '74-'76 Cougar), Chryslers (except with motor reversing parking system). Note: Auto wiring diagrams not supplied for this unit.
Kit CH-1068, Shpg. wt. 2 lbs. 17.95

Handy Heathkit Cab-to-Camper Intercom

Convenient Intercom has 3-position switch on Master to select "Standby," "Monitor" or "Talk" modes. Remote can initiate calls. Has "Radio" position to bring music into camper from cab radio. Requires 12 V, 250 mA power source.
Kit GD-160, Master, Remote & Cable. Wt. 5 lbs. 39.95
GDA-160-1, Accessory Plug. For quick disconnect. 1 lb. ...4.95

The Heathkit Car Security System protects your car

Sounds horn if thieves break in. Kit GD-1157, Wt. 3 lbs. 32.95
Kit GDA-1157-1, Optional Siren Accessory, 2 lbs. 21.95
GDS-1157, GD-1157 and siren together. 12 lbs.
If purchased separately .... $54.90, System price 42.95
Kit GDA-1157-2, Relay for cars without horn relay. 1 lb. ...2.95

Heathkit auto accessories

$79⁹⁵ Heath/Dana Speed Control increases gas mileage and reduces driving fatigue on long car trips

Just accelerate to your desired speed, set the control and the CS-2048 automatically maintains your desired 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 and light vans. It can be used with many foreign cars with appropriate adaptor kits sold below. For 12 VDC negative ground only.

CS-2048, Shpg. wt. 6 lbs. **79.95**
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-'77 Honda CVCC and '77 Honda Accord.
Shpg. wt. 2 lbs. **15.95**

CSA-2048-3, Kit contains servo cable, throttle linkage adaptor hardware and vacuum tee for '75-'77 Toyota Corollas. Shpg. wt. 1 lb. **15.95**

CSA-2048-4, Kit contains throttle linkage adaptor hardware and vacuum tee for '73-'75 Toyota Corona (2000 cc), '75-'78 Toyota Corona (2189 cc), and '73-'74 Toyota Celica. '75-'78 Toyota Celica, '74-'75 Toyota Crown, '75-'76 Toyota Mark II, '76-'78 Toyota Pickup, '74-'77 Datsun 610/710, '77 Datsun 810, '74-'77 Datsun 280Z.
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-'77 Volkswagen Dasher, '76-'77 Volkswagen Scirroco, '76 Volkswagen Rabbit, '76-'77 Audi Fox. Shpg. wt. 2 lbs. **15.95**

CSA-2048-6, Kit contains servo cable, magnet pair, and throttle linkage adaptor hardware for '75-'77 Datsun B210, '77 Datsun F10. Shpg. wt. 2 lbs. **15.95**

Vacuum Servo attaches to throttle
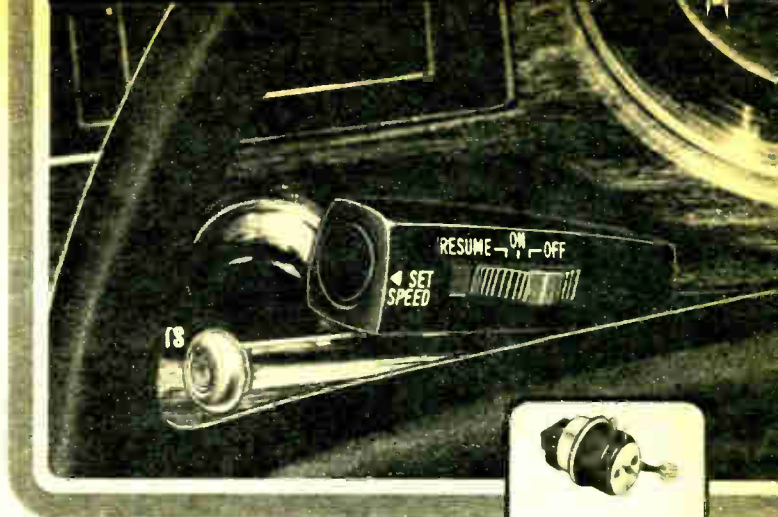
IMPORTANT INSTALLATION NOTE: While the CS-2048 Heath/Dana Speed Control comes fully assembled and tested, and includes a fully detailed manual, installation does require a certain amount of mechanical proficiency. Modifications must be made to the throttle linkage of your car, and work must be performed 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.

Electronic Control

The Heathkit Capacitive-Discharge Ignition System saves you gas

- Improves mileage to save you money
- 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. 3⅛" H x 3¾" W x 6" D.
Kit CP-1060. Shpg. wt. 3 lbs. **39.95**

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. **79.95**
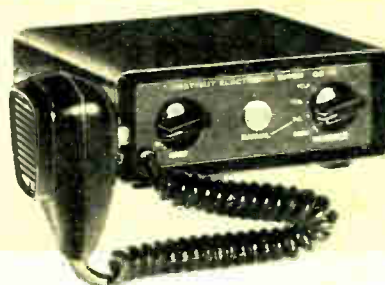
Concealed horn

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 4½" x 4½" x 13" behind grille. Note: please check standards for mobile sirens in your area.

Kit GD-18, Shpg. wt. 6 lbs. **74.95**
Assembled WD-5130, Siren/PA amp, Wt. 6 lbs. **139.95**
Assembled GDA-18-1, Exterior horn, Wt. 10 lbs. **79.95**
Kit GDA-18-2, Concealed horn, Wt. 10 lbs. **79.95**
Assembled WDA-5130-2, Concealed horn, Wt. 10 lbs. **99.95**

SAVE $19.95 On these Siren/PA systems! If purchased separately, 154.90
GD-18A (Kit GD-18 and Exterior Horn) Shpg. wt. 21 lbs. **134.95**
GD-18B (Kit GD-18 and Concealed Horn) Shpg. wt. 21 lbs. ...**134.95**

Amateur Radio and Heath give you the greatest hobby yet!

Amateur Radio is a hobby everyone can enjoy. Man, woman, child or senior citizen, there are no barriers to the two-way communication potential of Amateur Radio. And Ham Radio is versatile. You can communicate with the world right from your home, car or boat...or even on a back-pack trip into the wilderness. Every time you "work" your equipment, transmitting and receiving, you are in for a new, exciting adventure.

You can combine Amateur Radio with your other interests — get on the air and have a "QSO" with a group of Hams who share your love for boating, computers, R/C modeling...any subject under the sun. And, speaking of the sun, perhaps experimenting with a solar-powered QRP rig is an area you'd like to explore. The ways you can enjoy the exciting world of Amateur Radio are virtually unlimited.

Besides giving pleasure to hundreds of thousands, Amateur Radio provides a valuable service in times of emergency. Often when normal means of communications have been disrupted by earthquake, blizzard, tornado or fire, Amateur Radio has provided the vital link that helps protect property and save lives.

In this exciting and worthwhile hobby, we naturally think that starting and pursuing your hobby with Heathkit equipment is the best way to go. That's because our complete line of Amateur Radio equipment can provide everything you need, from a basic Code Practice Oscillator all the way to a sophisticated station.

Heathkit Amateur equipment is easy and fun to build, you learn about circuitry and operation as you put your equipment together, you'll probably save money over comparable assembled units, and you'll even save by being able to perform your own maintenance and service. Read on to see what Heathkit Amateur Radio equipment has for you.

The Heathkit Novice License Program makes it easier for you to get your ticket and get on the air!

From the world leader in Amateur Radio equipment — here is a self-instruction program that's guaranteed to help you get your Novice ticket. In fact, this program is so effective that if you fail to pass your FCC Novice exam after completing the course, we will REFUND your money for the program material. Simply return the program material to the store where you purchased it, along with a copy of your rejection notice from the FCC.

So...if you have been putting off getting your Novice ticket because of fear of failing the code test...or the technical exam, or if you just didn't know where to start, the Heathkit Novice License Program is the answer. Everything you need to get your license is in the comprehensive, well-organized package. You can't fail — Heath guarantees that you will pass! Order now — the exciting world of Amateur Radio is waiting for you.

$34⁹⁵   You can get on the air sooner than you think

Now — for CB'ers, electronic hobbyists, anyone interested in operating world-wide two-way Amateur Radio equipment — Heath makes it easier than ever! This deluxe learning program prepares you for the Amateur Radio Novice FCC exam, and provides you with helpful guidelines for setting up and operating your own station once you pass the exam. 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 Federal Communications Commission. The course is organized in 9 separate modules corresponding to the areas covered by the FCC Novice exam.

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 Continuing Education Unit and a Certificate of Achievement.

The Novice License Program includes two audio cassette tapes to aid in your Novice ticket. The first contains not only an introduction to Amateur Radio, but also 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 the five words per minute required to pass your FCC Novice code test.

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 the Program are packaged in an attractive vinyl binder for convenient reference after you have obtained your license.

ER-3701, Shpg. wt. 7 lbs. 34.95

Kit HD-1416, CW Oscillator (see below) Wt. 2 lbs. 12.95

Assembled Cassette Recorder/Player. Ideal for playing the tapes supplied with ER-3701 (above). Features volume and tone controls, pushbuttons for record and play, rewind, fast forward, stop and eject. Factory wired, not a kit.

ECP-3801, Shpg. wt. 4 lbs. 60.00

Handy CW Oscillator for your code practice

The ideal way to build up your code speed for the FCC exam, this practice oscillator features a telegraph key, phone jack, built-in speaker, plus volume and tone controls. Once you get your license, the HD-1416 can serve as a side tone oscillator for any transmitter using grid block keying. Dimensions: 2⅝" H x 4⅛" W x 4⅜" D. Operates on a single 9 V transistor battery (not included). Easy-to-build first-time kit.

Kit HD-1416, Shpg. wt. 2 lbs. 12.95

SAVE $7⁹⁵

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

We can 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 the pair together. And to save you even more money, this package even includes 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 Code Oscillator and Novice License Program would cost you $47.90.

ERS-37D1, Shpg. wt. 23 lbs. 39.95

Our General Class Amateur Radio Program will help you move up the ladder in your enjoyment of Amateur Radio

$49⁹⁵

When you upgrade, you open new doors to the full range of Amateur Radio experiences. Leave the crowded Novice or CB bands behind by earning your Technician or General Class License with the help of the ER-3702 General Class Amateur Radio Program. Upgrading has never been easier — it has everything you need.

The ER-3702 General Class Amateur Radio License Program helps you increase your technical knowledge and code skill so you can pass the FCC General Class License or the Technician Class License examination. If you have been putting off going for a higher class license, this is the program for you. It even carries the same money-back guarantee as the Novice Program. Move up to General Class and get all the added privileges it offers — more frequencies to operate on, plus voice transmission, radioteletype, Amateur television and more that you're missing by operating with just a Novice license.

This Program begins to prepare you by providing extra code practice to help you bring your code speed up to 15 words per minute. Since the FCC requires only 13 words per minute to pass the General exam, the extra "two-word edge" this program gives you helps eliminate examination day jitters by giving you the confidence you need to pass the code test with flying colors.

The written section of the License exam has been approached with the same concern for completeness and clarity. An informative text takes you through the subjects covered on the written exam. It is designed to concentrate on the information necessary to pass the exam, so you don't get bogged down by learning information that won't be covered by the FCC examination.

Just as the extra code builds your CW confidence, the program also includes a simulated FCC written exam. Not only does this exam give you the test-taking experience you need to build your confidence, but it also allows you to review any problem areas you might encounter so you will be more fully prepared for the actual exam. When you pass the FCC General exam, send us a copy of your new license or FCC notification of passing to receive 5.0 C.E.U.'s and a Certificate of Completion for the Program. Suitable for hanging on the wall of your shack.

Your General Class License Program will retain its value even after you pass your exam and get on the air. You will want to keep the materials handy as a valuable reference resource. That's easy to do — all materials included in the program are contained in two attractive matching vinyl binders.

Your General License Program is a complete package. In addition to the program text and two code practice tapes, you will receive:

- Code practice workbook
- Amateur Radio log book
- FCC Form 610
- T.V.I. booklet
- Two code cassette tapes
- Simulated FCC exams
- World call area map
- 8.0 C.E.U.'s
- Certificate of Achievement
- Two vinyl binders
- FCC exam schedule
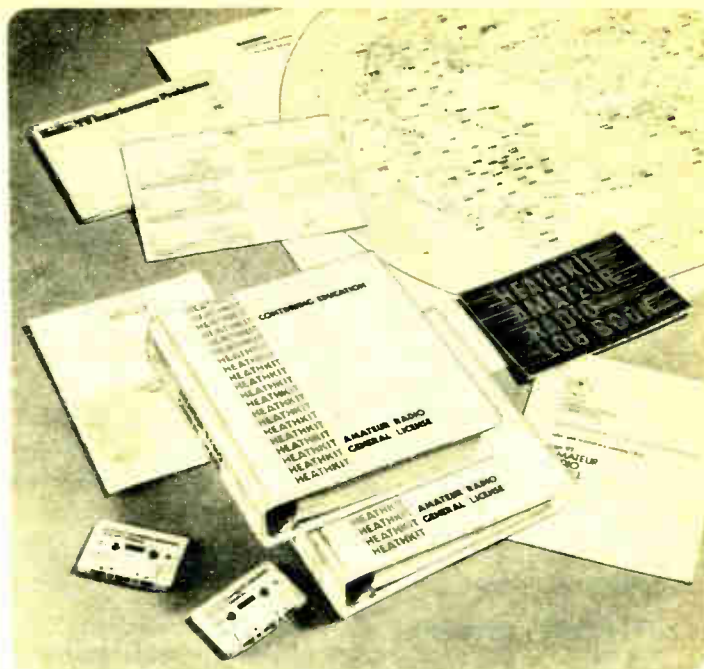
The General Class Amateur Radio Program is composed of 10 separate units arranged in the following manner:

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

We offer you the new General Class License Program with the same money-back guarantee as the popular ER-3701 Novice Learning Program. So confident are we of this Program, that should you fail to pass the FCC Amateur Radio General Class or Technician Class License Exam after completing this program, we will refund your money for the Program materials when you return them to the store where you bought them along with your FCC rejection notice.

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

Assembled Cassette Recorder/Player. Extremely useful in listening to the code tapes supplied with ER-3702 (above). This recorder/player features separate volume and tone controls, pushbuttons for play and record, rewind, fast forward, stop and tape eject. The built-in 3 digit counter helps find specific information in a hurry. Factory wired, not a kit.

ECP-3801, Shpg. wt. 4 lbs. 60.00

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

"Tune in the World with Ham Radio". A complete Amateur Radio Course with code practice cassettes and license manual. Produced by the ARRL.
HDP-1142, Shpg. wt. 2 lbs. 7.00

Ameco Junior Cassette Code Course. This tape cassette gives 10 lessons of Morse Code Practice. It takes you from an introduction to code through eight words-per-minute, more than enough to qualify for the FCC Novice or Technician code requirement of five words-per-minute.
HDP-432, Shpg. wt. 1 lb. 4.95

Ameco Senior Code Course. Two LP's with lessons for Code Practice to 18 words-per-minute.
HDP-332, Shpg. wt. 2 lbs. 7.50

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

"By the Word" Code Course. 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, EDP-123 . . . . .7.95
ADVANCED, EDP-124 . . . . .5.95
EXTRA, EDP-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.
EDP-126 . . . . .14.95

DX Callbook. Complete listing of foreign Amateurs, addresses, postal rate charts, call zone maps, world time conversion chart, world QSL bureaus, more. 900 pages.
EDP-127 . . . . .13.95

ARRL Radio Amateur's Handbook. Up to date electronics theory and application. Covers all facets of Amateur operations. 538 pages in new, larger format.
HDP-293 . . . . .9.75

73 Dipole Antennas. Descriptions, 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

Reliable, money-saving accessories to increase the operating

NEW
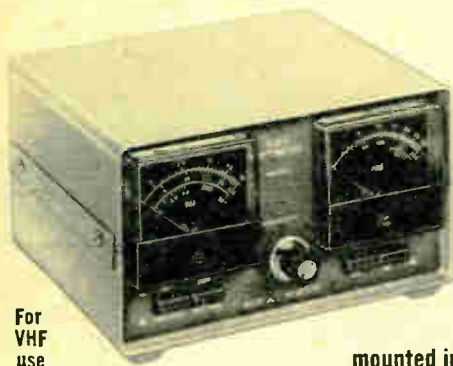
For VHF use

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

The HM-2140 boasts ±5% average forward power accuracy

For HF use

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

$79⁹⁵

- Dual meters
- ±7.5% Forward power accuracy
- Direct reading SWR
- Reads PEP or average power

Heath's new 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 ±7.5%. Reads SWR directly from 1:1 to 3:1. Factory-assembled and calibrated sensor for reliable performance. Operates on 9 V battery (not included) or on 120 VAC with the optional GRA-43-1 converter below.

Kit HM-2141, Shpg. wt. 3 lbs. 79.95
Kit GRA-43-1, 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), ±7.5% (AVG), 10 W (REF), ±10% (AVG). Dimensions: 4⅛" H x 7½" W x 6⅜" D.

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

$74⁹⁵

- 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, ±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. 74.95
Kit GRA-43-1, 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), ±5%, 50 W (REF), ±7.5%. Dimensions: 4⅛" H x 7½" W x 6⅜" 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. Styled to match our famous "SB" line. 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 7⅖" D.

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

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 μA 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. 69.95

efficiency of your Amateur station

[1] Heath Combination HF Wattmeter/SWR Bridge. This rugged in-line Wattmeter/SWR Bridge features dual power/SWR scales, easy calibration, and extra long interconnect cable to allow you to position the meter up to six feet from the detector/bridge. Operates over the 1.8 to 30 MHz range with minimal insertion loss and a nominal impedance of 50 ohms.
Kit HM-102, Shpg. wt. 3 lbs. **49.95**

HM-102 SPECIFICATIONS: Frequency Range: 1.8 to 30 MHz. **Wattmeter Accuracy:** ±10% of full-scale reading. **Power Capability:** 10 to 2000 watts. **SWR Sensitivity:** Less than 10 watts. **Impedance:** 50 ohm nominal. **Connectors:** UHF type SO-239. **Dimensions:** 5¼" H x 2¼" W x 6½" 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-ft. RG8U jumper with PL259 connectors, 1 lb. **4.95**

[2] Relative Field Strength Meter. Makes transmitter adjustments quicker and more precise. Provides visual indication that transmitter is radiating a signal and helps you tune transmitter for maximum output. Operates anywhere in the 1.8 to 250 MHz spectrum and is ideal for your HW-8. 2⅝" H x 4⅛" W x 4⅜" D.
Kit HD-1426, Shpg. wt. 2 lbs. **14.95**

[3] Portable Twin Speaker ideal for mobile mounting. The HDP-1228 plugs directly into the external speaker jack of most transceivers, tape players, etc. It's ideal for visor mounting to overcome road and traffic noise, and it can be quickly unplugged and removed from the vehicle for theft protection. Constructed of tough, lightweight plastic. 5¾" W x 3¼" H x 1¼" D. Fully assembled.
HDP-1228, Shpg. wt. 1 lb. **9.95**

[4] Famous Heathkit "Cantenna™" RF dummy load. Use the "Cantenna" to avoid unnecessary interference during tune ups or install it on your bench. 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 ohm impedance. Oil filled (oil not included).
Kit HN-31, Shpg. wt. 3 lbs. **19.95**
HDP-3622, 3-ft. RG8U jumper with PL259 connectors, 1 lb. **4.95**

[5] Hybrid Phone Patch. Add the versatility of phone patch capability to your shack with Heath's HD-15. Individual receiver/transmitter line gain controls simplify adjustment and the HD-15's VU meter continuously monitors the unit's output and lets you adjust for maximum null depth to produce maximum isolation between the telephone line and your station's equipment. Interfacing with your system is a simple matter. Matches 3-16 ohm speakers and hi-Z or 600 ohm inputs. PTT operation. 2⅝" H x 9¼" W x 3⅝" D.
Kit HD-15, Shpg. wt. 3 lbs. **42.95**

[6] Heathkit Micoder™ II Microphone/Auto Patch Encoder. Replace your old microphone with the Heathkit Micoder II — a real advance in Ham radio versatility and value. 300-3000 Hz response is tailored for clean voice transmission. Has up to 30 mV rms maximum output for full modulation and push-to-talk bar for conventional one-hand use. Accurate and stable tones for phone calls through repeaters equipped for auto-patch input. Operates on one 9-volt battery (not supplied). Can be used with any transceiver with a high-impedance input. Measures just 3¾" H x 2⅝" W x 1¾" D. Comes complete with 6-ft. coiled microphone cable and hanger clip.
Kit HD-1984, Shpg. wt. 1 lb. **44.95**

[7] NEW Fully assembled Heathkit Mobile PTT Mike. Features a high impedance piezo-ceramic element, with 200 to 5000 Hz response with a peak response frequency of 2300 Hz. Sensitivity: −55 ±3 dB below 1 volt per microbar at 1000 Hz. Comes complete with cable and mounting clip. Connector not included.
HDP-1340, Shpg. wt. 1 lb. **15.95**

[8] 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, and has a rugged die-cast case, finished in grey and satin chrome. The PTT switch can be mounted on the base or handle of the microphone. Includes cables.
HDP-121A, Shpg. wt. 4 lbs. **54.95**

[9] Multiple Outlet Box for Station Equipment. Provides additional electrical outlets for your equipment, helps eliminate long wire runs and messy hookups. Has 12 three-hole outlets, 11 switched and one unswitched. Includes 12 ft. cord.
Kit HD-1274, Shpg. wt. 4 lbs. **16.95**

[10] Frequency Spectrum Chart. Handy wall chart shows detailed breakdown of radio frequency spectrum. Colorful addition to the wall of your Ham shack.
HDP-1495, Shpg. wt. 1 lb. in mailing tube **4.95**

Antenna Tuner and Power Supplies for your shack

This new 2 kW Antenna Tuner accepts all feed lines

$149⁹⁵

- Built-in balun accepts balanced or unbalanced feed
- Continuously variable inductor for exact matching
- Eraseable front panel for writing in band settings

Large ceramic insulators are designed to handle 2000 W PEP

Capacitors are easy to build and service

Continuous tuning means a perfect match every time

Here's the Antenna Tuner you've been asking Heath for — and the more than 200 Hams at Heath have designed it with features and price that are hard to beat!

You're going to like the way the new SA-2040 2 kW Antenna Tuner from Heath helps you radiate more of your signal by maximizing power transfer from your transmitter to your antenna. Your neighbors will like it, too, because it will help you reduce TVI and out of band emissions. The built-in balun gives you the versatility of using any type of feedline — balanced or unbalanced. And you can tune continuously from 3.5 MHz to 30 MHz, which means your SA-2040 is ready for MARS operation or for future band allocations.

This handsome addition to your shack features a continuously variable inductor to give you an infinite number of impedance settings, assuring precise antenna matching. A convenient counter on the front panel indicates inductors settings. And the eraseable front panel allows you to make notations of band settings for ease of operation, especially helpful in contest conditions.

The SA-2040 features silver-plated straps and roller contact assembly for minimal RF loss at high frequencies. Its large ceramic feed-through insulators are designed to withstand high voltage RF. This Antenna Tuner is capable of han-

dling power input of up to 2000 watts PEP on side-band and 1000 watts on CW. SO-239 connectors allow incorporation into your system.

It won't take you long to get your SA-2040 on the air — the easy-to-build kit is a two-evening project. And when you've tightened the cover, you can personalize your Heathkit Antenna Tuner, because stick-on numerals and letters in the kit let you add your own call sign to the front panel. The rugged black metal cabinet measures 5⅝" H x 14¹³⁄₁₆" W x 13¹⁵⁄₁₆" D.

Compare our new SA-2040 2 kW Antenna Tuner with all the competitors — match power handling capabilities, features and price. Then you'll see by the SA-2040 is your best buy for the money. This new Tuner is going to look great in your shack...and do a great job for you, too!

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

SA-2040 SPECIFICATIONS: Frequency Coverage: 3.5-30 MHz. Power Input Capability: SSB 2000 watts PEP; CW: 1000 watts. Input Impedance: 50 ohm. Output Impedance: Wide Range. Cabinet Dimensions: 5⅝" H x 14¹³⁄₁₆" W x 13¹⁵⁄₁₆" D.

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

[1] The PS-1175 supplies the necessary voltage and current to power the HW-2036A transceiver and HA-202A 2-meter amplifier from standard 120 VAC or 240 VAC outlets for base station operation. Has 120/240 VAC wiring options, fused overload protection. With cables and 3-wire line cord.

Kit PS-1175, Shpg. wt. 15 lbs. 64.95

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. Fuses 4-ampere, 3AG, slow-blow for 120 VAC primary, 2-ampere, 3AG, slow-blow for 240 VAC primary. 15-ampere, 3AG, output. Dimensions: 5¹⁄₁₆" H x 6¾₆" W x 11" D.

[2] The HWA-2036-3 supplies the necessary voltage and current to power your HW-2036A 2-meter transceiver from a standard AC outlet for base station operation. Has 120/240 VAC wiring options, fused overload protection. With all cables for easy hookup and 3-wire line cord. Compact metal case matches the handsome styling of the Heathkit HW-2036. Easy printed circuit board kit assembly.

Kit HWA-2036-3, 7 lbs. . . . . .Was $42.95, Now 32.95

HWA-2036-3 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (Adjustable internally from approx. 10 to 15 VDC). Output Current: 2.7 amps, intermittent, 20 minutes max. (1.8 amps continuous). Regulation: Better than 1% from no load to full load (2.7 amperes). Ripple: less than 0.1%. Power Requirement: 110 to 130 VAC or 220 to 260 VAC, 50/60 Hz at 75 watts (full load). Dimensions: 3" H x 7¼" W x 10" D.

[3] The PS-23 provides the operating voltages for the HW-101 as well as those necessary for the operation of many older Heath transceivers. Has high voltage and two internally selectable low B+ taps. Also provides fixed bias and 12.6 filament voltage. The PS-23 features excellent bias supply filtering and extremely low ripple content. Can be used with many other transceivers, too.

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

PS-23 SPECIFICATIONS: High voltage output: 820 VDC no load; 700 VDC @ 250 mA ±10%. AC ripple. Less than 1% @ 250 mA. Low voltage output: (High tap) 350 VDC, no load; 300 VDC @ 150 mA ±10%, (Low tap) 275 VDC, no load, 250 VDC @ 100 mA; ±10%. Less than 0.05% AC ripple @ 150 mA, continuous duty to 175 mA. Fixed bias: −130 VDC ±10%, no load; −100 VDC @ 20 mA. Power requirement: 120/240 VAC, 60/50 Hz, 350 watts maximum. Dimensions: 6¾" H x 4¾" W x 9" L.
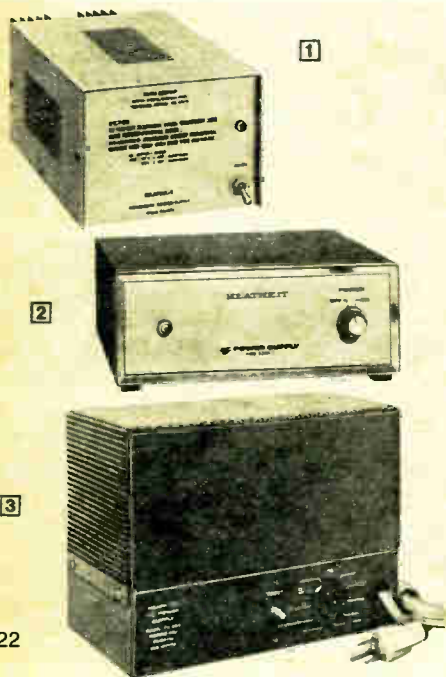
Amateur antennas and accessories

New Heathkit Remote Coax Switch makes antenna changing a snap!

89^{95}
- Saves on expensive coax feedline
- Handles full legal power
- Erasable front panel label

New bargain-priced Remote Coax Switch lets you replace five feedlines from the shack to your antennas with just one piece of coax. Silver-plated contacts give this easy-to-build kit low SWR. A shielded switch box further lowers SWR and protects from the elements. Special ground position for lightning protection. 1.05:1 SWR below 30 MHz; 1.20:1 SWR below 150 MHz. Includes U-bolt for mast mounting.

Kit SA-1480, Shpg. wt. 8 lbs. 89.95
IDA-1290-1, 50-ft. 8-cond. coax, 2 lbs. 7.95
IDA-1290-2, 100-ft. 8-cond. coax, 4 lbs. 13.95
IDA-1290-3, 150-ft. 8-cond. coax, 6 lbs. 18.95

1 **Hustler 4-BTV fixed-station vertical HF antenna** covers 40-10 meters. Rated at full legal power on SSB & CW. Ground mount or tower mount with radials. SWR at resonance: 1.15 to 1 or better. Uses a single 50Ω feedline. Height: 21'5".
HDP-3850, Shpg. wt. 15 lbs. 89.95

2 **This 75 meter trap for the 4-BTV** installs directly on top of the antenna. Adjustable between 3775-4000 kHz. Full legal power.
HDP-3850-1, Shpg. wt. 3 lbs. 29.95

(Not shown). **80 meter trap.** Same as above except covers 3500-3775 kHz. Full power.
HDP-3850-2, Shpg. wt. 2 lbs. 29.95

3 **Cushcraft 11 element yagi.** Features 13.2 dB front-to-back ratio, and gamma match tuning for minimum SWR. 146-148 MHz. Feeds directly with 52Ω coax. Assembly required.
HDP-1470, Shpg. wt. 6 lbs. 29.95

4 **Hustler standard gain 2M mobile antenna.** ⅝ wavelength rear deck whip. 3.4 dB gain, 1.1:1 SWR. Handles 100 watts. 47" radiator. 17' coax and connectors included.
HWA-202-3, Shpg. wt. 2 lbs. 23.95

5 **Cushcraft standard gain fixed antenna.** 135-175 MHz. Omnidirectional. 3.75 dB gain, 1.1:1 SWR. 100 watts. 52Ω feed with PL-259. Less coax. Mounts to 1¼" mast. Pre-assembled.
HWA-202-11, Shpg. wt. 2 lbs. 21.95

6 **Hustler super gain 2M mobile antenna.** Phased ¼ and ⅝ wavelength radiators. Provides 5.2 dB gain. 1.1:1 SWR; handles up to 200 watts; 6 MHz bandwidth. Height 85". 17' RG-58/U coax and connectors included.
HWA-202-9, Shpg. wt. 3 lbs. 39.95

7 **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 1¾" mast. Less coax.
HWA-202-10, Shpg. wt. 7 lbs. 72.95

Superflex RG-8/U 52Ω Coaxial Cables with PL-259 connectors

(Not shown). For use with antennas and accessories on this page. The finest rig and antenna system can't perform at top efficiency unless you use high quality coaxial cable. That's why Heath recommends maximum coverage superflex RG-8/U coax by Columbia Electronic Cable. 11-gage center foam polyethylene dielectric. 92% copper braided shielded flexlife jacket. PL-259 connectors.
HDP-3620, 100-ft. Shpg. wt. 11 lbs. 24.95
HDP-3621, 50-ft. Shpg. wt. 6 lbs. 14.95
HDP-3622, 3-ft. Shpg. wt. 1 lb. 4.95

8 **Cushcraft Tri-band Beam Antenna** (Cushcraft Model ATB-34). Equals a single-band yagi on 10, 15 and 20 meters. Rugged, state-of-the-art design features broad bandwidth and four active elements for super performance and outstanding front-to-back ratio all three bands. Comes complete with a low-loss, high performance 1:1 balun which mates with PL-259 connector. Factory adjusted for 50Ω coax feedline. SWR 1.5 to 1 or less at resonance. Full legal power. Boom length, 18'. Longest element, 32'8". Turning radius, 18'9". Wind area, 5.4 sq. ft. For masts to 2½". O.D. UPS shippable.
HDP-1471, Shpg. wt. 46 lbs. 239.95

9 **"W2AU" Balun.** This world-famous balun helps reduce TVI and improve F/B ratio. 2 kW PEP rating. Fully enclosed body with silver-plated SO-239 connector and hang-up hook, built-in lightning arrester. Weatherproof. Includes complete instructions and antenna length table.
HDP-3615, Shpg. wt. 2 lbs. 14.95

10 **Barker and Williamson 5-Band Trap Dipole antenna.** Pre-assembled antenna covers 80 thru 10 meters. Only 2 trap adjustments and terminations. Ready to use. Includes wire, traps, 50-ft. RG-8/U coax and PL-259 connector, two end insulators, and dipole center connector. 52Ω impedance. Traps weigh approximately 9 ounces each. Antenna length is approximately 110 ft.
HDP-3500, Shpg. wt. 10 lbs. 64.95

11 **Cushcraft 2-Meter Mobile Magnetic-Mount Antenna.** ⅝ 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-meter reception and transmission. Magnetic feature makes it easily removable.
HDP-1472, Shpg. wt. 3 lbs. 29.95

12 **Save $3.00!** Heath's HD-1234 Coax Switch takes up to 4 different antennas. Handles 2 kW PEP, up to 250 MHz, 50Ω. Grounds all outputs not in use.
Kit HD-1234, 1 lb. ....Was $12.95, Now 9.95
HDP-3622, 3-ft. coax with conn., 1 lb. 4.95

13 **Solve TVI problems** with this rugged low-pass Barker and Williamson filter. Provides a minimum of 70 dB attenuation. Cutoff frequency is 34 MHz. Less than 0.3 dB insertion loss at operating frequency. For 10-160 meters. 50Ω. Full legal power.
HDP-3700, Shpg. wt. 2 lbs. 29.95
HDP-3622, 3-ft. coax with conn. 1 lb. 4.95

14 **Alliance HD73 Heavy-Duty, Dual Speed Rotator.** For antennas with up to 10.7 sq. ft. wind load area. Has positive no-slip drive, automatic brake action. For masts 1⅜" to 2½" O.D. For 117 VAC, 60 Hz. Use 6-cond. cable, or 8-cond. 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. 13.95
IDA-1290-3, 150-ft. 8-cond. cable. 6 lbs. 18.95
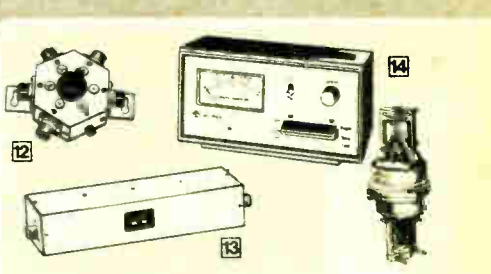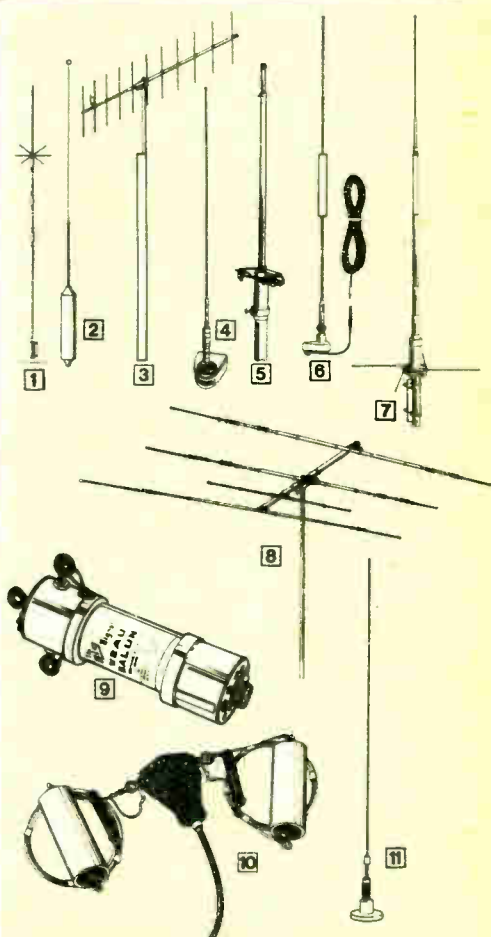
Heathkit Linears—the power packed performers

Put a full 2 kW power in your station with the SB-221 — FCC Approved!

The Heathkit SB-201 has a 1 kW — great for SSB — FCC Approved!

HEATHKIT charg-a-kit REVOLVING CHARGE
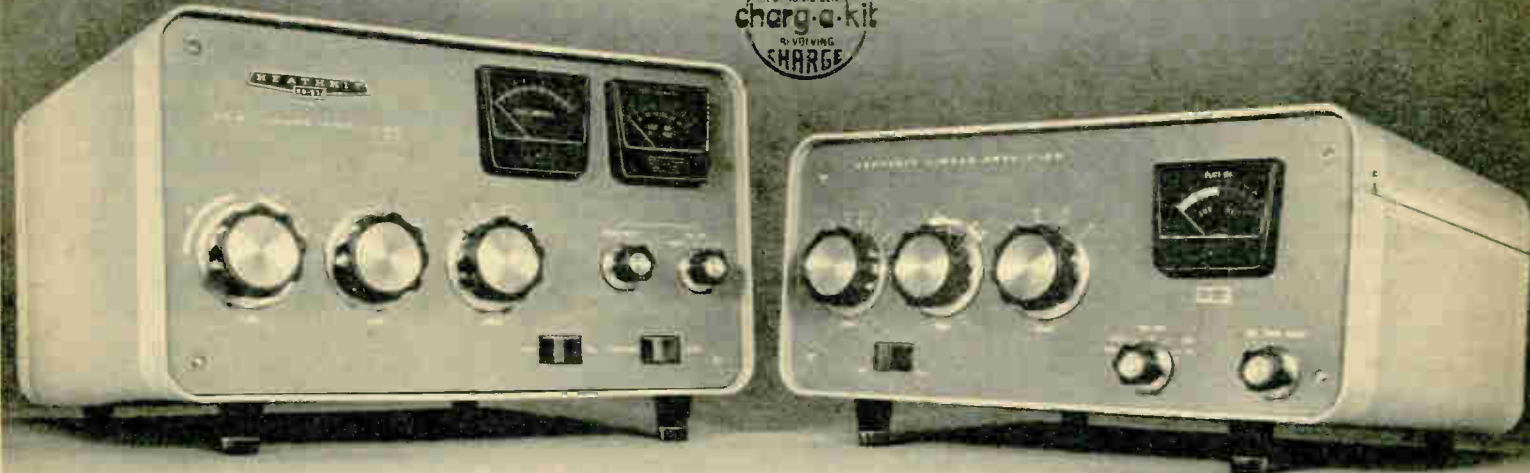
SAVE $50

Heathkit SB-221 2kW Linear Amplifier cuts through the QRM

$589⁹⁵

- Paralleled Eimac 3-500z's deliver top power
- 2kW PEP on phone, 1 kW in on CW and RTTY
- Heavy duty power supply for reliable operation

Heathkit SB-221 means power and performance. And when you look this amplifier over, you'll see why.

A pair of rugged Eimac 3-500z's deliver 2000 watts PEP in on Phone, or 1000 in on CW and RTTY. That's why a 221 in your shack guarantees you'll cut through the QRM and pile-ups with a signal that can always be heard.

There's dual front panel metering, easy operation and tune-up, a broad-band, pre-tuned pi-input for low distortion and high efficiency, and a hefty high-voltage supply that can stand up to years of tough operation.

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.

A lot more features, too, like fan cooling to stretch tube life, built-in circuit breakers, ALC overdrive protection, and tough construction. The list keeps on going. But then that's what you'd expect from an amplifier that carries the Heath name.

Kit SB-221, Shpg. wt. 66 lbs. . . . . .Was $639.95, Now 589.95
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. Driving power: 100 W. Max. power input: SSB, 2000 W. PEP; CW, 1000 W.; RTTY, 1000 W. Duty cycle: SSB, Continuous voice modulation. CW, Continuous (maximum key-down 10 minutes). RTTY, 50% (maximum transmit time 10 minutes). Third order distortion: −30 dB or better. Input impedance: 52 ohm unbalanced. Output impedance: 50 ohm unbalanced; SWR 2:1 or less. Front panel controls: Tune, Load, Band, Sensitivity Meter Switch, Power, CW/Tune — SSB, Plate meter, Multi-meter (Grid mA, Relative Power and High Voltage) Rear panel: Line cord, circuit breakers (two 10 A). Antenna Relay (phono). ALC (phono). RF Input (SO-239). Ground post. RF Output (SO-239). Tubes: Two Eimac 3-500Z. Power requirement: 120 VAC, 50/60 Hz at 20 amp. max. 240 VAC, 50/60 Hz at 10 amp. max. Cabinet size: 8¼″ H x 14⅞″ W x 14½″ D.

Heathkit SB-201 1kW Linear Amplifier gives you a 20 over 9 signal

$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

When it comes to economical performance, choose the Heathkit SB-201.

Just 100 watts is all it takes to drive the 201's pair of forced air cooled 572B's to a full 1200 watts PEP in on phone, and 1000 watts in on CW. There's 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.

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.

Kit SB-201, Shpg. wt. 47 lbs. 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 (max.), 240 volts AC @ 8 amperes (max.). Cabinet size: 6⅝″ H x 14⅞″ W x 13⅜″ D. Net weight: 35 lbs.

24

BNC-Type Antenna Connector

Top-Mounted Volume, Squelch and Offset Controls for Easy Operation

Built-in separate speaker and microphone for audio clarity

Optional auto-patch encoder

lets you access telephone lines from repeaters with auto-patch inputs to make telephone calls with your VF-2031.

The VF-2031 drops right into the battery charger for easy, convenient recharging of the built-in nickel-cadmium batteries. The VF-2031 will operate approx. 10 hours on a full charge and can be recharged usually in 14-24 hours. Charger and battery pack are included in purchase price.

The optional leather holster-style carrying case and external PTT microphone make your VF-2031 even more convenient and versatile! Just put the VF-2031 on your belt and use the ultra-compact and lightweight coiled cord Mic to transmit. The top-mounted controls including tone accessory remain easily accessible. The carrying case attaches to your belt and the coiled cord Mic attaches to a handy clip on the case so when you're not operating, both your hands are free.

$199⁹⁵ Buys It All

- VF-2031 2-meter Transceiver
- Orop-in Battery Charger
- Rechargeable Battery Pack
- "Rubber duckie" Antenna
- Built-in phone jack and earphone
- 8 Channel capability, duplex or simplex

Everything you need to begin operating, including 146.94 MHz crystal

Carry the excitement of 2-meter operation wherever you go with the great new Heathkit VF-2031. It's everything you've wanted in a hand-held.

You get a minimum of 2 watts out anywhere in the 2031's 143.5 to 148.5 MHz of band coverage — more than enough to put you into your local repeater full quieting everytime. The signal is clean too. Careful design and plenty of internal shielding insures stability and puts spurs a full 60 dB down. With Heath's 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. And for maximum versatility, you can choose simplex or duplex with a ±600 kHz split, all at the flick 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 μV quiets the 2031's hot receiver section a full 20 dB. And with fully adjustable volume and squelch at your command, you can tailor your operation to match most any listening condition.

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.

Check the features. Compare. You'll find the VF-2031 one of the most versatile hand-helds around and one of the best bargains in Amateur Radio.

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

Fitted Holster-Style Carrying Case for VF-2031. See left for description.
VFA-2031-2, Shpg. wt. 1 lb. **19.95**

Auto-Patch Encoder. See left for description.
VFA-2031-3, Shpg. wt. 1 lb. **39.95**

Crystal Certificates for VF-2031. Fill out certificate, specify crystal frequency and send to manufacturer. You receive crystal postpaid by return mail. Order one certificate for each crystal you need.
VFA-2031-4, Postpaid **6.95**

Continuous Tone Encoder. Accesses most repeaters. Builds right in to VF-2031.
VFA-2031-5, Shpg. wt. 1 lb. **39.95**

External Microphone. PTT MIC with coiled cord will plug right into VF-2031 to let you transmit without removing unit from holster.
Kit VFA-2031-6, Shpg. wt. 1 lb. **34.95**

2-Meter Amplifier. Ideal for use with the VF-2031. Delivers up to 10 watts for a 1½ watt input. See page 30 for full description.
Kit HA-201A, Shpg. wt. 2 lbs. **39.95**

Special system savings for this catalog only

Save $10.00 when you buy the VFS-2031 System now. Includes the complete VF-2031 with transceiver, battery pack, recharger, antenna, earphone and crystal, plus VFA-2021-2 Holster-Style Carrying Case and VFA-2031-3 Auto Patch Encoder.
VFS-2031 System, wt. 7 lbs. If purchased separately, would cost $259.85 . . . .**for this catalog only, 249.85**

VF-2031 SPECIFICATIONS: Receiver — Sensitivity: 0.5 μV or less for 20 dB quieting; 0.35 μV for 12 dB SINAD. Squelch Threshold: 0.25 μV 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). Operating Voltage: 12.5 VDC nominal. Antenna Impedance: 50 ohms. Speaker Impedance: 8 ohms. Size (Overall): 9⅛" H x 3⅜" W x 1⅞" D. Transceiver Weight: Including batteries: 2 lbs.

Heathkit HW-101—the best buy in Ham Radio today —over 27,000 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 μV 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 rig 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 μV 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. When you're ready to go the legal limit, by adding Heath's SB-201 or 221 to your shack, the HW-101 will make the perfect exciter. And don't forget to check out the new HDP-1220 Clipper (at right) for your HW-101. This true RF speech processor increases average SSB output 66% to really punch your signal through.

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 22 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 μV 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 ±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. 22). Size: 6⅜″ H x 14⅝″ W x 13⅜″ D.

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Low cost, high performance gear to help you get on the air!

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

$249⁹⁵

- 100 W out on 80-15, 75 W out on 10
- Built-in VFO
- Rugged 6146 finals
- Full-break-in (QSK)
- Designed to match the HR-1680
- Solid-state TR switching

The HX-1681 QSK Transmitter is a top notch CW rig for Novice or CW veteran. You get full break-in and built-in solid-state TR switching, sidetone output with adjustable tone arm level and receiver muting. A pair of rugged 6146As give you 100 W minimum on 80 thru 15 M and 75 out on 10. Covers 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5 MHz. Requires Heathkit PS-23 power supply on page 22. Dimensions: 6¾" H x 12¾" W x 12" D. The HX-1681 Transmitter is a perfect mate for the HR-1680 Receiver (at right).

Kit HX-1681, Shpg. wt. 16 lbs. 249.95
Kit PS-23, AC Power Supply, Shpg. wt. 17 lbs. 64.95

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

$219⁹⁵

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

Low cost and high performance make the solid-state HR-1680 the right choice for your first receiver. A hot dual-conversion front end and 0.5 μV sensitivity covers 80 thru 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. 4-Pole crystal filter for razor sharp selectivity. Tunable preselector filters out unwanted signals. Built-in 100 kHz calibrator. Match the 1680 with the HX-1681 for an unbeatable pair. Can be aligned without instruments. 120/240 VAC or 11.5-5-15 VDC. 6¾" H x 12¾" W x 12" D.

Kit HR-1680, Shpg. wt. 14 lbs. 219.95
Kit HS-1661, Matching Speaker, 5 lbs. 29.95

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 μV 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 the fun back 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. Power your HW-8 from a trail bike's battery to pump that QRP signal into the great outdoors through a dipole strung between two pines. Or join the growing number of Hams going to solar-powered QRP operation. 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 μV 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 so you can join the growing numbers who are discovering the fun and fraternity of QRP operation with the popular HW-8.

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 μV for readable signal; 1 μV 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: 9¼" H x 8½" W x 4¼" D.

$599.95 buys you the best transceiver value in town!

SAVE
$150⁰⁰
from Catalog 844R

NOW
$599⁹⁵

When things get tough, Heath gets tough. The SB-104A is a proven performer, and we're out to show you the kind of real performance/price values you get when you buy from Heath. Compare the features, specs and performance with any other transceiver. We know the answer you'll get! And, while you're at it, check our accessory prices too — External VFO, Station Console, Power Supply and Monitor Scope. Heath wins again.

And you'll be a winner, too, the moment you experience the excitement and convenience of SB-104A operation. Apply power and almost instantly six red digits are ready to display your operating frequency to within ±200 Hz accuracy. Pushbutton select CW upper, or lower sideband transmission, plug in your key, or opt for PTT or VOX operation and you're ready to experience broadband solid-state excitement.

Spin the main tuning knob and appreciate its feel as you smoothly move the 104A's temperature-compensated FET Hartley VFO up or down the band. And as you QSY, you'll quickly discover that the SB-104A's completely re-engineered front end receiver board really means business! Its circuitry is factory pre-assembled and tested, incorporates individual preselector filters for each band, features balanced first and second mixers, and plays a large part in the 104A's less than 0.5 microvolt sensitivity figure.

The SB-104A's receiver features razor sharp filtering, excellent IF selectivity, individual crystal-controlled BFOs for USB, LSB and CW, and balanced mixer product detection. Received audio quality is outstanding, precisely tailored for SSB and CW re-

production. And to make your QSOs more enjoyable, by reducing the nuisance of QSB, you can switch select either fast or slow AGC action.

When it comes to innovation, the SB-104A's transmitter section is second to none. You have a choice of 100 watts out for "barefoot" operation or, with the touch of a button, select one watt out and turn your 104A into Ham radio's most sophisticated QRP rig. Transmitter circuitry features quad op-amp audio processing on both phone-patch and microphone inputs, filter sideband generation, crystal-controlled heterodyne oscillators for maximum frequency stability, and a unique ALC system to eliminate distortion-producing overdrive. Most importantly, the SB-104A utilizes driver and PAs in a broadband no tune push-pull configuration.

For extra operating performance, add the optional SBA-104-3 400 Hz CW crystal filter or cut ignition noise by installing the SBA-104-1 noise blanker.

Operates from a charging 12 VDC auto electrical system or the PS-1144 Power Supply.

Kit SB-104A, Shpg. wt.
32 lbs. . . . . .Was $749.95, Now 599.95
Noise Blanker for SB-104A.
Kit SBA-104-1, Shpg. wt. 1 lb. 32.95
400 Hz CW Crystal Filter for SB-104A.
Kit SBA-104-3, Shpg. wt. 1 lb. 44.95

Look At These Super SB-104A Specifications!

Frequency Coverage: 3.5 MHz through 29.7 MHz amateur bands, 15 MHz WWV receive only. Frequency Stability: Less than 100 Hz/30 min drift after 30-min. warmup; less than 100 Hz drift for ±10% change in primary voltage. Readout Accuracy: Within ±200 Hz ±1 count. TRANSMITTER — RF Power Output: High Power (50-ohm non-reactive load). SSB: 100 watts PEP ±1 dB; CW: 100 watts ±1 dB. Low Power SSB: 1 watt PEP (minimum); CW: 1 watt (min.). Output Impedance: 50 ohms, less than 2:1 SWR. Carrier Suppression and Unwanted Sideband Suppression: −50 dB down from 100 watt single-tone output at 1000 Hz reference. RECEIVER — Sensitivity: 0.5 for 10 dB S+N/N for SSB. Selectivity: 2.1 kHz minimum at −6 dB, 5 kHz max. at −60 dB. (2:1 nominal shape factor). CW Selectivity: (with accessory CW filter) Selectable 2.1 kHz/400 Hz. IM Distortion: −65 dB min.; −57 dB typ. with noise blanker. Image Rejection: −60 dB min. Dimensions: 5¾" H x 14½" W x 13⅞" D.

