Heathkit®

Canadian Catalogue No. 004

FALL, 1980

New Audio Processor gives you complete control of your music.

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

New low-cost Microprocessor Trainer teaches you programming

New Digital Depth Sounder makes boating safer and more fun!

New low-cost Digital Frequency Counter

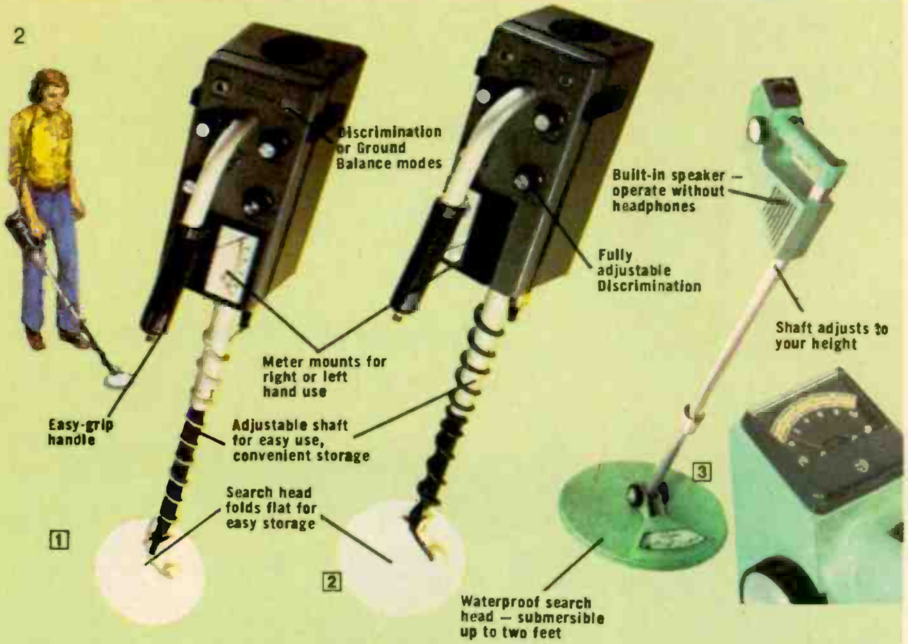
New Hand-held Digital Frequency Counter

New Microprocessor Programming Course requires no electronic background

HEATHKIT ELECTRONIC CENTRES
Across Canada, open Monday - Saturday
See Back Page for location nearest you or Order-By-Mail for Shop-At-Home convenience.

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

SEE PAGE 51 FOR HANDY INDEX


Discrimination or Ground Balance modes
Built-in speaker — operate without headphones
Fully adjustable Discrimination
Shaft adjusts to your height
Meter mounts for right or left hand use
Easy-grip handle
Adjustable shaft for easy use, convenient storage
Search head folds flat for easy storage
1
2
3
Waterproof search head — submersible up to two feet

Join the excitement of treasure hunting with a Heathkit Metal Locator

Search for old coins, artifacts, treasure — any metal object you want to find. Our finest Locator features a Very Low Frequency (VLF) Ground Balance Mode. You can use it anywhere for finding almost anything in any kind of soil — even in highly mineralized soil where conventional metal locators are useless. And our lowest-priced model uses an induction balance system to pinpoint your find. Order yours now and join the fun of treasure hunting.

1 Groundtrack™ Metal Locator

Useable in most soil conditions. Our finest Metal Locator will give you hour after hour of fun-filled excitement. Whether searching for buried treasure, antique artifacts or old coins, you'll be a step ahead of the others because the Groundtrack's adjustable discrimination lets you look in areas where high "junk" makes conventional locators useless.

A fully-shielded search coil prevents false signals and is waterproof, so you can even look for buried metal in up to two feet of salt or fresh water. The GD-1290 features a sophisticated induction balance system so you hear nothing until a piece of metal enters the search field; then the tone grows louder as you approach the metal object.

Use the lightweight Groundtrack anywhere — it's lightweight — and the adjustable shaft telescopes for easy storage. Uses 6 AA cells (not included) — or with the optional GDA-1190-1 Nickel-Cadmium Battery Pack installed, you can recharge your Groundtrack at home or from your car lighter socket.

Kit GD-1290, Shpg. wt. 2.5 Kg	**289.95**
GDA-1190-1, Rechargeable Battery Pack, 1 Kg	**34.95**

GD-1290 SPECIFICATIONS: Sensitivity: Locates dime at 4" to 6" typical, may be less depending on soil conditions, mode of operation and amount of discrimination selected. **Method of Detection:** Induction-balance circuit. **Detector Output:** Meter, speaker, phone jack. **Dimensions:** Search Coil: 6" diameter. **Extended Height:** 45½". **Collapsed height:** 22½". **Power Requirement:** Six AA dry cells or alkaline, or optional rechargeable Nickel-Cadmium Pack (GDA-1180-1, see above). **Net Weight:** 3.4 lbs.

2 Cointrack™ Metal Locator finds coins

The GD-1190 is designed for coinshooting. It features a search coil optimized for coin locating, and adjustable discrimination so good you'll be able to find treasure in areas where operation with other locators is all but impossible! Pushbutton tuning maintains maximum sensitivity. The 1190's waterproof head allows underwater searching.

The GD-1190 collapses for easy storage and transportation. And with its optional GDA-1190-1 Nickel-Cadmium Battery pack installed, you can recharge your Cointrack at home or in the field from your car's cigarette lighter socket. Can also be operated on six ordinary AA cells (not included).

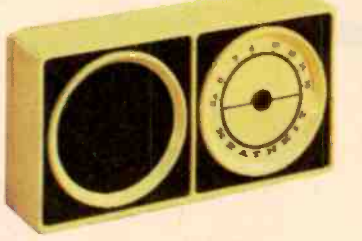
Kit GD-1190, Shpg. wt. 2.5 Kg	**259.95**
GDA-1190-1, Rechargeable Battery Pack, Shpg. wt. 1 Kg	**34.95**
GDA-1190-2, Headphones for GD-1190 or GD-1290, Shpg. wt. 1 Kg	**15.95**
GDA-1190-3, Carrying Case for GD-1190 or GD-1290, Shpg. wt. 1 Kg	**15.95**

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

3 Low-priced Induction Balance Locator

The GD-348 uses a sophisticated induction-balance system. Pinpoint finds through built-in speaker, optional headphones or use the front-panel meter. Null and ten-turn sensitivity controls let you adjust to find larger or smaller objects or to overcome ground effect. Less battery (order below).