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Station accessories for your SB-104A

Save on Remote VFO, Power Supply, Monitor and Console

1 Matching Speaker for the SB-104A

2 Remote VFO designed for the SB-104A

3 Matching Station Monitor

4 Five-function Station Console

1 Matching Speaker for SB-104A. Cabinet is large enough to house the PS-1144 Power Supply too. SSB response-tailored. 5" x 7" oval speaker. 300-3000 Hz response. Connector plug and cable included. 7⅛" H x 10⅛" W x 14" D.

Kit SB-604, Shpg. wt. 8 lbs. 44.95

Save $10.00 on the Power Supply. 120/240 VAC supply provides 13.8 VDC required by SB-104A. Full-wave bridge circuit with triple Darlington regulation has IC to sample at the transceiver, compare and automatically maintain fixed voltage. Mounts inside SB-604 Speaker cabinet.

Kit PS-1144, Wt. 27 lbs. .... Was $99.95, Now 89.95

2 Save $40.00 on the Remote VFO. Provides split transmit/receive so necessary for DX or net operation. Allows transceiver operation with either the "644A" or the SB-104A. Use either of two crystal positions for fixed-frequency control. Use 644A tuning scale for reference; SB-104A displays exact frequency readout.

Kit SB-644A, Wt. 10 lbs. ... Was $139.95, Now 99.95

SB-644A SPECIFICATIONS: Frequency Coverage: 5.0-5.5 MHz allowing 80-10 M operation in the SB-104A. Frequency Stability: less than 100 Hz drift per 30 min. after 30 min. warmup. Modes of Op: Remote VFO Main VFO; Receive Remote/Transmit Main; Receive Main/Transmit Remote; Crystal frequencies (2) (crystals not supplied). Power Requirement: 11 V and 13.6 V at 500 mA supplied by SB-104A. Size: 7¼" H x 10¼" W x 15¼" D.

3 Save $20.00 on the Station Monitor. Monitors SSB, CW & AM signals up to 1 kW from 80-6 M. Screen displays nonlinearity, insufficient or excessive drive, poor carrier or sideband suppression, regeneration parasitics, key clicks.

Kit SB-614, Wt. 17 lbs. ... Was $189.95, Now 169.95
HDP-3622, 3 ft. coax w/conn. Wt. 1 lb. 4.95

SB-614 SPECIFICATIONS: RF SAMPLING SECTION: Power Limits: Exciter Input (50-75 Ω) 10-300 W; Antenna Input (50-75 Ω) 10-1000 W. Insertion Loss: Negligible. VERT. AMPLIFIER: Input Impedance: 1 MΩ shunted by 75 pf. Sensitivity: 60 mV rms/¼" vert. deflection. Attenuator: 2-pos.; x1, 2V rms max. input; x10, 20V rms max. input. HOR. AMPLIFIER: Input Impedance: 1 MΩ shunted by 50 pf. Sensitivity: 50 mV rms/¼" hor. deflec. Power: 120/240 VAC, 60/50 Hz. Size: 7¼" H x 10¼" W x 15¼" D.

4 Save $20.00 on the Station Console. Features 24-hr. digital clock; 10-min. ID timer; 200/2000 W full scale RF wattmeter; SWR bridge with sensitivity control; manual/VOX phone patch providing at least 30 dB isolation. Input impedance 600 Ω.

Kit SB-634, Wt. 13 lbs. ... Was $219.95, Now 199.95
HDP-3622, 3 ft. coax w/conn. Wt. 1 lb. 4.95

SB-634 SPECIFICATIONS: CLOCK — Display: Six digits. Time Base: 24 hr. TIMER — Display: Three full digits. Time Interval: 10 min. with auto. reset. Manual reset at any portion of 10-min. period. Signal: Visual and aural or visual only. RF POWER/SWR METER — Frequency Range: 1.8 to 30 MHz. Wattmeter Accuracy: +10% of full-scale reading. Power Handling Capability: 2000 W (max.). SWR Sensitivity: Less than 10 W. Impedance: 50 Ω nominal. Connectors: SO-239. Power Requirement: 120/240 VAC, 50/50 Hz. Size: 7¼" H x 10¼" W x 15¼" D.

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Action-packed listing

SAVE $50.00

Built-in antennas for each band plus external antenna provision
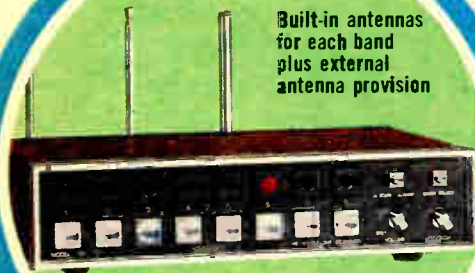
Checks priority channel every 4 seconds

VHF/UHF Monitor puts you right in the action on three high-traffic bands

$79⁹⁵
- Built-in antenna for each band
- Automatically scans channels
- AC and 12 VOC power supplies

Monitor fire calls, police, ambulance, Amateur 2-meter FM, marine emergency vehicles, gov't weather stations, more. Automatically scans each channel, stopping on any signal, then resumes scan after broadcast. Priority feature — checks priority channel every 4 seconds. 4-pole crystal filter (for better selectivity order optional 8-pole filter below); channel lockout buttons; extra-large lighted channel indicators. Telescoping antennas. Built-in speaker, volume and squelch controls. Order crystal certificates below.

Kit GR-1132, Shpg. wt. 9 lbs. Was $129.95, Now 79.95

Crystal Certificate. You send one to crystal mfr. for each specific frequency. Crystal returned postpaid.
GRA-1100-1 ....each 4.95

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**

4-Band Shortwave Receiver — just right for the beginning kit builder — your introduction to the fascinating world of shortwave listening

$89⁹⁵
- Complete coverage from 550 kHz to 30 MHz in four bands
- Built-in AM rod antenna plus connection for external short wave 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 — and the assembled radio will bring you many years of listening enjoyment.

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; however the Heathkit manual for the SW-717 includes instructions for instrument-alignment should you prefer.

The SW-717 is an ideal kit for the beginning electronics hobbyist, and it's especially recommended for use with our ER-3701 Amateur Radio Novice License program (see page 18). The manual includes instructions for operation, and a reception guide listing bands, frequencies, zones and times of best shortwave reception. Complete, easy-to-follow instructions and careful engineering make the SW-717 an attractive, responsive receiver. You'll be proud to tell your friends, "I built it myself."
Kit SW-717, Shpg. wt. 10 lbs. **89.95**

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. **5.95**

Superex 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. **6.95**

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:** 5⅓" H x 14½" W x 8" D.

A great addition to your SWL library

99 Ways to Improve Your Shortwave Listening. Details inexpensive and no-cost ways to get more pleasure from your hobby. Includes: antennas and installation, receiver improvements, listening techniques, troubleshooting tips and more. For the hobbyist, but valuable for the technician, too.
EDP-155 ....4.50

Sanyo 9-band Portable Shortwave Receiver with SW double conversion

NEW! The SWP-3010 (Sanyo RP8880) receives high marks from the Heath Co. evaluation dept. It features tuned RF stages covering 525-1615 kHz, 88-108 MHz, 150-350 kHz, 1.6-2.3 MHz, 2.3-5.95 MHz, 5.95-6.2 MHz, 6.2-10 MHz, 11.7-20 MHz, 20-30 MHz. Separate bass, treble, BFO and RF gain controls. External antenna terminals. AC, 12 VDC or 8 "D" cells (not included).

SWP-3010, Fully Assembled, 12 lbs. **279.95**

$279⁹⁵
Manufacturer's list price $329.95
Heath price $279.95

Telescoping MB, FM antennas

NEW

5" Unicone speaker

Revolving MW/LW bar antenna

Fine tuning control

31

Useful, reliable electronic gifts make flying safer

Our versatile Air Navigation Computer helps get you there safely!

$179.95 Kit

- THREE built-in microprocessors
- Multi-function display
- Built-in clock and timer
- Scientific calculator functions
- Up to NINE flight leg entries
- ETA to checkpoint and destination
- Flight leg countdown
- Automatically computes in-flight wind

Heath builds versatility, precision and quality into its OC-1401 Hand-Held Air Navigation Computer!

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 information in flight (including ETAs). You'd need an on-board computer to have more power.

Only an on-board computer could give you more power than the OC-1401. Our Navigation Computer has a multi-function 14-digit display, 36-key keyboard, built-in elapsed timer and clock, fuel warning indicator and Quasi RNAV function for heading to intermediate or non-VOR destination. It computes reciprocal headings for traffic pattern entry and 180° turns. Converts statute miles to nautical miles,

miles to kilometers, hours/minutes/seconds to decimal hours, °F to °C, gallons to liters — and their reciprocals. The OC-1401 can also operate as a versatile scientific calculator, with nine addressable storage locations and an additional five-level stack.

Built-in diagnostic checks help assure proper operation. Four built-in rechargeable batteries (included) allow at-home programming and memory preservation to airport. Can also be powered by aircraft lighter socket with 14 VDC cord (included) or by optional carrying case/rechargeable battery power supply (below). Operating manual included. Complies with FAA Advisory Circular No. 60-11, describing guidelines for using navigation computers during airmen written tests.

Kit OC-1401, Shpg. wt. 3 lbs. 179.95
OCW-1401, Assembled and Tested, 4 lbs. . . .284.95

The Heathkit OC-1401 — the navigation computer that does more!

Many of the features of this computer make it one of the most sophisticated, useful instruments of its type. This sophistication is made possible by three custom-designed, microprocessor integrated circuits. Computer entries are made on a 36-key keyboard, while entries and answers are clearly displayed on a 14-digit, seven-segment display. And the OC-1401 is designed for years of trouble-free-operation.

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:** 1¾" H x 3⅛" W x 6⅜" D (4.5 cm H x 7.9 cm W x 16.2 cm D).

Deluxe Carrying Case for your OC-1401 Navigation Computer

Convenient custom carrying case is designed to hold your aircraft navigation computer and its accessories. It features a separate independent rechargeable battery power supply that operates from a standard AC outlet from no charge to full charge in approximately 15 hours. Handy pocket for carrying your operation guide and fitted compartments for chargers and sunshield. Dimensions, 3⅛" H x 12¼" W x 8" D.

Kit OCA-1401-1, Shpg. wt. 5 lbs. 44.95
OCW-1401-1, Factory Assembled and Tested.
Shipping weight 5 lbs. 79.95
OCA-1401-2, Leatherette Carrying Case for OC-1401
only. Shipping weight 1 lb. 5.95

Strobe Light/Beacon for Aircraft/Emergency Vehicles

The Heathkit OL-1155 Aircraft Strobe Light signals a truly unusual kit-form value! It's designed as an aircraft strobe light for use as an anti-collision or supplemental beacon — or directly replaces a standard 3¾" rotating beacon. It operates from a 12 VDC negative ground supply, drawing a nominal current of 1.5 amperes, and includes a built-in line filter. An internal adjustable trimmer lets you vary the flashing frequency from 40 to 60 flashes per minute. The OL-1155 can be used in any number of emergency applications. Mount it on your boat cabin-top or masthead for marine foul-weather anti-collision protection. Use it atop antennas or other tall structures as a highly visible marker light. Or use it on emergency vehicles with optional red or amber lenses (below). Meets FAA Regulation No. 23.1401 anti-collision lighting requirements.

Kit OL-1155, with Clear lens, 3 lbs. 94.95
OLA-1155-2, Red lens, 1 lb. 8.95
OLA-1155-3, Amber lens, 1 lb. 8.95
NOTE: For the FAA PMA certification necessary for aircraft installation, return your completed OL-1155 to your local Heathkit Electronic Center or the Heath factory.

High-accuracy, rugged, low-priced 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 3⅛" panel mount, can be easily mounted in almost any aircraft. Operates on either 14 or 28 VDC, draws only 0.5 A maximum, with less than ±1 minute typ. accuracy per month.

Kit OI-1154, Shpg. wt. 3 lbs. 139.95

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

Heathkit Computer Systems put you in control

H8 8-Bit Personal Computer

H89 All-In-One Computer with Floppy Disk Storage

H19 Smart Video Terminal

H14 Hard Copy Line Printer

Save 5% when you buy a system!

H27 Floppy Disk System for the H11A Computer

Powerful H11A 16-Bit Personal Computer

The world's leader in quality electronic kits leads the way in personal computers and computer systems that give you more value and features while saving you money

For over 30 years, Heath Company has been at the forefront of consumer electronics, most recently in computers. Since introducing the first personal computer in 1957, Heath has continued to develop one of the most complete and innovative lines of personal computers and computer systems anywhere! Whether you purchase Heathkit computer products in economical, easy-to-build kits or as fully assembled units, you get more value for your computer dollar!

- Three computer families to fill any need
- Video terminals and hard copy printers
- Floppy disk memory storage systems
- Operating and applications software
- Memory and interfacing to make your computer more versatile
- A complete line of quality peripherals
- Thorough and accurate Heath Documentation
- Complete nationwide service support

Three very different computers for very different people

Heath designs computers for people, and because people want very different things from computers, Heath has designed three different computers.

For convenience — the All-In-One H89. If you want a complete, balanced computer system in one convenient package, the H89 All-In-One Computer is your choice. It includes computer, terminal, floppy, 16K RAM, keyboard and keypad. Just add software and you're ready to run (See page 34).

For flexibility — the H8. If you enjoy the ins and outs of computers, the H8 is your choice. With seven plug-in board positions for memory and I/O, you have the flexibility to design your own system (See page 36).

For power — the 16-bit H11A. If you're an advanced computerite ready to step up to the big power needed to run your complex programs, the H11A is your choice. It features 16-bit power plus seven plug-in board positions for memory and I/O (See page 38).

Value-packed Heathkit software includes programs written for MICRO-SOFT™ BASIC and Assembly languages for home and business applications. Our complete software line can help you write your own programs easily. And we won't let your disk-based Heathkit software go out of date — for one year after purchase, we'll send you, free of charge, any changes (see page 42).

Heath documentation is the best in the computer industry. If you want to build a Heathkit Computer System yourself, it is made easy with complete, easy-to-follow assembly manuals which take you, step-by-step, from unpacking to plugging it in. You'll understand your computer from the inside out. And in both kit and assembled forms, Heath's operating and instructional manuals are fully detailed and thorough. When it comes to documentation, you'll begin to realize the full value of a Heathkit computer.

Heath offers complete service support. Technical expertise, advice and service for your Heathkit Computer System is always available! Experts at the Heath factory or at the 55 Heathkit Electronic Centers nationwide can help you keep your computer system working right. That's an important advantage of buying from a company with 30 years' computer experience.

5% System Discount: When you buy the H8, H88, H89 or H11A computer, one major peripheral and any I/O devices and accessories you need to complete your computer system, you can deduct 5 percent from the total price (excluding shipping and handling charges).

All-In-One Computer: a complete system in one compact unit

- Heavy-duty professional keyboard
- Numeric keypad in calculator format
- Smart video terminal
- Two Z-80 microprocessors — one for computer, one for terminal
- 16K random access memory, expandable to 48K
- Built-in floppy disk storage
- Rugged construction
- Easy-to-read 12" CRT

Heath builds so much computing power and so many features in one computer for this low price:

Only **$1650⁰⁰** for H89

You can get all the power and built-in peripherals you need for any personal computing task in one compact, desk-top computer — the Heathkit All-In-One Computer! With convenience features that make it easy to program and operate, this 8-bit computer can make computerizing your home or business a reality.

The All-In-One's heavy-duty professional keyboard can control all video terminal functions, with eight user-definable keys available to help you program special functions. Select baud rates of up to 9,600 through the keyboard. Direct cursor addressing lets you insert and delete characters anywhere on the screen, and the terminal supports line graphics characters from keyboard or computer.

Designed in calculator format, a numeric keypad makes entering arithmetic programs faster and easier. Shifted functions give you cursor control for insertions and deletions.

The smart video terminal is one of the most sophisticated ever designed. Both the terminal and the computer have their own Z80 microprocessors. This means the All-In-One Computer can perform a multitude of high-speed functions, because the terminal never has to share processing power with the computer — not the case with most other desk-top computers and computer systems.

A 12-inch (diagonal measure) cathode ray tube produces clear, sharp, easy-to-read characters. Upper and lower case letters are formed by a 5 x 7 dot matrix in the format of 24 lines by 80 characters (with a special non-scrolling 25th line). Lower case letters with descenders use a 5 x 9 dot matrix. Also features 33 line graphics characters using 8 x 10 dot matrix.

You can expand the Heathkit All-In-One Computer to meet your needs. It comes with 16K RAM, expandable to 48K, with memory diagnostics built in to make memory checks faster and easier. Accessory interfaces let you communicate with printers, cassettes or time-share systems (with appropriate software), and all communication is EIA RS-232 Standard.

The built-in floppy disk system makes this a true All-In-One Computer, giving you tremendous storage capacity for programs and data. Each 5¼-inch diskette has 102K bytes of storage. The WANGCO/Siemens single-drive floppy disk system gives you virtually instant access to any information. Load programs in seconds, access and update data fast with the same H17-1 drive described on page 37.

The All-In-One Computer is built to withstand the toughest working environments, with a tough, rugged structural foam cabinet protecting its circuitry. And a convenient lift-off top gives you easy access to the H89 Computer's components and circuitry.

Order your Heathkit All-In-One Computer today. With so much computing power and so many features built in, this desktop computer brings exceptional value within your reach. Put this exceptional value to work for you now!

H89 All-In-One Computer, with floppy disk system. Includes H88-5 Audio Cassette Interface.
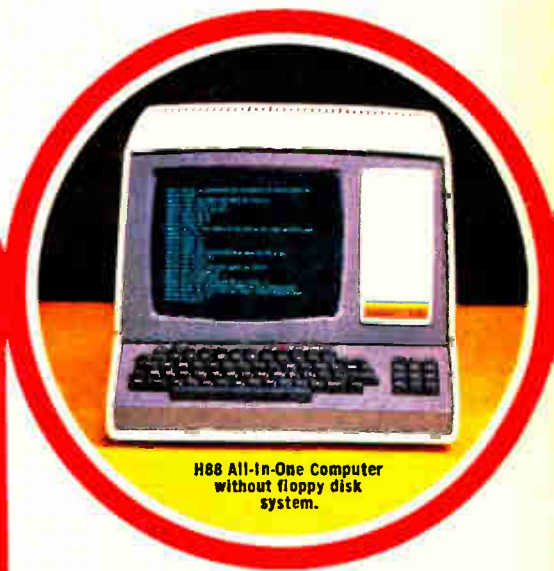Kit H89, Shpg. wt. 86 lbs. 1650.00

WH89 Completely Assembled All-In-One Computer, with floppy disk system. Does not include H88-5 Audio Cassette Interface.
WH89, Shpg. wt. 54 lbs. Motor Freight 2295.00

H88 All-In-One Computer, without floppy disk system. Includes H88-5 Audio Cassette Interface.
Kit H88, Shpg. wt. 59 lbs. 1250.00

H88 All-In-One Computer without floppy disk system.

Two independent Z80 microprocessors enable terminal and computer to act independently. CPU is completely wired and tested.

Two-port serial I/O interface hooks up to time-share systems and printers. H88 and H89 include cassette interface.

To add memory simply plug ICs into sockets. No soldering necessary.

High-resolution CRT with P4 phosphor produces sharp, clear images.

Video screen displays 1,920 easy-on-the-eyes characters at one time.

Rugged structural foam cabinet protects your All-In-One Computer.

H89 includes built-in floppy disk storage.

Numeric keypad in calculator format permits faster, easier arithmetic entries.

Professional electronic keyboard designed for easier reach, surer touch.

SPECIFICATIONS: Processor: Z-80. Clock: 2.048 mHz. Memory: 16K bytes user RAM (expandable to 48K). Video Terminal: High-resolution CRT with P4 phosphor. Screen Character Capacity: 1,920 characters. Character Type: 5 x 7 dot matrix (upper case), 5 x 9 dot matrix (lower case with descenders). 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, 50/100 Hz at 90 watts maximum. Dimensions: 13" H x 17" W x 20" D (33 cm x 43.2 cm x 50.8 cm).

Accessories and software let your All-In-One do even more!

The Heathkit All-In-One Computer runs programs written in MICROSOFT™ BASIC and Assembly languages, including scores of practical programs for your home or business. And the optional accessories enable you to perform more tasks, store more data and communicate with more peripherals, making the All-In-One even more versatile!

Cassette Systems Software for the Heathkit All-In-One Computer. Easy-to-use features include extended Benton Harbor BASIC, a modified version of Dartmouth BASIC, an easy-to-learn-and-use conversational language which uses simple English statements and algebraic equations; Assembly (HASL-8), a language which assembles source code and produces object code, utilizing all the standard 8080 mnemonics, extended mnemonics and numerous pseudo instructions; Text Editor (TED-8), a general-purpose, line-oriented text editor that is used primarily to prepare source code that can be assembled using the HASL-8 Assembly Language above, but can also be useful for letter writing, manuscript editing and preparation of newsletters; and Console Debugger (BUG-8), which you can use to load, execute and debug machine language programs in your computer.
H88-18, Shpg. wt. 5 lbs. **20.00**

Systems Software for the All-In-One Computer's Floppy Disk Storage System. Includes a diskette containing extended Benton Harbor BASIC; a two-pass absolute assembler; a text editor to prepare source code for BASIC and other languages; a full set of disk utility programs for convenient file manipulation and a console debugger to make debugging user machine language programs easier and faster. Dynamic File Allocation permits efficient use of free disk space, eliminating time-consuming disk-compacting utilities. Supplied on a standard diskette.
H89-17, Shpg. wt. 14 lbs. **100.00**

16K Random Access Memory Expansion Chip Set. Expand the capability of your Heathkit All-In-One Computer by adding one or two 16K RAM chip sets. The All-In-One Computer is equipped with 16K RAM; maximum memory capacity is 48K RAM.
**H88-2**, Shpg. wt. 1 lb. **150.00**

Two-Port Serial I/O Interface. Lets the All-In-One Computer communicate with the H14 Line Printer, time-share systems (with appropriate software) or any other serial peripheral. Two serial I/O ports support an EIA standard RS-232-C interface.
H88-3, Shpg. wt. 2 lbs. **85.00**

Popular MICROSOFT™ BASIC Computer Language. One of the most versatile languages for personal computing. Features direct access to CPU ports and memory locations, IF-THEN-ELSE control structure for more highly-structured programming, powerful program edit and file management facilities, powerful string processing functions, automatic line numbering and renumbering, double-precision floating point number and more. Requires floppy disk drive and minimum 32K memory (48K recommended).
H8-21, Shpg. wt. 3 lbs. **100.00**

Floppy Disk Storage System, Drive and Interface for the H88 All-In-One Computer. Store up to 102K bytes of information on each 5¼-inch diskette. Famous WANGO/Siemens single-drive system for speedy access to information. (Included in H89 only). Diskettes not included.
H88-4, Shpg. wt. 22 lbs. **490.00**

Audio Cassette Interface for WH89 All-In-One Computer. Connects your WH89 with a cassette recorder/player, such as the Heath-recommended ECP-3801 (page 40). Allows your computer to store and use more information. Standard with H88 and H89 All-In-One Computers.
H88-5, Shpg. wt. 5 lbs. **95.00**

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Heathkit H8 Personal Computer with "plug-in" flexibility
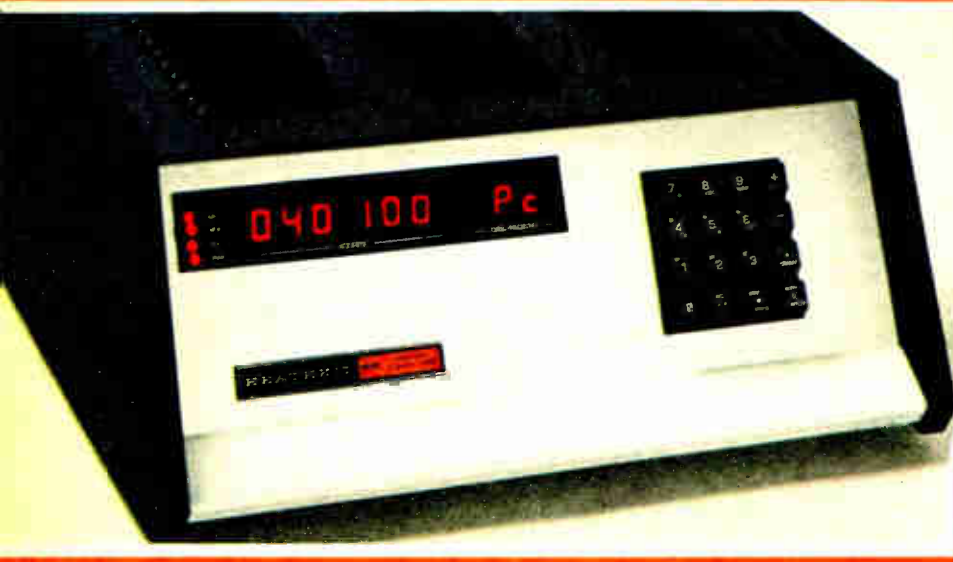
Heavy-duty power supply, rugged steel chassis and securely mounted and braced circuit boards.

The unique Heath-designed 50-pin bus is implemented on a heavy-duty printed circuit board.

Modular circuit boards slide into the H8 mainframe for easy memory and I/O expansion and easy access for servicing.

8080A-based, with front panel keyboard, digital readout and 7 plug-in board positions

$289.00 Kit

Requires at least one H8-1 Memory Board to operate

HEATHKIT ELECTRONIC CENTER charg·a·kit REVOLVING CHARGE

6 EVENING KIT Fast, Easy Assembly

- Built-in extended ROM monitor controls front panel program
- Heavy-duty power supply handles to 65K memory
- Exclusive Heath 50 line fully-buffered bus has 7 plug-in board positions for memory and I/O's

- Built-in speaker provides audible feedback for keyboard entry
- Convection cooled power supply — no fan needed
- CPU board is fully wired and tested for easy kit assembly and system setup

The H8's "intelligent" front panel provides the most informative display of any personal computer. The memory display shows memory location and contents. The register display shows CPU-register contents. The I/O port display shows I/O port data and location.

Front panel keyboard provides direct access to registers and memory while programs are running; one-button load and dump; a single instruction key for "stepping" through programs; and input/output keys for communicating directly with any port.

The computer that grows as you grow. The Heathkit H8 Computer gives you the flexibility to configure your computer just the way you want it. 7 plug-in board positions let you put together any combination of memory and I/O's. The low initial cost, along with add-on flexibility won't strain your budget either. It's the ideal choice for both the novice and the advanced computerite. The CPU board is fully wired and tested for easy system setup. It features the 8080A chip, clock, systems controller, ROM monitor and full bus buffering.

The H8, with the addition of 4K of memory, makes an ideal computer trainer. Its 16-key front panel keyboard provides octal data entry and gives you direct access to registers and memory, one-button program load and dump, and input/output keys for direct communication with any port. Its 9-digit octal readout provides far more information than conventional computers — memory, registers and I/O port displays are updated even while programs are running.

With the addition of more memory, peripherals and interfaces, the H8 can become even more powerful and versatile, allowing you to write highly sophisticated and practical programs. And because the H8 is based on the world-famous 8080A CPU, the amount of existing software (programs) from both Heath and other sources makes it one of the most immediately practical computers you can own.

Optional floppy disk system gives you vast storage capacity and instant access to data and programs. You'll be able to load programs and update files instantly. The H8's optional software is supplied in 1200 baud audio cassette form to get you up and running fast. Benton Harbor BASIC, HASL-8 2-pass absolute assembler, TED-8 line-oriented text editor, and BUG-8 terminal console debug program let you begin communicating with the H8 right away.

The H8 is housed in a heavy-duty metal cabinet with modern, high-impact structural foam side panels 6½" H x 16¼" W x 17" D. Switch-selected 120/240 VAC, 50/60 Hz. Requires at least one H8-1 memory board to operate.

Kit H8, Shpg. wt. 31 lbs. ....**Was $399.00, Now 289.00**

Factory Assembled and Tested H8. WH8, 30 lbs. 349.00

HKS81 Hobbyist Computer System. Includes H8, H8-5 Serial I/O and Cassette Interface, H8-1 8K Memory Board, H8-3 4K Chip Set, H9 CRT, ECP-3801 Cassette Recorder and H8-18 Cassette Software. $1103.00 if purchased separately. You save $108.00. **HKS81**, Shpg. wt. 94 lbs. 995.00

HKS82 Advanced Computer System. Includes H8, H8-4 Four-Port Serial I/O, WH8-16 16K Memory, H17 Floppy Disk, H19 CRT Terminal and H8-17 HDOS Software. $2104.00 if purchased separately. You save $109.00.

HKS82, Shpg. wt. 143 lbs. 1995.00

Examine Manuals before you buy. Manuals for the H8, H8-1, H8-2, H8-3, H8-5, H9 and latest software. Deduct $25.00 when you buy an H8 Computer.

HM800, Shpg. wt. 11 lbs. 25.00

NOTE: To specify a complete computer system using the H8, you will need both memory and interface accessory cards. The type and number of memory and interface accessories that you need for the H8 will be determined by your particular applications. The memory and I/O accessories are offered separately so you have complete freedom to assemble the system that meets your specific computing needs.

36

Floppy Disk Storage for instant data access with the H8

Add floppy disk storage to your H8 Computer and get instant access to programs and data. Enjoy the full capability of your H8 Computer.

SAVE $100

Shown with optional second drive

Vast storage, instant access, easy loading, you get it all with the H17 Floppy Disk

The H17 floppy disk system gives you the storage and programming capacity you need to load programs instantly. You can store hundreds of programs on a single disk and have immediate access to any one of them anytime you need it. And you can update your data instantly. Floppy disk storage is far more versatile and reliable than paper tape or cassette storage systems; it truly makes the H8 a "total versatility" computer system.

Designed exclusively for use with the H8, the H17 has been "systems" engineered to deliver a fully assembled package including: a disk drive, and interface disk/controller circuit board, and built in power supply. The controller circuit board plugs directly into the H8's mainframe and with the addition of the optional second drive you'll have optimum dual-drive versatility. Because the H17 is designed especially for the H8 Computer, you get a harmonious system that interfaces properly and runs smoothly.

The storage media for the H17 is the standard, hard-sectored 40-track diskette. Measuring just 5.25" in diameter, each disk offers access to better than 102K bytes of available program and data storage area. Disks are easy to handle and easy to load.

The drive system used in the H17 is the famous WANGCO Model 82, a performance-proven drive providing accurate high-speed data access. Specifications of this drive include a conservative 30 mS maximum track-step time and typical random sector access times of less than 250 mS. These figures are considerably better than most equivalent competitive drives.

The WANGCO 82 drive system is supplied fully assembled and tested. It's backed by extremely reliable mechanical and electrical operation. To use the H17 effectively with the H8 computer requires at least 16K of RAM for the H8 and H8-17 operating systems software, sold separately below. The H17 includes a single blank diskette.

Add the H17 Floppy Disk System to your H8 Computer and enjoy the full capability of your computer. Take advantage of all the practical and fun programs available to you.

Kit H17, Shpg. wt. 28 lbs. ....Was $595.00, Now 495.00
WH17, Factory assembled and tested. Shpg. wt. 25 lbs. 550.00
Optional Second Drive. Adds dual-drive versatility to H17 for a total of over 204K bytes of available program and data storage area.
H17-1, Shpg. wt. 5 lbs. 315.00
Package of 5 Blank Diskettes.
H17-2, Shpg. wt. 1 lb. ....each 25.00

H17 SPECIFICATIONS: Storage Media: 5.25" hard-sectored 40-track diskette. Drive Type: WANGCO Model 82. Track Seek Time: 30 ms maximum. Random Sector Access Time: Less than 250 milliseconds. Power Requirement: 120/240 VAC, 50/60 Hz. 75 watts. Dimensions: 6.25" H x 13.5" W x 13.5" D.

Kit with single drive
$495⁰⁰
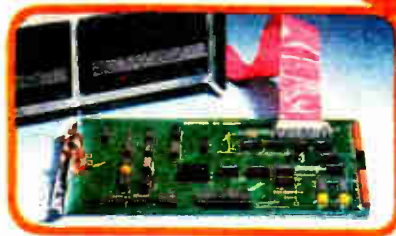
Rugged fully assembled WANGCO model 82 disk drive offers total reliability for years of trouble-free service.

The H17 includes the Interface/Disk Controller Circuit Board — an extra cost option with most other units.

Operating Software for H17 Floppy gets you up and running fast

Get your floppy system up and running fast with specially designed systems software. It's loaded with convenience features.

The Operating Systems Software for the H17 Floppy Disk System includes a diskette containing the standard H8 software. Includes extended Benton Harbor BASIC; a 2-pass absolute assembler; a text editor to prepare source code for BASIC and other languages; a console debugger for easy debugging of user machine language programs; and a full set of disk utility programs for convenient file manipulation.

Special features of this operating software include Dynamic File Allocation which automatically keeps free space available to permit unlimited file size and prevent squeezing of disks. Special facilities support running and backup of single-drive configurations to permit copying and transferring between disks even with a single-drive system.

Device independence permits direct communication between any program and any device. A file utility program allows two kinds of wild cards for fast, easy bulk manipulation of files. The software is supplied on a standard diskette.

H8-17 Operating Software helps you get the most from your H17 Floppy Disk System and from your H8 Computer.
H8-17, Shpg. wt. 14 lbs. 100.00

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Most powerful Heathkit Computer for the advanced computerite

- **16-bit power**
- **DEC® KD11-HA CPU**
- **Plug-in flexibility**
- **DEC PDP-11/03 Compatible**
- **Up to 60K bytes memory**

Rugged steel chassis and extra-thick backplane with heavy, solid connectors for added strength and years of reliable performance.

Compact power supply uses less power and generates less heat than conventional supplies. Overvoltage and overcurrent/short circuit protection, along with automatic power-up and power-down sequencing, give you long life operation of your system.

Modification Kit

Special modification kit for H11/WH11 and H11A/WH11A places line time clock switch on the front panel for easy access. Kit H11M $50 plus $3.50 shipping and handling.

Card cage with backplane accommodates up to seven accessory cards in addition to LSI-11/2. The card cage swings up for easy access even while the H11A is operating. Accessory boards slide directly into card guides with all connectors supplied.

Fully Assembled and Tested KD11-HA Circuit Board

The "heart" of the new H11A is the 16-bit microcomputer module, the KD11-HA. It's only half the size of the LSI-11 (KD-11F), but gives you more flexibility when you configure your system.

There is no on-board memory so you can match your RAM/ROM requirements to your particular needs. And full compatibility with the LSI-11 family means you can "mix or match" by combining components from both LSI-11 and LSI-11/2 families.

Features of the KD11-HA include: PDP-11/34 instruction set, raw computer speed of 380 nS microcycle time, resident firmware debugging (ODT) and ASCII console routines, and single and double operand instructions. The LSI-11/2 gives you the power and flexibility you need for virtually ANY system configuration you want!

H11A Computer runs your most complex programs efficiently

$1195⁰⁰ Kit

The H11A gives you all the power speed and flexibility you'll ever need in a microcomputer. It uses the same powerful microprocessor and runs all software designed for the DEC® PDP-11/03. You can choose from scores of practical programs to run your home more efficiently, to reduce the clerical costs of your business and to process all types of data. If you've been around computers awhile and the complexity of your programs requires extra power, the H11A Computer is designed for you.

New Half-size LSI-11/2

The H11A features the new, smaller KD11-HA microcomputer (LSI-11/2). That makes the H11A identical to the DEC PDP-11/03, but at a fraction of the cost. The smaller-size CPU leaves more space for computing power or I/O's.

7 plug-in slots

The H11A gives you the flexibility to configure exactly the system you require. Seven plug-in slots let you add any combination of I/O's and a maximum of 60K bytes memory. The basic H11A Computer is supplied with handsome cabinet, heavy duty power supply, backplane that includes bus and fully assembled CPU board. To the mainframe you add your selection of optional memory and I/O's accessories (see page 43). Complete systems software is optionally available in floppy disk form (see page 43).

Learn by building

What better way to know your computer than by building it yourself. Like all Heath electronic kits, the H11A comes with easy-to-follow assembly manual and a nationwide network of service centers to help you should a problem arise. And when you build it yourself, you can also perform more of the service steps yourself to keep it in top operating form.
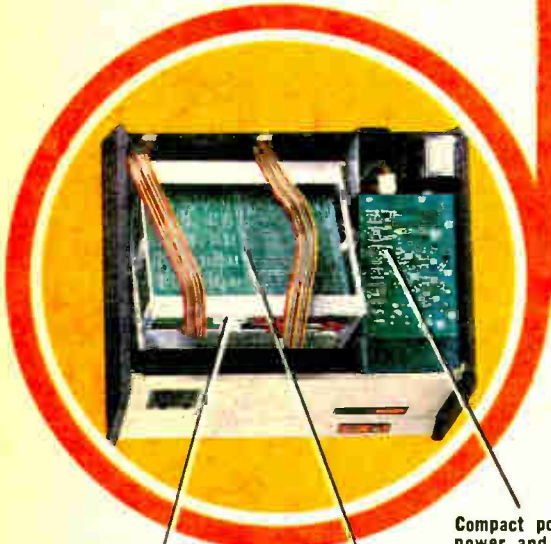
Value priced

Compare the price of the H11A with comparable 16-bit computers. The combination of advanced design and quality components make it one of the best 16-bit values anywhere.

Kit H11A, Shpg. wt. 43 lbs. **1195.00**
WH11A, Factory Assembled and Tested version of above.
Shpg. wt. 43 lbs. **1895.00**

DEC, DIGITAL and PDP are registered trademarks of Digital Equipment Corporation.

SPECIFICATIONS: Central Processing Unit: Uses DEC KD11-HA CPU. **Word Length:** 16 bits. **Instruction Set:** PDP-1103. **Memory:** Directly addresses 32 K. **I/O Addressed:** 28 K to 32 K. **RAM/ROM:** 0 to 28 K. **Backplane:** Eight 2-wide module slots. **Power Supply:** Overcurrent and overvoltage protected, switching regulator. Internal fan for cooling. **Inputs:** 120/240 VAC; 60/50 Hz, at 200 watts maximum. **Outputs:** +5 VDC at 15 amperes maximum and +12 VDC at 3 amperes maximum. **Cabinet Dimensions (overall):** 6½" H x 19" W x 17" D. (16.5 x 48.3 x 43.2 cm).

Dual-Drive Floppy Disk Storage for H11A Computer

Get fast access to programs and data with DEC compatible floppy and 512K total capacity

$1945⁰⁰ Kit

Designed especially for the H11A Computer, the H27 Floppy System gives you dual-drive convenience: one drive for your operating system disk, one drive for your program disk. You get instant access to programs and data, and vast storage capacity — so your computer can serve you better.

The WH27 includes the interface/controller (and a bootstrap program) on a single-circuit card at no extra charge.

Now enjoy instant access to programs and data

- ● Z80 Microprocessor-based Controller
- ● Full Compatibility with DEC RX01® (PDP-11/03)
- ● Head Step Time of 6 mS
- ● Dual-drive for a total capacity of 512K bytes

You get full compatibility with DEC® RXV11® (PDP-11/03 hardware and software) to give you the capability of using the hundreds of applications programs written by users of the DEC PDP-11/03, the world's most popular microcomputer. Performance-proven hardware and software base provides outstanding computing power.

Dual-drive versatility with a total of 512K bytes of program and data storage space gives you enough room for most all general-purpose application needs. And the Z80 micro-controller in the WH27 provides average access time of 252 mS. You'll have virtually immediate access to all your files and programs.

The H27, while maintaining full compatibility with the RX01 system, also gives you some special features you won't find on other RX01 systems:

1. A built-in self-test diagnostic on power-up that protects existing programs on your disks.
2. A mechanical interlock that prevents accidental media damage. (If floppy is not seated properly, the door will not close and the H27 will not operate.)
3. A write-protect function that protects important files and programs from being written over inadvertently.
4. A reformatting procedure that gives you the capability of writing in IBM 3740 standard format.

A single board interface/bootstrap uses one backplane slot leaving more space for memory and I/O devices. 8" H x 18" W x 20" D. For 100-135 or 200-270 V, 60 Hz AC.

The Operating System Software for the H27 (HT-11) described below requires at least 16K words of memory to use its full capabilities.

Kit H27, Shpg. wt. 93 lbs. 1945.00
WH27 Dual-Drive Floppy Disk. Fully assembled and tested.
Shpg. wt. 69 lbs. Motor Freight. 2595.00
H27-2, Pkg. of 5 Blank Disks. IBM 3740 format. Shpg. wt. 2 lbs. 30.00

Operating Systems Software for the H27 gets your floppy system operating quickly and efficiently

The HT-11 Systems Software lets you immediately enjoy the full benefits of a rapid access floppy disk system.

The HT-11 Operating system is a single-user, single task system for interactive program development and on-line applications for the H11 or H11A computers. Features of the HT-11 include: easy operation with NO system generation procedure; contiguous file structure for easy file manipulation; device-independent I/O programming; real-time interrupt capabilities to handle synchronous, asynchronous and event-driven I/O; low-overhead monitor with memory swapping functions for most efficient use of memory space. HT-11 Programs include:

EDIT — a text editor to create/modify files for programs and documentation.

EXPAND, ASMBLE and CREF — utilities for macro-expansion, assembly language processing and cross-reference listings. Supports several pseudo-operators in addition to the entire PDP-11 instruction set. Also offers the convenience of linkable object modules with global symbols.

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 creation of a runable program file for use by the rest of the system. Allows any number of overlays in any number of memory areas, subject only to memory size. Also picks called modules automatically from system or user created libraries.

LIBRARIAN — creates and maintains libraries of subroutines for use by the linker.

PIP — the Peripheral Interchange Program is the file maintenance and transfer utility 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 — high-level conversational programming language. Offers access to the HT-11 I/O system and file structure through the BASIC language. Extensions to standard BASIC in this program include: variable-length strings, sequential files, "virtual memory" arrays, chaining and overlay capability, "desk calculator" mode for once-only calculations or to aid in debugging.

MISCELLANEOUS PROGRAMS — Dump program prints the contents of HT-11 files in any of several useful formats; SRCOM compares two files and prints a summary of their differences.

Minimum requirements for operation of the HT-11 include a Heathkit H11 or H11A computer with at least 16K words of main memory, a console terminal and interface, and a Heathkit floppy disk drive, controller and interface.

*HT-11 Operating System with BASIC. Shpg. wt. 12 lbs. 350.00

FORTRAN for HT-11 System. Binary software features complete ANSI standard 1966 FORTRAN IV with extensions for increased speed. Some of the 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, IMPLICIT statement, more.

*HT-11-1, Shpg. wt. 9 lbs. 250.00

*NOTE. The HT-11 Disk Operating System and HT-11-1 FORTRAN are compatible only with the Heath H27 or WH27 Floppy Disk Systems. To obtain this software, the Customer Software Sublicense Grant must be signed and you must include the make, model and serial number of your CPU in the blank provided on page 42.

The Heathkit H19 Smart Video Terminal has features like professional keyboard and super-sharp CRT display

$695.00 Kit

- Z80 microprocessor-based for fast, efficient data handing
- Extremely wide bandwidth monitor for easy-to-read images
- Full professional keyboard in typewriter format
- Prints complete ASCII set including upper and lower case characters, and special graphic symbols

Look at these professional features:

- Eight separate user-definable function keys
- Separate numeric keypad
- Standard typewriter format
- Heavy-duty keyboard
- Addressable blinking cursor

Powerful Heathkit H19 "Smart" Video Terminal for a multitude of high-speed functions

The H19 Video Terminal is a top-of-the-line general-purpose peripheral designed for use with the Heathkit H8 and H11A computers or with any EIA RS-232 Standard interface. Its powerful Z80 microprocessor makes it ideal for high-speed data handling.

The typewriter format lets you start right in programming from the keyboard. The terminal's 32 separate functions can be controlled from keyboard or computer. A 12-key numeric pad in calculator format makes entry of arithmetic programs fast and easy. Baud rates of up to 19,200 are keyboard selectable for easy changes. Eight user-definable keys let you program your own special functions. The H19 prints the entire ASCII character set, including upper and

lower case letters. The print format is 24 lines by 80 characters (with software controlled 25th line). Addressable blinking cursor lets you make corrections or edit anywhere on the screen. Reverse video lets you emphasize any portion of the screen by reversing white on black.

The big 12" diagonal CRT has outstanding resolution for a bright, clear readout. The terminal also displays 33 different graphic characters that can be arranged for a variety of graphic displays and effects.

Kit H19, Shpg. wt. 54 lbs. 695.00
Factory Assembled and Tested Version of above.
WH19, Shpg. wt. 43 lbs. 995.00

H19 SPECIFICATIONS: CRT: 12" Diagonal, P4 phosphor. **Display Size:** 6½" high x 8½" wide. **Character Size:** 0.2" high x 0.1" wide (approx.). **Character Set:** 128 characters (95 ASCII and 33 graphic). **Character Type:** 5x7 dot matrix (upper case), 5x9 dot matrix (lower case with descenders). **Keyboard:** 80 keys (60 alphanumeric, 12 function) plus a 12-key numeric pad. **Cursor:** Blinking, non-destructive underline. **Cursor Controls:** Up, down, left, right, home, CR, LF and tab. **Cursor Addressing:** relative and direct. **Tab:** standard 8-column tab. **Refresh Rate:** 60 Hz. **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 an escape sequence. **Interface:** EIA RS-232C at 110 to 19,200 baud. **Communications Mode:** full or half duplex. **Parity:** even, odd, stick or none. **Power:** 120/240 VAC, 60/50 Hz, 45 W. **Dimensions:** 13" H x 17" W x 20" D.

Save $120 on H9 CRT Video Terminal and Keyboard

Displays twelve 80-character lines. Has auto-scrolling, plot and erase modes, automatic line carryover, cursor, built-in speaker. Serial interface provides EIA RS-232C levels, 20 mA current loop, TTL levels. Parallel interfacing includes TTL levels, 8 bits input, 8 bits output, 4 handshaking lines. 120/240 VAC, 60/50 Hz. 12½" H x 15⅝" W x 20¾" D.
Kit H9, 50 lbs. .... Was $499.00, Now 379.00
Adapter Cable. Interface H9 with other devices.
WH9-1, Shpg. wt. 1 lb. 15.00
40

Assembled Cassette Recorder/Player

Ideal for data storage

This Heath-recommended assembled Cassette Recorder/Player is ideal for data storage use with computers. Features volume and tone controls, push-button select of record, play, rewind, fast forward, stop, eject. Also has built-in 3-digit counter with reset button. Factory wired; not a kit.
ECP-3801, Shpg. wt. 4 lbs. 60.00
Heath-recommended high output, low noise, premium grade audio recording tape. Pack of three 30-minute blank cassettes.
ECP-3802, Shpg. wt. 1 lb. .... per pack 6.00

Acoustic Modem

Ideal for any phone

Cat Modem by Novation lets your computer talk to other computers over standard telephone lines. Designed especially for the small computer, it features selectable originate and answer modes. LED display of unit status and special acoustic self-testing. Compact, powerful. Plugs directly into wall sockets. Data exchange occurs at any speed up to 30 characters per second, via standard EIA-RS-232C interface. The ideal computer communications link. Many practical and fun applications. Fully assembled.
WH13, Shpg. wt. 3 lbs. 195.00

Printers: from low-cost matrix to letter quality font

Popular LA36 DEC Writer II Provides Sharp, Clear "Hard Copy" Printout

Compare our low price

$1550⁰⁰

Fully Assembled! Prepaid Shipment!

The H36 is an advanced technology teleprinter offering fast, reliable operation at one of the best price/performance ratios in the industry. It features a 7x7 dot matrix print head for crisp, clear character formation; switch selectable 10, 15 and 30 cps printing speeds; variable width forms handling from 3" to 14⅞" wide; adjustable left and right hand tractors half or full duplex operation; ANSI-standard multi-key rollover and a typewriter-like keyboard. It prints 10 characters per inch horizontal spacing and 6 lines per inch vertical spacing. Compatible with all Heathkit Computers, as well as most others. With connecting cable and integral stand. Overall size, 33¼" H x 27½" W x 24" D.

The H36 (LA36 DEC WRITER II) is shipped Motor Freight, prepaid to your nearest terminal in the Continental U.S.
H36 DEC Writer II, For 120 VAC, 60 Hz 1550.00
H36-1 Fan-fold Paper for H36. Standard 14⅞" x 11" white and green, single-part, lined paper. 3200 sheets per carton. H36-1, Shpg. wt. 47 lbs. 35.00
H36-2 EIA Interface. Provides EIA RS232-C Interface for LA36, 9-ft. cable with 25-pin data-set type connector.
H36-2, Shpg. wt. 1 lb. 70.00
H36-3 Acoustic Coupler. Provides hookup to phone lines for time-sharing. Kit H36-3, 10 lbs. 260.00
H36-4, Ribbon Accessory, Shpg. wt. 7 lbs. 15.00
DEC is a registered trademark of Digital Equipment Corporation.

Low-cost H14 Line Printer gives you permanent copies of your programs

$675⁰⁰ Kit

- One of the lowest-cost microprocessor-based printers
- Can be used with H8, H11A or most other computers

The H14 prints standard 96-character ASCII set (upper and lower case) on 5/7 dot matrix print head. The impact printer uses readily available 0.5" wide nylon inked ribbon on 2" spools. Maximum instantaneous print speed is 165 characters per second with selectable line length of 80, 96 or 132 characters. Line spacing is 6 lines per inch with 8 lines per inch software selectable. Baud rates selectable from 110-4800.

The H14 connects to the H8 or H11A computer by the use of a standard (RS-232C) serial interface or 20 mA current loop. Handshaking is provided by a busy control signal. Includes 25-pin male EIA connector and a matching paper catch.
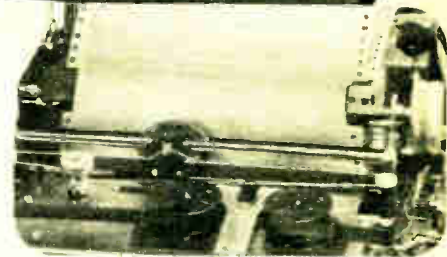
The H14 is supplied in kit form or fully assembled and factory tested. 4⅘" H x 18⅓" W x 14⅓" D. 120/240 VAC, 50/60 Hz. Requires H8-17, H8-18 or HC8-14 software for H8; HT-11 or H11-18 software for H11 or H11A.