Kit GD-348, Shpg. wt. 2.5 Kg	**169.95**
GDA-48-1, 9-Volt Battery, Wt. 1 Kg	**7.95**
GD-396, 600-ohm Superex Headphones, 1 Kg	**14.95**
GDA-348-1, Carrying Case, Shpg. wt. 1 Kg	**19.95**



Great first-time kit — AM Pocket Radio is fun to build and use

$24.95

- **Large speaker for fine sound**
- **Practical start to kitbuilding**

This pocket Portable is a practical first kit and a first rate performer. Take it camping, to the beach, use it around home. It's fast and easy to build — an ideal way to introduce someone else (or yourself) to kitbuilding. Famous Heathkit step-by-step instructions assure success. Features 3½" speaker. 4" H x 7⅞" W x 2" D. Uses 9V battery (not included). Kit includes necessary solder as do all our kits.

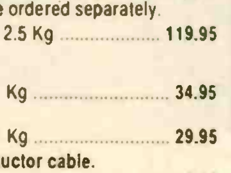
Kit GR-1008, Shpg. wt. 1 Kg	**24.95**

Precision Electronic Metronome for Music Practice

Maintains a steady beat so you can practice easier and more efficiently. A front panel control turns the unit on and adjusts the tempo from 40 to 210 beats per minute. A rear panel control adjusts the volume. The excellent repeatability and precision of this unit make it ideal for practicing "set pieces" over and over, without tempo changes. Handsome cherry finish birch cabinet with non-marring felt feet. Easy 1 evening kit assembly. Requires two 9-volt batteries (not supplied).

TD-1257, Shpg. wt. 1 Kg	**39.95**

Handy Heathkit Intercom in your home saves time and steps



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

GD-140, Master and Remote, 2.5 Kg	**99.95**

6-station Master — This master station lets you talk and listen to six remotes located anywhere in your home. All remotes must be ordered separately.

GD-110, 6-station Master, 2.5 Kg	**119.95**

Accessories

GD-120, Indoor Remote. 1 Kg	**34.95**
GD-130, Outdoor Remote Not for use with GD-140. 1 Kg	**29.95**
GDA-110-2, 100-ft. 4-conductor cable. For GD-110, 140. 1.5 Kg	**19.95**
GDA-110-4, 100-ft. 2-conductor outdoor cable, For GD-130. 1 Kg	**10.95**

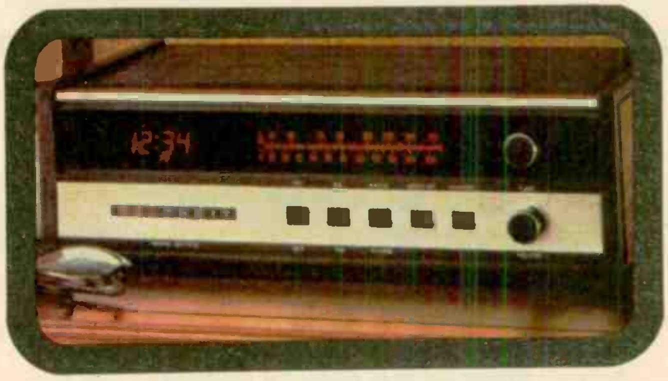
Kits to bring your family convenience and enjoyment

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 (compatible with push-button phone). Connects easily to modular jack. Do not use on party lines or pay phones. Easy assembly. 120 VAC, 60 Hz. 2" H x 8¾" W x 5¾" D.

Kit GT-1217, Shpg. wt. 1.5 Kg 139.95



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. 5 Kg 199.95

Ultra-convenient Ultrasonic Cleaner

- **Tackles those almost-impossible cleaning chores**
- **Won't interfere with radio or TV reception**

The Heathkit GD-1151 Ultrasonic Cleaner makes short work of most hard-to-clean projects. Deep clean watch parts, most jewelry, dentures or any delicate item that could be damaged or otherwise harmed by hard scrubbing, harsh cleaning agents or abrasives. Simply fill the stainless steel tank with any detergent or cleaning solution safe for the item to be cleaned. Place the object or objects in the tank, set the timer and the Ultrasonic Cleaner does the rest. The GD-1151 won't hurt radio or television reception. Tank measures 6" L x 4" W x 2⅜" D. Overall dimensions, 4⅝" H x 5¾" W x 11" L (including lid). For 120 VAC, 60 Hz.

Kit GD-1151, Shpg. wt. 2.5 Kg 169.95

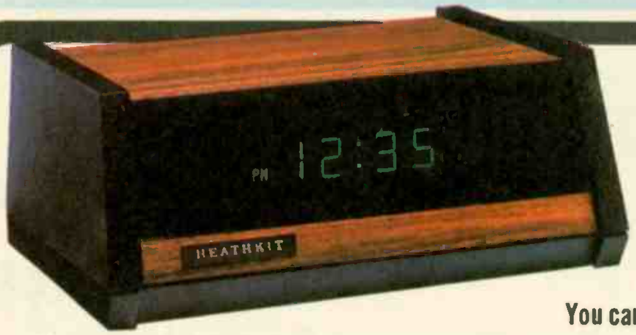
Dazzling Musical Light Show adds more to your sound system

- **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. 16 Kg 179.95

The convenience clock...with digital accuracy



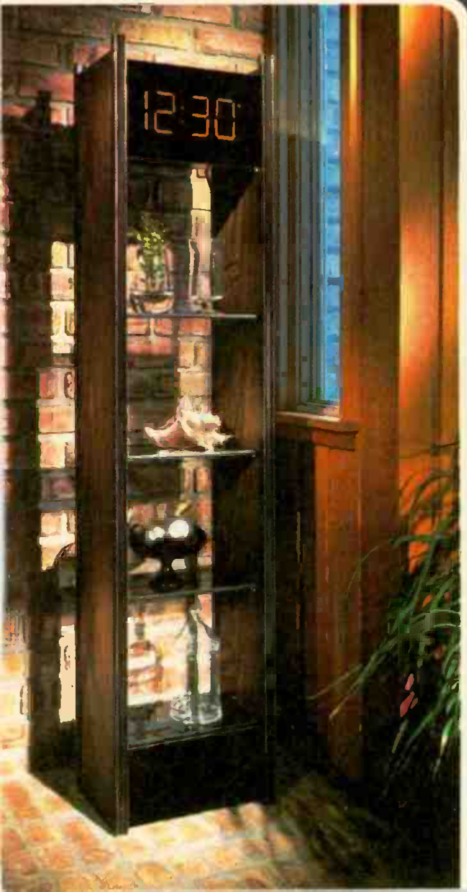
Loaded with convenient features

- Snooze alarm
- Automatic brightness adjustment
- Power failure alert
- Value priced

You can say: "I built it myself."

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. 1.5 Kg 49.95



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.

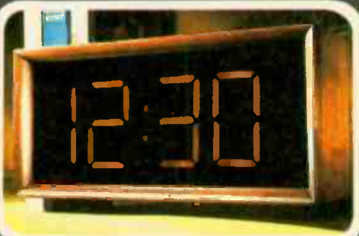
The clock displays hours and minutes, with the center colon pulsing each second. A special power failure indicator circuit pulses the display brightness to show that power has been interrupted and clock must be reset. Time setting is accomplished by easy-to-use fast and slow time advance switches located 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. 27 Kg 359.95

GC-1195 SPECIFICATIONS: Format: 3½-digit (12-hour) time readout. **Power requirement:** 108-132 VAC, 50/60 Hz, 30 watts. 216-264 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. 9 Kg 179.95

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. 1.5 Kg 139.95

Chafitz Sargon Modular Game System

This game utilizes the famous Sargon 2.5 Chess Program – the world's strongest playing micro-computer chess program. Features Balanced Game Strengths – SARGON Thinks on Opponent's Time – Game Related Messages – Backspace Control – Tournament Timer – Maximum Computer Strength Control – Audio Alert System – Exclusive Rank Display and Position Verification – Handicapping – Problem Solving – Move Monitor – Opening Book Library – Battery Operated Portable Use – Position Storage Memory – Multiple Playing Levels – Halt/Hint Control – Changing Sides – Instructional Mode Features – Plays by USCF Rules – Alphanumeric Display. Includes optional battery pack which permits portable use: a $99.95 value.

GDC-6100, Shpg. wt. 2 Kg **799.95**

Boris Diplomat II

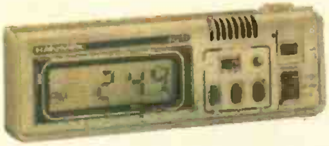
The world's first battery-operated compact portable chess computer which has the capacity to challenge a master, yet can guide the beginner, a step at a time, into and through the fascination of chess. Features – Infinite levels of play – Programmable Positioning – Handicapping – Standard Notation – Clear Entry – Castling – En Passant – Queening – Tutoring – Colour Selection – Rank Display – Player in Check or Checkmate – Random Play. Operates up to 8-hours on AA alkaline batteries (not included) and on AC adapter, included.

GDC-6000, Shpg. wt. 2 Kg **199.95**

HAQ-100, Quartz Analog Alarm Clock

Tasteful elegance in a reliable alarm clock that is superb value. Dependable quartz mechanisim provides precision performance. Compact design is suitable for travel use, or for any room where the convenience of battery operation is desired. Push button dial light and top mounted alarm switch. Extended operation from a single AA battery. Available in (1) White; (2) Black and (3) Red.

Model HAQ-100-1, -2, -3, Shpg. wt. .5 Kg **27.95**



AQ-11, 'Dual-Time' Traveller's Alarm Clock

Allows simultaneous setting of two different times. Ideal for international travellers. LCD display shows hours, minutes, seconds and weekdays with Quartz accuracy and reliability. Electronic alarm sounds for full 7-minutes and Snooze feature gives you 6-minutes of extra sleep time. Micro light for easy night-time reading. Provides up to years of operation from a single battery. Comes with a handy carry case.

Model AQ-11, Shpg. wt. .5 Kg **39.95**

The Controller-BSR System X-10

The BSR System X-10 plugs into any wall outlet in your house. No extra wires. Just a command console that can run your house at the touch of a button. For a start, the package comes complete with enough modules to control two lights and one appliance. The console, itself, will give you control over as many as 16 outlets, with extra modules available. So if television is turning you off, you can turn it off without getting up. Or, turn out all the lights in the house, from your bed. Or, turn on the front porch light when company comes. You can brighten lights. Or even dim them. With X-10. Once you've got control, you can take command.

GDC-5000, PK-400, Starter package, including control module; 2 lamp modules and 1 appliance module, Shpg. wt. 2 Kg **139.95**

GDC-5001, SC-311, Extra control module, Shpg. wt. 1 Kg **66.95**

GDC-5002, LM-501, Extra lamp module, Shpg. wt. 1 Kg **24.95**

GDC-5003, AM-601, Extra appliance module, Shpg. wt. 1 Kg **24.95**

GTE – Fashion Plate Telephone

Standard desk model, comes complete with 11 different coloured facemats to match any decor. Available in (0) White or (1) Brown.

Model GDC-100-101, Rotary Dial, Shpg. wt. 1 Kg **49.95**

Model GDC-110-111, Touch Call, Shpg. wt. 1 Kg **79.95**

GTE – Styleline Telephone

The sculptured styling and variety of colours makes this an ideal addition to your home. Dial is conveniently located in the handset. Available in (0) White; (1) Brown; (2) Ivory; (3) Gold; (4) Orange; (5) Red.

Model GDC-300-305, Rotary Dial, Shpg. wt. 1 Kg **79.95**

Model GDC-310-315, Touch Call, Shpg. wt. 1 Kg **99.95**

GTE – Flip-Phone Telephone

Fits anywhere – measures less than 2" X 2" X 6". Has electronic tone ringer with on-off switch. This push-button dial telephone works on both rotary and touch call exchanges. Comes in four decorator colours (0) White; (1) Brown; (2) Ivory and (6) Yellow.

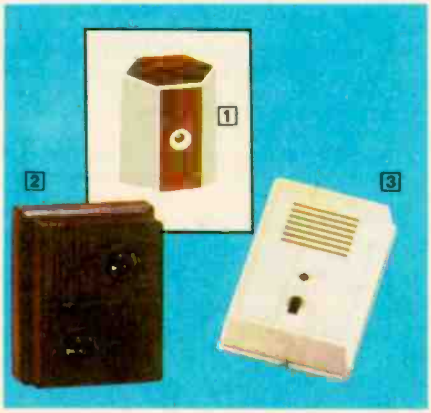
Model GDC-420, 421, 422, 426, Shpg. wt. 1 Kg **89.00**

Kits to make your home more enjoyable and secure

Tellus Smoke Fire Detector Alarm

The dual ionization chamber detects combustion at the earliest stage and sounds the 85 decibel alarm. Features test switch; LED power indicator and low battery warning. Up to 20 units can be interconnected. Operates on internal battery (included). ULC listed.

GD-007, Shpg. wt. 1 Kg 23.95



Protect home and food when you're away

1 Great low-cost "insurance." Turns lights on in the evening, off in the morning — automatically. Helps discourage burglars by giving your home a lived-in appearance while you're away. Great 1-evening kit.