Kit H14, Shpg. wt. 33 lbs. 675.00
WH14, Assembled version of above.
Shpg. wt. 27 lbs. 895.00
H14-1, 3200 sheets 9½" x 11" Fan-Fold Paper for use with H14. 31 lbs. 32.00

Compact, Versatile DEC Desktop Computer Teleprinter

Convenient desktop design makes the LA34 ideal for office uses

Desktop teleprinter prints the full 128 character ASCII set with switch selectable 110 and 300 baud rates. Offers true 30 cps print speed, adjustable character widths, adjustable line spacing, clear printing through a 9x7 dot matrix head. Designed like a standard typewriter for operator ease and convenience, the LA34 features standard sculptured keyboard, cartridge ribbon change, automatic line feed and more. Includes EIA RS232C standard interface cable, tractor feed, ribbon and paper. 7" H x 22" W x 15½" D. For 120 VAC, 60 Hz. WH34 DEC Writer IV, Fully Assembled and Tested.
WH34, Shpg. wt. 40 lbs. 1295.00
WHA34-1, 3 ribbon cartridges, wt. 1 lb. 30.00

Heathkit WH24/TI810 Line Printer is a complete unit at an affordable price

$1895⁰⁰

- Includes upper/lower case, floor stand and paper catch tray

NEW

Fully Assembled!

The WH24/Texas Instruments 810 Line Printer is a high-quality, low-priced line printer that can make an impact on both your printing and your printer costs. It has features you usually don't find at such a low price — like optimized 150 cps bidirectional printing, which minimizes printhead travel time and maximizes efficiency, and vertical and horizontal tabbing, which team with bidirectional printing to produce maximized data, regardless of format.

The WH24 has a 256-character FIFO buffer that lets you receive data at speeds from 110 to 9600 baud. Programmable forms length and a wide carriage can handle multiple-part forms, tickets and reports from 3 to 15 inches in width. And a 9 x 7 dot matrix character font prints clearer, more legible characters of an original, and up to five high-quality copies.

The WH-24's adjustable tractor drives make it easier to operate. Once a form has been engaged by the tractor drives, alignment can be made at the main control panel.

Compare with other printers — and find out just how big an impact the WH24 can make in your office! 120/240 VAC. 8" H x 25¾" W x 20" D. Needs WHA11-5 Serial I/O Card for H11/H11A only. Not required with other Heathkit systems.
WH24, Shpg. wt. 35 lbs. 1,895.00
WHA11-5, Serial I/O Card, 1 lb. 150.00

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H8/H89 software gives you more ways to use your computer

Whether you're a hobbyist or in business, Heath has software to help 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 Customer Software Sublicense Grant.

Microsoft™ BASIC: the most popular computer language. Microsoft BASIC is one of the most versatile languages for the personal computer. Scores of programs are written in this BASIC. It features the following capabilities: Direct access to CPU ports and memory locations (INP, OUT, PEEK, POKE); IF — THEN — ELSE control structure for more highly-structured programming, including editing during programming and random or sequential files; Powerful program edit and file management facilities; Powerful string processing functions including LEFTS, RIGHTS, MIDS, ASC, CHRS and concatenation; Automatic line numbering and renumbering; Double precision floating point number; PRINT USING for control of output formats; Error control via ON ERROR command; Variety of mathematical and logical functions as well including double precision math. Requires H8-17 (above) and a minimum of 32K memory.

H8-21, Shpg. wt. 3 lbs. **100.00**

Extended Benton Harbor BASIC: super-fast BASIC. Extended Benton Harbor BASIC is an easy-to-learn, easy-to-use conversational language. It features two different types of data: numeric data with over six digits of accuracy and Boolean values which permit logical operations. It also features free format programs, enhanced expression and conditional statement facilities. It provides even faster operation and includes character strings, additional convenience commands and math functions. Requires a minimum of 12K memory to run this BASIC. 16K is preferred for full use. Supports WH-14 line printer and WH8-4 Interface Board. Supplied in 1200 baud audio cassette format.

HC8-14, Shpg. wt. 2 lbs. **20.00**

Operating Systems Software Designed Especially for the H8 Computer. Gets you ready for programming your H8 quickly and easily. Includes Benton Harbor BASIC, Assembly (HASL-8), Text Editor for hard copy and Console Debugger

(BUG-8) for entry and debugging of programs. Get all the performance you want from your H8 Computer. Supplied in 1200 baud audio cassette format, which requires H8-5 (opposite) to load.

H8-18, Shpg. wt. 11 lbs. **20.00**

Operating Systems Software for the H17 Floppy Disk System. Includes a diskette with the standard H8 software. Extended Benton Harbor BASIC, a 2-pass absolute assembler, a text editor to prepare source code for BASIC and other languages, a console debugger for easy debugging of programs and a full set of disk utility programs. Supplied on standard diskette.

H8-17, Shpg. wt. 14 lbs. **100.00**

H8 Business Accounting Software cuts costs

This total system, designed for the H8 Computer and H17 Floppy Disk System, can save you money. Includes those parts of Microsoft™ BASIC and HDOS necessary to operate. Requires H19 Video Terminal (page 40) to operate.

Familiarity with HDOS (the Heath Disk Operating System) and/or general operating system terminology is required to implement these applications software packages. If you aren't familiar with operating system terminology, visit your nearest Heath Data Systems dealer or Heathkit Electronic Center. We'll be glad to help you with additional information and/or training before you buy.

NOTE: Due to lengthened field testing activity and documentation schedules, we sincerely regret that delivery of these applications packages has been further delayed by several months. Our pledge to offer only well-tested and documented software takes precedence over our desire to ship. We apologize for the inconvenience, and thank you for waiting so patiently. We're confident that when you receive these software packages, you'll be proud to own a top-quality product.

General Ledger Package. Heart of the total accounting system. Keeps a detailed record of all financial transactions and generates the balance sheet and income statement to provide timely information on your company's financial status. Accepts data from all other parts of the business accounting software system, described on the opposite page. 150 accounts, 450 transactions.

H8-32, Shpg. wt. 5 lbs. **350.00**

Have hours of excitement and fun with these H8 computer games

Supplied in 1200 baud audio cassette form, requires H8-5 (opposite) to load.

Biorhythm. Plot your body's biorhythm, know when to take on the world and when to stay home. Runs under extended BASIC, requires 16K RAM.
PA-82, 1 lb. **10.00**

Space War. Guide. control and command the starship Enterprise as it travels

through the galaxy. Requires 24K RAM. PA-83, Shpg. wt. 1 lb. **10.00**

Game Set =1. Lets you play 8 popular computer games, including Craps, Orbit, Tic-Tac-Toe, Nim, Hexapawn, Hangman, Hamrabi and Derby. Requires 8K or more RAM. These games will provide hours of entertainment. **PA-84, 1 lb. 10.00**

computer system more versatility than ever before!

The **ACCOUNTS RECEIVABLE** package is a complete invoice and monthly statement generating package that keeps track of current and aged accounts receivable. The current status of any account is instantly available. Permits sales or dun messages to be printed on statements, facilitates posting of payments and justifies amounts due. Debits and Credits can be passed automatically to the General Ledger software above. 250 customers, 750 transactions. H8-30, Shpg. wt. 5 lbs. 350.00

The **ACCOUNTS PAYABLE** package keeps tabs on current and aged accounts payable and incorporates a check writing feature. Maintains complete vendor file, passes transactions to General Ledger. 220 vendors, 450 transactions. H8-31, Shpg. wt. 5 lbs. 350.00

The **PAYROLL** package prepares payroll for hourly, salaried and commissioned employees while accumulating necessary tax reporting information. Can automatically write payroll checks. Up to 225 employees.
H8-33, Shpg. wt. 3 lbs. 350.00

The **INVENTORY SYSTEM** package helps you achieve effective inventory control. Provides a data base for complete records to be kept on-line, lists inventory balance and preceding events, displays status of any item and provides stock counting. H8-34, Shpg. wt. 3 lbs. 350.00

Accessories give your H8 more capability

Use any or all of these accessories to expand the capability of your H8 Computer and make your system even more versatile!

16K Wired Memory Board. Lets you expand your H8 to the full capability of the 8080A. Fully assembled and tested, and factory burned-in to eliminate memory problems. WH8-16, Shpg. wt. 2 lbs. 395.00

8K Memory Board. 8Kx8 memory card supplied with 4K memory plugs. Maximum storage capacity of 8192 8-bit words if expanded to 8K memory with H8-3 chip set below. Kit H8-1, Shpg. wt. 2 lbs. 95.00

4K Chip Set for H8-1. Kit of eight 4K static memory ICs. Expands H8-1 to full 8K storage. With sockets. Kit H8-3, Shpg. wt. 1 lb. 65.00

Assembled and Tested 8K Memory Board. H8-1 plus H8-3. Access time better than 450 nS. WH8-8, Shpg. wt. 2 lbs. 175.00

Parallel Interface. Connects H8 to any parallel interface, like printers which accept parallel I/O. Three parallel ports. Compatible with all Heath software. Kit H8-2, Shpg. wt. 3 lbs. 150.00

Four-Port Serial Interface. Recommended to interface your H8 and H19 CRT to the H14 Line Printer. All four ports support a standard RS-232C interface including MODEM controls. One port is switch programmable for 20 mA serial loop. Software programmable baud rate. Includes one WH8-41 connection cable. Kit H8-4, Shpg. wt. 2 lbs. 150.00

Factory Assembled and Tested Version of Above.
WH8-4, Shpg. wt. 3 lbs. 250.00

Adapter Cable for Use with H8-4. Provides EIA standard electrical and mechanical interface between H8-4 and other peripherals.
WH8-41, Shpg. wt. 1 lb. 15.00

Serial I/O and Cassette Interface. Cassette interface with one serial I/O port for control terminal. Note: H8-4 above is recommended for H8 Computer Systems without cassette data storage. Kit H8-5, Shpg. wt. 3 lbs. 95.00

Factory Assembled and Tested Version of Above.
WH8-5, Shpg. wt. 2 lbs. 120.00

Adapter Cable for use with H8-5. Provides EIA industry standard electrical and mechanical interface between H8-5 and other peripherals. For use with H8 Computer. Factory assembled and tested. WH8-51, Shpg. wt. 1 lb. 15.00

Circuit Design Breadboard Card. Lets you custom design your own analog or digital circuits. Make additional interfacing or create your own memory boards. Uses solderless breadboard sockets. 5 VDC power supply for logic circuits is provided on the board. Kit H8-7, Shpg. wt. 2 lbs. 90.00

H11A accessories, software and interfaces add flexibility

Modification Kit for H11/WH11 and H11A/WH11A 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, Shpg. chgs. prepaid 53.50

4K Memory Expansion Module. This module plugs into the backplane of the H11 or H11A Computers. It adds 4K x 16-bit word capacity to memory. Uses high-reliability 1K x 4 static MOS RAM chips. Access time is less than 500 nS. Module contains decode circuitry for operation on 4K address boundaries, and has a handle for easy installation and removal.
Kit H11-1, Shpg. wt. 2 lbs. 135.00

Assembled and tested version of 4K Memory Expansion Module.
WH11-1, Shpg. wt. 2 lbs. 160.00

Parallel Interface. General-purpose parallel interface featuring 16 diode-clamped latched data input lines, 16 latched output lines, 16-bit word or 8-bit byte data transfers. Has LSI-11 bus interface and control logic for interrupt processing and vectored addressing. Control status registers compatible with PDP-11 software routines. Maximum data transfer rate, 90K words per second under program control. Maximum drive capability, 25 ft. cable. Also compatible with TTL or DTL logic devices. The H11-2 Parallel Interface can be used to interface with printers or other devices which require parallel I/O.
Kit H11-2, Shpg. wt. 2 lbs. 100.00

Assembled and tested version of H11-2 Parallel Interface.
WH11-2, Shpg. wt. 1 lb. 160.00

Serial Interface. Universal asynchronous receiver/transmitter serial interface module for use between LSI-11 bus and serial devices, such as the Heathkit H9 Video Terminal (see page 40) and the H36 DEC Writer II (see page 41). Has an optically isolated 20 mA current loop or EIA interfaces, selectable baud rates of 50 to 9600. Plugs into H11 backplane, fully compatible with PDP 11/03 and other LSI-11 backplane machines. The H11-5 Serial Interface is supplied with all mating connectors. Kit H11-5, Shpg. wt. 2 lbs. 115.00

Assembled and tested version of H11-5 Serial Interface.
WH11-5, Shpg. wt. 1 lb. 160.00

Adapter Cable for H11-5 Serial Interface. Provides EIA industry standard electrical and mechanical interface between H11-5 Serial Interface and other computer system peripherals. For use with H11/H11A computers. Fully assembled and tested. WH11-51, Shpg. wt. 1 lb. 15.00

16K Memory Module. Provides 16K dynamic MOS random access memory on a 5" x 8½" board. Has on-board refresh, cycle time of 570 nS and access time of 250 nS. Fully assembled and tested. Fully expand memory with only two of these boards! Maximum memory capacity of H11A is 30K words.
WHA11-16, Shpg. wt. 2 lbs. 480.00

32K Memory Module. Provides 32K words dynamic MOS random access memory, with same 570 nS cycle time and 250 nS access time as WHA11-16 16K Memory Module above. Fully assembled and tested. Fully expand memory with just a single board! Maximum memory capacity of H11A is 30K words.
WHA11-32, Shpg. wt. 2 lbs. 995.00

H11-6 Extended Arithmetic Chip: Adds powerful arithmetic instructions to the LSI-11, including fixed point multiply, divide and extended shifts, plus full floating point add, subtract, multiply and divide. Helps minimize arithmetic subroutines. And the H11-6 saves memory space, too. The 40-pin dual-in-line package integrated circuit (IC) plugs into a socket on the H11/H11A board.
H11-6, Shpg. wt. 1 lb. 165.00

Look over the Manuals before you buy. Complete manuals for H11A Computer, H11-1 4K Memory Board, H11-2 Parallel Interface, H11-5 Serial Interface and H19 Video Terminal. Also includes complete software documentation. Get a first-hand look at the accurate, easy-to-follow assembly manuals that take you, step-by-step, from unpacking to final plug-in. Know your H11A Computer inside out before buying. And when you buy an H11A Computer, we'll deduct $25.00 from the purchase price. HM-1100 Manual Set, Shpg. wt. 12 lbs. 25.00

HUG has over 400 exciting programs for your computer

Heath User's Group

The Heath Users' Group keeps you up to date on happenings in the Heathkit personal computing world. There's an informative magazine, a complete program library and exchange, new product information and new computing ideas — all at your disposal when you join HUG!

HUG gives you all these advantages:

- A one-year subscription to REMark, the quarterly HUG magazine
- An attractive three-ring HUG binder to hold your magazines, software documentation and other materials
- Forms to submit your own programs to HUG
- The official HUG Identification Card
- Access to the HUG Software Library, which includes over 400 user-submitted H8 programs — including special utility routines, computer-aided instruction, financial packages, amateur radio applications programs, games and much more! See a more complete list of HUG programs below, right.

Only HUG — the Heath Users' Group — can give you all the advantages above and much, much more! HUG puts you in contact with other Heathkit computer owners. In fact, many HUG members are forming local groups to increase the benefits of belonging to HUG. These benefits include:

Your own one-year subscription to REMark, the quarterly magazine of HUG that updates you on the latest Heathkit computer product developments and lets HUG members share new hardware modifications, software enhancements, applications programs and other materials with other HUG members.

A three-ring, loose-leaf HUG binder loaded with information that helps you get the most from your membership in HUG, and gives you a place to store software documentation and back issues of REMark magazine, as well as other materials. HUG program submittal forms that enable you to share your unique programs with other HUG members by submitting them to the HUG Software Library.

An opportunity to compete for valuable prizes in HUG software contests.

The official HUG Identification Card, which entitles you to all of the special benefits that are available only to HUG members.

And access to the huge HUG Software Library, a constantly updated and expanded library which now has more than 400 user-submitted programs. Imagine between 30 and 80 programs on a tape for nominal reproduction and distribution cost. Software documentation and disks are also available. The HUG Software Library includes a diversified collection of programs, subroutines and procedures written by members of the Heath Users' Group. Whether you're an amateur radio buff, a businessman or just interested in playing games, you find a program for you in the HUG Software Library. The contents of the HUG Software Library, including computer-assisted instruction, business applications, personal finance programs, amateur radio programs and games, are described in the HUG Software Library Catalog, which is part of the initial HUG membership package. Each HUG Software Library program is listed by its author, program name, a short description of the program, language, version and equipment required to run the program.
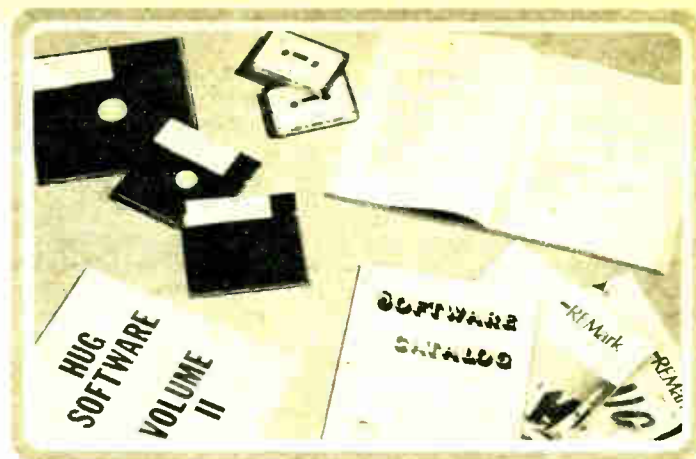
If you like what you've seen of HUG so far, check out this partial list of program titles from the HUG Software Library:

- Accounts Receivable
- Payroll
- Inventory
- Tax Program
- Declining Interest
- Mortgage Tables
- Loan Amortization
- Accounts Payable
- Real Estate Depreciation
- Small Business Package
- Home Budget Maintenance
- Personal Accounts Payable
- Checkbook Programs
- Finance
- Credit Card Management
- Peak Budget Demand
- Depreciation Calendar
- Stock Reporter
- Stock Market Game
- BASIC Tutor
- Space Wars
- Star Trek
- Biorhythms

- QSL File Maintenance
- Loop Antenna Designer
- Antenna Designer
- Handy Ham Problem Solvers
- Power Supply Design
- Op-Amp Circuit Design
- Morse Code Review
- RTTY Send/Receive
- Solid-State Amplifier Design
- Weather Forecasting
- Disk Transfer Systems
- BASIC Renumbering Programs
- Create-A-Program
- Interactive Data Base
- Word Processor
- 8080 Emulator
- CHI Square Multisort
- Octal/ASCII Dump
- File Maintenance
- Modem Drivers
- Pilot
- Blackjack
- Football

HUG membership application information and details are included with your Heath computer — or pick up an application at any store. H11 owners are also eligible for membership in DECUS, the Digital Equipment Computer User's Society.

Learn the programming languages that help you get more of the full capability of your computer

Heathkit Self-Instruction Program for Assembly Language

$49⁹⁵
- Use the full capacity of your computer
- Execute programs faster
- Store more in less space

Assembly Language lets you do everything your computer is capable of doing. It's the most versatile, most powerful language you can use.

Assembly includes a memonic for every machine operation. No need for programmed memory, no time wasted interpreting. So programs run faster.

Assembly makes more efficient use of memory. It stores in less space because codes are shorter, more explicit. The Heathkit Self-Instruction Program teaches you to program in Assembly at your own pace through a special 400-page text designed for self-study. An exercise workbook provides hands-on experience with programming exercises performed by you on your computer. The programmed instruction is so thorough that you can learn to program a computer by studying the text and test questions. To do the optional experiments — necessary for gaining the full benefit of the Program — you must have a computer.

The Heathkit Program is designed for computers using the popular 8080/8085 microprocessor series, which uses standard Intel 8080 mnemonics. This includes the Heathkit H8, H88 and H89 Computers.

Upon completion of the Assembly Program, you will be able to write your own programs to serve your specific needs. And you'll be able to do it in the most flexible, most functional of all languages. The only limit to what you can do will be the capacity of your CPU.

Along with text and workbook, the Program also includes a special Reference Placard containing all 244 Assembly Instructions for easy reference. The other side of this placard contains the ASCII code chart. Passing the Program's final exam (70% or better) earns you 6 CEU's.

With Heathkit Programs, computer languages have never been easier or more fun.

Now's the time to learn the language that puts you in total command of your computer's full potential. Send today for the Heathkit Self-Instruction Program for Assembly Language.
EC-1108, Shpg. wt. 7 lbs. 49.95
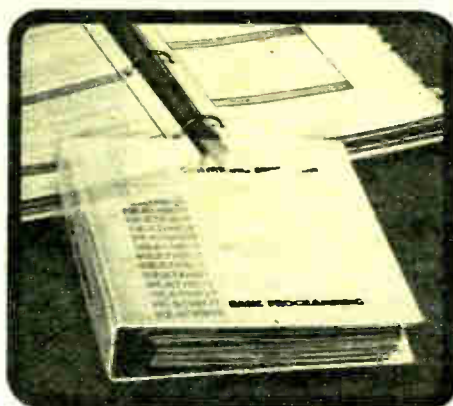
Heathkit Self-Instruction Program for BASIC Language

$39⁹⁵
- Easiest of all languages to write
- Now easiest of all to learn
- Hundreds of programs available in BASIC

More programs are written in BASIC than any other language. Because it uses English words, it's the easiest to learn and the easiest to write.

When you know BASIC, you can adapt and run hundreds of existing programs. You can exchange programs with others. You can write your own programs. With BASIC your computer can express algebraic terms and automatically perform I/O operations.

The Program covers all formats, commands, statements and procedures, plus special creative problem-solving tips you can use when writing your own programs.

In 14 easy-to-follow segments, you learn BASIC words, decision making, numbers, statements, functions, loops, lists and arrays, strings, programming techniques, programming tools, how to define and plan a program, how to format and write a program, and how to adapt existing programs. Each segment has its own objectives, text and review test. A special workbook provides programming instructions and experiments performed by you on your 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. Three appendices provide descriptions and playing rules for computer blackjack, a summary of microprocessor number systems and codes, and an introduction to Benton Harbor BASIC and extended Benton Harbor BASIC.

While the BASIC Program is keyed to Heathkit computers, it is equally applicable to any computer system using BASIC. Passing the Program's final exam (70% or better) earns you a certificate of achievement and 3 CEU's.

With Heathkit Programs, computer languages have never been easier or more fun.

Until you know BASIC, you're missing the full selection of programs available to you. Send today for the Heathkit Self-Instruction Program for BASIC Language.
EC-1100, Shpg. wt. 7 lbs. 39.95

Money-back Guarantee

Programs on this page carry a complete refund of purchase price, if you're not satisfied.

Is your business ready for a computer? Here's an easy way to find out the answer.

Heath's new "Computer Concepts for Small Business" is designed to give you the information and understanding to intelligently evaluate the uses you can make of a computer in your business. Are the benefits worth the cost? Heath's new program helps you decide.

$49⁹⁵ Designed for the businessman who knows little or nothing about computers, Heath's new Computer Concepts for Small Business shows you how a computer can serve your business. The program covers:

The Computer and How It Works: Types of memory, types of storage media and I/O's and types of software. A detailed discussion of applications software covers the typical tasks a computer can perform for a small business.

The Data Processing Department and Personnel: Organization of a typical DP department, duties of personnel, advantages of permanent employees vs. free-lance people.

Alternatives in Computer Services: advantages of owning vs. time-sharing vs. service bureau, and the common problems of each.

How to Select a Computer: how to define your DP requirements, how to put together the right combination of hardware, peripherals and software.

The Program includes a 160-page text with 3 appendices and 3 cassettes. Completion of the final exam with a passing grade of 70% earns you 1 CEU. A computer is a big investment. Computer Concepts for Small Business is a small investment to acquire the understanding needed for an informed decision.
EC-1103, Shpg. wt. 5 lbs. 49.95

Accessories make computing easier
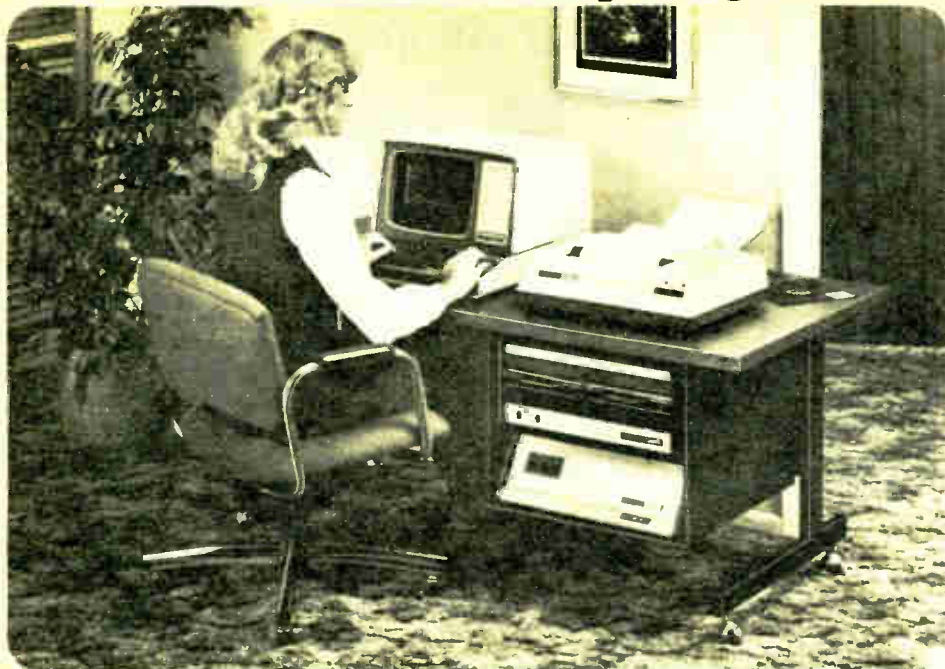
Computer Work Station organizes your computer system, adds efficiency

NEW

- Organizes your computer system in less space
- Components are easily accessible
- Easy-to-clean desk top
- Rugged metal construction

Heath's Computer Work Station organizes your computer 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 I/O's at a comfortable height for seated operators. The lower shelf holds horizontal components. The upper shelf is 8½" H x 20" W x 19¾" D, while the lower shelf is 7" H x 20" W x 19¾" D.

Rugged black steel legs and black sheet metal shelving are designed to last under constant use. Casters make it easy to roll the Computer Work Station from place to place, while caster locks prevent the work station — and your computer system — from rolling
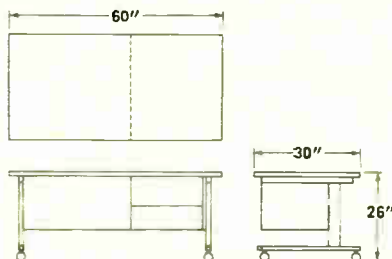
away by accident. The PD-11 Computer Work Station keeps your operator comfortable and efficient — puts every one of your computer system components within easy reach — and its rugged but handsome appearance make it an attractive addition to every office environment.

PD-11, Shpg. wt. 95 lbs., Motor Frt. 295.00

Multi-function calculator for the computer hobbyist

- Versatile three-key independent memory for complex problems
- Special logic operation for computer applications
- Fifteen levels of parentheses for involved calculations

Designed especially for the computer hobbyist, this fully assembled Texas Instruments Programmer/Calculator features fast conversions between octal, decimal and hexadecimal number systems; logic operations; versatile 3-key independent memory and 15 levels of parentheses for complex problems; constant mode to simplify repetitive calculations; and an 8-digit LED display. Lightweight, ideal for any computer application. Rechargeable battery and AC adapter/charger are included. Factory tested. 5½" H x 3" W x 1¼" D.

PC-11, Shpg. wt. 2 lbs. 59.95

Introduction to Microprocessors, Volume I. An introduction to the basic microprocessor.
EDP-224 . . . . 9.50

Getting Acquainted With Microcomputers. A basic guide to what microcomputers can do.
EDP-275 . . . . 8.95

8080 Machine Language Programming for Beginners. A comprehensive guide to 8080 machine language programming, written for beginners.
EOP-272 . . . . 7.95

PDP-11 Programming Fundamentals. How to program your PDP-11 computer with Assembly language and get the most out of it.
EOP-239 . . . . 10.00

FORTRAN IV Self-Teaching Guide. High-level computer programming in FORTRAN.
EOP-279 . . . . 5.95

6800 Microprocessor Applications Manual. The Motorola edition, with in-depth information.
EDP-244 . . . . 25.00

101 Basic Computer Games. New computer game ideas — all in BASIC — fun for the entire family.
EDP-237 . . . . 7.50

8080 Software Gourmet Guide and Cookbook. Interesting new ideas for your 8080A computer.
EDP-228 . . . . 10.95

BASIC Software Library, Vol. I. Business and recreational programs to run on your computer.
EDP-240 . . . . 24.95

BASIC Software Library, Vol. II. Special BASIC programs in engineering and statistics.
EDP-241 . . . . 24.95

BASIC Software Library, Vol. III. Advanced business programs that can cut clerical costs.
EOP-242 . . . . 39.95

BASIC Software Library, Vol. IV. General purpose programs with scores of applications.
EDP-243 . . . . 9.95

BASIC Software Library, Vol. V. Programs for the experimenter who enjoys learning.
EOP-251 . . . . 9.95

Heath-recommended tools for easier kitbuilding
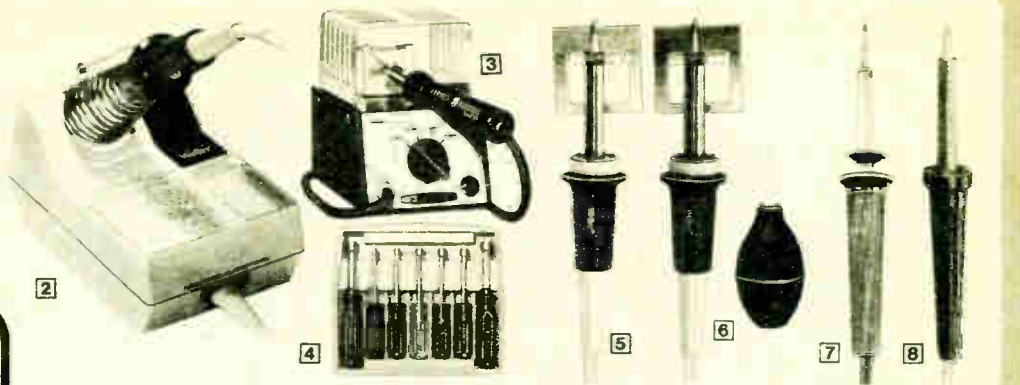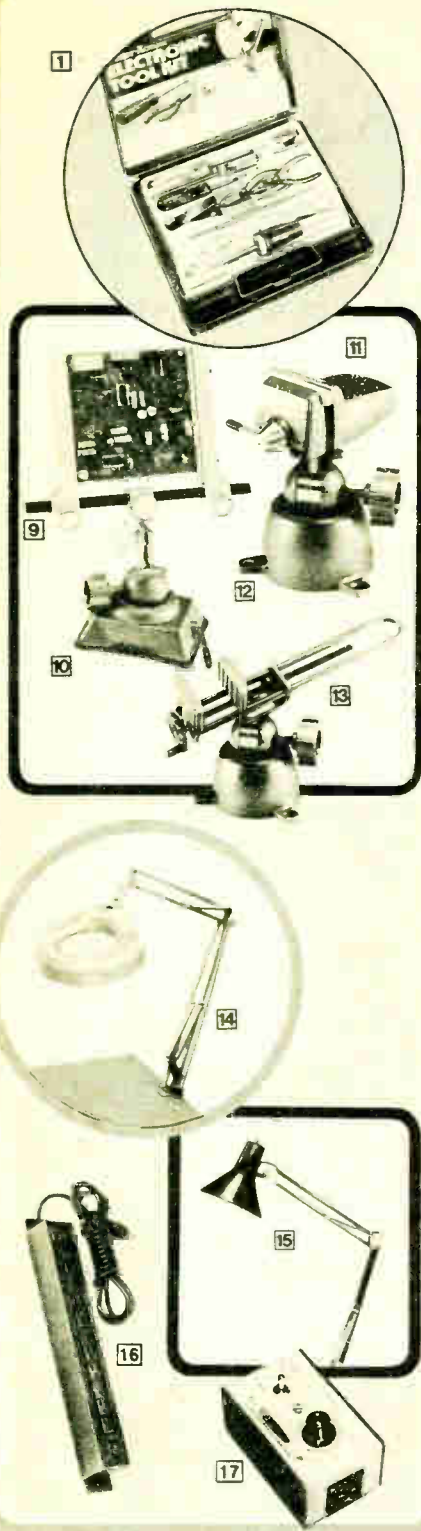
[1] Kitbuilders' Tool Set. Includes wire stripper; diagonal side cutter; small long-nose pliers; three screwdrivers (3/32″, 1/8″, 3/16″); Weller WP-25 soldering iron; nutdriver; nut starter; soldering aid; and solder.
GHP-1270, Shpg. wt. 3 lbs. 29.95

[2] Heat Controlled Solder Station. Weller WTCPN soldering station is transformer powered and features "closed loop" control of tip temperature. Has heat shield, indicator lamp, and sponge. With 700°F soldering iron tip.
GDP-1108, Shpg. wt. 5 lbs. 59.95

Set of Replacement Tips for above (all 700°F). Set includes: 1/16″ Screwdriver, 1/8″ Screwdriver, 3/16″ Screwdriver, 1/32″ Long Conical, 3/4″ Long Screwdriver.
GDP-1109, Shpg. wt. 1 lb. 11.95

[3] 3-Heat Soldering Iron Kit. Stand with metal cage keeps iron secure. 3 heat settings. Six-foot power cord. 120 VAC.
Kit GH-17A, Shpg. wt. 5 lbs. 34.95

[4] Heathkit Nut Driver Set. 3/16″, 1/4″, 5/16″, 3/8″, 11/32″, 7/16″ and 1/2″ sizes.
GDP-204, Shpg. wt. 2 lbs. 13.95

[5] Heath-approved Weller 25-Watt Pencil Soldering Iron. 1/8″ chisel tip develops 860° heat.
GDP-207, Shpg. wt. 1 lb. 12.95

[6] Solder/de-Solder Set. As above, with de-solder bulb. Weller 25-watt pencil iron develops 860°. Includes de-solder bulb.
GDP-1009, Shpg. wt. 1 lb. 13.95

[7] Soldering Iron for close work. Wall 25-watt pencil soldering iron for work on high-density boards. 3-wire cord. For 120 VAC.
GDP-1231, Shpg. wt. 1 lb. 7.95

[8] Heath Approved Soldering Iron for use on high-density circuit boards. 40 watts with standard tip.
GDP-1105, Shpg. wt. 1 lb. 7.95

[9] Circuit Board Holder. Holds most any shape or size circuit board. Spring loaded for quick change. Tilts 220 degrees.
GDP-1254, Shpg. wt. 2 lbs. 18.95

[10] Vacuum Base — Attaches securely to any smooth, non-porous surface. Powerful rubber suction pad holds without marring tabletop. Perfect for tabletop applications where permanent mounting is not practical. Overall height, 3³⁄₆″. Base dimensions, 5″ x 4¼″.
GDP-1252, Shpg. wt. 2 lbs. 17.95

[11] Vertical Jaw Vise Head — For most standard hobby applications. Nylon jaws open to 2¼ inches and provide a firm grip on the object to be worked on, without marring.
GDP-1253, Shpg. wt. 2 lbs. 13.95

[12] Standard Height Base — Designed for permanent installation. Three mounting lugs let you attach it securely to the work surface. Choose desired vise head from three styles listed.
GDP-1251, Shpg. wt. 2 lbs. 12.95

[13] Vertical Vise Head — Holds bulkier items — model parts, chassis, etc. Jaws open to 6½″. Neoprene pads are reversible and replaceable.
GDP-1255, Shpg. wt. 2 lbs. 13.95

[14] Illuminated Magnifier Kit. Fluorescent lighting and 5″ diameter 3 diopter lens take the strain out of close work at your bench. Clamps to horizontal surface. 360° movement, 45″ reach. Requires 22-watt T-9 Circline fluorescent tube (not included). Easy mechanical assembly only.
Kit GDP-200, Shpg. wt. 7 lbs. 49.95

[15] Extension Lamp Kit. Extension arm comes assembled. You attach socket, shade and cord. 34″ reach, 360° sweep; vented shade, and moveable base clamp. Less bulb.
Kit GDP-202, Shpg. wt. 4 lbs. 17.95

[16] Versatile Multi-Outlet Box Kit. Has 11 switched outlets, 1 unswitched outlet to power all your equipment. All are 3-hole outlets for equipment with ground plugs. Helps keep your shop or hobby bench neat and organized. Includes 12′ cord.
Kit HD-1274, Shpg. wt. 3 lbs. 16.95

[17] Motor Speed Control. Ideal for use with any universal motor with rating of 15 watts or less. Saves power, blades, bits, saws, etc. Allows you to use a large drill to cut through steel at slow speed without overheating the motor. (Not for use with Dremel tools)
Kit GD-973A, Shpg. wt. 2 lbs. 24.95

Custom-build an R/C system to meet your own special flying

Heathkit Pack-17™ R/C—uncompromised performance

All Heathkit radio control gear is the result of quality design and engineering by people who care about R/C. We were the first to use ceramic filters to help eliminate drift; the first to put 8 channels in a single, versatile unit; the first to give you the convenience of instant plug-in frequency change. Compare Heathkit R/C with top-of-the-line assembled models and you'll see why it's your smartest buy — whether you're into radio controlled airplanes...or R/C cars or boats. Heathkit R/C is easy and fun to build too — with a thorough and complete instruction manual that even shows you how to solder. Heathkit R/C gear — the winning way to fly!

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

1 **Exciting 5-Channel Dual Open-Gimbal Stick R/C Transmitter, now FCC approved.** You won't find the value, reliability and performance of this transmitter in any other unit in this price range! Here's dual-stick control of four R/C channels (one with ratchet) plus switch-activated aux. 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. Order your GDA-1919-1 in 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 GDA-1205-D and GDA-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. Includes two sticks.

Kit GD-1419, Shpg. wt. 1 lb. **39.95**

3 **8-Channel Dual Open-Gimbal R/C Transmitter.** Our top-of-the-line R/C line R/C transmitter now gives you Open-Gimbal stick convenience too! Has the same fine specifications as the GDA-1919-1 above, but provides dual-stick control of 4 channels and aux., plus landing gear switch and 2 additional channels. It's one of the most versatile R/C transmitters you'll find anywhere! Includes your choice of one plug-in frequency module. Order your 8-Channel Dual Open-Gimbal R/C Transmitter as part of a complete system from the next page.

Kit GDA-1205-OG. Shpg. wt. 5 lbs. **149.95**

4 **8-Channel Single-Stick Transmitter & 1 module, now FCC approved.** Stick control of 3 channels, throttle with trim and aux., plus landing gear switch & 2 additional channels.

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

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).

Kit GDA-1405-1, 3-ch. transmitter with 1 Module. 5 lbs. **89.95**
Kit GDA-1405-3, 4-ch. conversion. 1 lb. **14.95**

Advanced Radio Control. This book tells how to use R/C to make model planes, boats, etc., perform complicated maneuvers. 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. A must for the RCer's library. EDP-159 . . . .**6.95**

The easy-to-build Cessna 172 has 48″ wingspan and includes Fox .25 engine, fuel tank and line, machined aluminum mount, wheels, prop and hardware. All you need to add is fuel!

Your choice of transmitter

Sub-Miniature Servos

Miniature Servos

Receiver with Module

Transmitter Module

Cessna 172 Flight Pack

Convenient 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 and 72 MHz bands. When ordering specify frequency desired (see list below).
Transmit Module, 1 lb. ...... 21.95   Receive Module, 1 lb. 14.95

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, 72.24, 72.16, 72.32, 72.40, 72.96, 75.640 MHz. (When ordering, specify transmit or receive.)

SPECIAL 5-MODULE OFFER — SAVE $30.00!
5 Transmit and 5 Receive Modules of your choice. 2 lbs. .... Only $154.50

High-quality Heathkit Servos, Receivers and Batteries

SERVO COMPARISON CHART	Min. 1205-4	Sub-Min. 1205-5	Ni-Torque 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	4 lb.	4 lb.	6 lb.
Travel Time	0.5 sec	0.5 sec	0.4 sec
Rotary Travel	90°	90°	90° or 180°
Dimensions (HxWxL″)	1⅝x⅞x2⁵⁄₃₂″	1¹¹⁄₁₆x¾x2⁵⁄₃₂″	1⅝x⅞x2⁵⁄₃₂″
Net Weight	1.75 oz.	1.25 oz	1.75 oz.

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

Kit GDA-1205-5, Sub Min. Servo. Shpg. wt. 1 lb. 29.95
Kit GDA-1205-4, Miniature Servo. Shpg. wt. 1 lb. 29.95
Kit GDA-1205-8, Hi-Torque Servo. Shpg. wt. 1 lb. 34.95
Kit GDA-1205-2, Receiver with 1 Frequency Module. 1 lb. 64.95
Kit GDA-1205-3, Receiver Battery Pack. 1 lb. 13.95
Trainer Link Accessory. Lets you hook up two 1205 transmitters for flight instruction. GDA-1205-6, Shpg. wt. 1 lb. 11.95

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. Has meter, connector for all Heathkit battery packs, clips, case. Kit GD-1188, Shpg. wt. 1 lb. 17.95

SAVE $98.70! 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 $328.65. Save nearly $100 when you get the complete system!
GDS-1919, Shpg. wt. 9 lbs. 229.95

SAVE $113.70 on the Cessna 172 and a complete R/C system

Same as system GDS-1919 (above) plus the Cessna Skyhawk Flight Pack.
RPS-1919, Shpg. wt. 30 lbs. 289.90

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

The following systems include transmitter and one frequency module, receiver and one frequency module, receiver battery pack and batteries, and four servos (choose miniature, subminiature or both) — except GDS-1405-1 and GDS-1405-2 include 2 servos.

8-Channel Dual Open-Gimbal Stick System. If purchased separately up to $348.95. GDS-1205-OG, Shpg. wt. 11 lbs. 274.95
8-Channel Single Stick. If purchased separately, up to $373.65.
GDS-1205-S, Shpg. wt. 11 lbs. 289.95
3-Channel System. (Includes two servos). If purchased separately, $228.65.
GDS-1405-1, with miniature servos, wt. 8 lbs. 189.95
GDS-1405-2, with subminiature servos, wt. 8 lbs. 189.95
RP-1172, Cessna 172 Skyhawk Flight Pack only, Shpg. wt. 8 lbs. ...74.95
SAVE $88.70! Same as system GDS-1205-OG plus Cessna 172 Flight Pack.
RPS-1205-OG, Shpg. wt. 32 lbs. 334.90
SAVE $98.70! Same as system GDS-1205-S plus Cessna 172 Flight Pack.
RPS-1205-S, Shpg. wt. 32 lbs. 349.90
SAVE $53.80! Same as system GDS-1405-1 plus Cessna 172 Flight Pack.
RPS-1405-2, Shpg. wt. 29 lbs. 249.90
SAVE $60.90! Same as system GDS-1405-1 plus Cessna 172 Flight Pack and additional servo for complete 3-channel control.
RPS-1405-3, Shpg. wt. 29 lbs. 272.85

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

49

Heathkit marine equipment for boating fun and safety

Deluxe Dual-Range Depth Sounder shows you water depth and helps you find fish

An important boating accessory for improved fishing and navigation! Shows depth, type of bottom, schools and individual fish, submerged objects. A high-pitched "beep" alerts you to shoals or objects projecting above any pre-selected depth from 5 to 240 ft. Has switch-selected 0-60 and 0-240 ft. ranges. Fixed noise rejection, polarity protection, super-bright neon indicator. Gimbal mount, quick-disconnect power and transducer leads. Easy kit assembly. Shpg. wt. 8 lbs. 6½" H x 5¾" W x 7¼" D.

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

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

Heathkit Single-Range Depth Sounder. As above, single 0-240 ft. range, no alarm. Shpg. wt. 8 lbs.

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

Kit MI-1030-2, sounder with transom transducer and 25' coax for easy installation **74.95**

Transducers
Transom mount
Thru-the-hull

MI-1030 and MI-1031 SPECIFICATIONS: Frequency: approx. 200 kHz. Accuracy: Within 2% of actual depth. Transducer: Barium titanate ceramic element encased in waterproof housing. Power Requirement: 0-60' range, 225 mA @ 11-15 VDC (MI-1031 only), 0-240' range, 125 mA 11-15 VDC with one return pulse. Dimensions: 6½" H x 5¾" W x 7¼" D.

Heathkit portable Fish Spotter™ Sounder

Has adjustable audible alarm you set to sound off at any depth to 240 ft. Fish swimming between surface and preset depth will trigger alarm. Includes two switch-selected ranges (0-60' and 0-240') for sharper definition; noise rejection circuit; bright neon-flasher for precise depth reading. Rugged aluminum cabinet. Portable suction-cup transducer bracket. Powered by two 6-volt lantern batteries (not included). 7" H x 6" W x 11" D.

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

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

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

Scanning Transducer Bracket: (Not shown.) Designed for use with MI-2901 and MI-2900 Fish Spotter™ sounders. "C" clamp mounting. For 1⅜" cylindrical transducer. Kit MIA-2900-1, Shpg. wt. 4 lbs. ...**24.95**

Navigation is safer, easier with your Heathkit Digital Radio Direction Finder

Keeps you informed on 190-410 kHz longwave and standard AM. The digital displays are easy to read even in direct sunlight. And for maximum safety and convenience, they dim automatically at night. Finding your bearings is easy, too, thanks to the big azimuth ring marked in 2° increments and a generous 7-inch rod antenna. A lighted meter provides accurate null indications and a control adjusts meter sensitivity for weak or strong stations.

The telescoping sense antenna eliminates 180° ambiguity. Overall, bearing accuracy is an impressive ±3°. The MR-1010 is designed to be used with your boat's 12 VDC electrical system — or it becomes completely portable with its own built-in power source consisting of 6 "D" cell flashlight batteries (not included). To prolong battery life, the digital readout display automatically shuts off after approximately 20 seconds — but can be recalled instantly. 7¼" H x 11½" W x 12" D.

Kit MR-1010, Shpg. wt. 14 lbs. **239.95**

Thermo Spotter® Fishing Thermometer

Shows you the water temperature at any depth up to 100-ft. Completely self-contained with submersible sensing element on a 100-ft. cable. Kit includes operations manual with fish temperature preference charts. Uses 1.5-volt penlight battery (not included).

Kit MI-104, 3 lbs. ...**39.95**

Heathkit marine gear helps you find and catch the big ones
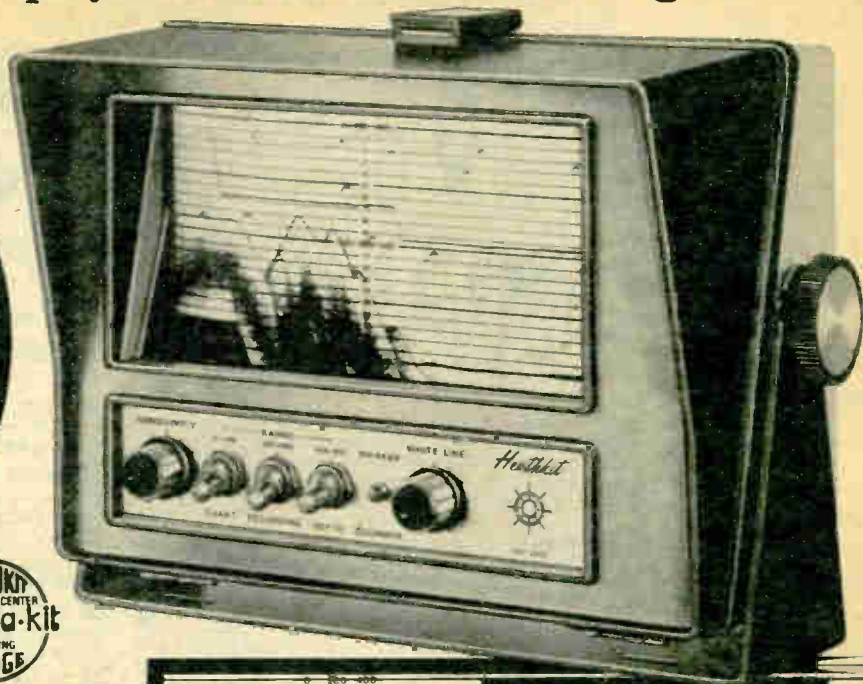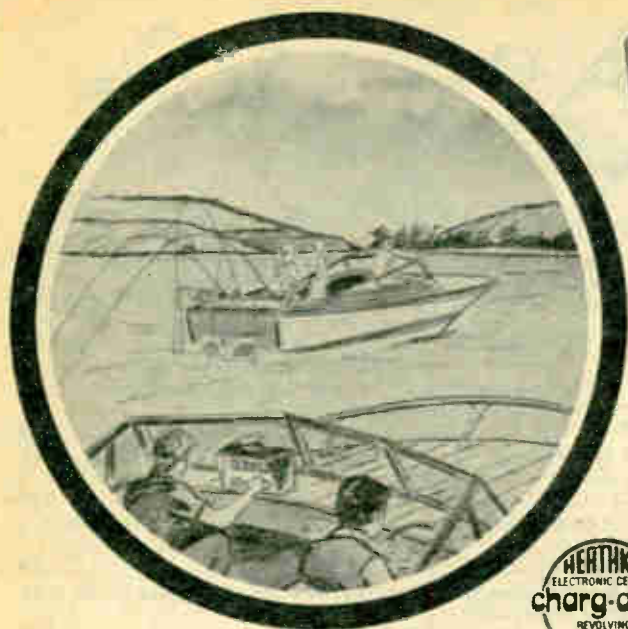
Heathkit Seeker™ shows you where the fish are

The Seeker Chart Recording Depth Sounder helps you find fish, and provides a permanent record so you can find your favorite spots again.

An on-off sensitivity control adjusts to indicate differences in depth. The extra-wide beam transducer covers a larger area of water than most conventional units, so you get a better and wider "picture" of what's below you. Its three ranges (5' to 200', 200-400', and 400-600') make it useful for any area.

Straight line recording system gives you easier, more accurate chart reading and interpretation. A white line control lets you adjust the bottom indication to a fine line so objects or fish close to the bottom can be distinguished easily. A roll of paper lasts approx. 13 hours for continuous charting.

Two lamps light the chart for easy operation at night. The weather-resistant case with gasket seals helps keep recorder water-tight. Operates from boat's 12-volt battery system. 8" H x 11" W x 7" D. With one roll chart paper.

Fish near surface
"White Line" Depth Indication
Fish at 40 ft.
Fish near bottom
Normal Depth Indication

You'll find the fish faster with Heath's best unit, the Seeker Chart Recording Depth Sounder.