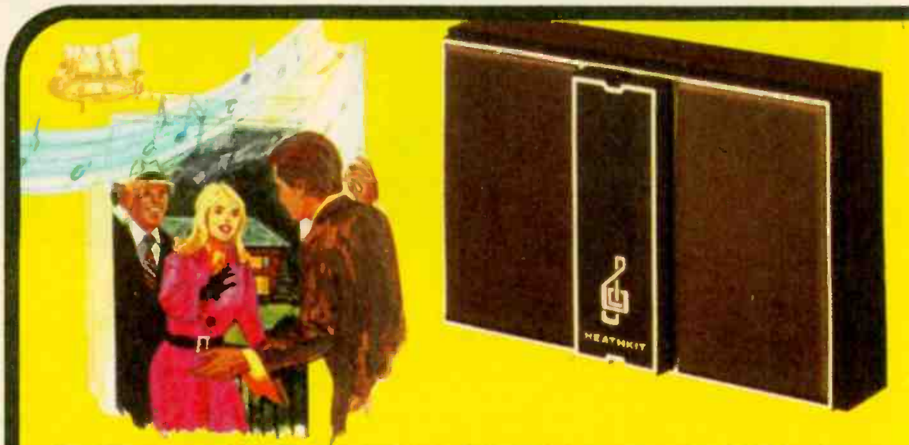
Kit GD-600, Shpg. wt. 1 Kg 17.95

2 Eye Spy™ Photobeam Relay is low-priced security. When beam is broken, warning devices or lamps plugged into the photocell are activated. Works up to 25 ft. from reflecting mirror.

Kit GD-1021, Shpg. wt. 1.5 Kg 29.95

3 The Food Freezer Alarm signals if the freezer door is left open or if freezer temperature reaches 20°F even with door closed. Operates on two standard "C" cells (not included). Installs easily on any freezer.

Kit GD-1183, Shpg. wt. 1 Kg 25.95



The "Programmable" Electronic Doorbell that plays any tune up to 16 beats

$59.95

- Program any 16-beat tune
- Change tunes easily
- A great first-time kit

What an exciting way for visitors to announce themselves... your favorite melody 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 season, an anniversary, a birthday, even a special party. And the TD-1089 tells you whether a visitor is at the front or rear door by the length of the tune.

Changing your tune is easy. Just rearrange the programming leads in the connectors of the C through C "keyboard" located behind the front-panel access door. The assembly manual includes programming instructions for over 50 tunes, or you can compose or program your own. Controls for tuning, volume, speed, and decay characteristics of the electronically synthesized sound also are located inside the front-panel door.

Single circuit board construction makes it easy-to-build even if you're a first-time kit builder. And installation is easy too, just wire between existing bell transformer and TD-1089. The attractive brown plastic cabinet with dull-gold color trim and tan fabric panels is included in the kit.

TD-1089, Shpg. wt. 1.5 Kg 59.95

The Informer® — looks like a book but is really an ultrasonic alarm

- Protects your home from its library shelf
- Built-in time delay
- Activates alarms, bells, floor or table lamps
- Detects an intruder up to 25 feet from unit

THE INFORMER
HEATH

$99.95

The Heathkit Informer Ultrasonic Intrusion Alarm sits quietly on bookshelf or table until something or someone invades its field of surveillance. Then "The Informer" can activate indoor buzzer alarms, outdoor bells, table or floor lamps... to alert you to the possible presence of an intruder as far as 25 ft. from the unit. Any movement that affects that transmitted signal in the room is perceived by the receiver, and the lamp outlet is triggered, turning on table or floor lamps. Approximately 30 seconds later, the alarm outlet is triggered, activating indoor or outdoor alarms. Built-in time delay between light and alarm allows you to enter room and deactivate the "Informer" without triggering the audible alarm.

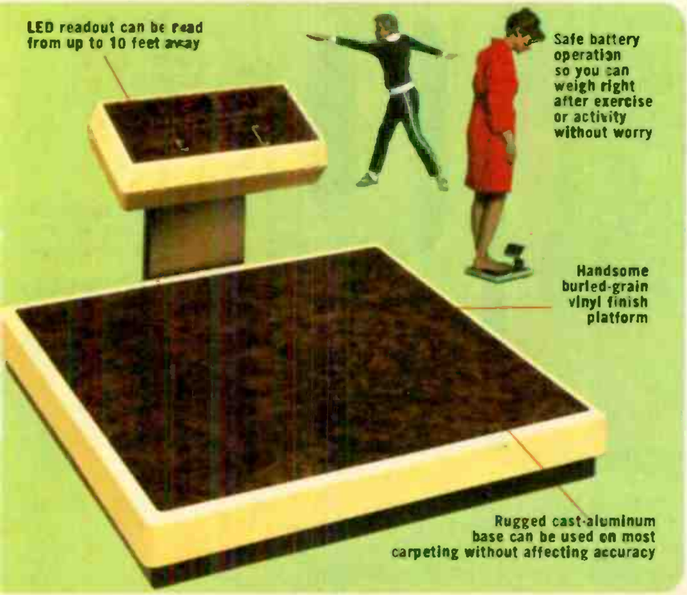
Kit GD-49, Shpg. wt. 2.5 Kg 99.95

GDA-39-1, indoor buzzer alarm, Shpg. wt. 1 Kg 19.95

GDA-39-2, outdoor bell, Shpg. wt. 2.5 Kg 52.95

NOTE: Since the GD-49 operates in the same frequency range as some Ultrasonic TV Remote Controls, interference between the two is possible.

Convenient kits for home, darkroom or private plane


LED readout can be read from up to 10 feet away
Safe battery operation so you can weigh right after exercise or activity without worry
Handsome burled-grain vinyl finish platform
Rugged cast-aluminum base can be used on most carpeting without affecting accuracy

Digital Electronic Scale offers "space age" convenience

$169⁹⁵ KIT

- Shows your weight far more precisely than dial scales
- Electronic reliability — no springs, weights or pins to go wrong
- Rugged, moisture-proof die-cast aluminum housing

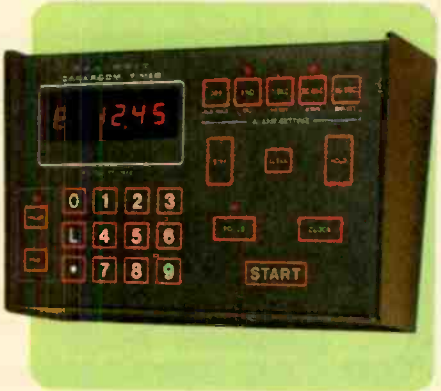
The Heathkit Digi-Scale is a digital readout "weighing machine" that shows your weight in big, bright, computer-like LED's. It has a 135 kilogram capacity (or can be wired to read out in pounds). It's far more precise and easier to read than conventional dial scales. The Digi-Scale uses solid-state circuitry and a strain-gauge transducer element like those used in expensive laboratory scales. It has no mechanical weights or springs to go out of adjustment.

A zeroing feature allows fine adjustments for accurate weighing of small items (weigh the baby, but not the blanket). Battery-operated for safety, even after a shower. Includes extra cable for placing readout at eye level on wall, if desired. Uses 6 "C" cells (not included). Platform: 11½" x 11½" x 1⅝". Readout: 6" x 3½" x 1½".

Kit GD-1186, Shpg. wt. 4 Kg	**169.95**
Factory assembled and adjusted GD-1186. Readout non-detachable. Reads in pounds. GDW-1186, Wt. 4 Kg	**299.95**

GD-1186 SPECIFICATIONS: Display: 4-digit, ½" high LED. **Low-Battery DED. Display Update Rate**, approx. 1 second. **Full Scale:** 300 pounds (136 kilograms). **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).

Put the versatile Heathkit PT-1500 Timer in your darkroom



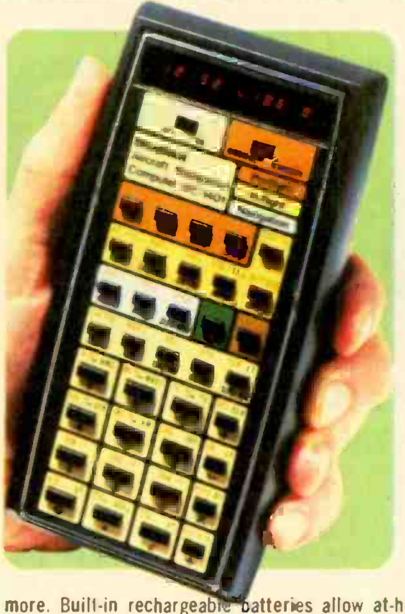
The Heathkit PT-1500 microprocessor-based Darkroom Timer is one of the most versatile timers available today — it even has its own programmable memory

The Heathkit PT-1500 Darkroom Timer is microprocessor-controlled for maximum accuracy. It's programmable memory can hold times for up to nine process steps and an enlarger step. Auto-step sequencing loads the timer so you're ready to time the next step. Using the optional Auxiliary Outlet to connect the timer to an external device (such as a color drum), the Auxiliary outlet is turned on during countdowns in the Process mode. Enlarger and safelight outlets are toggled so one goes on when the other goes off (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. Control start or focus switch with optional Foot Switch, or both start and focus switches with optional Dual Foot Switch (below).

Kit PT-1500, Shpg. wt. 3 Kg	**199.95**
PTA-1500-1, Optional Single Foot Switch, 1 Kg	**17.95**
PTA-1500-2, Optional Dual Foot Switch, 2 Kg	**39.95**
PTA-1500-3, Optional Auxiliary Outlet, 1 Kg	**23.95**

The Heathkit Air Navigation Computer helps get you there safely

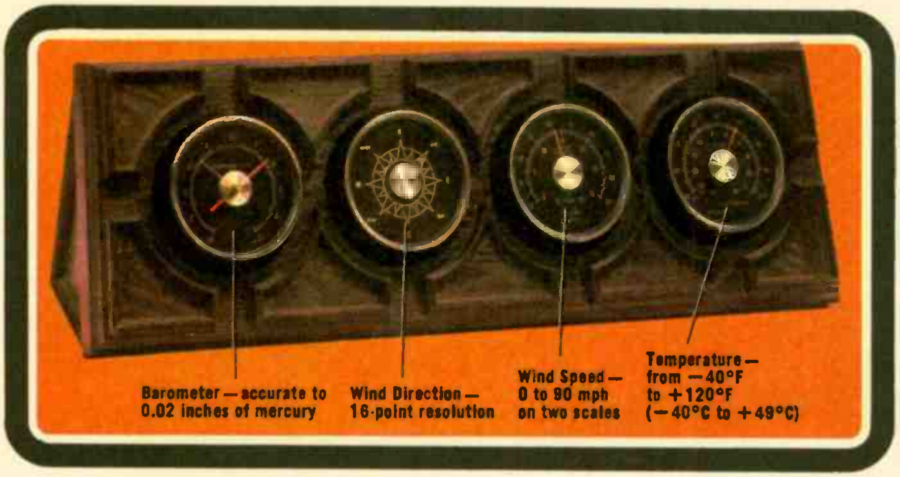


- Most powerful low-cost Aircraft Computer
- Built-In clock and timer for time-related computations
- Countdown fuel indication
- Scientific calculator functions
- ETA to checkpoint and destination
- Flight leg countdown
- Accepts preflight data and vectors for up to nine legs

The Heathkit OC-1401 Navigation Computer computes magnetic heading, true air speed, ground speed, time to next checkpoint, time to destination, clock time to next checkpoint, and clock time to destination. Features 36-key keyboard, 14-digit display, built-in clock and elapsed timer, special fuel warning indicator, more. Built-in rechargeable batteries allow at-home programming and memory keep-alive to airport. Powered by aircraft's lighter socket during flight.

Kit OC-1401, Shpg. wt. 2 Kg	**269.95**
OCW-1401, Assembled and Tested, 2 Kg	**419.95**
Kit OCA-1401-1, Deluxe Carrying Case/Power Pack. Includes four heavy-duty rechargeable nickel cadmium "C" Cells, 2.5 Kg	**79.95**
OCW-1401-1, Factory assembled, tested Case, wt. 2.5 Kg	**129.95**

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. 4 Kg 199.95

8-Wire cable for remote transmitters, **IDA-1290-1,** 50 ft. cable 1 Kg 15.95

IDA-1290-2, 100 ft. cable, 2 Kg...... 26.95 **IDA-1290-3,** 150 ft. cable 3 Kg 39.95

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 11 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.

16
Wind Speed
HEATHKIT

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. Includes remote transmitter as above. Order eight-wire cable above.

Kit ID-1590, Shpg. wt. 3 Kg 139.95

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.