Kit MI-2910-1, recorder with through-the-hull transducer and 30' cable. Shpg. wt. 17 lbs. . . 299.95
Kit MI-2910-2, recorder with transom mount transducer and 30' cable. Shpg. wt. 17 lbs. . . 299.95

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

SPECIAL OFFER — SAVE $9.75!
12 Rolls Chart Paper. If pur. sep., $59.70.
MIS-2910-1, Shpg. wt. 12 lbs. 49.95

For safer boating

Automatic Foghorn/Hailer. Features a husky 55-watt amplifier, weather-resistant deck horn, 20 ft. speaker cable, gimbal mount. 12 VDC pos. or neg. ground.
Kit MD-19A, Shpg. wt. 15 lbs. 139.95
Kit MDA-19-1, Optional remote speaker for intercom use. Shpg. wt. 2 lbs. 14.95
Economy Power Inverter (not shown). Operates small appliances from 6 or 12-volt input. Up to 175 watts power rating. Not for high starting current or sine wave AC equipment. 25-amp fuse.
Kit MP-10, Shpg. wt. 8 lbs. 54.95

Heathkit Digital Depth Sounder with "Shallow-Water" Indicator tells you water depth to 199 feet at a glance

Accurate depth readings at a glance. Dual-range digital display automatically reads depth in 0.1 foot increments from 2.5 to 19.9 feet and in 1 foot increments from 20 to 199 feet. A red light signals clearance of 10 feet or less. Single knob controls power on/off and brightness control. Rugged Cycolac® case; gimbal mounting bracket; 15 feet cable for through-hull installation, 25 feet for transom mount.
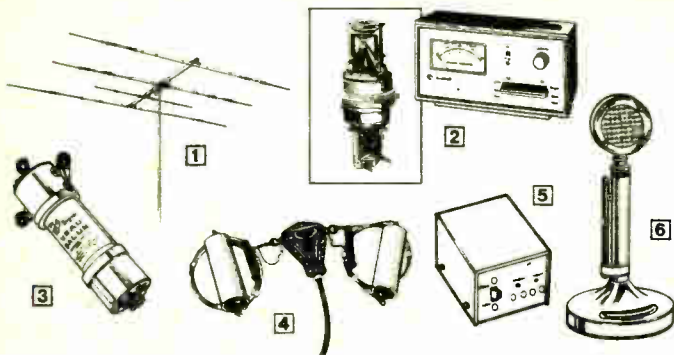
With through-hull transducer,
Kit MI-101-1, Shpg. wt. 7 lbs. 159.95
With transom transducer,
Kit MI-101-2, Shpg. wt. 6 lbs. 159.95

MI-101 SPECIFICATIONS: Accuracy: ±2%, ±1 digit. Current drain: 300-500 mA. Power requirement: 10-17 VDC @ 500 mA. Dimensions: 2¼" H x 6⅜" W x 8½" D (less gimbal hardware).

Outstanding Amateur Radio accessories

[1] Cushcraft Tri-Band Beam Antenna. Offers the performance of a single-band Yagi on 10, 15 and 20 meters. Broad bandwidth and four active elements for super performance and outstanding front-to-back ratio on all three bands. Has low-loss, high-performance 1:1 baluns which take PL-259 connectors. Factory adjusted for 50-ohm coax feedline. Boom length, 18-ft. Longest element 32'8". For masts to 2½" O.D.
Model HDP-1471 ....239.95

[2] Alliance HD73 Heavy-Duty Rotator with Dual Speed Control. For antennas with up to 10.7 sq. ft. of wind load area. Has positive no-slip drive, automatic brake action. For masts 1⅜" to 2½" O.D. For 117 VAC, 60 Hz. Require 6-cond. cable (use 8-cond. cable, page 3).
Model HDP-1295 ....119.95

[3] "W2AU" Balun. This world-famous balun helps you reduce TVI and improve F/B ratio. 2 kW PEP tested. Fully enclosed body with silver-plated SO-239 connector and hang-up hook, built-in lightning arrester. 600= pull — no insulator needed. Weatherproof. With complete instructions including an antenna length table.
Model HDP-3615 ....14.95

[4] 5-Band Trap Dipole Antenna. Pre-assembled antenna cover 80 thru 10 meters. Only 2 trap adjustments and terminations. Ready to use. Includes antenna wire, traps, 50-ft. RG-8/U coaxial cable and PL-250 connector, two end insulators, and dipole center connector. Traps weigh approx. 9 oz. each. Approx. length 110 ft. 52 ohms impedance.
Model HDP-3500 ....64.95
Model 370-12, same as above, except assembly of wire terminations required 54.95

[5] 2-Meter Antenna Matcher. This mobile antenna matcher lets you use your auto's AM/FM Antenna for your mobile 2-meter rig. Eliminates theft due to "give-away" second antennas. Tunes 144 to 148 MHz, has front panel tuning and loading adjustments and LED output indicator. Input impedance 50 ohms. 50 watt power capacity. Has universal mounting bracket.
Model AT-200 ....29.95

[6] Base Station Microphone. This chrome-plated beauty features grip-to-talk operation and a side lock clamp for "no-hands" transmission for the ultimate in easy operation. Excellent response and high gain for clear modulation. Universal hookup capability.
Model GD-104 ....39.95

[7] PL-259 Double Male Adaptor. Two PL-259 type plugs "back-to-back" for easy connection of SWR meters, antenna tuners, switches, many other applications.
Model S-622 ....3.38
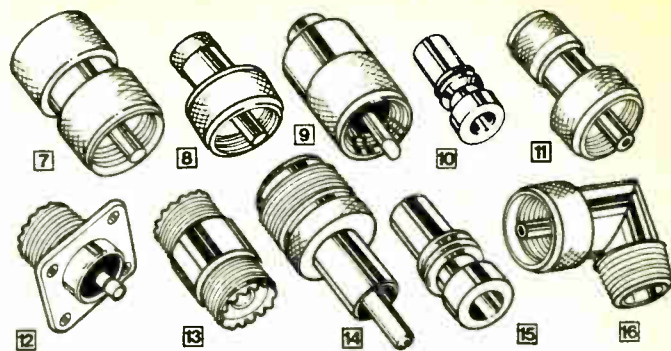
[8] RG-58/U Male Connector. New low-loss solderless connector for RG-58/U coax cable. Possesses better RF characteristics than the standard PL-259.
Model S-630 ....2.28

[9] PL-259 Male Connector. The standard antenna connector for RG-8/U (and RG-58/U using UG-175/U adaptor) coax cable.
Model S-602 ....2.20

[10] UG-175/U Adaptor. For use with PL-259 Male Connectors when using RG-58/U coax cable.
Model S-603 70

[11] RG-8/U Male Connector. New low-loss one piece connector for RG-8/U coax cable. Possesses better RF characteristics than the standard PL-259.
Model S-629 ....2.28

[12] SO-239 Type Receptacle. Standard antenna connector replacement on transceivers. Also useful for project building.
Model S-605 ....1.14

[13] PL-258 Double Female Adaptor. For coupling coax cable. Both ends accept standard PL-259 type antenna plug.
Model S-604 ....1.30

[14] PL-259/Motorola Plug Adaptor. Use your standard antenna system with most walkie-talkies. One end accepts PL-259 connector — the other is a standard Motorola plug.
Model S-606 ....2.12

[15] UG-176/U Adaptor. For use with PL-259 male connectors when using RG-59/U coax for co-phase harnesses, Ham Rigs and other applications. Commonly used for "Scanner" cables when RG-59/U is used.
Model S-609 70

[16] R.F. "L" Adaptor. Type M-359. SO-239 connector one end, PL-259 plug on the other. Ideal for use in tight places or where space is at a minimum; such as behind mobile units or with awkwardly located connectors on SWR meters.
Model S-621 ....3.06

Maximum coverage superflex RG-8/U coax by Columbia Electronic Cable (not shown). 11-gauge center foam polyethylene dielectric. 92% copper braided shielded flexlife jacket with PL-259 connectors both ends.
Model HDP-3620, 100-ft. with conn. 24.95
Model HDP-3621, 50-ft. with conn. 14.95
Model HDP-3622, 3-ft. with conn. 4.95

FREE Frequency Spectrum Chart ($4.95 value) with every purchase of $10.00 or more of amateur radio products or accessories!

Your Heathkit Electronic Center carries these amateur radio books and magazines
(Selection varies from store to store. Some stores carry additional volumes too!)

Books
Amateur Radio License Study Guides — make getting any radio license easy. NOVICE 5.95
GENERAL 7.95
ADVANCED 5.95
EXTRA 5.95
Radio Handbook. Comprehensive radio theory and practice for hams. 19.50
Amateur Tests and Measurements 5.50
US Callbook. Complete listing of Amateurs in all US call areas and territories. More. EDP-126 ....14.95
DX Callbook. Complete listing of foreign Amateurs, addresses, postal rate charts, call zone maps.
EOP-127 ....13.95
73 Dipole Antennas 4.95

73 Vertical and Beam Antennas 5.50
The Radio Amateur's Handbook (1979 Edition) 9.75
ARRL Antenna Book 5.00
Solid State Basics 5.00
Understanding Amateur Radio 5.00
The Radio Amateur's V.H.F. Manual 4.00
FM and Repeaters 4.00
ARRL Electronics Data Book 4.00
Single Sideband 4.00
ARRL Ham Radio Operating Guide 4.00
Specialized Communications Techniques For The Radio Amateur 4.00
Hints and Kinks 4.00
A Course in Radio Fundamentals 4.00

Radio Amateur's License Manual 3.00
Getting to Know Oscar 3.00
Radio Frequency Interference 3.00
Solid State Design 7.00
Tune in The World With Ham Radio. Packages sold as a unit consisting of Workbook and Tape Cassette 7.00
ARRL Map 3.50
Log Book 1.75

Magazines
QST
"73"
Ham Radio
Ham Radio Horizons

Unique assembled gifts—selected & recommended by your Heathkit Electronic Center

The Sound Conditioner simulates ocean surf, rainfall and waterfalls to block out unwanted, annoying sounds

$99⁹⁵

- Solid-state, electronic "white noise" generator
- Separate rate, range, tone and volume controls
- Can mask both low and high frequency noises

Have your efforts to concentrate or to go to sleep ever been thwarted by annoying outside noises? Then the Marsona 1200 Sound Conditioner is for you. A solid-state, electronic "white noise" generator with filter networks and oscillators, it is designed to modify basic "white noise" to simulate sounds found in nature: ocean surf, rain and waterfalls. "White noise" has long been recognized for its ability to help mask out or greatly reduce the annoyance of unwanted, uncontrollable noise that normally interferes with your ability to sleep well, relax, meditate, or to concentrate on work and studies.

The Marsona 1200 features four functions: Surf I, Surf II, Rain and Waterfall. Surf I produces a single-breaking, ocean wave pattern that will repeat the same pattern over and over again unless modified by either the Surf Rate or Surf Range controls. Surf II produces a random, ocean wave pattern. The effect is that of being on the beach and hearing waves all intermingled for a realistic effect. Surf II may also be modified. "Rain" is a steady, heavy downpouring effect that helps mask intruding noises. Adjusting the Tone control produces a nearby or far off sound effect. "Waterfall" simulates the "roar of Niagara."

The Surf Rate control gives a wide variety of surf speeds. The Surf Range control affects the difference between the high sound level and the low sound level of the surf action. The Tone control adds "a little splash" to the rain, "a little spray" to the breaking surf. The Marsona 1200 also features an on-off-volume control. Switch-selected 120/240 VAC, 50/60 Hz. 7" H x 5½" W x 8¼" D.

Marsona 1200 Sound Conditioner 99.95

NEW

Great Gift Idea!

Like transporting yourself to a secluded island!

Fascinating Clock and handy Light make great additions to your holiday gift list!
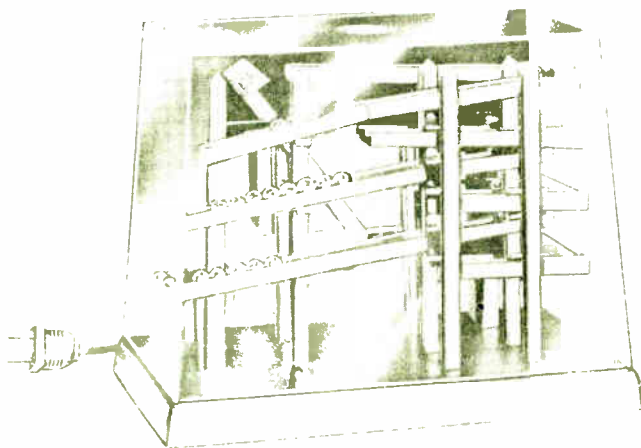
See-Thru Ball Clock is an absorbing study in time and motion

$29⁹⁵ Clock-watching was never so much fun as it will be when you give this See-Thru Ball Clock to someone special

You and your family will love watching the See-Thru Ball Clock keep time. Thirty-two nickel plated steel balls roll down a series of snap-together tracks and stop over numbers that indicate the correct time. An electric motor drives a swinging pendulum that delivers a ball every minute with no resetting. Precision snap-together parts and simple illustrated instructions allow you to assemble this unique timepiece in as little as one hour. A stylish, molded plastic dustcover is included. Measures 8" H x 9⅝" W x 5½" D. 120 VAC.

Model AH-675 Ball Clock Kit 29.95

Q-Beam® Spot/Flood can illuminate objects as far as a mile away, and it even works under water!

NEW

$29⁹⁵

- Combines 200,000 candlepower spot and 100,000 candlepower flood
- Uses any 12VDC power source
- Waterproof housing gives the Q-Beam underwater capability

Perfect for your camping or boating needs, the Q-Beam Spot/Flood is a powerful 200,000 candlepower spotlight and a 100,000 candlepower floodlight in a single unit. It is capable of illuminating objects more than one mile away. The ABS Cycolac® housing is great for boating use — if your Q-Beam Spot/Flood should accidentally fall into the water, it will float until you can retrieve it. In fact, with an exclusive sealed beam, it will even continue to operate under water! The Q-Beam Spot/Flood is designed for utmost convenience. It features a comfortable pistol grip. And a handy built-in, multi-purpose hanger allows you to position it for "hands-free" illumination. The recessed switch guard prevents accidental lighting or extinguishing of the light. And the extended safety lens guard prevents damage to the Q-Beam's lens. The Yellow Sportlite case assures easy visibility of your Q-Beam so it can be located quickly in emergencies. The Q-Beam plugs into any standard cigarette lighter, and comes complete with a 15-foot straight cord, 2½-foot pigtail adapter, lighter plug and a removable, "non-spooking" red filter ideal for use with wildlife.

Model 800-1302-0 Spot/Flood 29.95

Fail-safe security alarm system protects home, business

NEW

[1] Microwave Transceiver
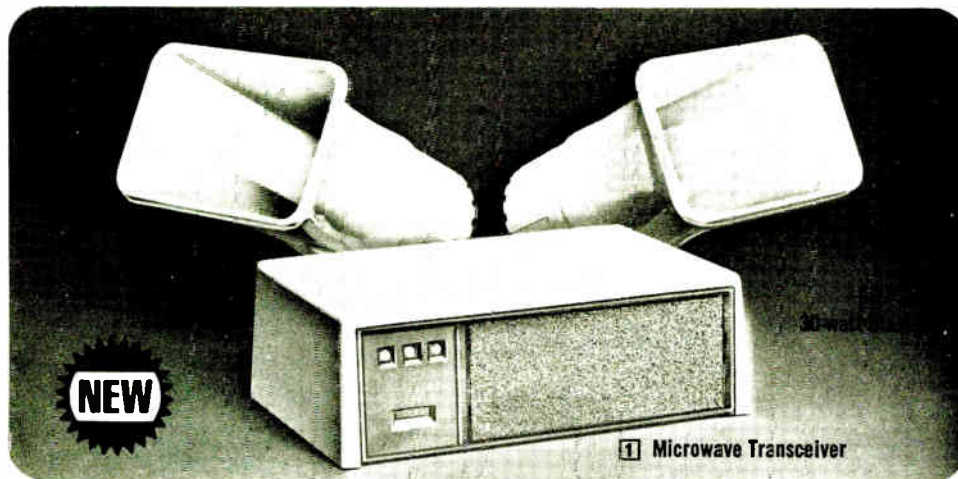
Immune to false alarms, operates on its own power during brownouts or blackouts

$199⁹⁵

- Piercing alarm drives thief from your home
- Outside hookup (also available) frightens intruder even more, alerts neighbors to call for assistance
- Provides security and peace of mind 24 hours a day — when home or during prolonged absences from home
- Added feature also provides input to add door and window contacts and, for greater margin of safety, even smoke detectors
- Protecting family and property from intruders makes good sense. A professional quality burglar alarm you can afford now!

The Midex System 55 is a professional-quality security system for your home. You can install this burglar alarm system quickly and privately, and at a price you can afford. The Midex System 55 is engineered to detect the slightest movement of an intruder, then activate one or more loud speakers/sirens installed on your premises. When an intruder tip-toes into the microwave transceiver's signal, an area alarm signal is triggered. A range control allows adjustment of the size of the pattern to 20 feet by 50 feet. And the system is immune to power failures — operates then on its own power. For maximum security, use two Blasthorns (order separately below) — one inside the home to frighten and drive the intruder back outside, the second one mounted outside to sound the alert to your neighbors to summon the police. The all-weather Blasthorn is especially designed to provide maximum alarms up to 120 dB — ear jarring —

on the threshold of pain, more than ample to drive off a thief.

The Midex System 55 is the type of professional-quality security system you need in your home to protect your most valued possessions whenever you are away. No other security system can offer you so many features and so much reliability at such an affordable price. Come in to your nearest Heathkit Electronic Center to see the Midex System 55 today — don't leave your home and possessions unprotected from unlawful intruders for another day. Transmitter/receiver included in system. Order optional blasthorn below.

[1] **System 55, Alarm System** **$199.95**
[2] **SP30, Extra-loud, 30-watt Blasthorn Speaker** **$44.95**
[3] **SP5, Loud, 5-watt, Blasthorn Speaker (not shown)** **$39.95**

Theft Alert system warns you (but not the thief) so you can catch him in the act!

Range is more than one-half mile
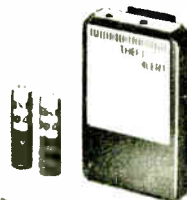
Pocket Pager goes with you everywhere
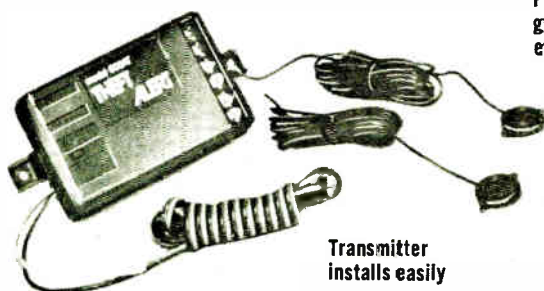
Transmitter installs easily

$99⁹⁵

- Thief cannot hear alarm — while you call police
- Transmitter's .5-watt signal penetrates buildings
- Installs easily in your car, camper, truck, or boat
- Protects your vehicle anywhere, 24 hours a day

The auto thief is the last to know that he has been detected tampering with your auto. Most thieves are conditioned to expect a loud signal if a car has a warning system installed, which frightens them off — fast. But the Page Alert™ 500 pocket pager enables police to capture a thief in the act of forced entry into your car, or in the immediate area. With greatly improved chances of recovering valuables stolen from the car. When the thief tampers with your car, the Page Alert 500 pocket pager alerts you, and you alone. A .5-watt transmitter concealed in your car sends a silent signal to the pocket pager you carry with you. When your pocket pager begins beeping, you can telephone the police. The thief, hearing no signal, has no reason to believe he has been detected. No one is more surprised when the police swoop down on him, caught completely off guard. This silent guardian has foiled untold numbers of forced auto entries. And it greatly enhances the chances of recovering valuables. Finding no reason to hurry away in the absence of a loud warning alarm, the thief is caught in the act or somewhere nearby.

The Page Alert 500 transmitter has an effective range of more than one-half mile. Within its range, the transmitter beams a signal powerful enough to penetrate buildings and other obstacles. This means you are within range of the transmitter virtually at all times — at work, home, social gatherings, anywhere, 24 hours a day. You can install the warning system in any car, truck, camper, or boat. The transmitter installs easily in your vehicle, ready to send its signal to the Pocket Pager you carry with you. Protect your car stereo; protect your two-way communications gear; protect your vehicle! Get the Theft Alert now, and get real peace of mind in knowing that your valuable vehicle and possessions are protected against theft. System includes transmitter, Pocket Pager receiver, self-contained batteries and complete instructions.

Model 500 Page Alert System **99.95**

Tilt, regular speaker stands give you pure, beautiful sound

Fantastic savings on these popular gift items!

The Microflame™ Miniature Torch makes a great hobbyist/craftsman gift

⅓ off!

WAS $29⁹⁵

NOW ONLY **$19⁷⁷**

Open up a whole new world of fun-filled enjoyment and creativity in metalsmithing

With the Microflame Miniature Gas Torch you can turn otherwise worthless scraps of metal such as tin cans and coat hangers into striking works of art. Temperatures of 5000 F give you capability for small soldering or brazing jobs around your home, too. Kit contains: Microflame Torch, 6 Micronox™ cylinders, 3 Butane cylinders, spark lighter, 12 six-inch rods and flux, fireproof work surface and complete instructions.

Model MIC-4000 ....Was $29.95, Now 19.77
MIC-4190, "Metalsmithing-Something New" book Was $1.95, Now 1.28
MIC-1100, Jungle Elephant — metalsmith kit ...Was $2.29, Now 1.51
MIC-4130, Tree — metalsmith kit ....Was $3.95, Now 2.60
MIC-4210, Mushrooms — metalsmith kit ....Was $2.95, Now 1.95
MIC-1110, Flying Ducks — metalsmith kit ......Was $2.29, Now 1.51
MIC-4110, Flower Arrangement — metalsmith kit Was $5.49, Now 3.62

Get push-button weather information

cut $4⁰⁰

Listen to official U.S. Weather Service reports on this portable VHF weather monitor

WAS $16⁹⁵

NOW ONLY

$12⁹⁵

This sensitive FM receiver picks up official reports and emergency weather broadcasts direct from the United States Weather Service on 162.40, 162.475 or 162.55 MHz. Just press the orange button for instant weather news. A great way to keep instantly informed of the changing weather situation in your area.

A fold-down telescoping antenna brings in signals from up to 40 miles away. Attractively styled in a two-tone ivory and brown cabinet with chrome accented walnut-grain faceplate. Powered by a 9 volt battery (not included) so you can take your weather monitor with you everywhere.
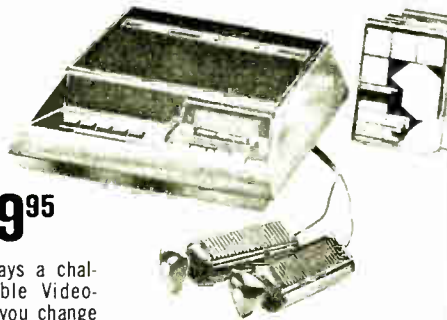
Model MID-901 ....12.95

Not all items available in all stores.

Channel F Video Game and Cartridges

SAVE $100⁰⁰

WAS $169⁹⁵

NOW ONLY **$69⁹⁵**

This TV game is always a challenge. Interchangeable Videocart™ cartridges let you change your game as your skills and interest grow. Your TV set becomes a new source of entertainment. Game unit is fully assembled and tested and includes control unit and two player controls. FCC Type Approved.
Channel F Video Game ....Was $169.95, Now Only 69.95

1¢ SALE! Pay $9.95 for first cartridge; get a second for one cent more! **$9⁹⁵**

GDA-1240-1, Tic-Tac-Toe, Shooting Gallery, Doodle, Quadra-Doodle
GDA-1240-2, Desert Fox Tank Battle, Shooting Gallery
GDA-1240-3, Blackjack and Double-Blackjack
GDA-1240-4, Spitfire — air dogfight
GDA-1240-5, Spacewar, battling spaceships
GDA-1240-6, Math Quiz (Add and Subtract)
GDA-1240-7, Math Quiz (Mult. and Div.)
GDA-1240-8, Magic numbers logic games
GDA-1240-9, Dragstrip
GDA-1240-10, Maze Games
GDA-1240-11, Backgammon
GDA-1240-12, Baseball
Not all cartridges available at all stores.

Big Savings on elegant Tiffany Style Lamp Kits for your home

25% off! $67⁴⁶

Deluxe "Pyramid" Tulip Lamp. You'll enjoy this lovely Tiffany replica every time you turn it on, and your friends will marvel that you handcrafted it yourself. But you don't have to tell them it was easy to build with its pre-cut authentic stained glass and pre-channeled lead strips. All you need is a soldering iron. Includes socket, chain, wire, solder and all necessary hardware.
Model 2503, Deluxe Pyramid Tulip Lamp Kit ..Was $89.95, Now 67.46

Deluxe "Umbrella" Tulip Lamp. This authentic reproduction from the Tiffany era is one of the most breathtaking lamps you'll ever see. A classical shape that lends itself to almost any interior theme. The windblown tulip pattern is pleasantly reminiscent of the breezy outdoors. A big 20 inches in diameter. The kit includes socket, decorative chain, wire, solder and all necessary hardware.
Model 2502, Umbrella Tulip Lamp Kit 67.46

See these values at your Heathkit Electronic Center!

Explore the galaxy with Space Labs from MiniLabs

NEW

Make your own space movies with Star Flicks

Now young movie makers can make their own space flicks, featuring animated aliens, spaceships, UFOs, space battles and a host of other special effects. With movie strips, backgrounds and guides.

Star Flicks 5.95

Make space movies!

Mind Force ESP helps you explore your mind

Explore extra-sensory perception and discover the full range of your own "mind force". With ESP pyramid, prediction pendulum, biorhythm calculator, ESP symbol cards and prediction board.

Mind Force ESP 5.95

Look into your mind

Wage your own star wars with Astro War

Fight your own galactic war with this electronic space battle game. Battles are reprogrammable — no two battles are ever the same. With 8 different battle charts based on space science and science fiction themes.

Astro War 5.95

Battle throughout the galaxy!

Eliminate messy wiring with Multi-Outlet Boxes

Plug in the soldering iron; plug in the lamp; plug in the...oops! Run out of outlets? Not any more! Our versatile Multi-Outlet Boxes bring plenty of 3-hole grounded outlets within your reach, without a lot of messy wiring. Helps keep your shop or hobby bench neat and organized. Whether you need six or 12 outlets, your Heathkit Electronic Center has the Multi-Outlet Box you need!

①	HD-1274, 11 switched outlets, 1 unswitched	16.95
②	JB-60G, 6 unswitched outlets	12.95

Make a beautiful rug or wall hanging with one of our Latch Hook kits!

NEW

$4⁹⁵ each

- Choose from six pretty designs
- Easy-to-use, whether you're new or experienced
- 100% Orlon® acrylic rug yarn

Get in on the growing latch hook hobby! Our new line of M/H Latch Hook Kits are easy to use — even if you've never latch hooked before! A free latch hook is supplied with each kit so you can begin right away. Each of our six beautiful kits (listed below) finishes to a 12" x 12" rug or wall hanging. They include a 100% cotton canvas design, 100% Orlon acrylic pre-cut rug yarns, full instructions and ideas for use. Come in to your Heathkit Electronic Center today — and start latch hooking right away!

Flower	4.95
Panda	4.95
Pussy Cat	4.95
Lion	4.95
Raccoon	4.95
Elephant	4.95

The next best thing to Mother Nature — Kelly's 4" wire tree sculpture kits!

NEW

Custom-finish to suit your own preference

$3⁰⁰ each

Easy-to-assemble — all you need are two pairs of pliers and a can of spray paint

The beauty of nature is hard to beat, but these beautiful tree sculpture kits come very close. Each finished tree is unique — because the kits have been designed to allow you a degree of artistic freedom in finishing the tree. Each wire tree sculpture kit is supplied with wire, bark chips, a package of glue and a complete set of illustrated instructions. All you need to finish each kit are two pairs of pliers and a can of spray paint! Ages 12 and over.

Windblown	3.00
Weeping Willow	3.00
Clump Birch	3.00
Pine	3.00
Maple w/Swing	3.00
Oak	3.00

Heathkit Electronic Centers — the one-stop source for all your electronic chemical needs

Heathkit Electronic Centers carry a complete line of chemicals for electronic uses, including tuner cleaners, freeze spray, tape recorder head cleaners and many, many others. Each Center stocks a unique assortment of supplies for experimenters and hobbyists alike.

53

Fine tools make kitbuilding even easier

[4] "Third Hand" Tweezer Tool

[7] Fine-tip Soldering Iron

[8] Holder for above iron
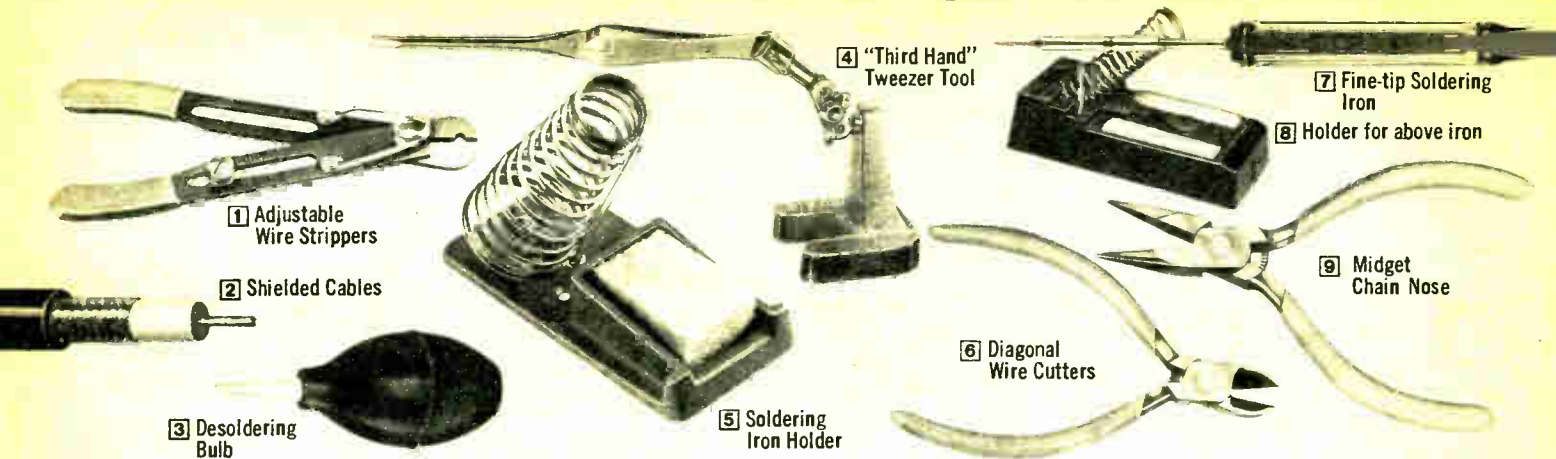
[1] Adjustable Wire Strippers

[2] Shielded Cables

[9] Midget Chain Nose

[3] Desoldering Bulb

[6] Diagonal Wire Cutters

[5] Soldering Iron Holder

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[1] Adjustable Wire Strippers — Honed cutting edges cut and strip stranded or solid insulated wire. Positive adjustment can be preset for any wire size from #10 to #20 gauge. Overall length 5¼".
Model 3195 .... **2.49**

[2] Shielded Cables — Shielded transmission cable for all amateur radio, citizens band and television needs. From Columbia Cable.

COL-198 RG 8/U Superflex .... 29¢ per ft.
COL-188 RG 58 A/U Superflex .... 09¢ per ft.
COL-755 RG 59 Superflex .... 07¢ per ft.
COL-508 5 Wire Round Rotor .... 11¢ per ft.

[3] Desoldering Bulb — Place tip near melted solder, squeeze and release bulb. Zip — excess solder is removed. **Model ACP-303** **3.50**

Replacement Soldering Iron Tips (not shown) For your Heathkit/Weller Pencil-type iron (shown on page 83). Screwdriver tip design.

Model ST-1 ¼" Wide 2.50
Model ST-2 ³⁄₃₂" Wide 2.50
Model ST-3 ⅛" Wide 2.50
Model ST-4 ³⁄₁₆" Wide 2.50

[4] "Third-Hand" Tweezer. Self-locking tweezer mounted in double ball joints connected to heavy base. Lets you hold work at any angle for soldering, gluing, positioning. A great kitbuilder's helper!
Model H200 .... **5.95**

[5] Soldering Iron Holder — By Weller. Designed for the Heathkit/Weller pencil-type irons on page 83.

Heavy base prevents tipping. Includes built-in sponge tray and sponge. **Model PH-60** **6.95**

[6] Diagonal Wire Cutters. Slim roundnose design. Will cut #20 gauge and smaller soft copper wire. For fine work. Overall length 4"; blue handles.
Model 98CG **6.95**

[7] Fine-Tip Soldering Iron. 15 watts with extremely small chisel tip. Perfect for closest work. Safe for C MOS circuitry. 45 seconds heat-up time, grounded 3-prong plug. **Model C** .... Now only **9.95**

[8] Holder for above iron. Insulated stand for soldering safety. Has two replaceable tip-cleaning sponges and holders for spare tips. **Model ST-3** **5.95**
Save! **Model C Iron and ST-3 Holder** **14.95**

[9] Midget Chain Nose. Slim streamlined pliers with fine serrations. For precision pick up, looping, twisting, bending of finest wire. Overall length 4½"; blue handles. **Model 77CG** **6.95**

---

[2] $5⁹⁵

$9⁹⁵

[1] Get the power you need to drive screws in securely
Shelton Super Versatool™ — ideal for hundreds of repair and maintenance tasks in your home, office, car, boat or camper. This rugged ratchet screwdriver has 3 times the power of an ordinary screwdriver and cuts the time required for screwdriving by over 50%. The universal ratchet head works left, right or locked, and changes direction at the flip of a finger. Includes driver head, 5½" extension adapter and 4 tool-steel bits for slotted and recessed screws.
Model 504 .... **9.95**

[2] Jeweler's Screwdriver helps place tiny screws in tiny places
Jeweler's Screwdriver Set. This is the perfect screwdriver set for small, small jobs when regular screwdrivers are too big. It's ideal for everything from eyeglasses to watch bands to typewriters...any precision screwdriving. It's a must for every home, workshop or office. The compact kit includes a handy holder and cover, knurled handle with swivel knob and 5 precision-ground driver bits — 3 for slotted screws, 1 for recessed screws, and 1 awl. Manufactured of high quality, heat-treated tool steel.
Model 707 .... **5.95**

Writes on woods, metals, glass, plastics to protect your possessions

Help protect your valuables with personalized identification

$7⁹⁵

- Tungsten carbide tip
- Variable stroke adjust
- 7,200 strokes per minute
- Sturdy 12-watt motor
- Durable hi-impact case
- Lightweight and contoured

Wen Electric Pencil Engraver. Discourage theft and assure the return of your valuables in the event of theft when you personalize your belongings with this Electric Pencil Engraver. You use it like a pencil to write, draw, monogram or engrave on woods, metals, plastics, glass and other hard surfaces. Features a super-hard tungsten carbide tip to scribe clean lines. The sturdy 12-watt motor produces up to 7,200 strokes per minute, and a variable stroke adjustment allows you to make heavy or fine line engraving. The Engraver is housed in a durable hi-impact case, and comes complete with on-off slide switch. The lightweight unit is contoured to fit your hand for extra ease of marking.
Model 21C **7.95**

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MONEY-BACK MANUAL PREVIEW

MONEY-BACK MANUAL OFFER. All kits come with manuals, but if you would like to see how easy kitbuilding is, you can purchase the manual first. We will deduct the price of the manual when you buy the kit. Simply return your manual and invoice to the store when you purchase the kit.

Manuals are $4 each, except for the following: color TV's, organs, H9, H10, H8-18, WH8, WH11A, SB-104A, HW-101, AN-2016A, AR-1515, AJ-1600, AP-1800, AA-1640, AJ-1510A, AR-1500A, SO-4150, SO-4235, IP-2711, and ET series, which are $7 each. Just ask your Heathkit Electronic Center for the manuals you want.

SEE HEATHKIT PRODUCTS ON EXHIBIT AT THE FOLLOWING SHOW:
Nov. 30-Dec. 5   AVA (American Vocational Association) .... Anaheim, CA

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: Director of Retail Operations, S.P.C., Box 167, St. Joseph, MI 49085.

Save Gasoline! Open a Heathkit Revolving Charge

That's right, save gasoline. When you have a Heathkit Revolving Charge, it's easy to get the Heathkit products you need at our stores. But ordering by phone can save gasoline, too. Just call the Heathkit Electronic Center nearest you during regular store hours and place your order by phone. We will be glad to ship your selection out to you the same day you call. See page 101 for the address and phone number of the Heathkit Electronic Center nearest you...and remember, parts and service are available, too.

The President's Corner

Dear Friends,

By the time you read this, it is likely that Heath Co. will be a subsidiary of Zenith Radio Corp. During the past 50 years since Ed Heath founded the company, ownership of Heath has changed hands three times. On each occasion our charter remained the same, and on each occasion the new owners brought something new and better to our operation. We have every reason to expect the same will happen this time.

For years, Zenith has enjoyed a reputation for the best quality in consumer electronic products. We like that. Zenith has led the industry in innovations and maintained their product design at the state of the art. We like that. Zenith is offering the continued employment of all Heath employees and, of course, we like that.

It is only by coincidence that in this same catalog we introduce a major new home entertainment product — projection TV. We have seen a number of large screen television sets, most of which did not come up to our expectations. However, we know you will be very pleased with our GR-4000, shown on pages 102 and 103.

This catalog also includes a number of new educational programs. These courses were originally intended for self-education; however, the demand was so great from schools, industry and government agencies that classroom versions were developed. We are now in the process of translating the basic courses into four other languages. Whether for vocation or avocation purposes, you will find these educational programs make learning a real joy.

It is with a sense of pride that we look forward to working with Zenith in providing you with new and exciting products while retaining the best of days gone by.

D. W. Nurse
David W. Nurse
President

Panavise® — Perfect for the Kitbuilder!
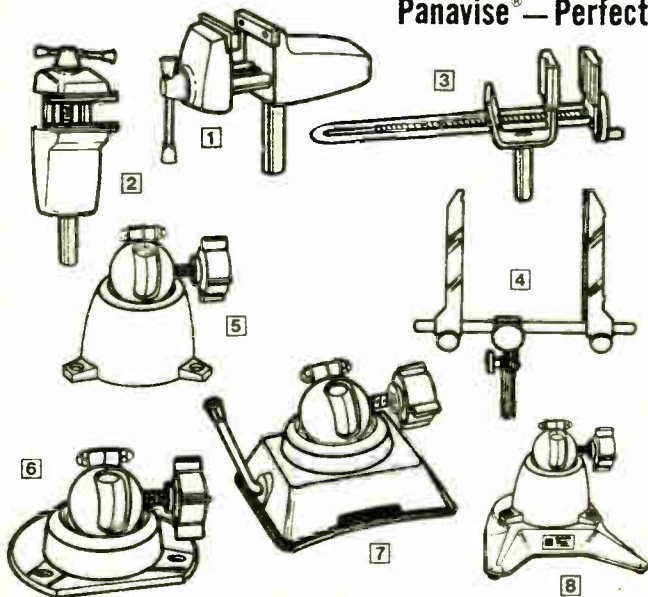
[1] **Vertical Jaw Vise Head** — All purpose vise head suitable for most hobby applications. Nylon Jaws won't mar work and open to 2¼".
Model 303 Vise Head **13.95**

[2] **Low Profile Vise Head** — Functions and features similar to above but straight front edge allows pivoting out and away from workbench.
Model 304 Vise Head **13.95**

[3] **Wide Opening Vise Head** — Opens to a full 6 inches. Neoprene jaws provide firm non-marring grip. Fine thread screw permits precise adjustment.
Model 366 Vise Head **13.95**

[4] **Circuit Board Holder** — Just what you need to hold just about any size or shape circuit board. Tilts 220 degrees. Spring loaded for quick insertion and removal. **Model 315 Circuit Board Holder** **18.95**

[5] **Panavise Base** — Holds all the above vise heads. Three mounting lugs attach to bench. Variable load control adjusts position of work as you desire. **Model 300 Base** **12.95**

[6] **Low Profile Base** — All the features of the above base but only 2½ inches high. For working close to bench. Will mount flush with edge of bench. **Model 305 Base** **12.95**

[7] **Vacuum Base** — Similar to above bases but with lever-actuated vacuum base for attachment to smooth, non-porous surfaces. Holds without marring. **Model 380 Base** **17.95**

[8] **Weighted Base Mount** — Drilled to accept Model 300 and 305 Bases above. Cast iron base weighs 5 lbs. and has non-marring, anti-skid feet. Mounting screws included. **Model 308 Base Mount** **14.95**

Heathkit Test Equipment gives you great value and performance

Heathkit Test Equipment is among the best you can buy anywhere at any price. Care in engineering and top quality materials mean that the test equipment you buy from Heath will perform up to the highest standards for years to come. Thousands of amateur and professional technicians around the world can attest to Heath reliability. Heathkit Test Instruments are more than just a purchase; they are an investment in your future as you continue to grow in your electronics hobby or career.

When you purchase a Heathkit Instrument you purchase years of engineering expertise in the field of test equipment design. Order your first piece of test gear from Heath and you'll agree; Heath is truly the best there is.

Heathkit Power Supplies to meet your special testing or design requirements
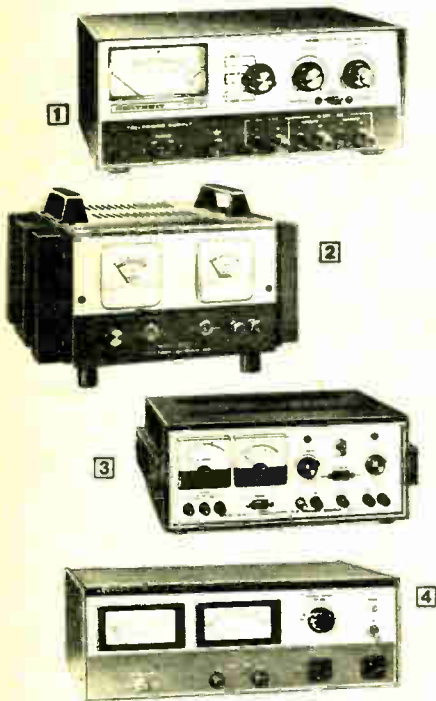
[1] **Tri-Output Power Supply** combines fixed 5 VDC output with two continuously adjustable 0-20 VDC outputs for circuit designs requiring more than one voltage supply. The outputs of the two 20V supplies and the 5V output can be interconnected in any combination to provide both positive and negative voltages with a fixed reference, or they can be allowed to "float."

Kit IP-2718, Shpg. wt. 12 lbs. **99.95**
Assembled SP-2718, Shpg. wt. 12 lbs. **195.00**

IP-2718 SPECIFICATIONS: Regulation: Load: less than 0.1% variation from no load to full load on 20V supplies; less than 2% 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. **Dimensions:** 4½" H x 10¾" W x 9" D.

[2] **Power Supply/Battery Eliminator** is clean, accurate voltage source for servicing Ham, Marine and CB communications gear. Two easy-to-read front panel meters continuously variable voltage selection from 9 to 15 VDC.

Kit IP-2715, Shpg. wt. 31 lbs. **149.95**

IP-2715 SPECIFICATIONS: Output Voltage: variable from 9-15 VDC. **Output Current:** 12 amps continuous, 20 amps intermittent (per derating curve in manual). **Ripple:** less than 1% at full load. **Regulation:** less than 2% variation from no load to full load. **Fuses:** 7A, 3 AG slow-blow primary; 20A, 3 AG output. **Power Requirement:** 110-130 VAC, 7A or 220-260 VAC, 3.5 A, 60/50 Hz. **Dimensions:** 5¼" H x 11" W x 11" D.

[3] **General-Purpose Power Supply.** 0-400 VDC output at 0-100 mA continuous (125 mA intermittent). 120/240 VAC, 50/60 Hz.
Kit IP-2717, Shpg. wt. 19 lbs. **129.95**
SP-2717, Assembled, tested. 19 lbs. **230.00**

[4] **Variable Isolated AC Power Supply.** Continuously variable 0-140 VAC output, with complete isolation from AC line. Input voltage is 120 VAC, 60 Hz. Output current is 3 A max.
Kit IP-5220, Shpg. wt. 28 lbs. **139.95**

Reliable General-Purpose Power Supplies to fill a special place on your bench

Kit IP-2710, 30V @ 3A analog.
Shpg. wt. 34 lbs. **189.95**
Assembled SP-2710, 30V analog.
Shpg. wt. 34 lbs. **290.00**
Kit IP-2711, 30V @ 3A digital.
Shpg. wt. 36 lbs. **249.95**
Assembled SP-2711, 30V digital.
Shpg. wt. 35 lbs. **370.00**
Kit IP-2728, 1-15 VDC regulated.
Shpg. wt. 5 lbs. **29.95**

Get more versatility and convenience from your Heathkit Instrument with these Probes and Accessories
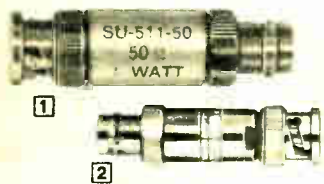
[1] **50-Ohm Termination.** Used to eliminate improperly terminated cables which can cause incorrect display in frequency counters and distorted waveforms in scopes. DC to 1 GHz; power rating, 1 watt. VSWR; 250 MHz, 1.2:1, 600 MHz, 2:1.
Assembled SU-511-50, Shpg. wt. 1 lb. **21.50**

[2] **RF Fuse** in UHF BNC-to-BNC connector. Prevents burnout. DC to 500 MHz range; 50 ohms; 1.2:1 VSWR (max.); insertion loss 1.80 dB max. at 500 MHz. With spare fuses.
Assembled SU-512-50, Shpg. wt. 1 lb. **55.00**

[3] **Low capacitance scope probe** provides direct or X10 attenuated operation; options for 3.3 or 1 megohm input resistance.
Kit PK-1, Shpg. wt. 1 lb. **8.95**

[4] **Scope demodulator probe** for distortion checks, RF & IF display. 30 V rms max., 500 VDC max. Banana plug/BNC wiring option.
Kit 337-C, Shpg. wt. 1 lb. **6.95**

[5] **RF Probe** provides RF voltage measurement capability for any 10 or 11 megohm DC input voltmeter. Frequency response is linear from 1000 Hz to over 100 MHz. Includes banana plug for 10 megohm input and phone plug for 11 megohm input.
Kit PK-3A, Shpg. wt. 1 lb. **9.95**
Assembled PKW-3A, Shpg. wt. 1 lb. **14.95**

[6] **Combination X1, X10 Scope Probe.** Has 2-position multiplier for X1 and X10 probe tip. DC to 15 MHz (X1) and DC to 80 MHz (X10) bandwidths. X10 risetime, 4.0 nS. Compensation range of 15-50 pF. Includes probe with 3-position slide switch, 4½ ft. cable.
Assembled PKW-105, Shpg. wt. 1 lb. **29.95**

Accessory cables . . . for inter-connecting scopes, counters, etc. All cable is RG-58/U, 50 ohm impedance. Shpg. wt. (each), 1 lb.
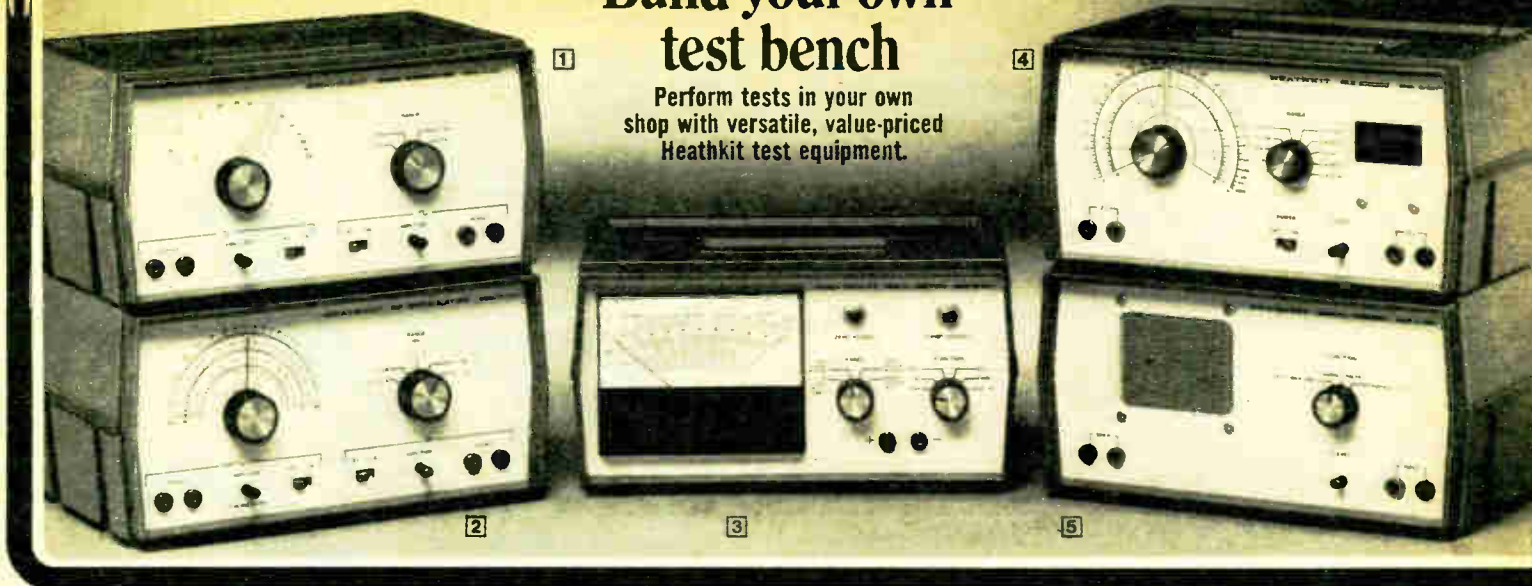Assembled SU-501-3, 3 ft., BNC/BNC **10.00**
Assembled SU-501-6, 6 ft., BNC/BNC **10.00**
Assembled SU-503-3, 3 ft., BNC/Banana **10.00**

Build your own test bench

Perform tests in your own shop with versatile, value-priced Heathkit test equipment.

1 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. Square wave output is ideal for determining frequency response (with appropriate associated equipment). Construction is rugged and assembly time is greatly reduced by single circuit board assembly.

Kit IG-5282, Shpg. wt. 5 lbs. **39.95**

IG-5282 SPECIFICATIONS: Frequency Output: 10 Hz to 100 kHz in four ranges. Sine Wave Output Voltage: 0-3 volts rms. Square Wave Output Voltage: 0-3 volts peak. Power Requirements: Two 9-volt batteries or the optional IPA-5280-1 Power Supply. Dimensions: 11″ H x 5¾″ W x 7¾″ D. Net weight: 3¼ lbs.

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.

Kit IG-5280, Shpg. wt. 5 lbs. **39.95**

IG-5280 SPECIFICATIONS: RF Output: Frequency Range: 310 kHz to 110 MHz in five bands, 100 MHz to 220 MHz on harmonics. Output voltage: 100 mV approx. Internal Modulation: 1000 Hz. AF Output: Frequency: 1000 Hz. Output Voltage: 2.0 volts rms (open circuit). Power Requirements: Two 9-volt batteries of IPA-5280-1 power supply. Dimensions: 5¾″ H x 11″ W x 7¾″ D. Weight: 3¼ lbs.

3 Multimeter for volts/ohms/DC current

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 X1MΩ. 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. **39.95**

IM-5284 SPECIFICATIONS: DC Voltmeter: Ranges: 0-1, 0-10, 0-100, 0-1000 volts full scale. Accuracy: ±3% of full scale. AC Voltmeter: Ranges: 0-1, 0-10, 0-100, 0-1000 volts full scale. Accuracy: ±5% of full scale. DC Milliammeter: Ranges: 0-1, 0-10, 0-100, 0-1000 mA full scale. DC Input Resistance: 10 megohms. AC Input Resistance: 1 megohm. Ohmmeter: Ranges: X1, X100, X1k, X1MΩ. Power requirements: Two 9-volt batteries and 1 "C" cell or IPA-5280-1 Power Supply and 1 "C" cell. Dimensions: 5¾″ H x 11″ W x 7¾″ D. Weight: 3¼ lbs.

4 RCL Bridge ideal for design work

The Heath 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 10Ω to 10MΩ, inductance in three ranges from 10 µH to 10H and capacitance, also in three ranges, from 10 pF to 10 µF. Easy single circuit board construction speeds assembly. With component clips.

Kit IB-5281, Shpg. wt. 5 lbs. **39.95**

IB-5281 SPECIFICATIONS: Resistance Ranges: 10Ω to 10MΩ in three ranges. Inductance Ranges: 10 µH to 10H in three ranges. Capacitance Ranges: 10 pF to 10 µF 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: 5¾″ H x 11″ W x 7¾″ D. Weight: 3½ lbs.

5 Signal Tracer for audio circuits

If you have been waiting to add an audio signal tracer to your bench because the price was just too high...look again. The IT-5283 Signal Tracer makes a great, low-priced addition to your trouble-shooting arsenal. A diode-equipped RF probe (furnished with the kit) lets you quickly trace radio and television receiver and transmitter circuits to reveal component and stage failures. When you flip the probe to its straight through (DC) position, you are able to locate defective circuitry in all types of audio components and systems with ease. 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. Turn the IT-5283 Signal Tracer off and its 3″ permanent magnet speaker is connected to two front-panel jacks which allow you to use it as a handy bench test speaker.

Kit IT-5283, Shpg. wt. 5 lbs. **39.95**

IT-5283 SPECIFICATIONS: Functions: Substitute speaker, AF signal tracing, RF signal tracing, Audible volt/ohmmeter. Speaker: 3″ permanent magnet. Power Requirements: Two 9-volt batteries and/or IPA-6280 power supply. Cabinet Dimensions: 5¾″ H x 11″ W x 7¾″ D. Weight: 3¼ lbs.

5280 Series 120/240 V Power Supply

(Not Shown.) Provides all voltages required by 5280 series equipment. Features full wave rectification, capacitor filtering and dual integrated circuit regulators to insure correct voltage output. Powers all five instruments simultaneously and has handy switch which allows operation from either 110 or 220 VAC outlets without rewiring.

Kit IPA-5280-1, Shpg. wt. 3 lbs. **27.95**

IPA-5280-1 SPECIFICATIONS: Output Voltage: +9 and −9 VDC ±9%. Maximum Output Current: 100 milliamps. Power Requirements: 100 to 135 VAC or 200 to 270 VAC, 50/60 Hz, 7 watts maximum. Dimensions: 6″ H x 3¾″ W x 3″ D. Fuse: 1/16-amp, 3AG, slow-blow.

Quality Heathkit Test Instruments make service fast and easy

High-performance logic probe for TTL/CMOS digital circuits

The Heathkit IT-7410 detects and indicates both high and low logic levels in TTL or CMOS digital circuitry. It also indicates the polarity and presence of signal pulses as short as 10 nsec duration, and shows intermediate or "bad" logic levels.

Simply touch the probe tip to an IC pin to observe the following conditions. Both indicators off shows open circuit or abnormal level (between thresholds). The low (white) indicator on shows constant logic zero. The high (red) indicator on shows constant logic one. Both indicators flash at a 5 Hz or lower rate to show signal pulses. One indicator flashing shows normal to abnormal logic levels. A separate manually reset memory indicator is lit whenever any transition in logic levels occurs.
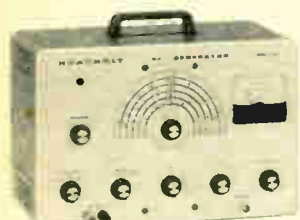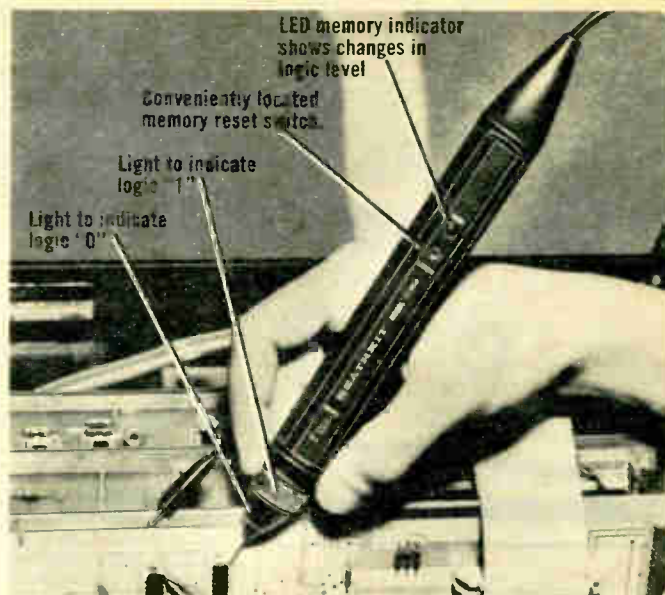
The probe is equipped with 34" power leads with strain relief and color-coded mini-clips; detachable high-frequency ground clip. The unit is powered by the circuit under test, or a separate regulated DC power supply

Kit IT-7410, Shpg. wt. 1 lb. 44.95

Factory assembled and tested version of above.
ST-7410, Shpg. wt. 1 lb. 69.95

IT-7410 SPECIFICATIONS: DC Threshold Levels: switch-selected, TTL logic "zero", .8V ±.15, logic "one", 2.1V ±.25 @ 5VDC. CMOS logic "zero", 30% ± 10% of supply voltage, logic "one", 70% ± 10% of supply voltage. Input Impedance: 400k ohms, parallel with 10pF. Response Limits: TTL or CMOS at 5VDC — single pulse or pulse train, 10 nS min. Square wave, 100 MHz max. CMOS at 15 VDC — single pulse or pulse train, 10 nS min. Square wave, 80 MHz max. Power Requirement: TTL — 4.75 to 5.5VDC @ 75 mA max. CMOS — 4.75 to 15VDC @ 115 mA max. Dimensions: ¾" H x 1" W x 9¼" L.

LED memory indicator shows changes in logic level
Conveniently located memory reset switch
Light to indicate logic "1"
Light to indicate logic "0"

General-purpose RF Generator makes testing fast and easy

The IG-5242 provides accurate and stable radio frequencies for precision testing of RF and IF stages, measuring gain and image rejection and determining sensitivity. Frequency coverage is from 100 kHz to 30 MHz with ±3% adjustable frequency calibration. RF output voltage adjusts from 5 to 100,000 μV in five attenuated steps with 5:1 variable attenuation. Output can be modulated from 0-50% with 5% accuracy. Easy kit assembly.

Kit IG-5242, Shpg. wt. 14 lbs. 129.95

IG-5242 SPECIFICATIONS: RF OUTPUT. Frequency Range: 100 kHz to 30 MHz in five bands. Accuracy: ±5%. Output Impedance: 50 ohms. Output Voltage: variable from .005 to 100 mV. INTERNAL MODULATION. Frequency: 400 Hz. Depth: variable from 0-50%. Front Panel Controls: Modulation, variable frequency and level controls; function, meter and millivolts F.S. switches. Power Requirement: 120/240 VAC, 50/60 Hz, 30 watts. Dimensions: 10" H x 13" W x 7¾" D.

High-accuracy Impedance Bridge for easy measurements

Has four separate bridge circuits for accurate measurement of resistance, capacitance, and low & high inductance, dissipation factor of capacitors and storage factor of inductors. Requires headphones or oscilloscope for alignment.

Kit IB-3128, Shpg. wt. 11 lbs. 169.95

IB-3128 SPECIFICATIONS: DC Measurements: Built-in power supply. Binding posts for external supply. Meter: 100-0-100 microampere meter. AC Measurements: Built-in 1000 Hz generator. Terminals for external generator. Detector: Vacuum tube detector and amplifier, using built-in meter. Terminals for external detector. Resistance: 0.1 ohm to 10 megohm. Capacitance: 100 pF to 100 μF. Inductance: 0.1 mH to 100 H. Dissipation Factor: (D) 0.002 to 1. Storage Factor: (Q) 0.1 to 1000. Accuracy: ½% decade resistors used. Power Supply: Transformer and silicon rectifier. Power Requirement: 120/240 VAC, 60/50 Hz, 10 watts. Dimensions: 8" H x 17" W x 6" D.
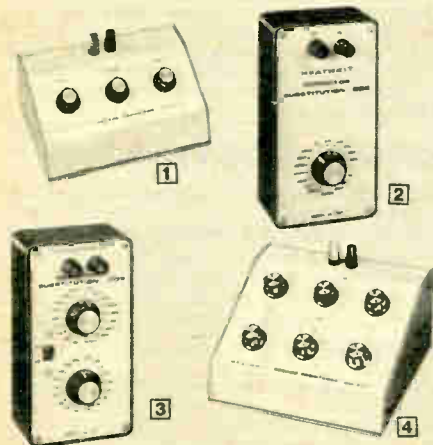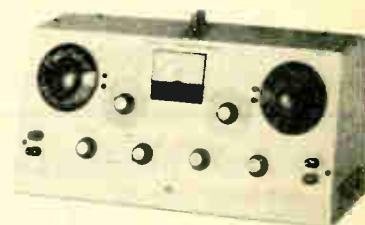
Instruments simplify testing

1 **Decade Capacitance Box.** Functions as a wide-range variable capacitor for design work, helps you determine unknown capacitance values without involved calculations. Covers 100 pF to 0.111 μF in 100 pF increments. 400 VDC rating.
Kit IN-3127, Shpg. wt. 2 lbs. 29.95

2 **Capacitor Substitution Box.** Provides switch selection of 18 EIA standard capacitors from 100 pF to 0.22 μF. All are rated at 600 V, except 3 lowest and 2 highest values, 500 and 400 V respectively. Kit IN-3147, Shpg. wt. 2 lbs. ..15.95

3 **Resistor Substitution Box.** Provides switch selection of 36 standard 10% 1-watt resistors from 15 ohms to 10 meg.
Kit IN-3137, Shpg. wt. 2 lbs. 15.95

4 **Decade Resistance Box.** Covers 1 ohm to 999,999 ohms in 1 ohm steps. Use with IN-3127 to solve complex resistance and capacitance network problems. Resistors are 1-watt, 0.5% tolerance. Kit IN-3117, Shpg. wt. 3 lbs. 47.95

Heathkit Instrument Test Probes

IMA-100-10 Probe multiplies DC ranges of any 10-megohm meter by 100. 1000 megohm input measures voltages as low as 1 V in high impedance circuits.

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

IMA-100-11 Probe provides X100 measurement for meters with 11-megohm input impedance. (Incl. probe resistance). Phone plug, ground clip.
Kit IMA-100-11, Shpg. wt. 1 lb. 12.95
Assembled SMA-100-11, Shpg. wt. 1 lb. 19.95

IMA-1000-1 Probe provides X1000 attenuation for meters with 1-megohm input impedance. Banana plug connector.
Kit IMA-1000-1, Shpg. wt. 1 lb. 12.95

High-Performance Test Equipment for Semiconductors & IC's
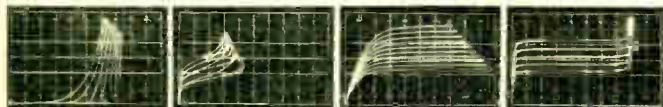
Curve Tracer makes semiconductor testing faster and simpler

Take the guesswork out of semiconductor testing with the Heathkit IT-3121 Curve Tracer. An invaluable tool for the designer, technician or the serious electronic hobbyist. Just connect the IT-3121 to any oscilloscope with horizontal sensitivity of 0.5 V/div. and vertical sensitivity of 1 V/div. and adjustable horizontal gain. Devices such as bipolar transistors, diodes, SCRs, triacs, FETs, etc. can be inspected or tested for specific applications. Plug-in cables are supplied for fast, easy scope hookup. A calibration switch permits fast and accurate scope calibration. You can display most fundamental parameters (see insets for typical displays). The extensive manual included in each kit tells how to interpret each display. Low profile styling and the sloped front panel permit the Curve Tracer to sit in front of most oscilloscopes without blocking the CRT. Extra leads (included) allow you to test large devices or make in-circuit tests.

Kit IT-3121, Shpg. wt. 10 lbs. **109.95**

IT-3121 SPECIFICATIONS: Sweep Voltage Ranges: 0-40 volts at 1 ampere max. 0-200 volts at 200 mA max. **Sweep Voltage Sampling:** .1, .2, .5, 1, 2, 5, 10, 20 and 50 V/div. ±3%. **Sweep Current Sampling:** .5, 1, 2, 5, 10, 50, 100 and 200 mA/div. ±%. **Sweep Dissipation Resistors:** 0, 10, 50, 100, 500, 1000, 5000, 10k, 50k, 100k, 500k, 1 meg ±10%. **Step Currents:** .002, .005, .01, .02, .1, .2, 2, 5, and 10 mA/step, ±3%, ±250 nA offset current max. **Step Voltages:** .05, .1, .2, .5, and 1 volt/step, +3%, ±5% mA maximum offset voltage. **Calibration Source:** 9 volts ±2%. in 1 volt steps. **Polarity:** PNP and NPN (P Channel - N Channel). **Oscilloscope Requirements:** Bandwidth to 20 kHz or greater. (DC-coupled oscilloscope is recommended). **Power Requirement:** 110 to 130 or 220 to 260 VAC. **Dimensions:** 4½″ H x 11¼″ W x 10″ D.

Negative resistance and interbase resistance (Rbb) for unijunction transistors.

Thermal runaway, leakage, linearity, beta, output admittance, saturation for bipolar transistors.

Typical field effect transistor display showing drain current versus drain voltage.

Field effect transistor breakdown.

Low-cost Heathkit Testers add convenience and versatility to your bench

① Deluxe Digital IC Tester for fast, easy IC checks

A "must for anyone working with digital integrated circuits. Lets you determine functions of IC's, check operation against your own data sheets. Features a special high-quality "zero-force" insertion socket — the same as used in expensive production-line testers — that lets you make thousands of insertions and extractions without worrying about bent pins. Exclusive "bounce-free," mercury stepping switch allows safe and easy "exercising" of multi-function IC's such as flip-flops. Has input-output jacks for each pin; neon indicators. Exceptionally easy to operate — 14- or 16-pin IC's can be installed in any position. Ideal for use with the Digital Techniques Program (page 70).

Kit IT-7400, Shpg. wt. 6 lbs. **79.95**

IT-7400 SPECIFICATIONS: Pull-up Resistors: externally connected, with patch terminals. **Patch Terminals:** one at each pin. **Selector Switches:** two at each terminal, one for +5V, step, or off; the other for gas discharge or ground. **Gas Discharge:** allows direct driving of neon indicator lamp for high voltage decoder driver. **Power Supply:** 5 VDC regulated, ±5%, 300 mA and 3.6 VDC, switch selected. **Power Requirement:** 100-135/200-270 VAC, 60/50 Hz. **Dimensions:** 4⅝″ H x 11⅜″ W x 9¼″ D.

② High-accuracy FET/Transistor Tester for in or out-of-circuit tests

For quick, accurate tests of conventional (bi-polar) transistors, diodes, FETs, SCRs, triacs and unijunction transistors. Tests components either in-circuit using color-coded test leads supplied or out-of-circuit using built-in sockets. Shows gain (DC Beta), trans-conductance (Gm) and leakage directly on the large easy-to-read meter. Five current ranges permit leakage measurements as low as 1 µA and collector currents as high as 1 ampere. Has easy-to-use push-button function switches, special battery testing circuit that shows the condition of batteries' power supply, two-color front panel design with black lettering for conventional (bipolar) transistors and red lettering for FET's. Batteries not included.

Kit IT-3120, Shpg. wt. 5 lbs. **67.95**

IT-3120 SPECIFICATIONS: Out-of-Circuit Accuracy: ±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_{eb2s}, I_{b2b1s} and emitter current. **Power Requirement:** Two 1½″ V cells, (alkaline for best performance, not supplied). **Dimensions:** 5″ H x 9⁷⁄₁₆″ W x 8⅛″ D.


Take this portable Transistor/Diode Checker with you anywhere for field checks

Transistor/Diode Checker. (Not shown). Checks high and low power transistors (NPN and PNP) for shorts, opens, leakage and current gain. Checks diodes for forward and reverse current; also can be used as a continuity tester. Has switches for FOR-REV/PNP-NPN, DIODE/HI-LO, LEAKAGE-GAIN. Easy-to-read calibrated meter. Metal cabinet can be placed so that switches are on top or either side for most convenient operation. Uses two 1.5-volt "C" cells for easy portability. 3⅛″ H x 3⅛″ W x 3¾″ D. Less batteries.

Kit IT-3127, Shpg. wt. 2 lbs. **13.95**
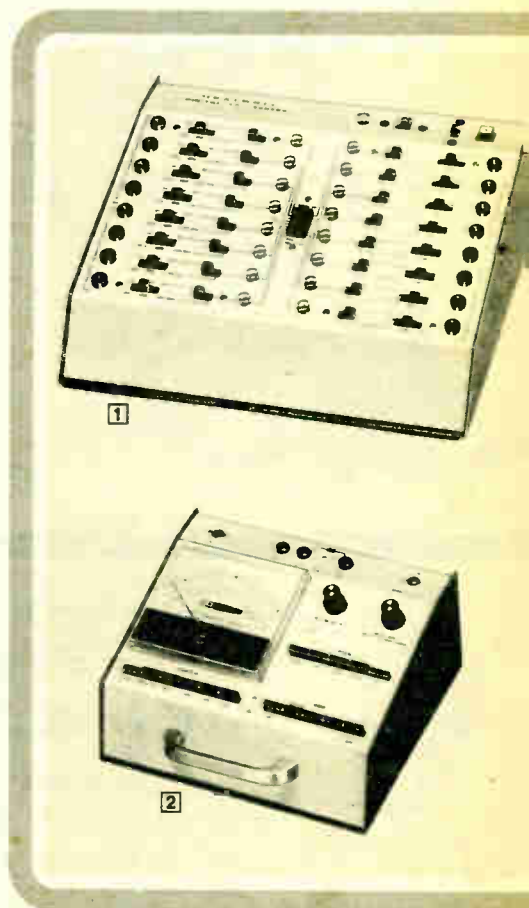
Heathkit TV service instruments save you time and money
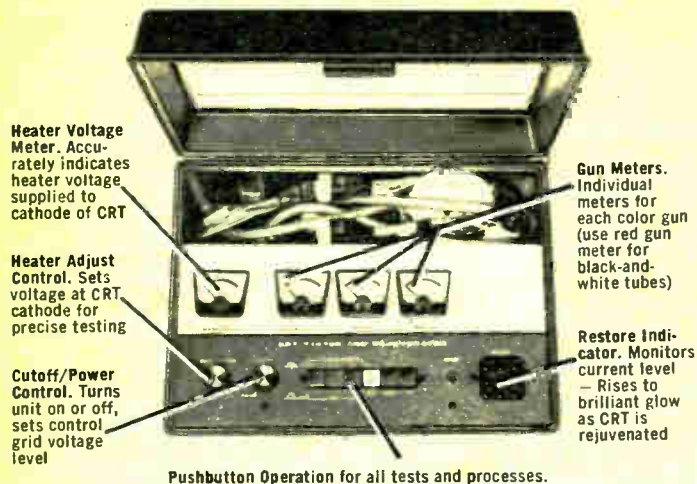
Heater Voltage Meter. Accurately indicates heater voltage supplied to cathode of CRT

Heater Adjust Control. Sets voltage at CRT cathode for precise testing

Cutoff/Power Control. Turns unit on or off, sets control grid voltage level

Gun Meters. Individual meters for each color gun (use red gun meter for black-and-white tubes)

Restore Indicator. Monitors current level — Rises to brilliant glow as CRT is rejuvenated

Pushbutton Operation for all tests and processes.

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. **99.95**

Factory assembled version of above.
ST-5230, Shpg. wt. 9 lbs. **150.00**

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.

HEATHKIT ELECTRONIC CENTER
charg·a·kit
REVOLVING **CHARGE**

Color level control adjusts the intensity of the three color levels

16 different pattern selections, including rainbow, dots, crosshatch, horizontal and vertical lines

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 than the IG-5240. Put this truly portable 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. **100.00**

IG/SG-5240 SPECIFICATIONS: Chroma Carrier: 3563.795 kHz ±0.005% crystal-controlled. Master Timer: 377.616 kHz ±0.005% crystal-controlled. RF Carrier: Channel 4, 67.250 MHz ±0.01% crystal-controlled. RF Output Level: 5000 μV 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 mAH capacity (NEDA #1604). Dimensions: 5.4" L x 2.75" W x 1.15" D.
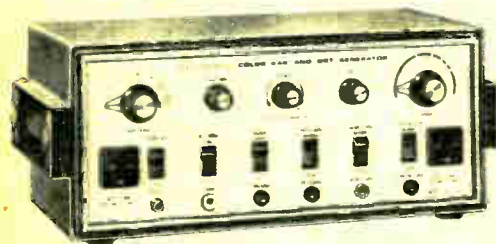
Easy to use and accurate — makes color TV service a breeze.
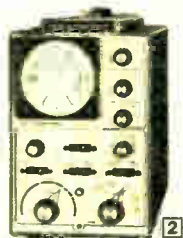
① Color Bar and Dot Pattern Generator for easy service

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 μV, 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. **129.95**

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. **199.95**

Heathkit TV/Radio Test Equipment saves time and money

NEW

Get world-famous Heathkit reliability in a Yoke/Flyback Tester — and spend a lot less money — with the new portable IT-5235

$99⁹⁵

- 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 and 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. 99.95
Assembled ST-5235, Shpg. wt. 8 lbs. 140.00
High-Voltage Probe, IMA-100-10, 1 lb. 12.95

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: ±5% of full scale, 100 Hz to 200 kHz. High-Voltage Scales: 0-10 k VDC, 0-40 k VDC. High-Voltage Accuracy: ±3% of full scale (including optional IMA-100-10 HV probe). Dimensions: 6⅞" H x 5¾" W x 10¾" D.

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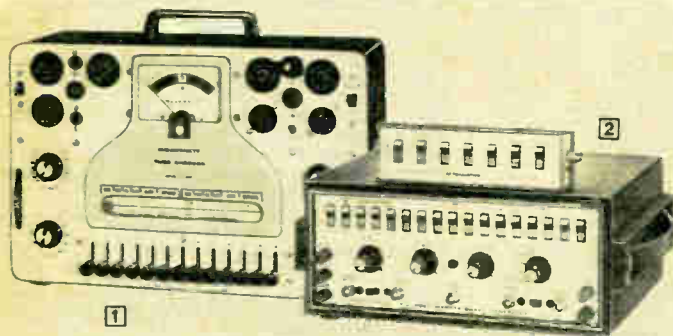
[1] **Low-Cost Heathkit Tube Checker.** Essential for radio-TV servicing! Tests tubes on the basis of total emission, for shorts, leakage, open elements, and filament continuity. Has good/bad indicator to show relative quality, neon bulb indicator for filament continuity and leakage or shorts between elements.
Kit IT-3117, Shpg. wt. 12 lbs. 149.95

IT-3117 SPECIFICATIONS: Sockets: 4-pin, 5-pin, 6-pin combination and pilot light. 7-pin miniature, octal, loctal, 10-pin miniature, 9-pin novar, 9-pin miniature, 12-pin compactron, 5-pin nuvistor, 7-pin nuvistor. Power Requirement: 120 VAC, 50/60 Hz. Dimensions: 8½" H x 13" W x 5½" 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. Compatible with NTSC system only.
Kit IG-5257, Shpg. wt. 16 lbs. 199.95

IG-5257 SPECIFICATIONS: Marker frequency: 100 kHz. Marker frequencies, crystal-controlled: 3.08, 3.68, 4.08, and 4.50 MHz ±0.01%. 10.7, 39.75, 41.25, 42.17, 42.50, 42.75, 45.00, 45.75, 47.25, ±0.005%; 67.25 and 193.25 MHz ±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

$169⁹⁵ 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. 169.95
Assembled and Tested SM-4180, Shpg. wt. 6 lbs. 260.00
Battery Charger/Eliminator, Kit IMA-4180-1, 2 lbs. 32.95
Assembled and Tested SMA-4180-1, Shpg. wt. 2 lbs. 45.00
Telescoping Antenna for IM-4180, SU-510, 2 lbs. 9.95

IM/SM-4180 SPECIFICATIONS: Deviation Ranges: 0-2, 0-7.5, 0-20 and 0-75 kHz peak. Accuracy: ±3% of full scale. Input Impedance: 50 ohms. Maximum Safe Input: 5 volts. Scope Output: 13 mV/kHz peak. Dimensions: 5" H x 10⅞" W x 7⅞" 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 ±3% accuracy. Easy operation and assembly.
Kit IM-5210, Shpg. wt. 2 lbs. 21.95

61

[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.

Kit IM-1104, Shpg. wt. 4 lbs. **109.95**

Assembled SM-666. Has 1μA current range, less 100 mA and 1000 mA ranges. Shpg. wt. 3 lbs. **195.00**

IM-1104 SPECIFICATIONS: Frequency Response: 0.1 to 30 volt ranges, ±3%, 20 Hz to 20 kHz, ±5%, 20 Hz to 50 kHz. 100-300 volt ranges, ±3%, 20 Hz to 10 kHz, ±5%, 20-Hz to 20 kHz. 1000 volt range, ±3%, 20 Hz to 1 kHz. DC VOLTAGE RANGES: 0.1, 0.3, 1, 3, 10, 30, 100, 300, 1000 V. Accuracy: ±2% of full scale. AC VOLTAGE RANGES: 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, 1000 V. Accuracy: ±3% full scale. DC MILLIAMETER: 0-0.1, 0.1, 1, 10, 100, 1000 mA. Accuracy: ±2% to 100 mA, ±3% to 1000 mA. AC MILLIAMETER: Same as DC mA; accuracy, ±3% to 100 mA; ±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. Features low-friction, taut-band meter with diode & fuse protected movement. Less batteries.

Kit IM-105, Shpg. wt. 3 lbs. **89.95**

Assembled SM-660, (less 5 KV ranges), 3 lbs. **100.00**

IM-105 SPECIFICATIONS: DC VOLTAGE RANGES: −0.25, 2.5, 10, 50, 250, 500, 1000 & 5000 V full scale. Accuracy: ±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: ±4% of full scale. Input resistance: 5000 ohms/V. Input capacity: Less than 20 pF. Frequency response: 2.5, 10, and 50 V ranges, ±5%, 10 Hz to 100 kHz; 250, 500 V ranges ±5%, 10 Hz. DC CURRENT RANGES: −0.05, 1.0, 10, 100, 500 mA & 10 A full scale. Accuracy: ±3% of full scale. RESISTANCE RANGES: −x1 (20 center scale), x10, x100, x1k, x10k. 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, 4-position pushbutton switches.

Kit IM-5225, Shpg. wt. 8 lbs. **99.95**

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-.01, 0.1, 1, 10, 100, 1000 milliamperes full-scale. AC Current: six ranges 0-.01, 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: 6⅞" H x 5¾" W x 11¼" D. Weight: 5¾ lbs.

[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**

Assembled SM-5238, Shpg. wt. 8 lbs. **170.00**

IM/SM-523B 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 5⅝" W x 10⅞" D.

[5] **Lin/Log Swept Function Generator.** Provides sine, square and triangle waveforms PLUS swept-function waveforms for convenient frequency response tests. Also has pen lift and chart control signals for use with Heath chart recorders and others. Has 50 dB switch attenuator variable between ranges; adjustable symmetry from 5% to 95%; 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, 15 lbs. **339.95**

Assembled SG-1275, 16 lbs. **450.00**

SG-1273 Function Generator. (Not shown). Same as IG-1275 above but no swept-function capability.

SG-1273, Fully assembled and tested. 11 lbs. **250.00**

IG/SG-1275 SPECIFICATIONS: Output: 50-ohm source — short circuit protected. ±10 volts open circuit. ±5 volts into 50-ohm load. Output Flatness: ±0.1 dB to 300 kHz. ±0.5 dB to 3 MHz. Frequency: 0.003 Hz through 3 MHz in 6 range steps on primary decade. Sine Distortion: Less than 1%, X10¹. Less than 0.5%, X10², 10³, 10⁴. Less than 0.75%, X10⁵. Harmonics 30 dB down X10⁶. Triangle Linearity: No deviation greater than 1% to 300 kHz. Square-Wave Rise and Fall: Less than 60 nS. Sweep Generator: 6 ranges, 10 μs through 100 sec. Sweep Output: Supplies 0 to 4.5-volt linear ramp at sweep generator rate from a 1000-ohm source. Power Requirement: 100 to 135 volts, 50-60 Hz, 20 watts maximum. (200 to 270 volts, 50-60 Hz, switch selectable.) Dimensions: 5⅜" H x 15" W x 11⅞" D.

*Applicable only on top decade of each frequency range. The IG-1275 and SG-1273 require a triggered sweep oscilloscope for calibration.
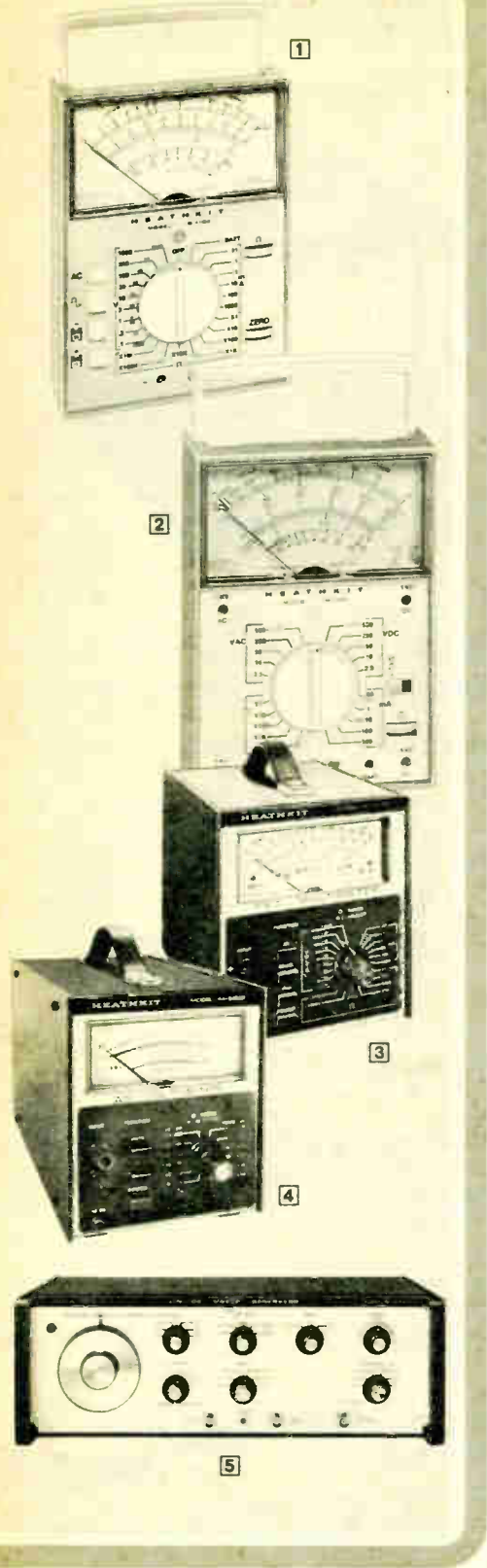
- Easy to Operate
  front panel controls
- Short-circuit-proof output amplifier
- Rugged case with carrying handle

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 4½" color-coded 200 μA 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. 54.95
Assembled SM-5218, Shpg. wt. 5 lbs. 100.00

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: 4½", 200 μA 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 ±3%, AC ±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: 7⅜" H x 4¹⅛" W x 4¼" 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. 64.95
Assembled SM-5228, Shpg. wt. 7 lbs. 130.00

IM/SM-5228 SPECIFICATIONS: DC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 V full scale; up to 30,000 V with accessory probe. Input Resistance: 11 megohm (1 megohm in probe) on all ranges; 1100 megohms with accessory probe. Circuit: Balanced bridge (push-pull) using twin triode. Accuracy: ±3% of full scale. AC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 rms scales. Frequency Response (5 V range): ±1 dB 25 Hz to 1 MHz (800 ohm source, referred to 60 Hz). Accuracy: 5% of full scale. Input Resistance & Capacitance: 1 megohm shunted by 40 pF measured at input terminals (200 pF at probe tip). OHMMETER — Ranges: Scale with 10 ohm center, X1, X10, X100, X1000, X10k, X1 meg. Measures 0.1 ohm to 1000 megohms with internal battery. Meter: 6", 200 μA movement, polystyrene case. Battery: 1½ V, "C" cell (not supplied). Power Requirement: 120/240 VAC, 60/50 Hz, 10 W. Dimensions: 5" H x 12¹³⁄₁₆" W x 4¾" D.
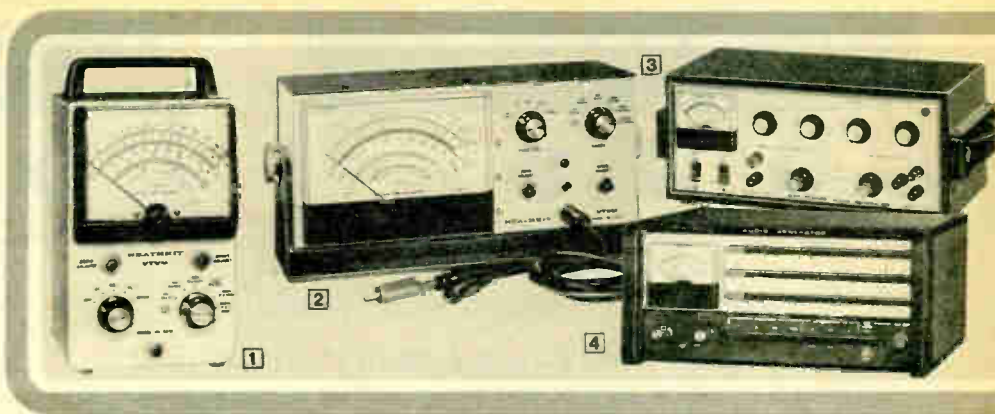
[3] **Sine-square wave Audio Generator.** Ideal for gain and frequency response measurements in audio amplifiers, as a signal source for harmonic distortion measurements or as an external modulator for RF signal generators. A meter, calibrated in both volts and dB, monitors the sine wave output.

Kit IG-5218, Shpg. wt. 10 lbs. 99.95
Assembled SG-5218, 10 lbs. 195.00

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: 5⅛" H x 13¼" 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. 149.95
Assembled SG-1272, 10 lbs. 180.00

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; ±4%, ±1 Hz, typical ±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: 5½" H x 11" W x 12⅓" 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 10 volt (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 trigged scope is necessary for calibration.

Kit IG-1271, Shpg. wt. 7 lbs. 129.95
Assembled SG-1271, wired version of the IG-1271. 7 lbs. 195.00

IG-1271 SPECIFICATIONS: Frequency range: 1 Hz to 1 MHz. Frequency accuracy: ±3% of full scale on dial. Functions: Triangle waveform: Nonlinearity, 5% maximum. Symmetry within 10% of 50% duty cycle. Square waveform: 100 nanosecond maximum rise or fall time. 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 ±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 7¼" W x 8⅞" D (with handle removed). Net weight: 4.2 lbs.

Solid-State portable VOM is ideal for fast, in-the-field checks

$**47**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 1½-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. 47.95

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: ±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: ±5% full scale. Frequency Response: 1 dB, 10 Hz to 1 MHz. OHMMETER: Rx1, Rx100, Rx10K, Rx1M (10 ohms center scale). Meter: 4½", 100 μA, 100 degree movement. Batteries: (not supplied): two 9-volt, one 1.5 V "C" cell. Dimensions: 5⅜" H x 9⅜" W x 9" D.

High-performance, budget-minded frequency counters

Heathkit Deluxe Frequency Counters — packed with extra features for value!

These Heathkit Frequency Counters give you the accuracy and reliability you need — plus features you just won't find on other counters in their price ranges. Features like a switchable attenuator on the 110 MHz input to divide the input signal x1, x10 or x100 to accurately measure high-amplitude signals. Or a time base switch to select the gate time and the resolution of the display. The IM-4120 time base is controlled by a high-quality TCXO (temperature-controlled crystal oscillator) with a temperature stability of ±1 part per million and an aging rate of 5 parts per million per year for excellent stability. The IM-4110's crystal oscillator has a temperature stability of ±10 parts per million and an aging rate of 10 parts per million per year. To maintain a low VSWR (voltage standing wave ratio), separate 50-ohm inputs are used for frequency ranges above 110 MHz, while inputs in frequency ranges below 110 MHz are 1 megohm shunted by less than 25 pF. To connect an external time base, there's a rear panel oscillator input/output jack.

The counters also feature rugged metal cases with non-marring front panels and a 12-position handle which rotates a full 360 degrees for easy storage and handling. The frequency counter circuitry can operate completely free of the metal case, which makes servicing your counter much easier. And you can calibrate your counter without instruments!

Kit assembly is easy, with a Heathkit construction manual to guide you every step of the way. And there's no better way to learn how to service your counter (and save on service costs) than building it yourself!

The counters operate on 120 or 240 VAC, 50/60 Hz (switch-selectable), 12 VDC (with optional IMA-4130-1 12-Volt Converter below) or 12 optional SMA-4130-2 rechargeable nickel-cadmium batteries (order below; can be recharged by optional IMA-4130-1 12-Volt Converter). Cables are not included with counter.

5 Hz to 110 MHz Frequency Counter. Applications include CB radio, low-band AM and FM radio, AM and FM broadcast bands, crystals, video tape systems, musical instruments and much more. Accepts any input between 5 Hz and 110 MHz.

Kit IM-4110, Shpg. wt. 12 lbs. **219.95**
Assembled SM-4110, Shpg. wt. 10 lbs. **350.00**

5 Hz to 250 MHz Frequency Counter. Same applications as IM-4110, plus marine and aircraft radios, 2-meter FM radio, 220 MHz FM radio, general laboratory and research work, and much more. Accepts inputs from 5 Hz to 110 MHz, and from 5 MHz to 250 MHz. Withstands 25 Vrms.

Kit IM-4120, Shpg. wt. 12 lbs. **319.95**
Assembled SM-4120, Shpg. wt. 10 lbs. **490.00**

	IM-4110	IM-4120
Frequency Range	5 Hz to 110 MHz	5 Hz to 250 MHz
Inputs	5 Hz to 110 MHz	5 Hz to 110 MHz 5 MHz to 250 MHz
Input Sensitivity	25 mV RMS	25 mV RMS
Input Impedance	1 meg shunted by <25 pF	50 ohms, VSWR less than 1.5:1 at 110 MHz
Protection	250 V (DC + peak AC) to 100 kHz	5 Vrms
Time Base Freq.	10 MHz	4 MHz TCXO
Aging Rate	<10 ppm/yr	<5 ppm/yr
Temp. Stability (0 to 40 C ambient)	±10 ppm	±1 ppm

OTHER SPECIFICATIONS: FUNCTIONS: Events: 1 to 99,-999,999. Period Resolution: 0.1 μS. Period Average: 1,000 periods. Period Pulse Width: 100 nS minimum. Low Frequency Signal Risetime: 1 mS to signals less than 10 Hz. OSCILLATOR CONNECTION: External Input Frequency: 1 MHz. Sensitivity: TTL or 2.5 Vrms for 50-ohm source. Protection: −5 V peak to +10 V peak. Internal Output: >1.5 V p-p into 50 ohms at 1 MHz. GATE INTERVAL: Frequency: 1 mS to 10 S. Period: determined by period of input frequency. Power Requirement: 105-130 VAC or 210-260 VAC (switch-selectable), 50-60 Hz, 35 watts; or 9-14 VDC at 2.5 A max. Dimensions: 4" H x 10¼" W x 13¼" D (less handle).
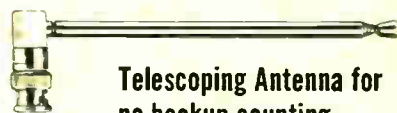
12-Volt Converter for IM-4110 and IM-4120 Counters. Mounts inside counter cabinet, allows counter to operate from a 12 VDC source to facilitate mobile operation. Can also be fitted with 12 optional SMA-4130-2 rechargeable nickel-cadmium batteries (order below).
Kit IMA-4130-1, Shpg. wt. 3 lbs. **34.95**
Assembled SMA-4130-1, Shpg. wt. 3 lbs. **60.00**

Set of 12 rechargeable nickel-cadmium batteries. Powers IM-4110 and IM-4120 Frequency Counters for portable use. Recharge with optional IMA-4130-1 12-Volt Converter (above).
SMA-4130-2, Shpg. wt. 4 lbs. **99.95**

Our compact, lowest-priced Frequency Counter gives you top value and performance

$**109**⁹⁵ Kit
- Full five-digit frequency counter
- Built-in input attenuation
- Internal or external time bases

The Heathkit IM-4100 gives you almost unbelievable value in a low-priced frequency counter. It's a full five-digit counter that also functions in period and totalize modes. And it provides built-in input attenuation and 12-volt operation.

The front panel attenuator switch allows the amplitude of input signals to be divided by 1,10 or 100. A reset switch quickly resets to zero.

A rear panel switch easily selects internal or external time base. The rear panel connector can be used as an input for an external time base signal and for frequency ratio measurements. Display includes overrange indicator and gate lamp. The IM-4100 operates on 120/240 VAC, or 12 VDC (mating connector supplied). Cables not included.
Kit IM-4100, Shpg. wt. 6 lbs. **109.95**
Assembled SM-4100, Shpg. wt. 6 lbs **190.00**

IM-4100 SPECIFICATIONS: Sensitivity: 20 mVrms (50 mV, 5 Hz to 50 Hz). Risetime: 1 mS for signals less than 10 Hz. Input Impedance: 1 megohm shunted by less than 35 pF. Protection: 240 Vrms at 60 Hz. TIME BASE: Frequency: 10 MHz. Stability: ±10 ppm, maximum, 0° to 40°C ambient. OSCILLATOR CONNECTION: External Input Frequency: DC to 20 MHz. Dimensions: 2¾" H x 7¼" W x 10½" D (less handle).

Telescoping Antenna for no-hookup counting

Hooks up to Heathkit 4100-series frequency counters to determine frequencies without direct connection to the unit(s) being tested. For any device where direct counter connection is either inconvenient or inaccessible.
SU-510, Shpg. wt. 1 lb. **9.95**

64

Economical, easy-to-use, precision Heathkit test equipment

High-precision X-Y Chart Recorder gives you extra versatility, extra accuracy for the most demanding uses

- Complete front panel controls for ease of operation
- Adjustable line frequency filtration
- Accurate to ±0.5 percent of full scale
- Electric pen lift to zero coordinates

$499.95 Kit

Low-priced, accurate and durable Heathkit Strip Chart Recorder

Functional styling and modern design make the IR-18M easy to use. Features 1 mV or 10 mV full-scale input (selected during assembly), twelve chart speeds from 5 sec./in. to 200 min./in. Accurate to ±0.5 percent of full scale. Zener diode-regulated voltage supply. Power, servo and chart switches, coarse and fine zero controls, high impedance floating input. Switchable line frequency rejection, from 20 to 80 dB. For 120/240 VAC, 50/60 Hz. Dimensions, 6" H x 15" W x 9⅛" D.

Kit IR-18M, Shpg. wt. 15 lbs. 239.95
Three 140 ft. rolls chart paper.
IRA-18-1, Shpg. wt. 5 lbs. 13.95
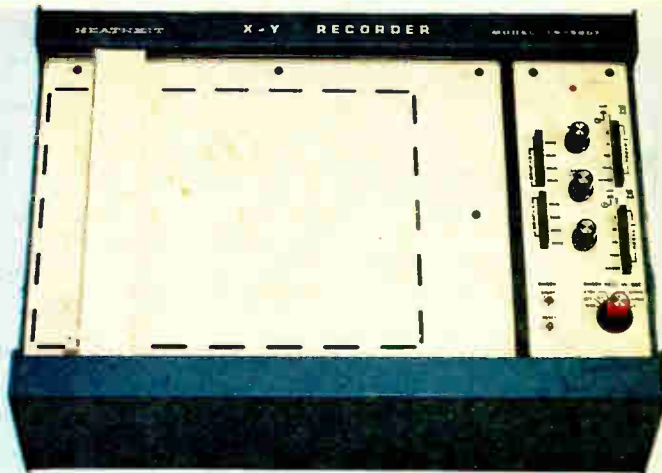
The easy-to-use IR-5207 Chart Recorder is precise enough for your most demanding measurements. Precise to ±0.5 percent of full scale (dead band and non-linearity error is less than 0.25 percent of full scale.)

The IR-5207 is easy to set up and operate. Complete front panel controls assure you of easy-operating convenience in any application. Front panel input filters with pushbutton controls let you tailor filtering to your exact requirements. The integral paper holdown can be used in both horizontal and vertical positions without modification, and it can use any type of special application paper that fits the graph table. Calibrated ranges of 1, 10, 100 mV and 1 V per inch are selectable from the front panel. And you can go from 1 mV per inch to 10 V per inch in the variable mode. Electric pen lift lets you place pen anywhere on the chart with zero input on both coordinates. The IR-5207 — versatile enough to help you in almost any chart recording application.

Kit IR-5207, Shpg. wt. 28 lbs. 499.95
Factory assembled and tested version of IR-5207.
SR-207, Shpg. wt. 30 lbs. 995.00
SU-205-6, Disposable Red Nylon Tip Pen for chart speeds under 1 in./min. Shpg. wt. 1 lb. 3.75
SU-205-7, Disposable Blue Nylon Tip Pen for chart speeds over 1 in./min. Shpg. wt. 1 lb. 3.75

IR-5207 SPECIFICATIONS: MECHANICAL: Chart Size: 8½" x 11" (21.59 cm 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 second for full-scale deflection. Overshoot: <1% of full scale. ELECTRICAL: Range: 1, 10, 100 mV/in., 1 V/in. (0.5, 5, 50, 500 mV/cm) calibrated, 1 mV/in. to 10 V/in. (0.5 mV/cm to 5 V/cm) variable. Zero Control Range: Pen may be placed anywhere on chart with zero input to both coordinates. INPUT CHARACTERISTICS: Type: Single ended, independently floating. Maximum Common Mode Input Voltage: 400 V. Ambient Temperature: 10° to 40°C. Power Requirements: 120/240 VAC, 50-60 Hz, 35 watts maximum. Dimensions: 5⅝" H x 17⅝" W x 12¼" D.

Professional-quality Harmonic and Intermodulation Distortion Analyzers

Harmonic Distortion Analyzer. The Heathkit IM-5258 Harmonic Distortion Analyzer is a professional-grade total harmonic distortion (THD) analyzer. Its outstanding sensitivity and bandwidth let you measure total harmonic distortion at levels as low as 0.03 percent, from 5 Hz to 100 kHz, with 5 percent full scale accuracy. Not for use in strong RF fields. For 120/240 VAC, 50/60 Hz. Dimensions, 5⅜" H x 15" W x 11½" D.
Kit IM-5258, Shpg. wt. 17 lbs. 239.95
Assembled SM-5258, Shpg. wt. 16 lbs. 350.00

Intermodulation Distortion Analyzer (not pictured). The IM-5248 Intermodulation Distortion Analyzer is similar to the IM-5258 Harmonic Distortion Analyzer, except the IM-5248 measures Intermodulation Distortion (IMD). Excellent sensitivity (10 mV to 300 V in a 1-3-10 sequence) means you can measure almost any level of IMD. Not for use in strong RF fields.
Kit IM-5248, Shpg. wt. 14 lbs. 129.95
Assembled SM-5248, Shpg. wt. 15 lbs. . . .200.00

Heathkit Audio Load (not pictured). The ID-5252 can provide audio loads of 2, 4, 8, 16 or 32 ohms for testing purposes. Available load combinations (all are 1% resistors) include: four 8-ohm loads at 60 watts each, two 16-ohm loads at 120 watts each, two 4-ohm loads at 120 watts each and one 2, 8 or 32-ohm load at 240 watts. Dimensions, 4" H x 9" W x 9" D.
Kit ID-5252, Shpg. wt. 6 lbs. 47.95

Rugged Bi-Directional Wattmeter

$114.95 Kit

Covers 100 MHz to 1 GHz without costly elements or slugs; ideal for servicing.

The Heathkit IM-4190 is ideal for use in repairing and servicing two-way radios, VHF and UHF communications equipment. Measures forward and reflected power in transmission lines between 100 MHz and 1 GHz. Easy-to-read front panel meter, N-type coax connectors for easy hookup, N to PL-259 adapters. Requires 9-volt battery (not included).
Kit IM-4190, Shpg. wt. 3 lbs. 114.95
Factory assembled and tested version.
SM-4190, Shpg. wt. 3 lbs. 150.00

High-accuracy 3½-digit auto-ranging Multimeter

$299⁹⁵

- 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 ±0.2%; Basic AC accuracy is ±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. 299.95

IMA-2212-1, Optional Rechargeable Battery Pack for in-field use.
Shpg. wt. 4 lbs. 42.95

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: ±[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): ±[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: ±[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): ±[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: ±[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: 3⅓ per second. Overrange Indication: flashing display on highest range, or when using RANGE HOLD switch. Power Line Isolation: COM 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

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. 130.00

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 µA. Ohms: 1 ohm. Accuracy (Full Scale, ±1 Digit): DC volts: ±1%. DC current: ±1.5%. AC volts: ±1.5%. AC current: ±2%. Ohms: ±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

$199⁹⁵

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 semi-conductor devices. Has 3½-digit display with leading zero suppression, automatic polarity indication and decimal placement.