+80
INDOOR
OUTDOOR
HEATHKIT

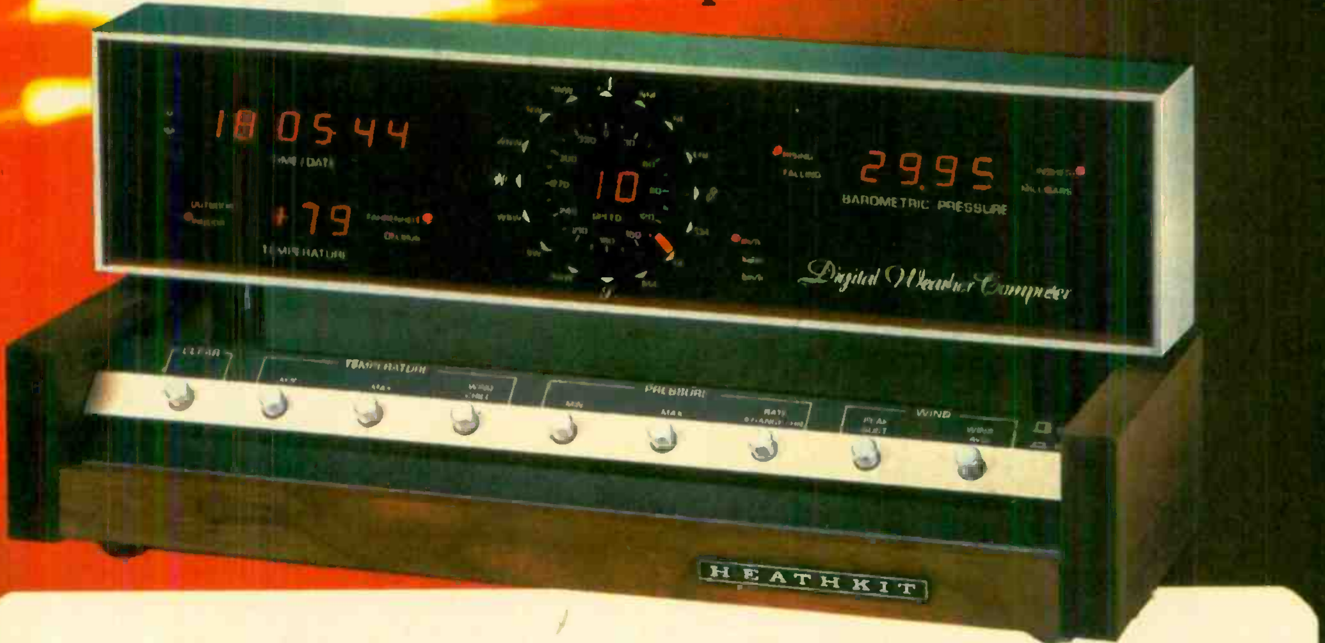
Easy-to-build digital Indoor/Outdoor Thermometer

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-1390B, Shpg. wt. 2.5 Kg 129.95

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.

Now get up-to-the-minute weather reports with your own computerized weather station.



Electronic Weatherman

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. Microprocessor-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 Centigrade, 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.

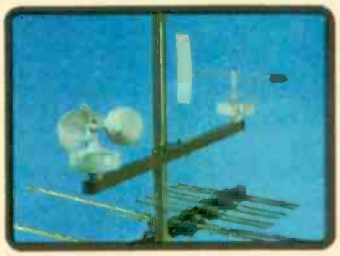
Order the Heathkit Weather Computer today. And you'll have your own reliable, weather reports at the press of a button.

Kit ID-4001, Shpg. wt. 8 Kg	**649.95**

ID-4001 SPECIFICATIONS: DIGITAL CLOCK/4-YEAR CALENDAR. Time Accuracy: Determined by accuracy of AC line. No accumulative error. **WIND VECTOR:** Accuracy: ±5% or better. Direction Display: Accuracy: ±11.25% 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 (50° to 95° F). Power Requirement: 120/240 VAC. Provision for external battery connection for memory backup during power failures. Dimensions: 16″ W x 7¼″ H x 6″ D.

8-Wire cable for ID-4001

IDA-1290-1, 50 ft. cable, 1 Kg.	15.95
IDA-1290-2, 100 ft. cable, 2 Kg.	26.95
IDA-1290-3, 150 ft. cable, 3 Kg.	39.95



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

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.

Easy-to-build kits for family savings and convenience

Portable Rechargeable Fluorescent Light provides illumination anywhere you go

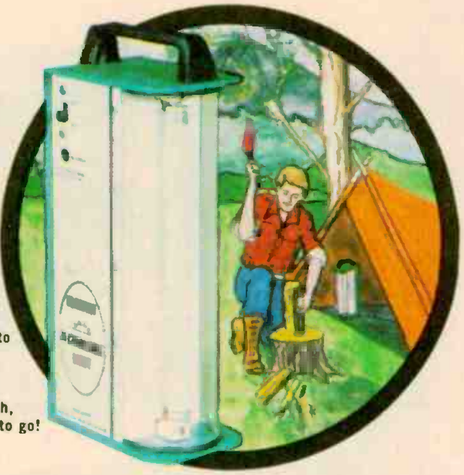
- **Provides a wide "flood of light" to help you see what you're doing**
- **Eliminate the fire hazard of gasoline-fueled lanterns or lamps**

Fishing, hunting, camping...or working in the yard, garden, attic or basement — wherever you need bright, portable illumination without troublesome cords, the GD-1246 Portable Rechargeable Fluorescent Light will provide it for you. Its floodlighting characteristic allows light to disperse widely (as opposed to the beam from a flashlight), so you can illuminate much more of the surrounding area. The built-in rechargeable battery and separate preassembled battery 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. Besides being convenient, the Rechargeable Light eliminates the fire hazard and mess of gasoline-fueled lanterns, kerosene lamps or candles. The GD-1246 is great for emergencies, too — it's a good idea to keep one in each of your family's cars. The GD-1246 features a bright, non-glare fluorescent tube, and is housed in a rugged but attractive, lightweight portable case with carrying handle. Dimensions: 9⅜" H x 3⅛" W x 4 5/16" D. Recommended for use above 40°F.

Kit GD-1246, Shpg. wt. 3 Kg	**64.95**
12-volt adapter/charger. Kit GDA-1246-1, Shpg. wt. 1 Kg	**10.95**

$64.95

With the Portable Rechargeable Fluorescent Light you eliminate the time-consuming inconvenience of running to the store to buy expensive replacement batteries every time your light goes dim just when you need it most. Simply plug the GD-1246 into any AC outlet, or use the handy optional 12-volt adapter/charger after each use, and always have a fresh, full-strength battery ready to go!



Digital Stopwatch lets you time any event, anywhere!

Used by coaches and timers of the United States International Skating Association.

Quartz crystal accuracy with seven functions and bright readout

Two exclusive Heath PMOS IC counters and quartz crystal accuracy make it ideal for any timing job. Reads hours, minutes, tenths and hundredths of seconds in a bright red digital readout that's easy to see in any light. Accurate to ±0.005%. 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 2 1/32" W x 2" D.

Kit GB-1201, Shpg. wt. 1 Kg	**149.95**
ICA-2009-1, Felt-lined Naugahyde® carrying case, Shpg. wt. 1 Kg	**6.95**

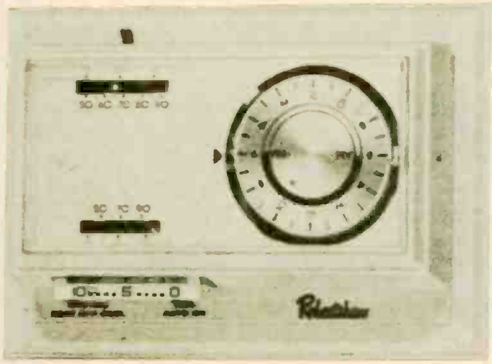
Electronic Flying Insect Killer keeps annoying bugs from bugging you

- **Electronically charged 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. Operates for only pennies a day. For 120 VAC. 16" H x 11" W x 11" D.

Kit GD-2007, Shpg. wt. 5 Kg	**134.95**
GDA-2007-1, Mounting Bracket, Shpg. wt. 1 Kg	**7.95**

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



$74.95

- **Saves you up to 20% on heating and cooling bills. Pays for itself in no time. Provides automatic control and savings for air conditioners, too.**

It makes good sense to replace your prefectly good thermostat with the new Robertshaw Convertible Automatic Set-Back Thermostat. Once set, it never wastes heating or cooling at night when you're sleeping or, when you're away. Automatically increases when you need it. Choose either one or two energy-saving periods in a 24-hour time span. Self-charging, battery-powered timing device increases/decreases temperature from 1° to 10° F at times you select. Uses same wiring as your old thermostat. Easy installation. For use with four- or five-wire 24 VAC furnace control systems. Not for use with heat pumps. Measures 3⅜" H x 5½" W x 2⅛" D. Fully assembled.

GDP-1369, Shpg. wt. 1 Kg	**74.95**

Home Heat Control saves up to 20%

- **A low-cost way to keep fuel bills down!**
- **ECON-NORMAL switch lets you override the timer**

Automatically reduces room temperature during one or two preprogrammed periods. Has adjustable temperature setback to more than 10° for periods of ½ hour minimum to 23½ hours maximum. Heat is returned to its normal level automatically. NOTE: For use with single-stage heating systems only. Some systems may require service by a licensed electrician. Check building codes.

SAVE Kit GD-1776,
Shpg. wt. 2.5 Kg .... Was 84.95 **NOW 69.95**

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

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

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

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

Choose from three very different computers for different people:

For convenience — the All-In-One H-89. If you're more interested in running software than in hardware and software development, the H-89 gives you a complete, balanced computer system in one package. It's powerful and very cost-competitive, with a personality that a first-time computer user will find comfortable. The H-89 will run all disk-based H-8 software. And the new H-77 Floppy Disk system adds a new dimension of flexibility — up to three drives, including the H-89's built-in floppy. For more information on the All-In-One, see page 12.

For flexibility — the H-8. If you're interested in developing hardware, need more than 48K of read-write memory or write physical I/O routines in Assembly language, the H-8 is for you. Its versatile bus-oriented architecture, expandability and hardware front panel position it as the right choice. More details can be found on page 14.

For DEC compatibility — the 16-bit H-11A. If you need a computer for scientific uses, real-time systems or similar applications, and DEC PDP-11V03 hardware and software capability is significant, the H-11A is your choice. We offer a large selection of compatible hardware and software. See pages 15 and 19.

Heathkit Accessories — Including new wire wrapping products, memory, interfacing and others — make your computer more useful. See pages 13 and 19.

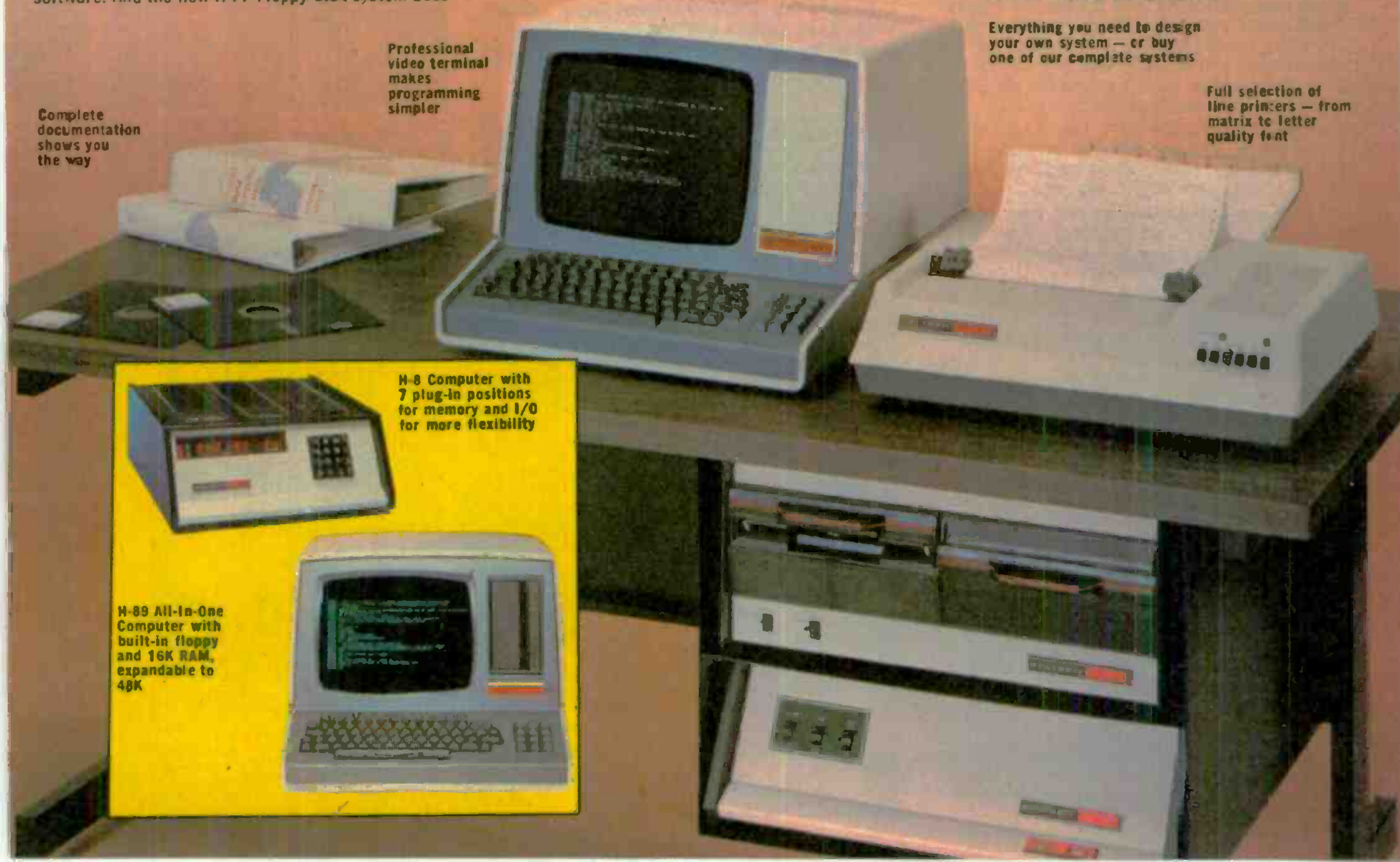
Value-packed Heathkit Software includes programs written in BASIC™ and Assembly languages, on floppy or cassette, that make your computer more versatile. In this catalog, we introduce MICROSOFT FORTRAN for the H-8/H-89, Zenith™ Electronic Typing Word Processing Software and source listings for selected Heathkit software. Our complete software line can help you write your own programs easily. And for one year after purchase, we'll send you any changes to our disk-based software, free of charge. See pages 15, 20 and 21 for more.