Kit IM-2202, Shpg. wt. 8 lbs. 199.95

IM-2202 SPECIFICATIONS: DC VOLTAGE — Overload Capability: 300 V on 100 mV & 1V ranges; 1000 V on 10 V & 1000 V ranges: Accuracy: ±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: ±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 µA/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mV/150 mV, 1000 mA/300 mV. Accuracy: ±0.5%, ±1 digit (except ±1%, ±1 digit on 1000 mA range). AC CURRENT — Range/Voltage Drop: 100 µA/100 mV, 1.000 mA/100 mV, 10.00 mA/100 mV, 100.0 mA/150 mV, 1000 mA/300 mV. Accuracy: ±1.0%, ±3 digits except ±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 kΩ/1.0 mA, 10.00 kΩ/0.1 mA, 100.0 kΩ/1.0 µA, 1000 kΩ/10. µA. Accuracy: ±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 (internal selectable); 60/50 Hz; (Accuracy specs use built-in references.) Size 3" H x 8¼" W x 8" D .

Portable hand-held Multimeter with LCD digital readout

**One of the lowest-priced hand-held DMM's available —
offers top performance and easy one-hand operation**

$99⁹⁵

- Measures AC and DC voltage, current and resistance
- Big, easy-to-read Liquid Crystal Display (LCD)
- Built-in references for easy in-the-field calibration
- Low-current drain circuit for long-life battery operation

The new IM-2215 brings you the features you need in a hand-held DMM at a great low price. Measurement functions include AC and DC volts, AC and DC current, and resistance. Special alternating high-to-low resistance test voltage makes it ideal for measuring semiconductors and in-circuit resistance. Easy one-hand operation and built-in calibration references make it ideal for in-the-field use. The 3½-digit liquid crystal display features large, easy to read digits and automatic decimal point placement. Battery condition is continuously monitored and a "Lo-Bat" is displayed for the last 20% of battery life. The special low-current drain circuit provides long battery life — a typical alkaline 9-volt battery provides up to 200 hours of operation.

Pushbutton switches permit easy one-hand operation, leaving your other hand free for probe placement. A pivoting stand is included to place the display at a convenient angle for bench use. Easy one-evening kit assembly. Operates on 9-volt battery (not supplied), 120 or 220 VAC with optional cords (order below).

Kit IM-2215, Shpg. wt. 2 lbs. **99.95**

Rugged Leather Carrying Case with Belt Loop.

IMA-2215-1, Shpg. wt. 1 lb. 14.95

PS-2350, 120-volt AC outlet cord. Shpg. wt. 1 lb. 4.95

PS-2450, 220-volt AC outlet cord. Shpg. wt. 1 lb. 14.95

IM-2215 SPECIFICATIONS: DC VOLTAGE: Ranges: ±200 mV, ±2 V, ±20 V, ±200 V, ±1000 V. Accuracy: Lab standards ±(.25% of reading +1 count). Built-in standards: ±(.35% or reading +1 count). Input Impedance: 10 megohms on all DC voltage ranges. Overvoltage Protection: 1000 VDC, 750 VAC on all DC ranges. AC VOLTAGE: Ranges: 200 mV, 2 V, 20 V, 200 V, 750 Vrms. Accuracy: ±(.5% of reading +3 counts). Built-in standards: ±(.6% or reading +3 counts). Frequency Response (25°C ±10°C): 200 mV, 2 V, 20 V, 200 V ranges ±(1% of reading +3 counts), 40 Hz to 1 kHz. 750 V range, ±(1% of reading +3 counts), 40 to 450 Hz. Input Impedance: 10 megohm shunted by approx. 100 pF on all AC ranges. Overvoltage Protection: 2 V, 20 V, 200 V, 750 V ranges, 1000 VDC, 750 VAC. 200 mV range, 1000 VDC, 15 seconds maximum over 300 VAC. DC CURRENT: Ranges: ±2 mA, ±20 mA, ±200 mA, ±2000 mA. Accuracy: ±(.75% of reading +1 count) on all DC ranges. Voltage Drop: 2 mA, 20 mA, 200 mA ranges, .25 VDC maximum at maximum display. 2000 mA range: .7 VDC at maximum display. Overcurrent Protection: 2000 mA maximum on all ranges in circuits with open circuit voltage less than 250 volts. AC CURRENT: Ranges: 2 mA, 20 mA, 200 mA, 2000 mA. Accuracy: 20 mA, 200 mA, 2000 mA ranges, ±(1.5% of reading +3 counts), 40 to 1 kHz. 2 mA range, ±(1.5% of reading +3 counts), 40 to 200 Hz. Voltage Drop: 2 mA, 20 mA, 200 mA ranges: .25 VAC maximum at maximum display. 2000 mA range: .7 VAC maximum at maximum display. Overcurrent Protection: 2000 mA maximum on all ranges in circuits with open circuit voltage less than 250 volts. RESISTANCE: 200 ohms, 2 kilohms, 20,000 ohms, 200 kilohms, 2 megohms, 20 megohms. Accuracy: 200 ohm range, ±(.3% of reading +3 counts). 2 kilohm, 20 kilohm, 200 kilohm, 2000 kilohm ranges, ±(.25% of reading, +1 count). 20 megohms range, ±(2% of reading +1 count). Voltage at max. display: 200 ohms, 20 kilohms, 2000 kilohms ranges, less than .25% VDC (low-test voltage). 2 kilohm, 200 kilohm and 2000 kilohm ranges, greater than .7 VDC (high-test voltage). Overvoltage Protection: 300 volts DC or AC on all ranges. GENERAL: Operating Temperature Range: 0°C to 50°C (32°F to 122°F). Storage Temperature: −20°C to 60°C. Temperature Coefficient: ±(.1 x applicable accuracy)/°C. Power Requirements: 9-volt battery (NEDA 1604) or equivalent or battery eliminator. Polarity Indication: automatic negative, implied positive. Overrange indication: all digits except most significant digit blanked. Maximum Resolution: voltage, 100 μV, current, 1 μA, resistance, 1 ohm. Display Rate, approx. 2½ per second. Display: 3½ digit (maximum count 1999) liquid crystal. Dimensions: 2″ H x 3¼″ W x 7½″ L. Weight: 14 oz. (with battery.)
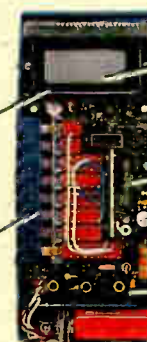
Loaded with convenience features, the IM-2215 is your best buy in a hand-held, solid-state multimeter!

All dual-slope and analog-to-digital conversion circuitry is contained on a single MOS/LSI IC for simplicity and stability

Pushbutton range and function switches allow easy one-hand operation

3½-digit liquid-crystal display is easy-to-read in any light

A single printed circuit board makes kit assembly easy and fast

Separate voltage and current inputs provide good circuit protection for the units under test

67

Deluxe DC-35 MHz Delayed-Sweep Dual-Trace Oscilloscope-

The perfect addition to your service bench — ideal for any testing use.

$899.95 Kit

NO OTHER MANUFACTURER OFFERS ALL THESE TOP PERFORMANCE FEATURES AT A PRICE THIS LOW!

- Smooth rolloff allows observation of signals beyond 50 MHz
- Less than 10 nS rise time for complex fast-rise signals
- Vertical delay lines for observing the leading edge of signals
- 2 mV vertical deflection sensitivity at full bandwidth
- Dual-trace for simultaneous observation of two separate signals
- Algebraic ADD with the ability to invert either channel for observing differential signals
- Sweep speeds from 50 nS/cm to 0.2 sec/cm, plus 5 times expansion, for an effective sweep speed of 10 nS/cm at the highest sweep rate
- Triggering to greater than twice the specified vertical bandwidth
- Single-sweep function for observing random signals
- A full complement of trigger sources, couplings and modes including a unique TV coupling which triggers on 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 the brightest display we have ever offered in an oscilloscope

The Heathkit IO-4235 — one of the most sophisticated and versatile oscilloscopes available anywhere!

This deluxe oscilloscope is ideal for measuring and observing virtually any kind of waveform — from the simple sine wave signals of hi-fi components and television to the highly complex waveforms produced by the latest solid-state devices including computers.

The IO-4235 laboratory-quality oscilloscope offers true professional performance at an affordable Heath price! It's the oscilloscope you'll want on your bench for years to come.

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. Because the start and length of the delayed sweep are user controlled, any given portion of the normal waveform can be displayed at a much higher rate. In fact, using a 1000 times expansion the displayed jitter will be less than ½ cm.

The 8x10 cm mesh CRT features 10 kV post acceleration voltage — 2½ times greater than any oscilloscope we've ever offered — to give you truly outstanding brightness and greater writing speeds. In fact, the IO-4235 is bright enough to pick up the fast, narrow signals other scopes might miss. This CRT is among the finest available for this application.

The IO-4235 also has fully regulated power supplies, variable hold off control, front panel 1-volt square wave output, more. Calibration requires a precise source of square waves such as the IG-4005 on page 70, and a DC voltmeter.
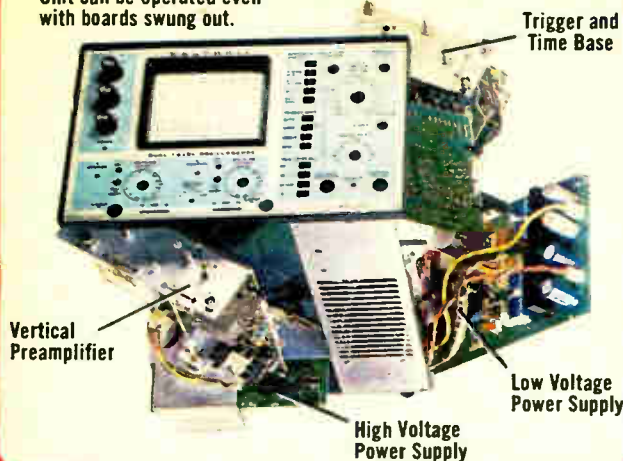
Kit IO-4235, Shpg. wt. 52 lbs. 899.95

Factory assembled and tested version of above.
SO-4235, Shpg. wt. 38 lbs. 1295.00

the finest scope we offer!

Unit can be operated even with boards swung out.

Trigger and Time Base

Vertical Preamplifier

Low Voltage Power Supply

High Voltage Power Supply

The Heathkit IO-4235 is the most advanced oscilloscope Heath has ever developed! We started with the same team who designed our superb IO-4510, surrounded them with additional designers, technicians, engineers, writers, draftsmen and illustrators — invested nearly 10-man-years and came up with a product which is unmatched in performance, quality and features at its price! This oscilloscope can be directly compared with other oscilloscopes costing literally hundreds of dollars more — i.e., the Tektronix T935A.
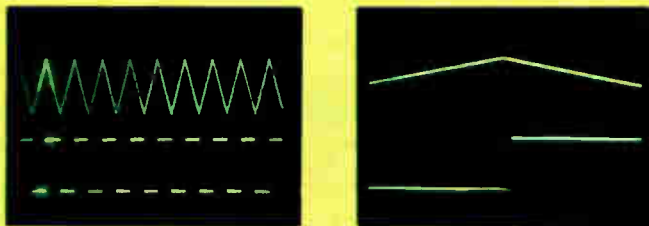
The delayed sweep takes the user selected portion of the waveform (intensified portion in the left picture) and magnifies it the desired number of times for closer examination (right picture).

IO-4235 SPECIFICATIONS: Vertical. Deflection Factor: 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. Maximum Input, 400 volts peak combined AC and DC. Connector, BNC. Vertical Modes: Y_1, Y_2, Y_1 and Y_2 chopped, Y_1 and Y_2 alternate, algebraic add ($\pm Y_1$ $\pm Y_2$). 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. Magnifier, X5, accurate to within 5%, 20°C to 50°C; 7%, 10°C to 40°C. HORIZONTAL DISPLAY: Modes: "A", "A" intensified by "B", "B" delayed by "A", X-Y and EXT X. Delay Time Position: 1 cm to 10 cm. Jitter: greater than 10,000 to 1, typically 20,000 to 1 at 5 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). Connector: BNC. TRIGGER: Source, ± channel Y_1, ± channel Y_2, ± 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. Input Z: 1 megohm paralleled with 30 pF. X-Y: Y Channel, same as vertical. X Channel, same as vertical, except response limited to 2 MHz and no delay line. Phase Shift: less than 8° at 100 kHz. Voltage Range: 120/240 VAC switch selected. 85 watts. Temperature Range: 10°C to 40°C. Dimensions: 7¾" H x 13¾" W x 19¾" D (without handle).

Lab Quality Oscilloscope — Dual-Trace, DC-15 MHz with vertical delay lines

$669⁹⁵ Kit

Vertical input sensitivity of 1 mV/cm is provided over the entire bandwidth so that a x10 probe, waveforms to 10 mV can be read.

The IO-4510 will typically trigger on signals up to 45 MHz and is guaranteed to 30 MHz with only 1 cm deflection. And, there is no stability control needed with the digitally controlled triggering circuits. In the automatic mode, a reference baseline is generated even when the trigger signal is absent. Complete triggering controls are provided with choice of AC, ACF or DC coupling. The ACF (coupling) mode is provided to reject low-frequency components of the trigger waveform for accurate scope triggering. A trigger select allows triggering at any point on the vertical signal, or from either channel Y_1 or Y_2.

You have a choice of normal or automatic sweep, and can use any one of 20 time bases from 0.2 sec/cm to 0.1 μsec/cm. Any sweep speed can be magnified five times. You can also select an externally generated horizontal signal.

Internal delay lines insure the start of a horizontal sweep prior to the beginning of the vertical signal. The IO-4510 guarantees display of at least 20 nanoseconds of the pre-triggered waveform, insuring complete waveform display.

Fully regulated power supplies provide stable voltages regardless of the varying line voltage conditions. The 4 kV regulated post-acceleration potential of the CRT insures display brightness. Calibration requires precise source of square waves such as IOA-4510-1 or IG-4505 (page 70).

Kit IO-4510, Shpg. wt. 36 lbs. **669.95**
SO-4510, factory assembled & calibrated, Shpg. wt. 28 lbs. **870.00**

IO/SO-4510 SPECIFICATIONS — VERTICAL: Deflection Factor: Sensitivity: 1 mV/cm to 5 V/cm in 12 steps. Variable: Continuous between steps to approx. 15 V/cm. Accuracy: Within 3% (20°C to 30°C), 5% (10°C to 40°C) referenced to 0.2 V/cm @ 25°C. Vertical Response: DC Coupling: DC to 15 MHz (−3 dB). AC Coupling: 2 Hz to 15 MHz (−3 dB). Rise Time: 24 nanoseconds. Overshoot: Less than 3%. Delay Line: Allows display of at least 20 ns of pretriggered waveform. Vertical Input: Impedance: 1 megohm shunted by approx. 40 pF. Maximum Input: 400 volts peak combined AC & DC. Vertical Modes: Y_1 or Y_2 selected by vertical position controls. Dual: Chopped (200 kHz) or alternate automatically selected by Time Base switch. HORIZONTAL: Time Base: Ramp: 0.2 sec/cm to 0.1 μsec/cm in 20 steps. Variable: Continuous between ranges to approx. 0.6 sec/cm. Accuracy: Within 3% (20°C to 30°C), 5% (10°C to 40°C) referenced to 1 ms/cm @ 25°C. Magnifier: X5 (adds additional 2% to sweep accuracy). External: Sensitivity: 0.2 V/cm (approx.) Impedance: 200 kilohms (approx.). Frequency Response: DC to 1 MHz (−3 dB). TRIGGER: Internal: Automatic: Zero crossing ±0.5 volts. Normal: Adjustable over 8 divisions. Slope Selection: + or −. External: Automatic: Zero crossing ±0.2 volts. Normal: Adjustable over ±5 volts. Slope Selection: + or −. Impedance: 1 megohm shunted by approx. 30 pF. X-Y: Y Channel: Same as Vertical. X Channel: Same as Vertical, except response limited to 1 MHz and no delay line. X-Y Phase Shift: Less than 3° @ 100 kHz. Power: Voltage Range: 120/240 VAC, switch selected, 75 watts. Dimensions: 6.4" H x 12.9" W x 19.3" D (handle extended). Net Weight: 24 lbs.

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Heathkit oscilloscopes give you top performance, unbeatable

Single-Trace DC to 10 MHz Oscilloscope. Has the same fine features as the IO-4550, except single-trace operation only. Easy kit assembly.
Kit 10-4555, Shpg. wt. 29 lbs. **369.95**

$419⁹⁵ Kit Heathkit Dual-trace DC to 10 MHz Oscilloscope is ideal for your service and design work!

An excellent choice for electronic tests, the Heathkit IO-4550 Oscilloscope's extra-bright trace can easily be read — even in high ambient light conditions! And its two vertical input channels have a good sensitivity of 10 mV/cm for accurate measurements. Input channels can either be displayed, chopped or alternated by a time base switch. The time base can be precisely triggered at any point on the time positive or negative slope of the signal with a trigger select switch and level control. The IO-4550 operates to specifications on standard line voltages from 100 to 270 VAC, thanks to a fully-regulated power supply. Complete mu-metal shielding helps prevent interference from stray magnetic fields. With just four printed circuit boards, the IO-4550 is a breeze to assemble. Calibration requires a precise source of square waves, like the IOA-4510-1 (with additional 6-volt power source) or IG-4505 below.

Kit 10-4550, Shpg. wt. 27 lbs. **419.95**
Assembled and calibrated SO-4550, Shpg. wt. 25 lbs. **615.00**

IO/SO-4550 SPECIFICATIONS: VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. Attenuator: 11 steps in 1-2-5 sequence. Variable: Continuous between steps to approximately 60 V/cm. Accuracy: Within 3%. Vertical Response: DC Coupling: DC to 10 MHz. AC Coupling: 2 Hz to 10 MHz. Rise Time: 35 ns. Overshoot: Less than 5%. VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. Attenuator: Vertical Input: Impedance: 1 MΩ shunted by 38 pF. Maximum Input: 400 V. HORIZONTAL: Time Base: Ramp: 0.2 s/cm to 200 ns/cm. Positions: 19 steps in 1-2-5 sequence. Variable: Continuous between ranges to approximately 0.6 s/cm. Accuracy: Within 3%. Magnifier: X5 (adds additional 2% to sweep accuracy). External: Sensitivity: 0.1 V/cm (approx.). Impedance: 100 kΩ (approx.). Frequency Response: DC to 1MHz. Connector: BNC. TRIGGER: Internal: Automatic: Adjustable over 10 divisions. Normal: Adjustable over 10 divisions. Slope Selection: + or −. External: Automatic: Adjustable over 0.8 V. Normal: Adjustable over 0.8 V. Slope Selection: + or −. Impedance: 1 MΩ shunted by 40 pF. Connector: BNC. X-Y: Y Channel: Same as vertical. X Channel: Same as vertical except response is limited to 1 MHz. Phase Shift: Less than 8° @ 100 kHz. Power: Voltage Range: 120/240 VAC switch selected, 70 watts. 6.9″ H x 12.9″ W x 19.3″ D (without handle).
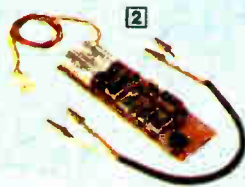
Quality accessories make your Heathkit oscilloscope more versatile

1 Top-value Scope Switch for dual-trace capability. Gives any single-trace scope with external trigger input dual-trace versatility! Provides simultaneous display of two separate input signals for comparison, observing phase relationships, etc. Also can be used as impedance coupler, preamp or square wave generator in experimental circuits. A sync output on each channel permits scope sweep to be locked to either input signal. DC coupling adds versatility. Compatible with NTSC system only.
Kit 1D-4101, Shpg. wt. 5 lbs. **54.95**

ID-4101 SPECIFICATIONS: Signal Gain: >10 times. Maximum input signal: 600 VDC or 600 VAC p-p. Input impedance: 1 megohm/50 pF. Maximum signal output: 8 V p-p. Output loading: 1000 ohm minimum. Hum and noise: (single channel only). <40 mV p-p. Chopping rates: Approx. 100, 500, 1000 and 5000 Hz. Power requirement: 120/240 V, 60/50 Hz, 6 W. Dimensions: 4¼″ H x 10⅜″ W x 5⅛″ D.

2 Low-priced Scope Calibrator for IO-4510, IO-4530. The Heathkit IOA-4510-1 is an easy-to-build, easy-to-use crystal-controlled time base designed by Heath's 'scope engineers for oscilloscope calibration. It provides everything you need to accurately calibrate your IO-4510 or scopes to 15 MHz. It generates a square

wave signal with selected ranges from 1 MHz to 1 kHz at TTL output levels. The 1 kHz output level can be adjusted from 0 to 4.7 volts peak. Draws operating power from IO-4510 or external 6 V source.
Kit IOA-4510-1, Shpg. wt. 1 lb. **18.95**

3 Deluxe Calibrator for scopes to 35 MHz bandwidth. The IG-4505 is a practical oscilloscope calibrator at a sensible price. It provides all the waveforms necessary to adjust sweep speeds, vertical calibration, delay line terminations, high frequency compensation and attenuator compensation for oscilloscopes with bandwidths up to 35 MHz. Round out your test bench today.
Kit IG-4505, Shpg. wt. 4 lbs. **49.95**

IG-4505 SPECIFICATIONS: TIME CALIBRATION: Range: 0.5 sec. to 1 μs square wave in 1-2-5 sequence, accurate to within .01%. Amplitude: ≈200 mV peak. Rise Time: ≤4 ns. Overshoot: ≤3%. Output: 50 ohms terminated cable. VOLTAGE CALIBRATION: Ranges: 1 mV to 100 V peak square wave in decade sequence. Accuracy: To within 2% with 1MΩ load referenced to 1 V position. Rise Time: ≤2 μs. Frequency: DC, 2 Hz to 10 kHz in 1-2-5 sequence. Accuracy of Internal Voltage Standard: Within 1%. Power Requirement: 120/240 Volts AC, 60/50 Hz, 12 watts. Dimensions: 2¾″ H x 9⅛″ W x 4¼″ D.

quality and better value...because you build them yourself!

$299⁹⁵ 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 µS/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. 299.95
Assembled and Tested. SO-4205, Shpg. wt. 20 lbs. 480.00

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 µS in 7 steps, plus variable. Trigger Source: Y_1/Y_2 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 persistance 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.

$219⁹⁵ Kit — A professional DC-5 MHz Oscilloscope that's priced right for the hobbyist!

- 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 µS/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. 219.95
Assembled and Tested SO-4105, Shpg. wt. 19 lbs. 395.00

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 µS in 7 steps, plus variable. Trigger Source: Y_1/Y_2 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 persistance 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.

A great holiday gift for all the family

$1495⁰⁰

- Save over $300 from our summer price on the computerized Heath/Thomas Troubador organ!
- One of the richest, most realistic sounding organs you can buy anywhere!
- Easy-to-build and easy-to-play

You'll be playing in no time. And enjoying every minute of it too. The TO-1860 is Heath's easy to build version of the fabulous microprocessor-based Thomas Troubadour. In fact, it's the easiest-to-build organ kit we've ever offered. Quick-learn features like Color-Glo keys, color-coordinated music, one finger chords and chord memory make it easy and a real delight to play!

Voices and effects include flute, trombone, trumpet, bassoon, diapason, clarinet, oboe, violin, mandolin and banjo. Rhythm accompaniment includes Waltz, Fox Trot, Swing, Rhythm and Blues, Rock, Polka, Samba, Bossa Nova and Rhumba. The sound system consists of a powerful, quality solid-state stereo amplifier and two 12" heavy-duty speakers.

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

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

Kit TO-1860, Shpg. wt. 256 lbs. Motor Freight ...... Was $1799.95, Now 1495.00

TOA-1860-1, Demo Record & Information Packet 1.50

SAVE OVER $300

Heathkit Electronic Metronome

Ideal for music students and teachers. Maintains a steady beat so you can practice more efficiently. Adjust tempo between 40 and 210 beats per minute with a front panel control, while a rear panel control adjusts volume. A chart on the bottom of the cabinet relates the number of beats per minute to tempos in different time signatures. Handsome cherry finish birch cabinet with non-marring felt feet. Easy one-evening assembly makes it an ideal beginner kit. Uses two 9-volt batteries (not supplied).

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

High-performance, solid-state 25-watt Guitar Amp

Rugged one-piece case with handle houses a full control amplifier and speaker system with two heavy-duty 12" woofers. Two dual-input channels. Features double-spring variable reverb and tremolo with variable rate and depth, a line reverse switch to minimize hum. Two footswitches for reverb, tremolo. 19¾" H x 28" W x 9" D. 120/240 VAC.

Kit TA-16, Shpg. wt. 61 lbs. 209.95

The Heathkit PT-1500 Darkroom Timer—the most versatile darkroom timer available! NEW

$129⁹⁵

- Programmable memory holds up to nine process steps
- Convenient touch control
- Easy-to-build two-evening kit

The Heathkit PT-1500 Darkroom Timer is one of the most versatile darkroom timers anywhere! The timer is microprocessor-controlled for maximum accuracy. The PT-1500's programmable memory can hold times for up to nine process steps and an enlarger step, and auto-step sequencing loads the timer so you're ready to time the next step. If you use the optional PTA-1500-3 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 (outlets for non-inductive loads only).

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. And a display switch turns off the LEDs and backlighting without affecting countdowns or memory when you need complete darkness. Convenient touch control for easy operation. Litetouch™ front panel is impervious to darkroom chemicals. Control start or focus switch with optional PTA-1500-1 Foot Switch, or both start and focus switches with optional PTA-1500-2 foot switch (order below).

Kit PT-1500, Shpg. wt. 5 lbs. 129.95

Optional Single Foot Switch.
PTA-1500-1, Shpg. wt. 5 lbs. 9.95

Optional Dual Foot Switch.
PTA-1500-2, Shpg. wt. 3 lbs. 24.95

Optional Auxiliary Outlet.
PTA-1500-3, Shpg. wt. 1 lb. 14.95

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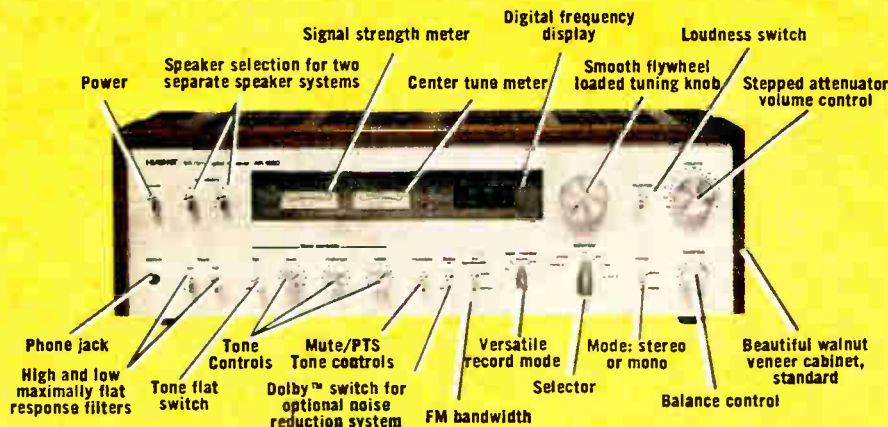# Introducing the finest Heathkit Stereo Receiver ever

NEW

125 watts of superbly defined sound plus 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
- FM signal-to-noise ratios of 73 dB (stereo) and 80 dB (mono) for minimal distortion
- Hum and noise down 90 dB for backgrounds of total silence
- Total harmonic distortion of 0.1% (phono + amp) and 0.1% (FM + amp) assure clean, natural sound

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
- Complete speaker and circuit protection includes speaker turn-on delay and thermal circuit breaker
- Center tune meter indicates exact center of channel for best separation and lowest distortion and noise
- 5-section tuning capacitor reduces noise

Signal strength meter | Digital frequency display | Loudness switch
Power | Speaker selection for two separate speaker systems | Center tune meter | Smooth flywheel loaded tuning knob | Stepped attenuator volume control

Phone jack | Tone Controls | Mute/PTS Tone controls | Versatile record mode | Mode: stereo or mono | Beautiful walnut veneer cabinet, standard
High and low maximally flat response filters | Tone flat switch | Dolby™ switch for optional noise reduction system | FM bandwidth | Selector | Balance control

For a variety of listening options

- Source selection includes two phonos, two auxiliary sources, FM or AM or tape monitor
- Record mode lets you record from deck 1 to deck 2 and monitor either one
- 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
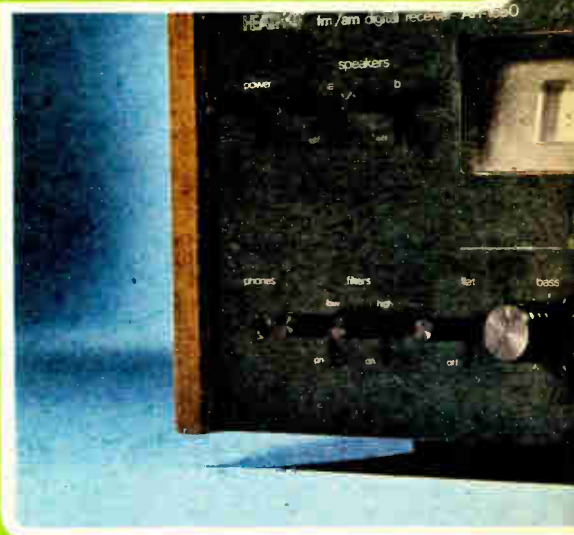
New Heathkit AR-1650 Stereo Receiver

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 new AR-1650 not only has all the raw power you'll ever need, it also delivers a sound quality unlike any you've ever heard before.

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 new 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 tenth. 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

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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 either deck or any other source.

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 flywheel 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.

Superbly designed receivers give you thrilling sound

$649⁹⁵

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

Elegant and functional, the Heathkit AR-1515 is an exceptional stereo receiver. LED 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 μV sensitivity, and the optional AD-1504 Dolby Module (below) lets you enjoy reduced noise and even greater dynamic range. Dual-gate MOSFETs in the front end and a computer-designed 9-pole filter make the AM section one of the finest in any receiver! Heath builds in an extra margin of performance to assure clean, wide-range sound, over a background of silence, without audible strain or struggle — even on the most complex musical passages. The controls are easy to reach. Preamp out/amp jacks allow an audio equalizer or noise reducer to be used. And modular design and color-coded wiring harnesses, along with a test meter to double-check your work, make the AR-1515 as easy to assemble as it is to listen to!

Kit AR-1515, Shpg. wt. 47 lbs. **649.95**
Dolby FM Module, Kit AD-1504, Shpg. wt. 1 lb. **49.95**
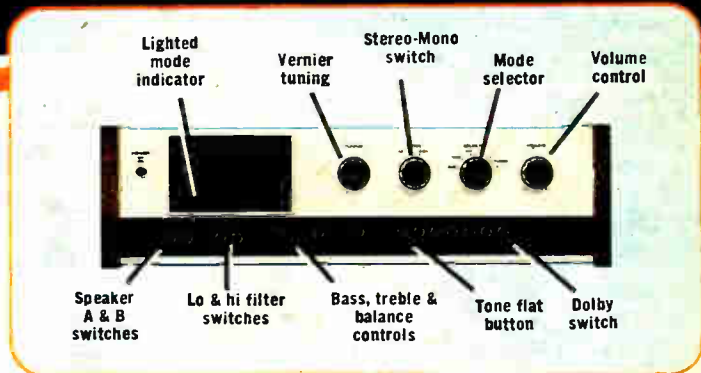
High-performance amplifier section of the AR-1515 Stereo Receiver.
Kit AA-1515, Shpg. wt. 39 lbs. **319.95**

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 μV IHF. **Selectivity:** 100 dB IHF. **Image Rejection:** 90 dB IHF. **Stereo Separation:** 40 dB or greater at mid-frequencies. **AM Sensitivity:** 5 μV with 50-ohm direct input. **Selectivity:** 20 dB at 10 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: ±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:** 2μV 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:** 3⅞" 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

$239⁹⁵
- High-performance tuner sections
- 40 dB typical separation for spacious stereo sound

When it comes to giving you expensive performance at an economical price, the Heathkit AR-1219 is hard to beat! We've taken years of audio engineering excellence and packed them into a simple, low-cost 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. High-performance tuners give you excellent sensitivities of 100 μV/M on AM and 2 μV on FM. And there are plenty of operating features which really add up! Controls are large enough to be adjusted easily. A headphone jack and speaker disconnect are provided for private listening. And there's a tape monitor switch for extra convenience.

Kit AR-1219, Shpg. wt. 18 lbs. **239.95**

This can be the heart of a beautiful sound system for you

$389⁹⁵

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 most any listening area. And specifications that mean true professional performance! FM sensitivity is an excellent 1.8 μV 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 also build and install the optional AD-1504 Dolby™ FM Module for the reduced noise and increased dynamic range of the Dolby FM broadcasts offered by many stations. Compare this combination of features and specifications with any other similarly classed receiver. With its superb performance and

versatility, you'll find that the Heathkit AR-1429 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 Heath electronic kits, it comes with its own comprehensive, easy-to-follow assembly manual that takes you step-by-step from unpacking to final assembly. You'll find it hard to beat the AR-1429 without spending a lot more money. And this receiver has the looks to match the quality of its advanced electronic design. The cabinet with solid-walnut end panels (included) makes the AR-1429 a handsome addition to any decor.

Kit AR-1429, Shpg. wt. 32 lbs. 389.95

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

AR-1429 SPECIFICATIONS: AMPLIFIER — Frequency Response: −1 dB, 5 Hz to 45 kHz. Damping Factor: 60. Input Sensitivity: Phono, 2 mV; Aux. Tape and Tape Mon., 200 mV. Hum and Noise: Phono, −65 dB (−79 dB for 10 mV input); Aux.. Tape and Tape Mon., −75 dB. Phone RIAA* Equalization: ±1 dB (30 Hz to 20 kHz). FM SECTION — Sensitivity: 1.8 μV* (10.3 dBf) usable, 4.0 μV (17 dBf @ 50 dB signal to noise). Selectivity: 65 dB. Capture Ratio*: 1.8 dB; AM Suppression*: 48 dB; Image Rejection: 90 dB*. Stereo Separation: 40 dB, typ. at 1000 Hz. Frequency Response: ±1 dB from 20 to 15,000 Hz. AM SECTION — Sensitivity: 10 μV. Selectivity: 20 dB. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 4¾″ H x 20″ W x 13½″ 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!

$134⁹⁵

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. 14 lbs. 134.95

$134⁹⁵

AM/FM Stereo Tuner with great sensitivity and PLL circuitry

The AJ-1219's pre-assembled and aligned FM front end provides 2 μV 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. The AJ-1219 — great performance on a budget! Kit AJ-1219, Shpg. wt. 12 lbs. 134.95

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Heathkit Pro-Series gives you studio

The finest Heathkit audio system ever

The Pro-Series has specs you can hear — and the flexibility
to let you hear them just the way you like. The pride of building it,
the pleasure of listening to it will last a lifetime.

HEATHKIT ELECTRONIC CENTER charg·a·kit REVOLVING CHARGE

[1] **Heathkit AJ-1600 Pro-Series FM/AM Tuner**

[2] **Heathkit AP-1800 Pro-Series Preamplifier**

[3] **Heathkit AD-1701 Graphic Output Indicator**

[4] **Heathkit AA-1600 Pro-Series Stereo Amplifier**

Heathkit Pro-Series components are also available with optional oak-finish wood cabinets. Cabinets are listed and sold separately for each component. Order from next page.

① Heathkit AJ-1600 Pro-Series Stereo FM/AM Tuner

The new Pro-Series Tuner is Heath's finest and one of the world's finest. It's loaded with features that let you adjust to strong signals or weak signals for distortion-free, noise-free reception: Super-sensitive 1.8 μV (mono) and 3.5 μV (stereo) for reception of distant stations. Signal-to-noise ratios of 83 dB (mono) and 75 dB (stereo) are the best you'll find for the money. 0.1% harmonic distortion levels assure full, rich sound. Extra-wide band-width reduces noise and improves separation. Band-width switch lets you select narrower band for minimal interference in crowded signal areas. RF attenuator adjusts sensitivity for clear, clean signal reception. Multipath switch lets you meter multipath distortion. 75/300-ohm antenna switch maximizes front-end sensitivity. Digital readout displays frequencies more accurately than tuning dial.

Both the 5-gang FM front end and FM IF/Stereo Demodulator boards are factory assembled and tested to shorten kitbuilding time and assure optimum performance. The open chassis layout and wiring harnesses also speed assembly.

Kit AJ-1600, Shpg. wt. 25 lbs. **399.95**
AEA-1800-2, Oak-Finish Cabinet for AJ-1600.
Shpg. wt. 6 lbs. **39.95**
Kit AJA-1600-2, Dolby FM Module for AJ-1600.
Shpg. wt. 1 lb. **54.95**

AJ-1600 SPECIFICATIONS: FM Section. Frequency Response: ±0.5 dB, 20 Hz to 15 kHz. Antenna: 300 ohm balanced, 75 ohm unbalanced. Selectivity: Wide IF Bandwidth, −40 dB. Narrow IF Bandwidth: −80 dB. Signal to Noise Ratio: 83 dB (mono), 75 dB (stereo). Mono Harmonic Distortion: 0.1% @ 1 kHz. Image Rejection: 100 dB. IF Rejection: 100 dB. Spurious Rejection: 100 dB. Capture Ratio: 1.2 dB. AM Suppression: 60 dB. Stereo Channel Separation: 45 dB at 1000 Hz. Stereo Harmonic Distortion: 0.1% at 1 kHz. 19 kHz and 38 kHz Suppression: 65 dB. AM Section: Sensitivity: External Antenna, 30 μV. Radiated, 250 μV/meter. Selectivity: Alternate channel, −70 dB. Image Rejection: 70 dB at 600 kHz. 70 dB at 1400 kHz. GENERAL: Power Requirement: 120 or 240 VAC, 50/60 Hz, 20 watts. Dimensions: 5¾" H x 19" W x 14" D.

② Heathkit AP-1800 Pro-Series Stereo Preamplifier

Quality design and special features make it an extraordinary value: dual turnover tone controls permit more precise tone adjustment. Three phono inputs include one with a built-in preamp for moving coil cartridge. Selectable cartridge capacitance provides flattest frequency response for your cartridge. Phono overload indicator assures correct sensitivity. Magnetic phono preamp is designed for lowest noise with cartridge connected (rather than preamp shorted) for super-quiet performance under real working conditions. Dual turnover filters permit more subtle filtering. Built-in infra-sonic filter reduces rumble and low-frequency noise from your records. Versatile record mode lets you record from deck 1 to deck 2 or vice-versa while listening to source or tape. Independent loudness control is based on new, more ac-

curate data. Adapter switch allows addition of noise reducer or equalizer. Precision attenuator-type volume control provides more accurate tracking between channels even at low levels. The AP-1800 switches up to 1500 watts (maximum) of power.

Kit AP-1800, Shpg. wt. 27 lbs. **399.95**
AEA-1800-2, Oak-Finish Cabinet for AP-1800.
Shpg. wt. 6 lbs. **39.95**

AP-1800 SPECIFICATIONS: Input Sensitivity: phono (moving coil), selectable 100 μV/200 μV/400 μV; phono, selectable 1 mV/2 mV/4 mV; high-level, 200 mV. Overload*: phono (moving coil 20 mV; phono, 200 mV; high-level, 10 V. Hum and Noise*: phono (moving coil −70 dB; phono, −75 dB; high-level, −95 dB. Input Impedance: phono (moving coil), 100 ohm; phono, 47K ohms; high-level, 50K ohms. Frequency Response: phono RIAA ±0.2 dB, 20 Hz-20 kHz; high-level, +0, −0.2 dB from 20 Hz to 20 kHz. Rated output: 1.5 V. Total Harmonic Distortion: phono, 0.03%; high-level, 0.02% from 20 Hz to 20 kHz. Intermodulation IM Distortion: 0.02% maximum. Crosstalk: −50 dB at 1000 Hz. Separation: phono, 50 dB at 1000 Hz; high-level, 50 dB at 1000 Hz. Power Requirement: 108-132 volts or 226-264 volts AC, 50/60 Hz. 20 watts typical. Rear Panel AC Sockets: 3 switched, 3 unswitched. Dimensions: 5.22" H x 19" W x 11¼" D. *Selectivity switch at 2 mV position.

③ Heathkit AD-1701 Pro-Series Graphic Output Indicator for accurate monitoring

Accurate monitoring of peak power output is critical to avoiding overloads and speaker damage. The AD-1701 is one of the finest output indicators available at any price. Two rows of 15 LED's give visual indication of output enabling speaker balance to within a few tenths of a dB.

Six-position range switch gives you a wide range of sensitivity (see specs). Super-wide dynamic range (53 dB) covers almost any source material. Monitor peak or average values. Extremely fast response time detects transient bursts as short as ½ cycle of 20 kHz, so you're always on top of the signal.

Kit includes beautiful solid oak finish panels.
Kit AD-1701, Shpg. wt. 15 lbs. **199.95**

AD-1701 SPECIFICATIONS: PEAK MODE. Frequency Response @ 0 dB, 20 Hz to 20 kHz ±0.5 dB. Display Accuracy at 1 kHz: ±0.5 dB from +3 dB to −30 dB; ±1 dB from 35 dB to 50 dB. Channel Tracking: 0.5 dB from +3 to −30 dB; 1.0 dB from −35 to −50 dB. Peak Detector Rise Time: 13 μsec (50 dB rise). Hold Time: 50 msec. Decay Time: 3 msec. Input Impedance: 100 K ohms. Range/Sensitivity: Low-level, 0.1 volt; 0.32 volt; 1.0 volt. High level (8 ohms). 60 watts, 125 watts, 250 watts. Dimensions: 1¾" H x 19" W x 13" D. 2" H x 19¼" W w/side panels. Power Requirement: 120 or 240 VAC, 50/60 Hz.

Heath-recommended cartridge for your Pro-Series system (NEW)

Audio-Technica AT-30E Cartridge with Dual Moving Micro-Coils™. Brings out the full capabilities of your Pro-Series system. 1.4 to 2.0 grams tracking force, radial damping system. 15 Hz-25 kHz frequency response, 25 dB separation at 1 kHz, 0.28 mV output at 5 cm/S. Requires AP-1800 or similar preamp.
ADP-1294, 1 lb. **79.95**
With turntable or changer purchase from p. 83,59.95

④ Heathkit AA-1600 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

The AA-1600 reproduces the entire musical spectrum with a clarity and definition that make it an excellent choice for use with the most demanding speaker systems. Hum and noise are a full 100 dB down, so music springs from a background of total silence. Transient intermodulation distortion is less than 0.05% for clean, well-defined sound, especially at the high end of the frequency spectrum. Gold-plated binding posts provide more reliable, distortion-free connections. Fused B+ and B− power supply lines for each channel, along with rugged output devices eliminate the need for dissipation limiters which can cause tweeter-damaging clicks and pops. Complete speaker and circuit protection includes speaker turn-on delay and a thermal circuit breaker.

To assure performance to specifications, the amplifier and power supply circuit boards are supplied fully assembled, tested and adjusted. Minimal point-to-point wiring and a clean, open chassis layout make building fast and easy. This beautifully designed power amp deserves to be part of the finest stereo system.

Kit AA-1600, Shpg. wt. 52 lbs. **379.95**
AEA-1800-1, Oak-Finish Cabinet for AA-1600:
Shpg. wt. 7 lbs. **39.95**

AA-1600 SPECIFICATIONS: Frequency Response: ±1 dB, 7 Hz to 50 kHz. −3 dB, 5 Hz to 100 kHz (at 1 watt). Intermodulation Distortion (SMPTE): Less than 0.05% from 250 mW to 125 watts. Transient Intermodulation Distortion (T.I.M.), after. Leinonen, Otala and Curl: 0.05%. Damping Factor: Greater than 50. Hum and Noise: 100 dB below 125 watts. Channel Separation: 70 dB minimum. Input Impedance: 20K ohms. Input Sensitivity: 1.5 Volts. Net Weight: 38¼ lbs. Dimensions: 7⅛" H x 19" W x 13" D. Power Requirement: 120 VAC, 60 Hz.

Heathkit Pro-Series Rack combines beauty and function

The AE-1705 Stereo Component Rack lets you bring together all your Pro-Series components in a way that makes them look their best and gives you easy access to all controls. It has handsome walnut veneer side panels and convenient swivel casters that lock in position. Standard EIA panels in any height are compatible. Record dividers and extra shelf are included.
Kit AE-1705, Shpg. wt. 74 lbs. **249.95**

Quality Heathkit components enhance your audio system

① Active Audio Processor reduces noise and expands dynamic range of any program material

$219⁹⁵

$219⁹⁵ Improves the sound of your hi-fi system without introducing distortion

The Heathkit AD-1304 is specifically designed to both eliminate 10 dB of high frequency noise and add 7 dB of dynamic range expansion to any program source. A separate expander section accounts for 7 dB of dynamic range expansion. Three high-frequency dynamic filters work in conjunction with a sensitivity control to discriminate between noise and music for up to 10 dB of noise reduction. Each filter operates in its own separate portion of the audio spectrum to provide the best sound while maintaining overall frequency response. For inherently noisy material such as 78-rpm recordings, AM radio or 8-track tapes, a high-filter switch on the front panel activates a 7 kHz, linear phase, 12 dB per octave filter. The AD-1304 connects between the tape output and tape monitor jacks on most units. Tape monitor facilities are provided on the back panel of the AD-1304 so that the tape monitor function is not lost.

The front panel LED's provide an easy-to-read indication of the processing. −3 dB and +4 dB LED's indicate the expander's gain. When both are of equal intensity, gain is unity. Noise reduction LED's indicate the relative amount of noise reduction. All four on indicates maximum reduction, while the green LED at lower left indicates no reduction.

The Heathkit Audio Processor boosts your dynamic range in an unobtrusive way. Your sound remains natural. Make it part of your system today.

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

AD-1304 SPECIFICATIONS: Rated Input: 200 mV. Input Impedance: 100K ohms. Gain: Expander off, 0 dB (unity) ±0.5 dB. Expander on, −3 dB to +4 dB. Frequency Response: +0, −0.2 dB from 20 Hz to 20 kHz. High Filter: 7 kHz, 12 dB octave rolloff. Noise Reduction: 10 dB typical between 4 kHz and 15 kHz. Hum and Noise: −70 dB, 20 Hz to 20 kHz. Channel Separation: 50 dB at 1 kHz. Output Impedance: 500 ohms. Input Overload: 5 volts. Total Harmonic Distortion: 0.1% from 20 Hz to 20 kHz. Power Requirement: 120/240 VAC, 50/60 Hz, 15 watts. Dimensions: 4½″ H x 17½″ W x 8⅛″ D.

② 5-Band, 2-Channel Audio Equalizer gives you complete, precise tone control

$139⁹⁵

$139⁹⁵ Lets you control the entire frequency spectrum for exacting system response and beautiful sound.

The AD-1305 Audio Equalizer offers complete tone control with five slide controls for each stereo channel. It is designed for use with any receiver or amplifier having a pre-amp output and power amp input, or tape monitor. Provides precise corrections without overlapping.

A center detent allows exact 0 dB setting bypassing each band; a tone flat switch bypasses the equalizer. Compensates for acoustics, differences in cartridges and speakers, even deficiencies in sources. Can also be used with tape recorders to filter old or scratchy records or broadcasts.

The AD-1305's own tape monitor lets it be used in a receiver's tape monitor circuit without losing monitor capability.

The Heathkit Audio Equalizer is a fun-to-build kit, too, even for the first-time builders. Parts mount on three simple circuit boards. Price includes case.

Kit AD-1305, Shpg. wt. 11 lbs. **139.95**

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: 4⅝″ H x 17½″ W x 8″ D.

Solid-state mono amplifier — a perfect beginner's kit

3.25 watts, min. RMS, into 8 ohms with 4.5% THD from 40-20,000 Hz

Use the AA-18 with a record player fitted with a ceramic cartridge, a tape player, a mono AM or FM tuner or any other signal input of at least 250 millivolts. You'll be surprised at the volume the AA-18 delivers to an efficient 8-ohm speaker, like our AS-1332 — and it's clean sound, too. Assemble in just a couple of evenings. Attractive metal case included. Makes an ideal gift for the beginning kit builder.

Kit AA-18, Shpg. wt. 4 lbs. **29.95**

Stereo Mike Mixer Console for pro-quality tapes

- Priced to fit your budget
- Just 0.5% maximum distortion

Wide frequency response and low distortion deliver clean, life-like mixing capability. Each output has its own master level control and meter. Two high-level auxiliary inputs and mike inputs can be switched off or to the left or right channels. The fourth mike input has a pan control to adjust its apparent location. Backlighted meters. For 120/240 VAC, 50/60 Hz. 60 dB gain permits use with almost any type of microphone. Case with walnut-veneer end panels. Dimensions, 5⅜″ H x 16″ W x 9⅞″ D.

Kit TM-1626, Shpg. wt. 12 lbs. **169.95**

Get top quality Heathkit audio at low kit prices!

The AA-1640 Stereo Amplifier — an amp for the audiophile!

$489⁹⁵
Less meters

Great Gift Idea!

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

The AA-1640 is for the audiophile who strives for musical reproduction free from imperfection and coloration. It features distinctive styling, excellent specifications, and a unique combination of power and features which offer the ultimate musical reproduction and maximum system protection.

The AA-1640 utilizes a unique speaker protection system which does not connect your speaker until transients have decayed, and immediately disconnects them at turn-off. It also prevents dangerous DC voltages and very low frequencies from reaching and damaging your expensive speaker system. The electronics found in the AA-1640 have but one purpose — clean, flawless reproduction of musical information. The inputs provide optimum matching and maximum preamplifier-to-power amplifier signal transfer. 8 output devices per channel and massive heat sinks develop maximum power and efficient cooling without noisy fans. Both channels are fused and current-limited for protection, should an external short occur.
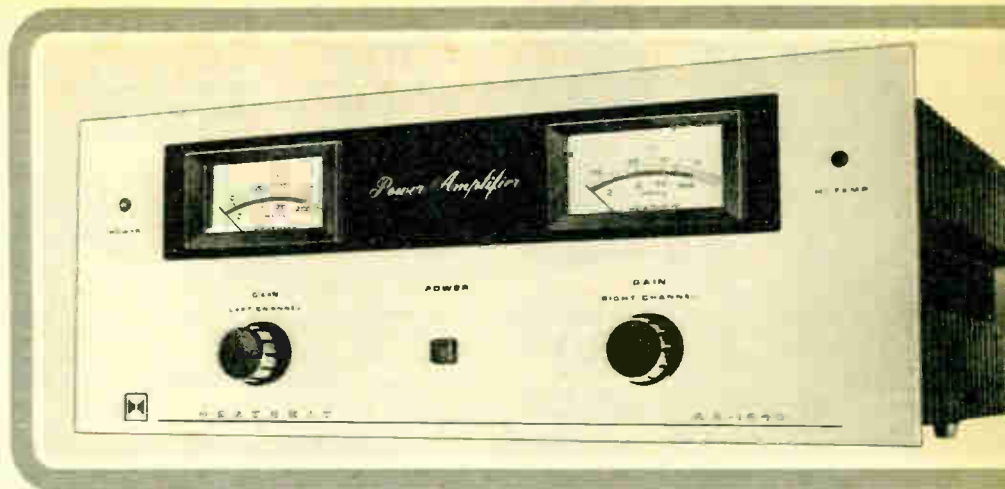
The result of these efforts is an amplifier capable of reproducing quiet passages and thundering fortissimos with equal ease and definition. Frequency response is flat within −1 dB from 7-50,000 Hz, total harmonic distortion <0.1% from 250 mW to 200 W, and hum and noise inaudible.

For more precise control add optional peak-responding panel meters to your 1640. Sensitive enough to respond to a record click, the meters feature backlighted scales and calibration from −30 to +3 dB and 0.2 to 200 watts (into an 8 ohm load). Save $29.95 by purchasing the meters with your amplifier.

Kit AA-1640, Less Meters, 74 lbs., UPS only **489.95**
Kit AAA-1640-1, Output meters, 3 lbs. **69.95**
SAVE! Kit AAS-1640, Amp and Meters together.
Shpg. wt. 86 lbs. **529.95**

OTHER AA-1640 SPECIFICATIONS: Frequency Response: −1 dB, 7 Hz to 50 kHz; −3 dB, 5 Hz to 100 kHz. Intermodulation Distortion: less than 0.1% from 0.25 to 200 watts. Damping Factor: greater than 50. Hum and Noise: Less than 400 µV or 100 dB below full output. Channel Separation: 50 dB, min. Input Impedance: 50k ohms. Input Sensitivity: 1.5 V. Dimensions: 7¼″ H x 19″ W x 18″ D. Power Requirement: 120 VAC. 50 Hz only.

Audio Control Center adds flexibility

Use the AD-1307 to meter your power amplifier

Features peak-responding meters (same as AA-1640 above) to monitor power output, terminal strips for versatile amplifier and speaker hookup, headphone jacks for conventional phones and hookup for electrostatic headphones. Has four switched and four unswitched AC outlets (with a total of 1500 watts) for flexible control of other components. The AD-1307 measures 4½″ H x 17½″ W x 8½″ D.

Kit AD-1307, Shpg. wt. 11 lbs. **139.95**

Versatile AP-1615 Stereo Preamplifier produces great sound

Ideal for use with the AA-1640 Power Amplifier

An outstanding budget-priced preamp for use with AA-1640 or other quality amplifiers. Extremely wide dynamic range with <0.05% IM distortion. Has speaker relay to prevent turn-on "thumps", sub-sonic filter, high-frequency filter, two phono inputs with excellent overload specs, aux and tuner inputs, tape monitor, headphone jack and dubbing inputs and outputs. Dimensions, 4½″ H x 17½″ W x 8¹⁄₁₀″ D (11.4 cm H x 44.5 cm W x 20 cm D).

Kit AP-1615, Shpg. wt. 12 lbs. **149.95**

The amazing Heathkit Modulus™ system — an outstanding component system — and an outstanding value!

$619⁹⁵

The Heathkit Modulus Tuner/Preamp is one of the finest components ever from Heath. The matching amp delivers 60 watts minimum RMS, per channel into 8 ohms at less than 0.1% total harmonic distortion from 20-20,000 Hz. Features of the AN-2016 are: digital frequency readout, signal-strength and center-channel tuning meters for tuning precision, peak-responding power output meters. A phase-locked loop stereo multiplex circuit assures wide FM stereo separation of 40 dB at 1000 Hz. Even the AM section features dual-gate MOSFET's, a nine-pole LC filter and static-shielded loop antenna for great reception. Add the optional modules (order below) for even more performance.

Kit AN-2016A, Tuner/Preamp, Shpg. wt. 39 lbs. **619.95**
Kit AA-1506, Matching Amp, Shpg. wt. 25 lbs. **219.95**
Kit AD-1507, CD-4 Demodulator Module. Shpg. wt. 2 lbs. **89.95**
Kit AD-1504, Dolby FM Module. Shpg. wt. 1 lb. **49.95**
Kit AM-1503, Full-Logic SQ Decoder Module. Shpg. wt. 2 lbs. **59.95**

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Give great sound this year!

The ASX-1383 — with reduced defraction for great sound quality

SAVE $50.05 per pair

IN STOCK FOR IMMEDIATE DELIVERY

$284.95 each

Sold in pairs only

An improvement in sound reproduction you can really hear. Now available for immediate delivery.

The ASX-1383 uses the same revolutionary design concept found in speaker systems costing $1000 and more. Now each pair is even less — a value you can't afford to pass up. The linear phase design aligns each driver's radiating surface in the same plane so the entire sound output reaches your ears at the same time, resulting in a clarity and richness of sound that you have to hear to believe. A unique curved baffle reduces defraction to produce spaciousness and open sound, combined with outstanding stereo dispersion and imaging. The ASX-1383's drivers provide full-frequency response with excellent dynamic range. A 10-inch woofer, a 5-inch midrange and a softdome 1-inch tweeter provide the ASX-1383's excellent sound. The speaker elements are arranged for minimum line height (the entire distance from woofer voice coil to tweeter voice coil) to approximate a single-point sound source for increased dispersion and realism. Each driver is individually fused.

The ASX-1383 has been designed to look as great as it sounds too. The cabinet is select Brazilian rosewood veneer with a center-book-matched front panel for an elegant look in any decor. A charcoal black "acoustically transparent" grille cloth complements the cabinet. Sold in matched pairs only.

Kit ASX-1383, 114 lbs.
Motor Freight ......Was 619.95, Now pair 569.90

ASX-1383 SPECIFICATIONS: Frequency Range (−10 dB): 30 Hz to 30 kHz. Frequency Response: ±3 dB, 40 Hz to 25 kHz. Impedance: 8 ohms. Recommended Amplifier Power: 10 watts minimum to 200 watts (fused for larger amplifiers). Crossover Frequencies: 750 Hz, 400 Hz. Fuses: Woofer, 1 amp slow-blow; midrange, ½-amp slow-blow; tweeter, ½-amp regular. Dimensions: 36" H x 13½" W x 13¼" D (96 cm H x 34.3 cm W x 33.7 cm D).

This 3-way floor/shelf speaker system produces beautiful sound

$179.95 Each

Our best-selling system possesses remarkable dynamic range and clarity not found in any other 3-way system in this price range.

A truly outstanding floor/shelf speaker system, for use with the best components. The 10" woofer provides solid, well-defined bass. The woofer to midrange crossover frequency is 500 Hz to minimize IM distortion and insure smoothness. The 4½" midrange is isolated in 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 horizontal dispersion of a full 120° even at 12,000 Hz. All three drivers are flush mounted, and there are no "rails" around the cabinet to limit treble dispersion. For best stereo imaging, you can position the tweeter directly above the midrange whether you position the system vertically or horizontally — a Heath exclusive! While the AS-1373 can be used with almost any amplifier, a high-power amplifier like the AA-1640 reveals its awesome dynamic range and clarity. Has individual fusing for each driver, two high-frequency controls to match response to your listening area. Fully assembled walnut-finish veneer cabinet with deluxe, acoustically transparent foam grille, make this speaker system look as good as it sounds. With an easy-to-follow assembly manual, the AS-1373 is easy-to-build, even for first-time kitbuilders. Assembly requires just a couple of evenings per system, and when you're finished, you'll have a truly great sounding stereo pair! 8 ohms impedance.

Kit AS-1373, 68 lbs. UPS 179.95
Kit AS-1373-2, 141 lbs. UPS ....pair 339.95

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 Hz (12 dB octave) and 3000 Hz (12 dB/octave). Fuses: Woofer, 1¼ amp Slow Blow; midrange, ¾-amp Slow-Blow, tweeter, ½-amp regular. Controls: 3 kHz shelf/flat; 10 kHz rolloff/flat. Dimensions: 26" H x 14½" W x 11⅞" D, without 1¼" grille.
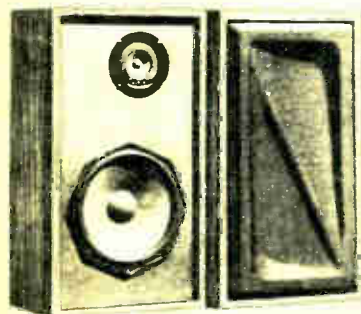
Budget-priced 2-way speaker system

$64.95 Each

Buy two and save an additional $9.95 on the pair!

The AS-1332 2-way speaker system may have a low price, but it doesn't compromise your sound. It can take up to 50 watts maximum power from your amplifier and produce beautiful sound, with frequency response ±3 dB from 50 to 18,000 Hz and frequency range from 40 to 20,000 Hz. Has an 8" woofer with a hefty 1-pound ceramic magnet and a 1¾" phenolic ring tweeter. Tweeter level control for high-frequency adjustments.

Kit AS-1332, Shpg. wt. 29 lbs., UPS ....each 64.95
Kit AS-1332-2 (Pair), 63 lbs., UPS .....pair 119.95

Compact bookshelf speakers

Excellent sound reproduction in a small speaker
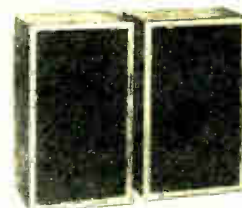
$39.95 Pair

The Heathkit AS-1140 Speaker System gives you excellent audio from two small enclosures. The high compliance, foam suspension speakers give you smooth audio with a frequency range of 70 to 16,000 Hz. 12" H x 7" W x 6" D. 8 ohms. Sold in pairs only. Great for the teenager's bedroom or the college student's dorm.

Kit AS-1140, Shpg. wt. 16 lbs. 39.95

Heathkit makes it sound great!

High-power 3-way speaker system with great performance!

$339⁹⁵

Massive 15-inch slot-loaded woofer, two midranges and three dome tweeters handle up to 250 watts with rare 22 to 22,000 Hz frequency range!

14 attenuation and rolloff settings assure maximum performance

The AS-1348 offers the bass power and extra-wide dynamic range to reproduce almost any kind of music realistically. Ideal for disco and rock music, where high sound pressure levels (SPL) are desired. Massive 15-inch slot-loaded woofer, two 4½" midranges and three 1" tweeters in a precision-designed cabinet. Individual protection fuses. Fully-assembled acoustic-suspension cabinet.
Kit AS-1348, Shpg. wt. 110 lbs., Motor Freight ....each 339.95
Kit AS-1348-2 (Pair), Wt. 220 lbs., Motor Freight ....pair 639.95

Two 4½-inch midranges and three 1-inch dome tweeters

Individual protection for each speaker

AS-1348 SPECIFICATIONS: Frequency Range (—10 dB): 22 Hz to 22 kHz. Frequency Response: ±3 dB, 28 Hz to 20 kHz. Impedance: 8 ohms nominal. Recommended Amplifier Power: 8 watts minimum to 250 watts (fused for larger amplifiers).

1 Two-way Sound Column speaker system
Sounds outstanding — no matter where you sit in the room! Reverberant speaker placement. Nominal 4 ohms impedance so most amps deliver up to TWICE their rated 8-ohm power.
Kit AS-1344, Shpg. wt. 57 lbs., UPS ....each 159.95
Kit AS-1344-2, Shpg. wt. 122 lbs., UPS ....pair 299.95

2 Low-priced three-way bookshelf speaker
Full-range system. Smooth sound, adjustable midrange and tweeter.
Kit AS-1363, Shpg. wt. 55 lbs., UPS ....each 159.95
Kit AS-1363-2, Shpg. wt. 128 lbs., UPS ....pair 289.95

3 High-efficiency reflex design two-way speaker system
Tweeter level control to custom-tailor sound. Beautiful medium sized speakers.
Kit AS-1342, Shpg. wt. 32 lbs., UPS ....each 84.95
Kit AS-1342-2, Shpg. wt. 78 lbs., UPS ....pair 159.95

Get the best sound with a famous-brand stereo cartridge

Quality Heath-recommended cartridges help you get more from your records. Order with a turntable (right) and save up to $80.00.

Ortofon ULM55E. Ultra-low 0.35 gm moving stylus mass protects your records. 10 Hz-30 kHz frequency response with low frequency intermodulation distortion of 0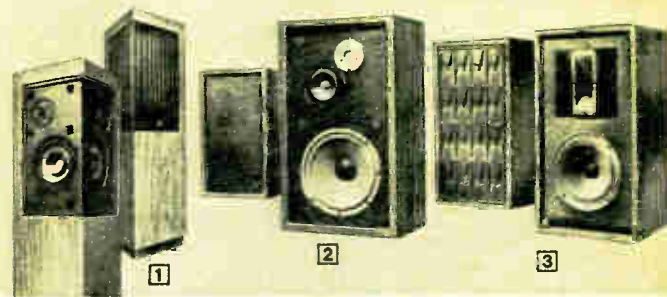.5% at −6 dB modulation level. Lower harmonic distortion. 28 dB separation at 1 kHz. 0.7 mV output at 1 cm/S. Biradial diamond stylus. For use only with Dual changers and turntables. Mfr.'s price $110.00.
ADP-1293, 1 lb. .....Our price 79.95. With any turntable or changer 59.95

Audio-Technica AT-30E Cartridge with Dual Moving Micro-Coils™. Remarkable sonic clarity and transparency. Diamond stylus is user-replaceable. 1.4 to 2.0 grams tracking force and radial damping system for excellent tracking. 15 Hz-25 kHz response, 25 dB separation at 1 kHz. Requires preamp like the AP-1800 (see page 79). Mfr.'s price $125.00.
ADP-1294, 1 lb. .....Our price 79.95. With any turntable or changer 59.95

Shure V-15 Type IV. Diamond stylus. 10 Hz-25 kHz response. 4.0 mV output at 5 cm/S. ¾ to 1¼ gm. tracking force. Mfr.'s price $150.00.
AD-1259, 1 lb. .....Our price 99.95. With any turntable or changer 79.95

Audio-Technica AT-14SA. Shibata stylus. Excellent 5 Hz-45 kHz response. 2.7 mV output at 5 cm/S. 25 dB separation at 1 kHz. ¾ to 1¾ grams tracking force. Mfr.'s price $150.00.
ADP-1139, 1 lb. .....Our price 89.95. With any turntable or changer 69.95

Shure V-15 Type III. Diamond stylus. 10 Hz-25 kHz response. 3.5 mV output at 5 cm/sec. ¾ to 1¼ grams tracking force. Mfr.'s price $90.00.
AD-1059, 1 lb. .....Our price 79.95. With any turntable or changer 59.95

Empire 2000E/III. Elliptical stylus. 20 Hz-20 kHz response. 4.5 mV output at 3.54 cm/S. ¾ to 1½ grams tracking force. Mfr.'s price $85.00.
ADP-1147, 1 lb. .....Our price 59.95. With any turntable or changer 19.95

Shure M91ED. Diamond stylus. 20 Hz-20 kHz response. 5.0 mV output at 5 cm/X. ¾ to 1½ gms. tracking force. Mfr.'h price $64.95.
ADP-1062, 1 lb. .....Our price 49.95. With any turntable or changer 19.95

Disckit™ by Discwasher. Keeps your records and cartridge clean and static-free. ADP-1286, Shpg. wt. 4 lbs. 49.95

Get the most from your records with our new line of assembled turntables!

1 B•I•C 80Z Changer. Quartz crystal servo-controlled microprocessor digital drive system for better speed control. Digital pitch computer with four-character readout and stopwatch. True dynamically balanced 9" tone arm with plug-in tone arm tube for minimum mass. Oil-damped cueing with cue rate control and three-scale anti-skate adjustment. Base and dust cover included. Order cartridge at left. Mfr.'s price $239.95. ACP-1463, 21 lbs. ....Our price only 209.95

B•I•C 4DZ Changer (not shown). Belt-driven changer plays 1 to 6 records. Repeat play. 9" statically-balanced tone arm. Base/dust cover included. Order cartridge at left. Mfr.'s price $149.95. ACP-1462, 19 lbs. ....Our price only 129.95

2 Dual 714Q Semi-Automatic Single-Play Direct-Drive Turntable. Dual uses a new low mass tonearm to reach a new high in performance! Total effective mass of Dual's ULM tonearm/cartridge system, with the Ortofon ULM60E cartridge, is an amazingly low 8 grams! Motor utilizes a quartz reference oscillator, PLL control circuit. The precise quartz oscillator functions with pitch control and illuminated strobe. Four-point gimbal tonearm suspension, anti-skating feature, switchable groove sensor, automatic tonearm return shutoff, front panel solenoid-operated cue control, damped in both direction. Base and dust cover included. Order cartridge at left. Mfr.'s price $479.95. ACP-1466, 22 lbs. ....only 449.95

Dual 622 Automatic Single-Play Direct-Drive Turntable (not shown). Automatically starts and stops, continuously repeats. Base and dust cover included. Order cartridge at left. Mfr.'s price $319.95. ACP-1465, 16 lbs. ...Our price only 299.95

Dual 1264 Changer (not shown). Best-selling changer. Plays 1 to 6 records, continuously repeats. Tunable anti-resonance filter. Base/dust cover included. Order cartridge at left. Mfr.'s price $275.00. ACP-1464, 17 lbs. ....only 249.95

Unsurpassed sound and quality in cassette decks!

The most advanced, best performing cassette deck we've ever offered!

1 Two-speed deck records, plays the new metal tapes

$799⁹⁵

- High 71 dB S/N ratio with Dolby™ and metal tape
- 3-head, dual-capstan configuration
- Two-motor/full-logic solenoid control

B•I•C® brings reel-to-reel quality to cassette tapes — for the first time — in this series of Heath-recommended cassette decks! The top-of-the-line (Heathkit Model No. ATP-1484) T-4M is B•I•C's most advanced cassette deck, designed to be used with top-quality audio components like the Heathkit Pro-Series line. (You can mount the T-4M in the Pro-Series rack with the optional adapter below.)

Even at 1⅞ ips, it produces sound that compares favorably to units costing a thousand dollars and more! And its 3¾ ips speed gives high-frequency headroom that makes even inexpensive tape sound good. You can hear the difference. When you use high-quality metal particle tape, the T-4M can attain a signal-to-noise ratio of 71 dB at 3¾ ips with Dolby™ noise reduction! Frequency response at 3¾ ips is a wide 20-23,000 Hz, ±3 dB. Record calibration, microprocessor control, electronic digital readout and a state-of-the-art 45 dB peak indicating bar graph display help you maintain better control of recordings. And the T-4M lets you become more creative in recording, with mic/line mixing and Dolby™ FM copy, backed up by B•I•C's breadband electronics and a three-head/dual capstan record/play configuration.

With its impressive arsenal of performance features, the T-4M is one of the world's finest cassette tape decks! Rosewood vinyl case included.

ATP-1484, Fully Assembled, Shpg. wt. 22 lbs. 799.95
Optional Rack Mount Adapter to mount ATP-1484 in Pro-Series Rack.
ATA-1484-1, Shpg. wt. 2 lbs. 24.95

ATP-1484 SPECIFICATIONS: Tape Speeds: 1⅞ or 3¾ ips. Wow and Flutter: 0.03% WRMS at 3¾ ips, 0.05% WRMS at 1⅞ ips. Fast Forward and Rewind Time: 48 sec. with C-60 cassette. Output: Line, 2.0 VRMS into 10 kilohms; Headphones, .7 VRMS into 100 ohms. Power Requirement: 120 VAC, 50/60 Hz, 40 W. Dimensions: 6⁵⁄₁₆″ H x 17⅝″ W x 10⅛″ D.

2 T-2 2-speed cassette deck with Dolby™

$329⁹⁵

- Loaded with features and value
- 67 dB S/N ratio with Dolby at 3¾ ips

B•I•C's T-2 Two-Speed Cassette Deck (Heathkit Model No. ATP-1482) offers many of the features of the T-4, without metal tape capability. You still get great sound, with 25-19,000 Hz frequency response at 1⅞ ips and a 67 dB S/N ratio with Dolby™ NR at 3¾ ips. Tach feedback DC servo motor. Case included.
ATP-1482, Fully Assembled, Shpg. wt. 15 lbs. 329.95

3 Budget-priced doesn't mean budget performance!

$279⁹⁵

- Wide frequency response — 30 to 20,000 Hz at 3¾ ips
- Excellent 66 dB S/N ratio with Dolby at 3¾ ips

The T-1 Cassette Deck (Heathkit Model No. ATP-1481) may be our lowest-priced two-speed cassette deck from B•I•C — but you'll be tested to tell by listening! You'll find many of the features of our higher-priced B•I•C decks — Dolby™ NR, high-speed tape handling and six-position equalization and bias. Case included.
ATP-1481, Fully Assembled, Shpg. wt. 14 lbs. 279.95

Save with super-discount prices on Heath-recommended, top quality Scotch® Master™ Series cassette tapes

Now you can save up to $4.00 on quality Deluxe Scotch® Master™ Series cassette tapes. Whether you're looking for expanded dynamic range with normal bias; extra high- and low-frequency response with chrome (CrO₂) bias; or increased low- high-frequency sensitivity with ferri-chrome (FeCR) bias — there's a Master Series cassette designed for long life and mechanical reliability. These tapes will capture more of your system's range of recording capability...and save you money, too. Order more than one package to increase your savings.

Stock No.	Master Series	Type of Bias	Playing Time	Shpg. Wt.	Package of 4	
					Was	Now
ADP-1904	MI-C90	Normal	90 min.	1 lb.	15.95	11.95
ADP-2604	MII-C60	CrO₂	60 min.	1 lb.	13.95	10.95
ADP-2904	MII-C90	CrO₂	90 min.	1 lb.	17.95	13.95
ADP-3604	MIII-C60	FeCr	60 min.	1 lb.	13.95	11.49
ADP-3904	MIII-C90	FeCr	90 min.	1 lb.	17.95	14.49

Your car never sounded so good!

High-power digital AM/FM stereo/cassette unit

$399⁹⁵

- Performance equaling fine home units
- SASC circuitry to enhance FM reception
- 30 W RMS power amplifier

LSI tuning circuit and PLL provide accurate FM tuning and stability. The PE-958A's SASC Control improves FM reception by drastically eliminating static. With Dolby™ NR and metal tape capability, the cassette section performs as well as high-quality home decks. With powerful GA-302E 30W RMS amplifier.

CCP-1393, Assembled, 12 lbs., Mfr.'s price $519.90 ....399.95

CCP-1393 SPECIFICATIONS: FM Sensitivity: 1.5 μV at 75 ohms. FM Selectivity: 80 dB (±400 Hz). FM S/N Ratio: 55 dB. FM Frequency Response: 30 Hz-15 kHz (±3 dB). Tape Frequency Response: 40 Hz-15 kHz (±3 dB). Tape Wow and Flutter: .13% WRMS. Tape S/N Ratio: 62 dB with Dolby™ NR, CRO₂ EQ and metal tape. AM Sensitivity: 26 dB. Dimensions: 6.0 cm H x 18 cm W x 14 cm D. For amp specifications see CAP-1392 below.

B·I·C C1 Two-Speed Auto Cassette Deck

Complements the B·I·C 2-speed home decks on the opposite page. Metal tape capability. Delivers 12 W RMS per channel, with 40 Hz-20 kHz frequency response, less than 1% THD and .08% WRMS wow and flutter at 3¾ ips. 58 dB S/N ratio, 10 dB Dolby™ NR. Fast forward and rewind. Full controls. Preamp output jacks. Underdash mount. Mfr.'s sugg. ret. price $229.95.

CTP-1541, Assembled, Shpg. wt. 6 lbs. 219.95

Clarion stereo radio/tape combinations

PE-751B (CRP-1391, shown) 10 W RMS per channel. SASC improves FM. Dolby™ NR. Add GA-302E (CAP-1392) amp for more power. For better sound, add EE-115 (CEP-1394) EQ to GA-302E. PE-666B (CRP-1267) similar to CRP-1391, without SASC, Dolby™ NR or metal tape capability.

CRP-1391, 7 lbs., Mfr.'s price $389.95 .....299.95
Dimensions: 50 mm H x 180 mm W x 160 mm D.
CRP-1267, 6 lbs., Mfr.'s price $252.95 .....169.95
Clarion PE-623B, similar to CRP-1267 except 8-track.
CRP-1266, 5 lbs., Mfr.'s price $163.95 .....129.95

Quality accessories make car stereo sound even better

[1] Clarion GA-302E 30 W RMS Power Amplifier. Delivers 30 RMS, 24 W per channel minimum into 4 ohms with less than 1 percent total harmonic distortion (THD) from 40 to 20,000 Hz. 80 dB signal-to-noise ratio. Use with new PE-751B (CRP-1391) AM/FM stereo/cassette unit above for ultra-high power at low distortion. Fully assembled. Dimensions, 125 mm H x 140 mm W x 100 mm D.

CAP-1392, 6 lbs., Mfr.'s price $99.95 ....79.95

Clarion Equalizers. Perfect and compatible companions for your auto stereo system. Custom mix highs and lows to adjust music to your personal taste. EE-115 (CEP-1394), for PE-958A and PE-751B units equalizes only. Clarion 100EQB-3 (CAP-1264), which fits most tuners and tape players such as CRP-1266 and CRP-1267 above, includes 15 W RMS

power booster. Assembled.

[2] CEP-1394, 3 lbs., Mfr.'s price $54.95 ....44.95
Dimensions: 50 mm H x 140 mm W x 30 mm D.
[3] CAP-1264, 4 lbs., Mfr.'s price $124.95
Was $99.95, Cut $10.00 ....NOW ONLY 89.95

[4] Clarion RKA-055 High-Power Fader Control. This great accessory gives you additional flexibility in customizing your sound when installing four speakers with high-power amplifiers. The high-power fader allows you to control front-to-rear sound balance to suit your tastes and vehicle acoustics. Designed for use with CEP-1393 and CCP-1394 systems, can also be used with most high-power amps. Fully assembled. Save from manufacturer's list price.

CDP-1395, Shpg. wt. 1 lb. 19.95

SAVE $10⁰⁰
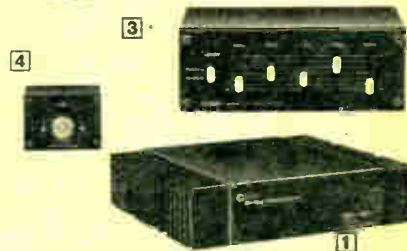
Clarion Speaker Systems speak highly of your music

[1] New 3-Way Rear Deck Mount Speaker Systems fit without custom installation. 6" x 9" woofer, 20-oz. magnet. 30W/ch. max.
CSP-1396 (Clarion SK-103), Shpg. wt. 15 lbs. 129.95

Same as above, except 4" x 10" to fit compacts, door mounts.
CSP-1397 (Clarion SK-102), Shpg. wt. 12 lbs. 119.95

[2] Two-Way Car Stereo Speaker The Clarion SK-89 Speaker brings great sound to your vehicle at a low price — and Heath makes it even better by offering a discount from the manufacturer's $67.95 suggested list price. 6" x 9" woofer and 3" center-mounted tweeter. Installs flush in rear deck, includes handsome grill.
CSP-1261, Shpg. wt. 10 lbs. 64.95

Buy any receiver above — and any pair of speakers above — and take 5% off the full price
(excluding sales tax, shipping and handling charges).

HEATHKIT CONTINUING EDUCATION
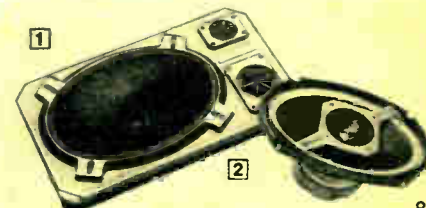
At last there's an easy way to teach yourself electronics

"Programmed" Learning Texts

Each program in the Heathkit Continuing Education Series features a programmed learning text. You can read at your own pace in easy-to-understand, step-by-step segments. Almost before you know it, you've digested a portion of material that teaches you about the subject in a manner you'll understand and appreciate. After a few of these portions, a self-test review lets you check your progress. The chapters and units are arranged in a clear, easy-to-understand and logical manner, and you work your way through the text material quickly and easily.

Get "Hands-on" experience for a better understanding of electronics

Learning the concepts and uses of electronics in our society — and being able to apply what you've learned to everyday situations — are your goals with the Heathkit Continuing Education series. For that reason, we have spared no effort in assuring your complete comprehension. Our optional Electronic Trainers perfectly illustrate the Heath approach to learning. Specifically designed for use with each program, these trainers give you actual "hands-on" experience with electronic components and circuitry. It's an acknowledged fact that you learn best by doing and the trainers let you do exactly that. You get a better grasp of circuit concepts and perform the program projects quicker and easier as well. After you complete the programs, the trainers serve as ideal circuit experimental units so you can do your own breadboarding and circuit design. They do not lose their value to you after you complete your programs.

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Open new opportunities for yourself. Perform your own repairs and save.

The Heathkit Continuing Education Series of individual learning programs is designed to take you step-by-step through a variety of electronics-related subjects — basic electronics, automotive maintenance, computer programming and test equipment. Understanding these subjects can open up new opportunities for you. You can perform your own repairs and save.
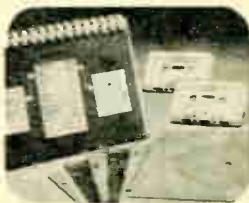
They use proven effective step-by-step "programmed" texts, plus records or optional audio cassettes to reinforce the text material.

They include audio-visual aids and even electronic parts for "hands-on" experiments using optional electronic trainers. They're in use by the thousands — by individuals, in schools and industry training programs — and they've been proven effective!

Audio Records "reinforce" the text material

In order to personalize the instruction, the text material is accompanied by audio records (or optional cassettes, listed with each program). These audio aids, plus the large illustrated visual materials found in most of the programs, really help you to learn faster and more effectively. They help to make the text material more interesting. And all you need to use them is a record player or a standard cassette recorder/player.

CEUs and the Heath Guarantee

If you elect to take the optional final exam and score 70% or better, you will receive a Certificate of Achievement and be awarded Continuing Education Units (CEUs). CEUs are a nationally-recognized way of acknowledging participation in non-credit adult education. We're so confident you'll be happy with any program you order, we give you a full money-back guarantee. If for any reason you are dissatisfied with these programs, Heath Company will refund the full purchase price of the text material (less trainer).

Subscribe to Self-Learning Newsletter

We publish a newsletter about continuing education called PERSONAL LEARNING and it keeps you informed about the many developments going on in adult Continuing Education. It features stories about people who have benefitted from the Heath Continuing Education Programs and profiles of companies using Heath Continuing Education Programs for their in-company training programs. For your one-year subscription to PERSONAL LEARNING, send $5.00 to PERSONAL LEARNING, Heathkit Continuing Education, Benton Harbor, MI 49022.

IMPORTANT TAX NOTE: All the Continuing Education 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 compensation.

Learn how to get the most from your test equipment

Heathkit Test Instrument Self-Instruction Program

Would you like to save on repair costs by maintaining your own electronic equipment? This program will help you understand the test equipment you'll need to use. The complete program consists of four units, with all the necessary parts and text materials. The Basic Electronics Program (EE-3101 through EE-3104, see pages 88 and 89) and the Digital Techniques Program (EE-3201, see page 90) — or equivalent knowledge — are prerequisites. When you complete the optional final exam with a 70% or better score, you'll earn 6.0 CEUs and a Certificate of Achievement.

Unit 1: Analog and Digital Meters

This first learning unit consists of two comprehensive texts, the first describing analog meters and the other, digital meters. The unit on analog meters covers the types of movements and how each is used to measure voltage, current and resistance, the operation of the volt-ohm-milliammeter (VOM) and the electronic volt-ohm-milliammeter. The unit on digital meters covers the conversion from analog to digital, compares analog meters to digital meters and discusses factors to consider when you select your own meter. When you complete both of these texts, you will be able to use both analog and digital meters to make electrical measurements, explain how to determine the sensitivity of a meter, explain how high input impedance is achieved in an electronic meter, describe the uses of the high and low-voltage ohms positions of an ohmmeter. You will be able to explain the advantages of a digital meter over an analog meter, give the reasons to select an integrating digital meter over a non-integrating digital meter, describe how electrical current and resistance are measured with a digital multimeter, explain what is meant by resolution, sensitivity and accuracy, and understand the types of probes used with meters, explaining what each type of probe does. A digital meter, an analog meter and the ET-3100 Trainer (below) should be used to get the most out of Unit 1. Once you've learned about analog and digital meters, you progress to:

Unit 2: Oscilloscopes

The second unit covers oscilloscopes which are essential for designing, testing and servicing electronic equipment. There are an almost infinite number of wave-shapes that can exist with electrical signals, and you can actually see and interpret these wave-shapes with an oscilloscope. Unit 2 discusses the components and circuits which become part of the oscilloscope. It also discusses the function and operation of various controls and how to interpret various scope displays. When you complete this unit, you'll be able to identify the various parts of a Cathode Ray Tube (CRT), identify various oscilloscope controls, explain the uses of each control, identify and describe various types of sweeps, discuss scope specifications, explain the operation and applications of storage and sampling oscilloscopes and identify various oscilloscope controls, explaining the use of each control. An oscilloscope and the ET-3100 Trainer are required to complete this unit. Then, on to:

Unit 3: Frequency Generation and Measurements

This unit covers frequency generation, measurement and counting. A knowledge of frequency characteristics is essential for performing virtually any electronic circuit troubleshooting and repair. When you complete Unit 3, you'll be able to express frequency values in wavelength, powers of ten and Hertz (Hz), calculate unknown frequency values, select a counter that fits your requirements, understand advantages of electronic counters and potential sources of counter error, list five sections of a general-purpose frequency counter, understand the basic modes of counter operation, increase the frequency range of electronic counters and describe the methods of calibrating electronic counters. Frequency generators, a frequency counter and the ET-3100 Trainer are required. Finally, proceed to:

Unit 4: Special Measuring Instruments

This unit covers some of the more specialized test instrumentation available for making measurements on solid-state devices, digital circuitry and other electronic equipment. You'll learn what these special measuring devices can read, and some basic techniques for using and interpreting these measurements. An oscilloscope, a meter and the ET-3100 are required to complete Unit 4. Then, take the optional final exam, and you have completed the Heathkit Test Instrument Self-Instruction Program. When you pass the final exam, you will earn 6.0 Continuing Education Units (CEUs).

EE-3105, Shpg. wt. 3 lbs. **59.95**

NOTE: Various test instruments are required to complete the optional experiments in this learning program. See pages 56-71 for our quality test equipment.

Experimenter/Trainer provides hands-on learning experience during experiments

For use with the DC, AC, Semiconductor, Electronic Circuits and Instruments programs — helps you perform each experiment quickly and easily. Has solderless breadboarding sockets, 2-range variable sine and square wave (200-20,000 Hz) signal source, dual-variable power supplies for positive and negative voltages (both variable over 1.2 to 16 volts, 120 mA, both regulated and short-circuit protected), 1k and 100k linear potentiometers. Center tapped transformer provides 30 V rms, 60 Hz for line experiments. For 120/240 VAC, 60/50 Hz.

Kit ET-3100, Shpg. wt. 5 lbs. **69.95**

ETW-3100, Factory Assembled Trainer, 6 lbs. **129.95**

ET-3100/ETW-3100 SPECIFICATIONS: POWER SUPPLIES: Positive Supply Output: 1.2 to 15 volt DC, continuously variable. Lead Regulation: Better than 1%, no load to full load. Current Output: 100 mA with short circuit protection. Negative Supply Output: −1.2 to −15 volts DC, continuously variable. Load Regulation: Better than 1%, no load to full load. Current Output: 100 mA with short circuit protection. GENERAL: Power Requirement: 120/240 VAC, 60/50 Hz, 7 watts maximum. Dimensions: 3½" H x 12⅛" W x 11¾" D.

# We make it easy to learn about the basics of electronics

Professionally designed programs make learning fast, easy and very affordable.

Open new opportunities for yourself when you learn electronics. You can perform your own tests and repairs. Save money and have fun. Gain the knowledge to supplement your income or start a second career in the interesting and useful world of electronics.
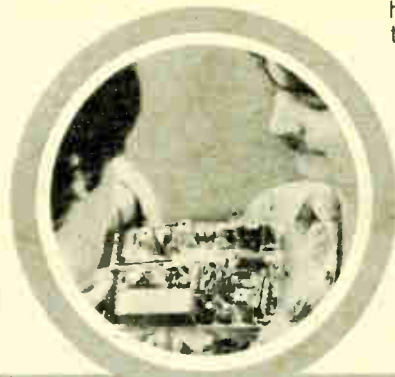
Learning electronics could be the most important step you'll ever take. There are many factors to consider. If you're like most people, you don't have the time for conventional learning institutions. They cost a lot in time, travel and tuition. The Heathkit Continuing Education Series makes learning electronics more convenient and affordable for everyone.

Each learning program is simply and logically arranged for easy, step-by-step "programmed" learning. Each program includes everything you need for a thorough understanding. Audio records (or optional cassettes) reinforce the text material and an optional final exam lets you test your overall comprehension. Truly, there's never been a learning method like it. We're so confident you'll be pleased by these programs, we offer a money-back guarantee. If for any reason you are dissatisfied, we will refund the full purchase price of the text material (less trainer).
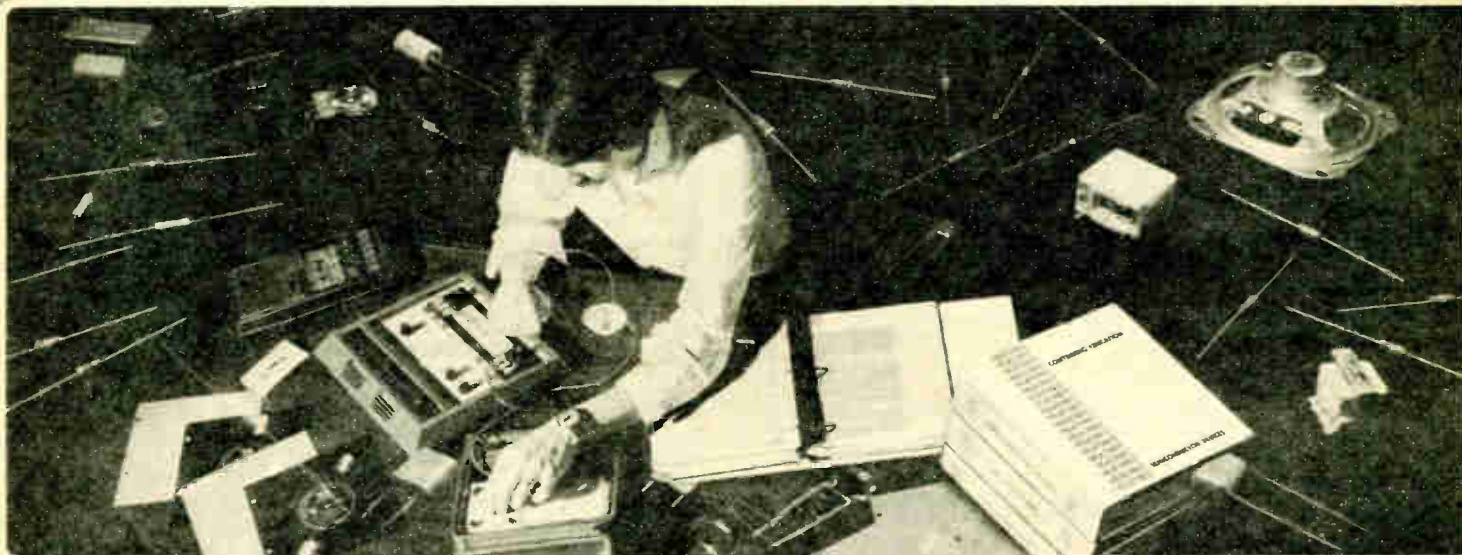
Basic Electronics Education Programs are economical. They all use the same trainer so you can get a complete education in fundamental electronics at a price you can afford, usually much less than courses offered at night schools, community colleges or technical institutes. And you save energy, too...you don't have to drive to a campus for classes or to perform lab work.

The AC and DC Electronics Programs are designed for beginners. They're ideal for training field service personnel, or maintenance and production technicians in the basics of electronic equipment. They can provide fundamental information for those peripherally involved with electronics processes, too. For example, a chemical engineer who requires a basic background in the electronics systems used in chemical processing can find these programs very useful.

The Semiconductor Devices Program is designed for the engineer or technician who is already familiar with basic electronics. It gives you the opportunity to refresh your knowledge of semiconductors and solid-state electronics, and to learn the newest electronic technologies, including integrated circuits and optoelectronics.

The Electronics Circuits Program is ideally suited for design engineers or technicians who wish to learn the most efficient or easiest way to design actual circuits, using the latest developments in electronic technologies and the newest electronic components. This program assumes that the first three programs have been completed, or that equivalent knowledge has been attained.

Get "Hands-On" experience and a better understanding of electronic theories and practices with Heathkit Practical Electronic Trainers. Specifically designed for use with each program, these electronic trainers give you actual "Hands-On" experience with electronic components and electronic circuitry. It's an acknowledged fact that you learn more by doing, and the electronic trainers let you do exactly that. The trainers help you gain a better grasp of circuit concepts and perform the program projects quicker and easier as well. Solderless connectors on the trainer panel make hook up of the components supplied with the program quick and neat. Built-in power supplies and signal sources provide convenient operation. Practical Electronic Trainers are available in both kit and assembled forms. The Basic Electronics Education Programs use the ET-3100 trainer (see page 87 for complete description). The advanced programs on the following pages use their own trainers.

Special 4-module design gives you thorough understanding

DC Electronics Learning Program

Covers current, voltage, resistance, magnetism, Ohm's Law, electrical measurements, DC circuits, inductance and capacitance. In short, a complete foundation in basic electronics. Included are texts, records, and electronic components for 20 different experiments. Cassette tapes that duplicate the material on the records are optionally available. The average completion time for DC Electronics is 30 hours. A knowledge of high school math is assumed and an appropriate review of such material is included. 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. Convert metric prefixes and work with powers of ten.
8. Explain the construction, operation, and purpose of resistors, potentiometers, switches, fuses, relays, capacitors, inductors, and batteries.
9. Use safety procedures for you and your test equipment.
10. Build and experiment with basic DC circuits of your own design.

EE-3101, Shpg. wt. 7 lbs. 44.95
EEA-3101, Optional Cassettes*, Shpg. wt. 1 lb. 9.95
ECP-3801, Cassette Record/Player, (not shown, see p. 97) Shpg. wt. 4 lbs. 60.00

AC Electronics Learning Program

Covers the fundamentals and basic theory of alternating current in a simple, straight-forward manner that can be easily understood. Included is everything you need for thorough, no-compromise learning. Included are texts, records and 16 electronic components for 8 different experiments. If you choose to take the optional final exam and score 70% or better, you will receive a Certificate of Achievement and 1.5 Continuing Education Units. Upon completion of AC Electronics, you will be able to:

1. Explain the difference between AC and DC.
2. Describe the operation of a simple AC generator.
3. Determine average value of an AC sine wave.
4. Determine the frequency of an AC waveform if its period is known.
5. Use AC meters to measure current, voltage, and power.
6. Analyze simple AC circuits which contain resistance.
7. Describe the electrical property of capacitance.
8. Analyze AC circuits with capacitance or capacitance/resistance.
9. Describe the electrical property of inductance.
10. Analyze AC circuits with inductance or inductance and resistance.
11. Explain the basic transformer action.
12. Determine the current, voltage, and power relationships at the inputs and outputs of both ideal and practical transformer circuits.
13. Analyze circuits with resistance, capacitance, and inductance.
14. Explain the operation of series and parallel resonant circuits.

EE-3102, Shpg. wt. 7 lbs. 44.95
EEA-3102, Optional Cassettes*, Shpg. wt. 1 lb. 9.95
ECP-3801, Cassette Recorder/Player, (not shown, see p. 97) Shpg. wt. 4 lbs. 60.00

Semiconductor Devices Learning Program

No education in electronics would be complete without including solid-state technology. Semiconductor Devices teaches you all about this comparatively-recent development. Audio aids help emphasize the text material and you get hands-on experience with the interesting experiments. An optional final exam tests comprehension. 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. Prerequisites are the first two Heathkit Continuing Education Programs (DC and AC Electronics) or equivalent knowledge. 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. Upon completion of the Semiconductor 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 without damage.
6. Recognize semiconductor packages and their schematic symbols.
7. Design your own circuits using semiconductor devices.
8. Test various semiconductor devices for proper operation.

EE-3103, Shpg. wt. 6 lbs. 44.95
EEA-3103. Optional Cassettes*, Shpg. wt. 1 lb. 9.95
ECP-3801, Cassette Recorder/Player, (not shown, see p. 97) Shpg. wt. 4 lbs. 60.00

Electronic Circuits Learning Program

This program brings all the theory of your first programs together and shows you how it applies in actual circuit operation. Prerequisites are AC and DC Electronics and Semiconductor Devices (or equivalent knowledge). Included are texts, records, and 110 electronic components for 18 different experiments. If you choose to take the optional final exam and score 70% or better, you will receive a Certificate of Achievement and 4.0 Continuing Education Units. When you have completed this course, you will be able to:

1. Identify basic amplifier circuits and describe their operation.
2. Discuss direct current amplifiers, audio amplifiers, video amplifiers, intermediate frequency amplifiers, and RF amplifiers.
3. Explain differential amplifiers, comparators, filters.
4. Analyze and design simple inverting and non-inverting amplifiers.
5. Explain power supply rectifiers, filters, and regulation circuits.
6. Identify commonly used LC, RC, and crystal oscillators.
7. Explain shapers, multivibrators, Schmitt triggers, generators.
8. Explain AM, FM, heterodynes, modulation and detection.
9. Construct many transistor and IC circuits.
10. Use voltmeter and oscilloscope to analyze electronic circuits.

EE-3104, Shpg. wt. 7 lbs. 54.95
EEA-3104, Optional Cassettes*, Shpg. wt. 1 lb. 9.95
ECP-3801, Cassette Recorder/Player, (not shown, see p. 97) Shpg. wt. 4 lbs. 60.00

These programs use the optional ET-3100 Electronic Trainer for completion of the experiments. See page 87 for description.

*Optional cassettes duplicate material on records, but in convenient, easy-to-use cassette form.   89

Advanced Digital Techniques Self-Learning Program
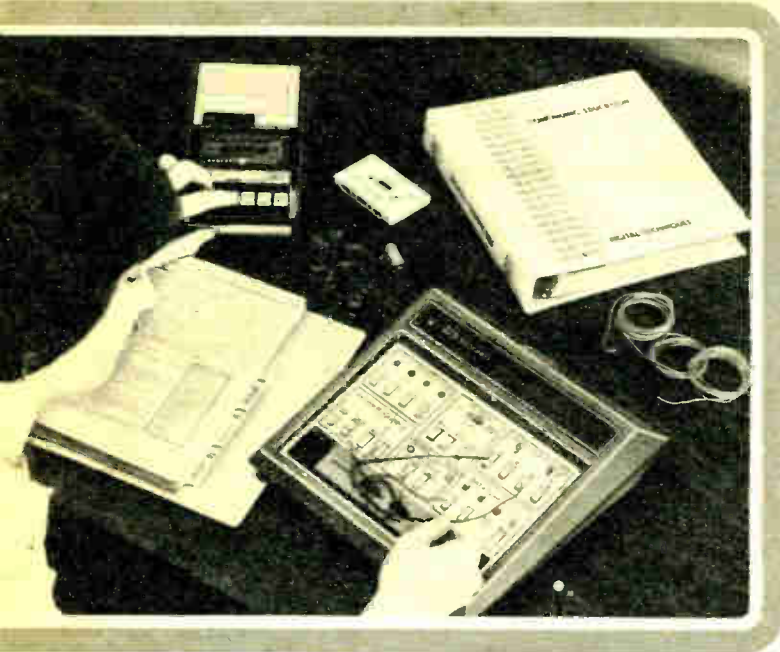
Learn the operation of digital logic circuits and the major applications of digital techniques in electronics. Covers everything from TTL and CMOS to ROM's, PLA, microprocessors and computers.

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 electronic equipment.
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 the operation of digital logic gates.
6. Identify the more commonly used integrated circuit families used in digital equipment and discuss their operation, characteristics, and features.
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 to the selection of the integrated circuits.
12. Understand the operation and application of digital counters in time and frequency measurements.
13. Understand how a digital computer is organized and how it operates.
14. Understand microprocessors, explain their operation and give examples of their applications.

Teaches fundamentals, logic circuits, design applications, more

The Digital Techniques program covers fundamentals and theory, digital logic circuits, digital integrated circuits, Boolean algebra, flip-flops and registers, sequential logic circuits, combinational logic circuitry and digital design. It shows you how to design digital circuitry for virtually any modern electronic application. The program assumes a prior knowledge of electronics, (either the four basic Heathkit programs or equivalent). Includes text, records and 44 electronic components for 24 experiments. The ET-3200 Digital Trainer is required to perform the experiments. Heath also recommends the IM-5284 multimeter (page 57) and an oscilloscope such as the IO-4105 (page 71), is necessary for some experiments. If you choose to take the final exam, a passing grade of 70% or better earns you 4.0 Continuing Education Units and a Certificate of Achievement.

EE-3201, Shpg. wt. 9 lbs. **59.95**
EEA-3201, Optional Cassettes*, Shpg. wt. 1 lb. **9.95**
ECP-3801, Fully assembled Cassette Recorder/Player, (not shown, see p. 40) Shpg. wt. 4 lbs. **60.00**

*Optional cassettes duplicate material on records.

This versatile electronic trainer lets you learn by doing. Use it to get maximum benefit from the Digital Techniques Program.

The Heathkit Electronic Trainer is the way to learn by doing. Use it to perform all the experiments in the Digital Techniques Program, develop projects, build and test prototypes, verify circuit operation and check digital IC's. Has solderless breadboard sockets for experimentation and design, four binary data switches, 2 "no-bounce" switches to pulse logic circuits, 3-frequency pulse clock generator and 4 LED's for visual indication of logic states. The ET-3200 also contains three regulated power supplies with outputs of +12 VDC @ 100 mA, −12 VDC @ 100 mA and +5 VDC @ 500 mA. Each output features current limiting and is overload protected for safe operation. Breadboard sockets accommodate up to eight 14 or 16-pin dual-in-line ICs, also 24, 28, and 40-pin DIPs. The power supplies and circuitry of the ET-3200 are compatible with most of today's commonly-used integrated circuit logic families including: RTL; DTL; TTL; CMOS; ECL; NMOS; PMOS; Linear. For 120/240 VAC, 60/50 Hz.

Kit ET-3200, Shpg. wt. 5 lbs. **84.95**
ETW-3200, Assembled and tested version of above, Shpg. wt. 6 lbs. **149.95**

ET-3200 SPECIFICATIONS: DATA SWITCHES: States: +5 volts or 0 volts. Maximum Current: 10 mA, each switch. Outputs: 4 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 volts and +0.2 volts. CLOCK: Output Frequency: 1 Hz, 1 kHz, 100 kHz; ±20%. Duty Cycle: 45%. Output Voltage: 5 volts peak-to-peak. POWER REQUIREMENT: 120/240 VAC, 60/50 Hz, 15 watts maximum. Fuse: 3/16-ampere, slow-blow. DIMENSIONS: 3½" H x 12⅛" W x 11¾" D.
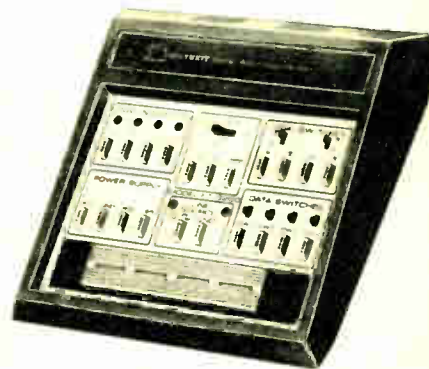
Use for the experiments in the program, and for circuit design and experimentation after you complete it.

Heathkit Learning Programs designed for classroom teaching

The famous Heathkit electronics learning programs have been completely reformatted for classroom use. Using the instructor's guide, the teacher can add to the information in the program material his own experience and guidance to give the student a fully rounded learning experience. The programs are ideal for classroom use in schools, industry seminars or adult education classes.

The programs are broken down into three separate publications for student and teacher convenience. The student text is the core of the learning material. The student workbook with its exams and laboratory experiments, is keyed to the text. The instructor's guide presents the material in an orderly fashion.

Along with the publications, separate parts packages contain the electronic components needed to implement the workbook experiments. These parts are required for the experiments in the learning programs. To complete the experiments in DC and AC Electronics, Semiconductor Devices and Electronic Programs the ET-3100 Trainer is required. For the Digital Techniques Program, the ET-3200 Trainer is required. For the Microprocessor Program, the ET-3400 Trainer is required to complete the workbook experiments in the program.

Free brochures are also available, detailing the course objectives and outlines, at Heathkit Electronic Centers in the areas listed below. (For addresses and telephone numbers, see the listing on page 72). Contact your local center for information and discount schedules. All educational products are displayed at each center. Come in and browse before you buy.

ARIZONA — Phoenix
CALIFORNIA — Anaheim, El Cerrito, Los Angeles, Pomona, Redwood City, Sacramento, San Diego, San Jose, Woodland Hills
COLORADO — Denver
CONNECTICUT — Hartford
FLORIDA — Miami, Tampa
GEORGIA — Atlanta
ILLINOIS — Chicago, Downers Grove
INDIANA — Indianapolis
KANSAS — Kansas City
KENTUCKY — Louisville
LOUISIANA — New Orleans
MARYLAND — Baltimore, Rockville
MASSACHUSETTS — Boston (Peabody), Boston (Wellesley)
MICHIGAN — Detroit, East Detroit

MINNESOTA — Minneapolis, St. Paul
MISSOURI — St. Louis
NEBRASKA — Omaha
NEW JERSEY — Fair Lawn, Ocean
NEW YORK — Buffalo. Jericho, LI, Rochester, White Plains
OHIO — Cincinnati, Cleveland, Columbus, Toledo
OKLAHOMA — Oklahoma City
PENNSYLVANIA — Philadelphia, Frazer, Pittsburgh
RHODE ISLAND — Providence
TEXAS — Dallas, Houston, San Antonio
UTAH — Salt Lake City
VIRGINIA — Alexandria, Norfolk
WASHINGTON — Seattle
WISCONSIN — Milwaukee

Program	Text Shpg. wt. 2 lbs.	Price	Workbook Shpg. wt. 2 lbs.	Price	Instructors' 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	15.95	EEA-3101	9.95
AC Electronics	EB-6102	17.95	EB-6102-40	7.95	EB-6102-50	8.95	EB-6102-30	9.95	EEA-3102	9.95
Semiconductor Devices	EB-6103	17.95	EB-6103-40	7.95	EB-6103-50	8.95	EB-6103-30	9.95	EEA-3103	9.95
Electronic Circuits	EB-6104	19.95	EB-6104-40	8.95	EB-6104-50	8.95	EB-6104-30	21.95	EEA-3104	9.95
Digital Techniques	EB-6201 (3 lbs.)	24.95	EB-6201-40	10.95	EB-6201-50	8.95	EB-6201-30	19.95	EEA-3201	9.95
Microprocessor	EB-6401 (4 lbs.)	19.95	EB-6401-40	8.95	EB-6401-50	8.95	EB-6401-30	49.95	EB-6401-60	12.95

Learn to solder the correct way with this low-cost Heathkit programmed instruction format

ONLY

$14⁹⁵

Invaluable for novice kitbuilders

Our Soldering Manual and Kit teach you the techniques for high reliability soldering in electronics applications. Whether you're a kitbuilder, hobbyist or experimenter, it's the perfect way to learn or brush up this skill. Using a proven programmed instruction format, the text covers mechanical connection, tinning, temperature control and much more. And to give you "hands-on" experience, a handy practice kit is included. Requires soldering iron and small hand tools (see page 47).

EI-3133, Shpg. wt. 2 lbs. 14.95

NEW Classroom version of our Automotive Electrical Systems Program for instructor-led group learning

The Heathkit Automotive Electrical Systems Program is now in a new format for classroom use. The student text is the core of the learning material. The student workbook ties into the student text, complete with examinations and experiments. Using the instructor's guide, the teacher can add experience and ideas to the learning material, giving the student a comprehensive learning experience. Separate parts packages contain electronic parts necessary to complete experiments. Filmstrips and cassette tapes also available. Contact your local Heathkit Electronic Center for information and discounts (see page 72 for store location). All educational products are displayed at each store.

EB-10, Auto Textbook, Shpg. wt. 3 lbs. 12.95
EB-10-30, Parts Pack, Shpg. wt. 2 lbs. 17.95
EB-10-40, Student Workbook, Shpg. wt. 2 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

For more details, turn to page 15.

Get into Personal Computing the easy, effective Heathkit way

Microprocessor Self-Instruction Program helps you learn about computers and programming

You'll learn microprocessor basics, computer arithmetic, programming, interfacing and much more. It assumes a knowledge of electronics equivalent to Heath's Digital Techniques Program.

Winner International Award of Distinction Society of Technical Communicators

You can teach yourself all about computers and programming with this easy-to-use program and the ET-3400 Trainer for program experiments

If you're involved in scientific or electronic pursuits, microprocessors are becoming a way of life and a dominant factor in your success or failure. The Award-winning EE-3401/ET-3400 self-instruction program and accompanying computer trainer is the easy, effective way to learn about these powerful devices. The program uses Heath's proven self-instructional techniques including programmed instructions and audio-visual aids to teach computer programming, microprocessor operation, interfacing and related topics. The **microprocessor program is organized into 10 learning units as follows:**

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 instruc-

tions, 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 adapter, key matrix and parallel-to-serial conversion, digital-to-analog and analog-to-digital conversion.

The EE-3401 is complete with 62 electronic components required to complete the experiments. These components include two 2112 256x4-bit RAM's, 6820 PIA interface chip, 1406 digital to analog converter, 741 and 301 op amps and a variety of other microprocessor-oriented devices. The ET-3400 Computer Trainer, on page 93, is required for the experiments in the Program.

If you choose to take the optional final exam, a passing grade of 70% or better earns you 8.0 Continuing Education Units and a Certificate of Achievement.

EE-3401, Shpg. wt. 12 lbs. **89.95**
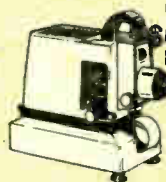
EE-3401-1 Slides. Optional 35 mm Slides duplicate the audio-visual flip charts in the EE-3401 program. Shpg. wt. 2 lbs. **60.00**

EE-3401-2 Filmstrip. Optional 35 mm Filmstrip duplicates the audio-visual flip charts in the EE-3401 Program. 1 lb. **20.00**

See page 91 for classroom version of EE-3401.

Learn microcomputer programming and interfacing the fun way
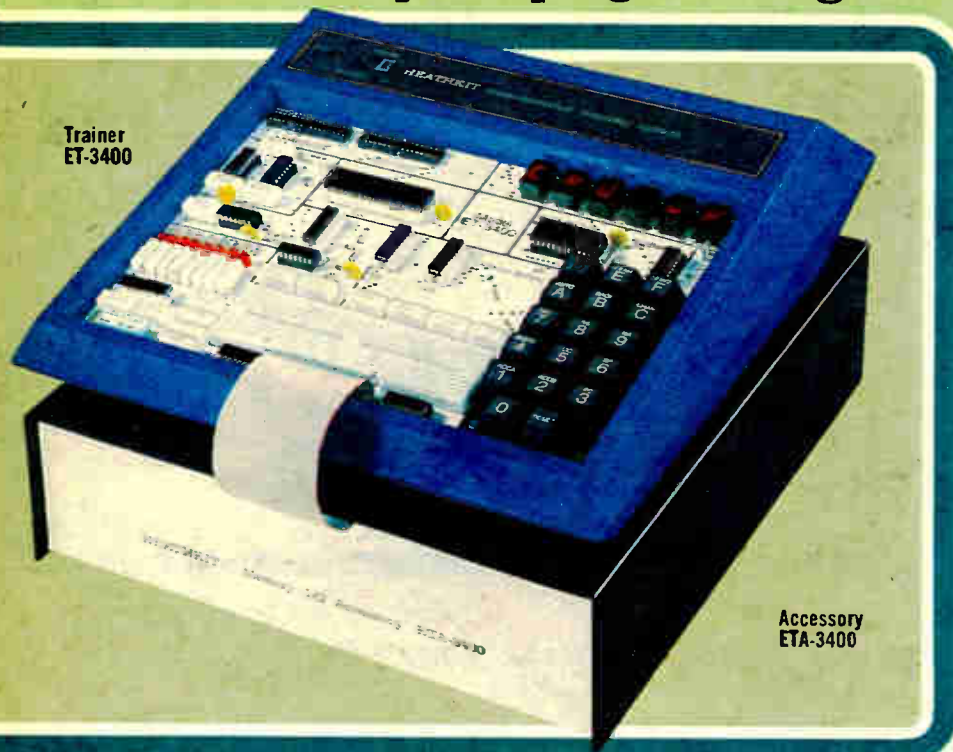
Trainer
ET-3400

Accessory
ETA-3400

Learn to do your own computer programming with these two versatile units. Join the fun of personal computing.

The ET-3400 Computer Trainer is designed for use with the EE-3401 Microprocessor Self-Instruction program. It provides all the necessary tools for you to learn the fundamentals of microprocessors, programming and interfacing, and it enables you to perform the experiments described in the EE-3401 program. After you complete the experiments in the EE-3401 program, add the Trainer accessory and a terminal such as the H9, and you'll have a complete low-cost computer system. Order from listings below.

This Microprocessor Trainer will give you real "hands-on" computer experience, then turn it into a complete, low-priced personal computer

$199 95 Kit

- Uses the popular 6800 microprocessor
- Built-in 1K ROM Monitor Program
- Breadboarding Socket for Prototyping
- 17-Key Hexadecimal keyboard and LED display

The Trainer and its accessory provide complete, low-cost computing power ideal for practice or practical programming!

Functioning as a miniature digital computer, the ET-3400 Microprocessor Trainer is essential for the experiments in the EE-3401 Self-Instruction Program. After completing the program, the ET-3400 is ideal for breadboarding, prototyping and system design. The ET-3400 features a built-in 1K ROM monitor program for controlling unit operation; 6-digit hexadecimal 7-segment LED display for address and data readout; 17-key hexadecimal keyboard for entering programs and data. Has 256 bytes of random access memory (RAM) built-in expandable to 512 bytes with the RAM's supplied in the EE-3401 program. Also has 8 buffered binary LED'S for display of breadboard logic states, 8 SPST DIP switches for binary input to breadboard circuits, 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 extend memory and I/O capacity. Built-in +5, +12 and −12 volt power supplies.

Microprocessor Trainer.
Kit ET-3400, Shpg. wt. 7 lbs. **199.95**

Factory Assembled and Tested.
ETW-3400, Shpg. wt. 6 lbs. 2 75.00

Microprocessor Trainer Accessory

Makes the Microprocessor Trainer into a complete, low-priced personal computer system. It provides an audio cassette interface so you can store programs on convenient cassettes, it also provides an additional 1K bytes of memory so you can run longer and more sophisticated programs through the ET-3400. The memory can be expanded to 4K bytes with the optional 3K chip set (ETA-3400-1, order from listing below). A serial I/O with EIA or 20 mA loop format in the accessory lets you hook up a terminal such as the H9. 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 to let you program using BASIC. Connects to the trainer by means of a 40-pin ribbon cable supplied. Parts required to modify Trainer are included. Since this modification changes the clock frequency of the Trainer, the experiments in the Microprocessor Program using timing loops will be changed. It is recommended that all the EE-3401 program experiments be completed before adding this modification kit. The accessory cabi-

net measures 3" H x 11" W x 12" D. For 110/220 VAC, 60 Hz.

Microprocessor Trainer Accessory.
Kit ETA-3400, Shpg. wt. 8 lbs. 160.00
Factory Assembled and Tested.
EWA-3400, Shpg. wt. 9 lbs. 250.00
Optional 3K Chip Set.
ETA-3400-1, Shpg. wt. 1 lb. 50.00

Versatility makes the ET-3400 a great value now — and later!

Use the ET-3400 Microprocessor Trainer to learn microcomputer programming now (with the EE-3401 Self-Instruction Program), then use the ETA-3400 Microprocessor Trainer Accessory to convert the Trainer to a full personal computer system.

NOTE: A terminal such as the H9 is required to use the BASIC and monitor software with the trainer accessory. See page 40 for details on the H9.

We make it easier to learn advanced electronics!

New Heathkit Continuing Education Programs can expand your electronic horizons

The new Heathkit Advanced Electronics Programs are effective multimedia self-instruction programs that make learning a variety of electronic subjects fast, fun and effective. The text lets you read at your own pace in easy-to-understand, step-by-step segments. Large, illustrated visual materials make learning 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 Advanced Electronics Programs.

Whether you're a technician/engineer who wants to upgrade your skills, a student looking for advanced electronics knowledge or a hobbyist interested in new electronic developments, these programs are designed for you!

Learn about Op Amps, one of today's most important integrated circuits

The new Operational Amplifier Program makes it easy to gain in-depth understanding of one of the most commonly used integrated circuits. Because op amps are being used more and more, you will be working with them more. This program gives you the experience you need to know how they work and how they can work for you.

A 385-page self-instruction text, with test questions at the end of each unit, takes you step-by-step through the design and operation of operational-amp circuits. At the end of each unit, a series of experiments are outlined for you to perform. The experiments require circuit parts, like resistors, capacitors, diodes, transistors, indicator lights and IC's — all of which are included in the program. Also needed for the experiments is the ET-3300 Heathkit Lab Bread Board (listed below), and an oscilloscope like the Heathkit IO-4105 (see page 71), a multimeter like the IM-1104 (see page 62) and a fre-

quency generator like the IG-1271 (see page 63). The 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, current-to-voltage convertors and voltage-to-current convertors — and much more. Even the popular Norton and BiFET operational amplifiers are covered in depth in this program. When you pass the optional final examination, 3.0 Continuing Education Units will be awarded for your efforts. The prerequisite for the Operational Amplifiers program is the Heathkit Basic Electronics Series (EE-3101 through 3104, see pages 88 and 89) or equivalent knowledge.

EE-101, Shpg. wt. 5 lbs.	39.95
Kit ET-3300, Trainer, Shpg. wt. 6 lbs.	89.95
Assembled ETW-3300, Shpg. wt. 6 lbs.	149.95

New Active Filters Program makes in-depth learning of this new design easy

This new program provides a complete understanding of a very critical element in circuit design — the active filter. The significant advantages of active filters over passive LC networks are making them more and more common in electronic devices. This new program is designed to give you a thorough grasp of the subject.

The new Active Filters Program includes a 300-page self-instruction text describing the design, operation and uses of active filters. Test questions at the end of each unit assure thorough understanding. Also, at the end of each unit, a series of experiments give you hands-on experience with active filters. A complete package of parts is included for use in the experiments.

With this program you teach yourself how to design active filters with op amps, how to plot and predict frequency responses, how to design and breadboard first-order low-pass, and high-pass filters. Later

units teach how to design and build second-order and high-order filters, as well as bandpass and state variable filters. Prerequisite for the Active Filters Program is EE-101 Op Amp or its equivalent.

To complete the experiments, you need the ET-3300 Laboratory Breadboard (listed below) or the ET-3100 Experimenter/Trainer (see page 87) (NOTE: The ET-3100 Trainer can not be used with the other Advanced Electronics programs), an oscilloscope like the IO-4105 (see page 71), a multimeter like the IM-1104 (see page 62) and a frequency generator like the IG-1271 (see page 63). Upon completion of the optional final examination with a score of 70% or better, 3.0 Continuing Education Units (CEUs) will be awarded.

EE-102, Shpg. wt. 5 lbs.	29.95
Kit ET-3300, Trainer, Shpg. wt. 6 lbs.	89.95
Assembled ETW-3300, Shpg. wt. 6 lbs.	149.95

Learn Phase-Locked Loops with our newest program

NEW

State-of-the-art knowledge is within your reach with this new self-instruction program

As growing technology requires more versatility from electronic components, phase-locked loops (PLLs) are becoming more and more popular. PLLs are widely used in television receivers — to lock in the picture, ensure more accurate color reproduction and as demodulators to convert audio signals to sound. You'll also find phase-locked loop frequency synthesizers in FM receivers, providing more stable, more reliable reception than mechanical tuners. Phase-locked loop synthesizers in 40-channel Citizens' Band and 2-meter FM transceivers let one crystal do the work of 40 or 50. And PLLs are widely used in industrial telemetry and motor control circuits. You need to know about phase-locked loops to keep up with state-of-the-art developments in electronics. And Heath's newest Electronics Self-Instruction Program helps you understand how PLLs work. Before starting this Program you should complete the EE-3104 Electronic Circuits Program (see page 89) and the EE-3201 Digital Techniques Program (see page 90), or have equivalent knowledge.

An extensive 268-page self-instruction text, with test questions at the end of each unit, takes you through the design and operation of phase-locked loops, one step at a time. At the end of each unit, you perform a series of experiments to gain hands-on knowledge of the many designs and uses of phase-locked loops in the electronics industry.

Electronic parts necessary to complete the experiments are included with the course. To perform the experiments, you'll need the Heathkit ET-3300 Laboratory Breadboard (below), a DC voltmeter like the Heathkit IM-5284 (see page 57) and a single-channel oscilloscope such as the Heathkit IO-4105 (see page 71). To get the most out of the Program, Heath highly recommends an audio signal generator like the IG-5218 (see page 63) and a dual-trace oscilloscope such as the Heathkit IO-4205 (see page 71).

The text teaches you the general principles of phase-locked loops and their building blocks — the phase detector, loop filter and voltage-controlled oscillator. The program covers digital frequency synthesizers, including frequency reference circuits, divide-by-N counters, TTL and CMOS fixed and programmable counters and programming switches. And the principles and applications of monolithic integrated circuits are included in the program.

Learn about some of the latest developments in electronic technology with Heath's Phase-Locked Loops Self-Instruction Program, part of the Electronic Technology series. Once you've completed this program, pass the optional final examination and you will receive a Certificate of Achievement and 3.0 Continuing Education Units (CEUs).

EE-104, Shpg. wt. 5 lbs.	49.95
Kit ET-3300, Shpg. wt. 6 lbs.	89.95
Assembled ETW-3300, Shpg. wt. 6 lbs.	149.95

Self-powered breadboard makes it easy to design circuits, test components and learn electronics

$89.95 Kit

- Ideal for conducting experiments of Heathkit Electronics Self-Instruction Programs
- Or perform your own experiments
- Easy-to-build, easy-to-use

The Heathkit ET-3300 Laboratory Circuit Breadboard is a great convenience tool for electronics learning or circuit design task. It's ideal for performing the experiments connected with any of the Heathkit Electronics Self-Instruction Programs on these two pages. Or you can use the ET-3300 to perform your own experiments, test your electronic components or design your own circuits and devices.

The solderless sockets of the Breadboard make your work easier and simpler. Just plug in any solid wire or common component lead, up to #20 (0.032 inch) without soldering. You can also use larger wires and leads in the ET-3300 by tack soldering a #22 wire to the larger wire or lead, and then inserting the #22 wire in the solderless socket.

The Laboratory Circuit Breadboard is designed to accept almost any electronic part. For example, the spacing between the two columns of connectors on each breadboarding socket is designed to accommodate any size dual in-line integrated circuit package. And an integrated circuit-puller is supplied with the ET-3300. It fits down into the center channel of a breadboarding socket to gently and easily lift an integrated circuit from the connectors, without damaging the IC or the breadboard.

A reliable built-in power supply provides +5 VDC (±4%), +12 VDC (variable) or −12 VDC (±2%) power to the breadboard, with fixed current limiting of each supply at its rated current providing protection against short-circuits.

The ET-3300 is easy-to-assemble, with a fully detailed Heathkit manual to guide you every step of the way. And if something ever goes wrong, the simple, easy-to-follow manual makes servicing easy, even if you're new to electronics.

Building your ET-3300 Laboratory Circuit Breadboard is an educational experience in itself. And using the Laboratory Breadboard can help you expand and define your electronic knowledge. Required with EE-104 (above) and EE-101, can be used with EE-102.

Kit ET-3300, Shpg. wt. 6 lbs.	89.95
Fully Assembled Laboratory Circuit Breadboard.	
ETW-3300, Shpg. wt. 6 lbs.	149.95

ET/ETW-3300 SPECIFICATIONS: Power Supplies: Output Voltages: +5 volts DC, ±4 percent, at 1.5 amps; +12 volts DC, adjustable, at 100 mA; −12 volts DC, ±2 percent, at 100 mA. **Load Regulation:** Less than 2 percent variation from no load to full load on 5-volt or 12-volt supplies. **Current Limiting:** Fixed current limiting of each supply at rated current provides short-circuit protection. **Power Requirement:** 120 VAC, 50/60 Hz, 30 W at full load. (240 VAC with internal wire change). **Dimensions:** 3.5″ H x 12″ W x 12″ D (8.9 cm H x 30.5 cm W x 30.5 cm D).

Practical math programs for the math skills you need every day

Unique new learning method makes it easy to learn the basic math skills

The new learning method — audio tutorial — uses cassette tapes to guide you through simplified text material. You hear the instructions as you read and carry them out. Learning is faster, easier and more fun. Now, you can teach yourself the metric system, soon to become the official system in the U.S. You can review the math you learned in high school and first-year college. And you can relearn those important algebraic concepts on which so much of modern engineering is based.

Math Tutorials for Science and Technology

Now you can get a quick review of the fundamental math skills that you have need for every day in your work. In twelve self-contained programmed workbooks you get a complete review of the math you learned in high school and college. It's an ideal way to refresh your use of these important skills. The tutorials cover:

1. Review: Arithmetic and Signed Numbers
2. Powers and Roots
3. Scientific Notation
4. Arithmetic in Scientific Notation
5. Units and Rounding
6. Graphs
7. Ratio and Proportion
8. Introduction to Algebra
9. Solving Equations
10. Triangle Trigonometry
11. Vectors
12. Probability and Statistics

Upon completion of the program and passing the optional exam (passing grade 70%), you will receive 4.0 Continuing Education Units and a Certificate of Achievement.

EM-1, Shpg. wt. 9 lbs. **39.95**

Think Metric, U.S.A. Now it's easy

Now you can learn the fundamentals of the metric system in a way that's fun and easy. Metric is the most common system of weights and measures used throughout the world. Soon it will become the official system in the U.S. and every American will need to know it. This program introduces you to the most commonly used metric terms, provides examples of what you will be measuring when you use the new units, helps you compare metric sizes to familiar terms, and provides practical examples of using the metric system. Topics include:

1. Metric Vocabulary
2. Linear Measure
3. Liquid Measure
4. Metric Mass
5. Temperature
6. Area and Volume

The material is presented in a three-ring binder and includes an audio cassette to reinforce the printed text material. Upon completion of the program and passing the optional exam (passing grade 70%), you will receive 1.0 Continuing Education Units and a Certificate of Achievement.

EM-2, Shpg. wt. 4 lbs. **19.95**

Algebra for today

Use these three self-instruction programs to gain a complete and thorough background in algebra. The programs include self-review quizzes as you go along, and audio cassettes to further explain and reinforce text material.

Because of the flexibility of these materials, they are suitable either as complete learning programs, or as supplemental or referral materials for any course in math or science where the student needs any of the algebraic skills covered.

The cassettes supplied with each program are not taped lectures requiring long periods of listening. Rather, they have been developed to produce continuous interaction between you and the subject material. You advance through the program by completing examples while the discussion of the example is in progress on the tape, you work along with the narration as a new skill is introduced, and you also complete exercises independently of the tapes.

Algebra Fundamentals reviews basic algebraic skills. A three-ring binder for the text material and seven cassette tapes are included. Subjects covered include: integer arithmetic, substance of algebra, proportional reasoning, graphs, divisions and multiples, fractions, roots and real numbers. The program helps you make the transition from arithmetic to the more abstract reasoning of algebra by emphasizing the relationships between the two. It is designed for those who have never had algebra, or for those who have trouble making the initial transition into the formal study of algebra. The audio-tutorial approach used in this program is particularly appropriate for the person who is weak in basic mathematical skills, or in need of a refresher. Upon completion of this program and passing the optional exam, you will receive 2.5 Continuing Education Units and a Certificate of Achievement.

EM-3, Shpg. wt. 6 lbs. **49.95**

Algebra. This Program provides a working knowledge of algebra. Eight modular sections, plus a workbook and 10 audio cassettes are housed in two attractive binders. The program covers: polynomial arithmetic, factoring (I and II), algebraic fractions (I and II), exponents and radicals, linear equations and inequalities in one variable, quadratic equations and inequalities in one variable; probability; sets and operations. Upon completion of this program and passing the optional exam, you will receive 3.0 Continuing Education Units and a Certificate of Achievement.

EM-4, Shpg. wt. 7 lbs. **49.95**

Intermediate Algebra. Eight modules covering advanced problems and theories. Text material and nine audio cassettes. Subjects covered: functions, relations and inverses; graphs and variation; linear relations; quadratic relations; systems of equations and inequalities; determinants; logarithms; sequences and series. Upon completion of this program and passing the optional exam, you will receive 3.5 Continuing Education Units and a Certificate of Achievement.

EM-5, Shpg. wt. 6 lbs. **49.95**

Now you can learn the fundamentals of trigonometry

Get a headstart on the knowledge you need

Use this new self-instruction program to learn the fundamentals of trigonometry, in depth. You need trigonometry to analyze alternating current, as well as more complex mathematical, circular and angular problems — and the new audio-tutorial learning method makes learning this college-level course easier than ever. There's no pressure, no cramming for tomorrow's exam. Learn at your own pace, when and where you choose.

NEW

The Trigonometry Program provides basic skills and a working knowledge of trig. Two three-ring binders for the text and nine cassette tapes are provided with this self-instruction program. This course is a natural step forward from algebra, and requires the successful completion of our Advanced Algebra course (EM-5, see page 96) or its equivalent. A basic knowledge of geometry is helpful.

Trigonometry is divided into 9 units in this self-instruction course:

1. Circular functions
2. Graphs of circular functions
3. Identities and proofs
4. Inverse functions and conditional equations
5. Right triangle trigonometry
6. The solution of right triangles
7. Polar coordinates and parametric equations
8. Vectors
9. Complex numbers

The textbooks in this course include math and trig problems, while the cassette tapes discuss the concepts of trigonometry. Together, you see and hear the ideas being taught in the course. You can learn first-year college trigonometry in as little as 40 hours. And you'll learn trig in depth — taking the time you need to really learn trig fundamentals. Use the Trigonometry Self-Instruction Program to supplement what you learn in school. Or use the program to prepare for the CLEP Trigonometry examination, where you can earn college credit for your knowledge. Upon completing the course and passing the optional final examination with a score of 70% or more, you'll receive 4.0 Continuing Education Units (CEUs) and a Certificate of Achievement.

EM-6, Shpg. wt. 6 lbs. **49.95**

We can help you earn C.L.E.P. college credit

The College-Level Examination Program (CLEP) enables both traditional and non-traditional students to earn college credit by examination, recognizing college-level achievement acquired outside the conventional college classroom. Anyone can take CLEP tests to demonstrate college-level abilities gained through employment experience, military/industrial/business or advanced work in high school courses or non-credit adult courses — including the Heathkit Continuing Education Series of individual learning programs. The Algebra for today series (EM-3, 4 and 5, opposite) will help you prepare for the CLEP College Algebra Examination. Or use the Trigonometry Program (EM-6, above) before taking the CLEP Trig Exam. With today's high cost of college tuition, room and board, CLEP can save a student real money and get a degree sooner. Hundreds of colleges and universities honor CLEP test scores for credit. To obtain a list of these institutions, and for more information on the CLEP Program, write the College Board, P.O. Box 1822, Princeton, NJ 08541.

Assembled Cassette Tape Recorder/Player

Ideal for use with Heathkit educational programs containing audio cassettes. Easy-to-reach pushbuttons control play, rewind, fast forward, stop, eject and record functions. Tone and volume controls. Built-in three-digit counter. Factory wired — not a kit.

ECP-3801, Shpg. wt. 4 lbs. **60.00**

Texas Instruments TI-50 Scientific Calculator

Advanced capability, including sixty functions, make it ideal for use with our practical math programs!

$39⁹⁵

- Scientific notation makes working with large numbers simpler and quicker
- AOS™ algebraic operating system with parentheses saves scratch paper
- Attractive slimline styling, convenient to use, pocket-portable
- Handles most-needed slide-rule functions and a wide range of problems
- Special functions make especially difficult problems easier to solve

Fully assembled

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 Heathkit educational courses. Sixty functions automatically handle a wide range of mathematical problems, including the most common slide-rule functions such as roots, powers, reciprocals, logarithms and trig (in degrees, radians or grads). Scientific notation lets you work both small and large numbers with ease.

EMA-10, Shpg. wt. 1 lb. **39.95**

Move up to beautiful big-screen color—you program

It's a completely automatic total home viewing system — a fully computerized programmable color TV.

This computer TV system allows you to program your set for an entire evening's viewing, then just sit back and relax.

The GD-1185 programmer then automatically changes to the right channel at the right time. You can even program the set to return to manual operation at a preselected time, then resume automatic operation at another time. And programming is easy too — the top bank of 8 keys accesses the memory and turns the on-screen clock display into a readout which lets you "see" your program as you enter it. The selected time appears in the first four digits of the clock display, the channel number in the last two. Simply enter the time at which you want the set to change channels, then enter the channel number you want. You can program up to 32 channel changes within two 12/24 hour periods!

The fully automatic antenna rotor system adds even more automated convenience — you can program the set to turn your antenna to the correct heading each time the GR-2001 changes channels!

To further automate the GR-2001 system, the GD-1184 antenna rotator control lets you rotate your antenna for the best reception on each channel — it's perfect for areas where stations are in widely separate locations. You can select up to 8 separate antenna headings with up to three stations per heading. It's the most convenient antenna-rotor system ever!

With all this programming convenience, you also get a color TV that features our best color picture ever!

While the programmer and antenna-rotor make the GR-2001 system unique, the color TV itself really makes the GR-2001 system worthwhile! The GR-2001 is simply one of the best-performing color TV's you'll find anywhere. Dozens of circuit refinements and improvements combine for a picture that's vivid, accurate, bright and ultra-sharp. The 25" (diagonal) rectangular picture tube uses a black matrix screen for one of the best pictures ever. It's fully shielded to maintain outstanding color purity by eliminating stray magnetic fields. The phase-locked loop horizontal and vertical oscillators provide a picture so rock steady and adjustment-free we've eliminated conventional horizontal and vertical hold controls!

Even the audio circuitry has been improved to provide excellent sound.

How good is the sound of the Heathkit GR-2001? Just ask yourself, "How many television manufacturers even publish audio specifications for the general public?" Ours are listed on the next page. Check them out; compare our set with the others — **we think you'll find the GR-2001 color TV**

one of the finest television values around. Order yours today and we'll include a FREE GRA-2001-6 Remote Control (for this catalog only). Simply specify model number when ordering.

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 or 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 has expired, the service fee is $5.00 per module plus parts. All picture tubes are warranted for two full years.

Eight programming pushbuttons let you sequence the GR-2001 to change channels and rotate your antenna at times you preselect! Above the pushbuttons, backlit nomenclature shows the current operating mode of the programmer.

Simulated TV Picture

Easy step-by-step kit assembly

Comprehensive, fully illustrated assembly manuals take you step-by-step from unpacking your kit to plug-in. Check-off blanks by each step let you keep your place and follow the instructions for easy, organized kit assembly. There's even a section on proper soldering so you can be sure your solder connections are correct.

Built-in service features

Famous Heath built-in self-service features let you keep the GR-2001 in perfect shape for years to come. A dot generator, centering and convergence circuits and a test meter help you do your own service, should the need arise. You can really save money on service over the life of your color television set.

Custom-installation for good looks

Our custom-installation option lets you build the GR-2001 into a wall, mount it in your own custom cabinet, or order one of our beautifully constructed cabinets on page 100. Any way you do it, you'll find the GR-2001 returns your investment with year after year of beautiful, trouble-free performance.

and never leave the comfort of your own easy chair

Simulated TV Picture

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

Now with free remote control

Even if you order it without the options below, it's still one of the finest sets you can buy anywhere! Less cabinet, order your choice of fine-furniture cabinets at right. Includes chassis, picture tube, one speaker. Be sure to specify FREE GRA-2001-6 Remote Control when ordering.
Kit GR-2001, Shpg. wt. 146 lbs. 759.95

Second Speaker for GR-2001. Fits in space on GR-2001 cabinets where indicated. Includes all cables. GRA-2000-7, Shpg. wt. 2 lbs. 10.95

GR-2001 SPECIFICATIONS: Deflection: Magnetic, 90°. Focus: Electrostatic. Convergence: Magnetic. Antenna Input Impedance: VHF: 300Ω balanced or 75Ω unbalanced. UHF: 300Ω balanced. Picture IF Carrier: 45.74 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: 4Ω or 8Ω. 2 watts. Power Requirement: 110 to 130 volts AC, 60 Hz, 200 watts. Net weight: 112 lbs.

8-Channel Accessory for your GR-2001

Adds 8 more channels to the GR-2001's random-access tuning system (a total of 24 channels) for even greater versatility.
Kit GRA-2001-9, Shpg. wt. 1 lb. 10.95

GD-1185 TV Programmer

Automatically changes channels at any time you select — up to 16 changes in either of two switch-selected 12/24-hour periods. Front-panel keyboard and on-screen readout make it easy to enter any time or channel you want. It's the ultimate in convenience — and a Heathkit exclusive! Requires GRA-601 Clock below for operation. Kit GD-1185, Shpg. wt. 9 lbs. 179.95

Hand-held Remote Control for the GR-2001

(Not shown). Lets you adjust volume, turn the set on or off, adjust tint, scan up or down, even turn the optional programmer on or off — all from the comfort of your easy chair. Operates to 20-ft. away from set.
Kit GRA-2001-6, 4 lbs. . . . . Reg. $99.95. FREE with GR-2001 purchase

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FREE REMOTE CONTROL WITH PURCHASE

The on-screen digital clock displays the programming sequence in bright, easy-to-see 1" high digits.

Easy-to-build On-Screen Digital Clock

Displays the time on your TV screen. Time in hours, minutes and, if desired, seconds in 12/24 hour format below the channel number. Easy-to-read white digits can be on permanently or automatically reappear at selected intervals.
Kit GRA-601, Shpg. wt. 1 lb. 35.95

Automatic Antenna Rotor Control for Better Reception

Automatically rotates your antenna to preselected directions for the best reception on each channel. Accepts up to 3 channels for each of 8 directions. Operates with or without GD-1185 above. For use only with existing Cornell Dubilier AR-40 rotor system (Heath GDP-1176 or GDP-258) or optional motor below.
Kit GD-1184, Shpg. wt. 6 lbs. 69.95
GDA-1184-1, Rotor Motor. Requires 5-wire cable (not supplied). 11 lbs. 39.95

99

GR-2000 25" diagonal Color TV for outstanding viewing

Simulated TV picture

Now get our $99.95 Remote Control FREE with your GR-2000

FREE

The set that brought color TV into the digital age includes our $99.95 Ultrasonic Remote Control FREE for this catalog only. The GR-2000 also features on-screen channel display and an optional digital on-screen clock.

"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 digit readout and 12 or 24-hour format.
Kit GRA-601, Shpg. wt. 1 lb. **35.95**

Ultrasonic Remote Control for GR-2000

Lets you watch and control your GR-2000 right from your easy chair. On/off, color controls, digital readout and channels. Includes receiver for in-chassis mounting, hand-held transmitter. Operates up to 20 ft. from set. Included free with purchase of GR-2000 Color TV (for this catalog only).
Kit GRA-2000-6, Shpg. wt. 4 lbs. **99.95**

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; negative 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 and lots more.

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 below.

The GR-2000 will save you big money, too. Because you build it yourself, you can service it yourself. All the service circuitry you need is built-in.

And remember, now you get our regular $99.95 Ultrasonic Remote Control free when you purchase the GR-2000 Color TV (from this catalog only). Order yours now. Simply specify GRA-2000-6 on your order blank.

Kit GR-2000, Shpg. wt. 147 lbs. Motor Freight **659.95**
Second Speaker for GR-2000. Fits in space on GR-2000 cabinets (where indicated). Includes all cables. **GRA-2000-7,** Shpg. wt. 2 lbs. **10.95**

GR-2000 SPECIFICATIONS: Picture Tube: 25" (diagonal). Viewing Area: 315 sq. in. Deflection: Magnetic, 90 degrees. Antenna Input Impedance: VHF: 300 Ω balanced or 75 Ω unbalanced. UHF: 300 Ω balanced. Tuning Range: TV channels 2 through 83. (Preset any 16). 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: 20⅛" H x 29⅛" W x 21¾" D. Power Requirement: 110 to 130 volts AC, 60 Hz, 200 watts. Net Weight: 112 lbs.

Fine-Furniture Cabinets for your GR-2001 or GR-2000

[1] **Contemporary cabinet.** This beautiful cabinet will make your Heathkit Color TV a job to behold...even when it's not turned on. Constructed of wood solids and veneers, it features an oiled walnut finish. It has dual speaker capability, too. Comes assembled and finished. 28⅜" H x 46¹³⁄₁₆" W x 20⅝" D (23⅝" D with cup).
GRA-602-25, Shpg. wt. 66 lbs. Motor Freight **219.95**

[2] **Compact contemporary cabinet.** Solidly constructed of wood solids and veneers, beautifully finished in luxurious oiled walnut finish. Comes fully assembled with cutout for one speaker. 34⅜" H x 33⅞" W x 20⅝" D (24⅛" D including cup).
GRA-608-25, Shpg. wt. 65 lbs. Motor Freight **169.95**

[3] **Early American cabinet.** Your GR-2001 or GR-2000 will occupy a place of prestige in any room of your home in this handsome cabinet. Constructed of distressed maple finished wood solids and veneers, it has simulated wood-grain trim. Hardware has Winsor Antique Gold finish. Fully assembled and finished. Has twin speaker capability. 31¾" H x 47¹³⁄₁₆" W x 20½" D (23⅞" D including cup). Shpg. wt. 83 lbs.
GRA-603-25, Motor Freight **229.95**

[4] **Mediterranean cabinet.** For a cabinet as sharp as the picture on your Heathkit Color TV, you couldn't make a better choice than this cabinet crafted of wood solids and veneers. Its simulated wood-grain trim and dark oak finish are accented by Antique Gold finish hardware. Fully assembled and finished. Accepts two speakers. 30¾" H x 49¹⁵⁄₁₆" W x 20⅞" D. (23¹⁵⁄₁₆" D including cup). Shpg. wt. 82 lbs.
GRA-604-25, Motor Freight **229.95**

Simulated TV pictures

100

Get great color with a Heathkit Color TV, plus accessories to increase your viewing enjoyment

GR-500 19" Diagonal Measure Color TV Kit

Simulated TV picture

Has in-line gun color TV tube with negative matrix screen for excellent contrast and brightness, on-screen channel display, automatic fine-tune, instant-on, hi-fi output and speaker defeat switch.

Kit GR-500, less cabinet. 99 lbs. UPS **539.95**
GRA-500-1, walnut veneer table model cabinet (shown), 17¼" H x 25½" W x 14" D (17" D including cup), Shpg. wt. 28 lbs., UPS **51.95**
GRA-403-18, roll-around cart. 22" H x 27" W x 15⅝" D, Shpg. wt. 17 lbs., UPS **24.95**
GRA-601, Digital Clock Accessory, 1 lb. **35.95**

FREE Remote Control (GRA-2000-6) with purchase of GR-2050 Color TV. $99.95 value, FREE this catalog only.

The GR-2050 brings you all the technical excellence and quality design of our famous GR-2000, 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. And the GR-2050 is an exciting kitbuilding experience too. Modular circuit boards and color-coded wiring harnesses keep point-to-point wiring to a minimum. Built-in service features and adjustment circuits include dot generator, service circuit board, centering and pincushion circuits — so you can save money on service costs.

Order yours today and we'll include a FREE GRA-2000-6 Remote Control. Simply specify model number on order blank.

Kit GR-2050, 122 lbs., Mtr. Frt. **599.95**
GRA-2050-1, Contemporary Cabinet. Shpg. wt. 74 lbs. Motor Freight **189.95**

Simulated TV picture

Kit GRA-601, Optional On-Screen Digital Clock. (See complete description on the opposite page).
Shpg. wt. 1 lb. **35.95**

Antennas and Accessories for improved color reception

"Super Antenna." 60-element VHF-UHF-FM has 171" boom and 109" turning radius. Includes removable FM blocking elements. Less mast and cable. Motor Freight. **GD-1461,** 300 ohms, Shpg. wt. 17 lbs. **84.95**
GDS-1461, 75 ohms, Shpg. wt. 34 lbs. **89.95**
"Deluxe Fringe Antenna." 28-element antenna. 131" boom, 80" turning radius. Less mast and cable.
GD-1441, 300 ohms, Shpg. wt. 10 lbs. **39.95**
GDS-1441, 75 ohms, Shpg. wt. 34 lbs. **44.95**
Cornell-Dubilier Rotor System. Consists of control box and rugged outdoor rotor. Supports antennas to 150 lbs. Lower mast clamp accepts ⅞" to 2" dia. masts. Requires 5-wire cable (not supplied).
GDP-1176, Shpg. wt. 14 lbs. **64.95**
75/300 Ohm Transformer-Splitter. Matches one 75 ohm coax 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**
CB Trap Filter. Cuts out unwanted CB interference. 300 ohm impedance. No assembly is required. **GD-1239,** Shpg. wt. 1 lb. **6.95**
Matching Transformer. Converts 300 ohms to 75 ohms for coax. 82 channel. **GD-1054,** Shpg. wt. 1 lb. **3.95**
Coax Cable. 100 feet of high quality coax cable with antenna boot and connectors (installed) Needs matching transformers (above) at both ends. **GD-328,** Shpg. wt. 4 lbs. **12.95**

The all-purpose Digital Thermometer

Get accurate temperatures for photo processing, baby's bath, dozens of uses. The GD-1226 can read temperatures from +32°F to +230°F (0°C to +110°C) with 0.5 percent accuracy, and never needs calibration! Solid-state microprocessor technology gives you accurate readings in as little as 10 seconds. Weighs just 5½ ounces and fits comfortably in your hand for maximum versatility. A shock-resistant high-impact plastic case protects the GD-1226 from damage. Operates from one 9-volt battery (not included) for up to one year under normal use conditions. Flashing decimal low battery warning. Fully assembled, not a kit. Dimensions, 2" H x 2½" W x 5" L. Resolution, 0.1°F or 0.1°C. Ambient temperature range, 0°F to +120°F (–18°C to +49°C). Battery life under continuous use, 25 hours maximum.
GD-1226, Shpg. wt. 2 lbs. **39.95**

Videorecorder, camera and monitor give you more from TV

Never miss a game or show again, even if you're away from home or just watching another channel!

[1] Fully Assembled Sony Betamax Video Cassette Recorder with Three-Hour Recording Capability. You can record shows in color as you watch them, record from a different channel than the one you're watching, or with the built-in timer, even record a show while you're away! It even includes a remote pause/start control so you can hold recording during commercials or pauses and restart it right from your easy-chair.

GDP-8600, Fully Assembled. 45 lbs. UPS **960.00**
GDA-1230-2, 2-Hour Videocassettes. 1 lb. .each **16.95**
GDP-8601, 3-Hour Videocassettes. 1 lb. .each **20.95**

[2] Sanyo VC-1600X High-Sensitivity Video Camera. High-resolution black-and- white TV picture ideal for security and surveillance uses. Can also make tapes when used with a VCR with video input. Excellent in businesses, stores, anywhere remote monitoring is effective. With 50 ft. cable and connectors. For 117 VAC, 60 Hz.

GDP-1850, Fully Assembled. Shpg. wt. 10 lbs. **259.95**
GDP-1852, Mounting Bracket for Camera. 2 lbs. **19.95**

[3] Sanyo VM-4209 High-Performance Video Monitor. Use with camera above for an outstanding monitoring and security system. Has 9" diagonal viewing area, high-resolution black-and-white picture. Rugged steel cabinet, 8⅝" W x 9³⁄₁₆" H x 9¾" D. For 117 VAC, 60 Hz.

GDP-1851, Fully Assembled. Shpg. wt. 17 lbs. **189.95**
COMBO OFFER — SAVE $49.95! Camera and Monitor Together. With all cables and connectors. If purchased separately, $449.90.
GDS-1850, 34 lbs. **399.95**

101

The exciting new Heathkit Screen Star Projection TV

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

$2295⁰⁰

- 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

HEATHKIT
ELECTRONIC CENTER
charg·a·kit
REVOLVING
CHARGE

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 new 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 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 diagnoal, 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 Viewing 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 101).

We've even designed a video input/output panel with an auxiliary 120 VAC outlet that lets you directly connect a video cassette recorder (VCR — like the Sony Betamax (see page 101). Direct connection assures higher-quality video reproduction!

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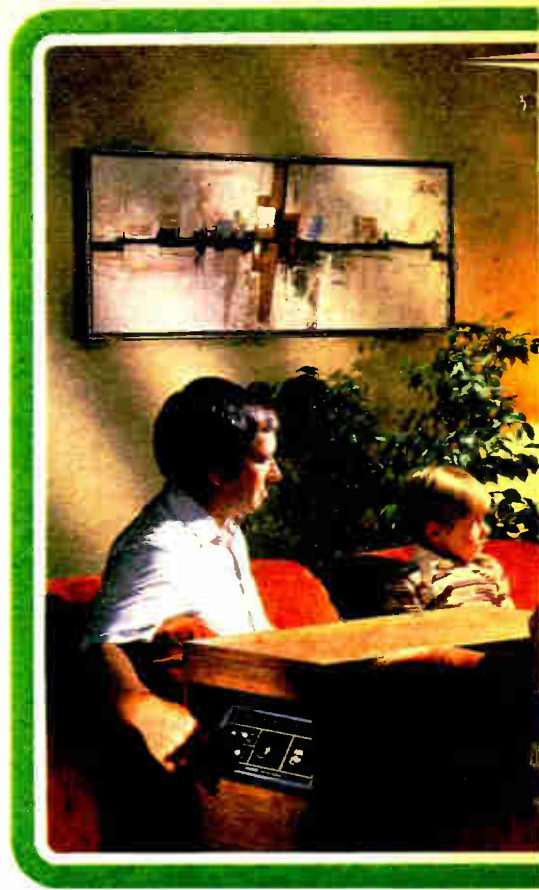
All controls on the projector are easy-to-find and easy-to-use. Illuminated channel indicators instantly tell you which of the 82 UHF and VHF channels you're tuned to. And all adjustments, including the focus controls, are on top of the chassis or an easily accessible panel.

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 GRA-4000-1 Viewing 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 over the life of your Heathkit Screen Star TV.

Should your 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. See it at your nearest Heathkit Electronic Center now.

Kit GR-4000, Wt. 170 lbs., Mtr. Frt. **2,295.00**
Optional Viewing Screen Stand for GR-4000.
GRA-4000-1, Shpg. wt. 17 lbs. **84.95**
(*If your present TV is 25" diagonal or smaller.)

brings big-screen color television right into your living room!

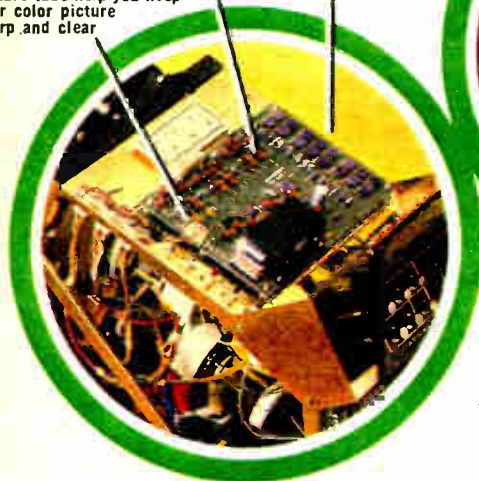Simulated TV picture

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 Viewing Screen Stand)

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

Chassis swings back for easier servicing

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 16¼" W x 32" D. Power Requirement: 120 VAC, 60 Hz, 150 Watts.

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Become a pinball wizard!

Brunswick® ASPEN® Home Pinball Game

$529⁹⁵

NEW

- A great holiday gift for the whole family!
- Save up to $100 from similar models
- A 2-evening kit — easy to assemble

Heath brings all the fast, action-packed excitement of a pinball arcade into your game room with the Brunswick® ASPEN® Home Pinball Game. This full-sized game features a SCHUSSRING™ high-action field with 18 scoring areas. Points are racked up faster than you can follow the regulation pinballs! And double and triple scoring add to the fun.

The fast action is maintained by two jet kickers, a thumper bumper, six rubber band switches, three rollover switches, three spin gates and three target switches. Two independently operated flippers put you in maximum control of the ball. A free ball lane makes the game even more exciting. An adjustable tilt sensing mechanism stops action on the ball in play when you tilt the field. Seven musical melodies play at the beginning and end of each game, at bonus scores and when the field is tilted.

The ASPEN® Pinball Game features a microprocessor-based electronic memory that remembers scores 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.

You can easily assemble the game in just two evenings with tools normally found in the home. The circuit boards and playing field are factory assembled and tested for greater reliability and durability.

All the fun of a genuine arcade, with modern solid-state reliability, make the ASPEN® Pinball Game a perfect gift!

Kit GD-1210, Shpg. wt. 141 lbs., Motor Freight **529.95**

Heathkit handy index

For location of Heathkit Electronic Center nearest you, see page 72.
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