HUG — the Heath Users' Group — keeps you informed of new programs, written by other members and available to you. It also keeps you up to date on new Heathkit computer developments. Owners of Heathkit Computers can become members of this group, which shares an extensive program library. See page 22 for more information.

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

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

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



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

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

Professional video terminal makes programming simpler

Complete documentation shows you the way

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

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

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

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

Only
$2749 95 Kit
for H-89

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

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

This easy-to-operate 8-bit computer features separate Z-80 microprocessors for the computer and video terminal. Computer never has to share processing power with terminal, so the All-In-One can perform a variety of high-speed tasks.

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

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

Select baud rates up to 9600 through the keyboard. Direct cursor addressing lets you insert or delete characters anywhere on the screen. All 32 terminal functions can be controlled from keyboard or computer. Reverse video lets you emphasize any portion of the screen by reversing white on black.

Designed in calculator format, the 12-key numeric keypad makes entering arithmetic programs faster and easier than before. Shifted functions give you control to make insertions or deletions.

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

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

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

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

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

Choose from a wide selection of software. The Heath Users' Group (page 20) maintains over 500 applications programs, most of them compatible with the All-in-One.

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

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

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

Kit H-89, Shpg. wt. 39 Kg **2749.95**

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

WH-89-CS, Shpg. wt. 25 Kg **3995.00**

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

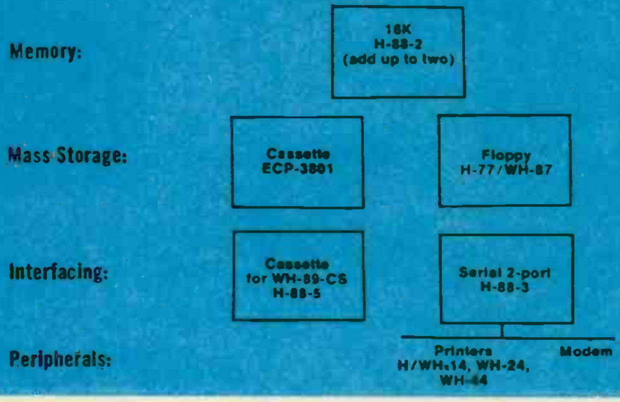
Kit H-88, Shpg. wt. 27 Kg **1995.95**

H-89/WH-89-CS/H-88 SPECIFICATIONS: Microprocessor: Z-80. **Clock:** 2.048 mHz. **Memory:** 16K bytes user random access memory (RAM) — expandable to 48K. **Video Terminal:** High-resolution 12" diagonal CRT with P4 phosphor. **Keyboard:** 80 keys, typewriter format, with numeric keypad in calculator format. **Cursor:** Blinking, non-destructive underline or block. **Cursor Controls:** Up, down, left, right, home, CR, LF, back space and tab. **Cursor Addressing:** Relative and direct. **Tab:** Standard eight-column tab. **Refresh Rate:** 60 Hz at 60 Hz line frequency, 50 Hz at 50 Hz line frequency. **Edit Functions:** Insert and delete character or line. **Erase Functions:** Erase from beginning of line, erase to end of line, erase from beginning of page, erase to end of page, erase line and erase page. **Power Requirement:** 120/240 VAC, 50/60 Hz at 90 watts maximum. **Dimensions:** 13" H x 17" W x 20" D.

Design an All-In-One system for your needs

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

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



NEW

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

$795⁹⁵

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

Designed especially for the Heathkit All-In-One Computer, the H-77 Floppy Disk System gives you all the storage and programming capacity you need for most applications. When you use the H-77 Floppy Disk with your All-In-One Computer, you have room for up to three disk drives. You can mount your operating system and program disks at the same time, to get rapid access to programs and data.

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

The storage media for the H-77 is the standard, hard-sectored 40-track diskette. Measuring just 5.25 inches in diameter, each floppy disk offers access to 100K bytes of program and data storage.

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

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

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

Kit H-77, with one drive, 12 Kg **795.95**

Assembled Dual-Drive Floppy Disk System. Requires H-88-6 Modification Kit for installation.
WH-87, Shpg. wt. 13 Kg 1695.00

H-88-6 Modification Kit. Cables, junction box to connect WH-87, future accessories to H-88, H-89. Not required, but may be used with H-77.
H-88-6, Shpg. wt. 2 Kg 74.95

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

All-In-One Accessories

16K Random Access Memory Expansion Chip Set.
H-88-2, 1 Kg .... Was $239.95, Now 109.95

Two-Port Serial I/O Interface. Communicate with printers, other peripherals (w/appropriate software): RS-232C serial interfacing.
H-88-3, Shpg. wt. 1 Kg 149.95

Floppy Disk Storage System/Interface for H-88 All-In-One Computer. Diskettes not included.
H-88-4, Shpg. wt. 10 Kg 889.95

Audio Cassette Interface for WH-89-CS.
H-88-5, Shpg. wt. 1 Kg 159.95

NEW! Wire Wrapping Board for the All-in-One. Design custom circuits. Punched, etched board with room for 48 16-pin sockets (or other combinations). With bus connectors. Full description p. 19. Uses HCA-6, HCA-7 below.
Kit H-88-10, Shpg. wt. 1 Kg 39.95

NEW! Wire Wrapping Kit. Description on page 19. Kit HCA-6, Shpg. wt. 1 Kg 21.95

NEW! Wire Wrapping Socket Kit. Description on p. 19. Kit HCA-7, 1 Kg 49.95

NEW! Pannelgraphix Anti-Glare CRT Filter. Plastic.
HCA-3, Shpg. wt. 1 Kg 14.95

NEW! Sun-Flex CRT Filter. Fabric anti-glare cover.
HCA-4, Shpg. wt. 1 Kg 24.95

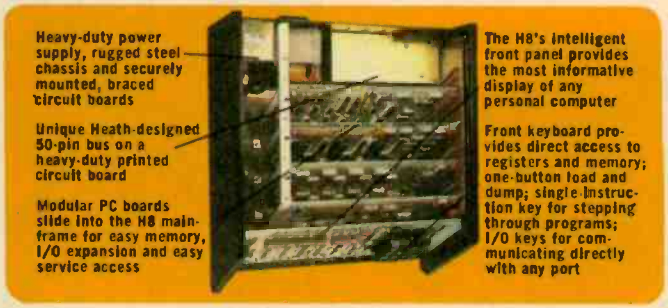
Optional Second Drive for H-77 Floppy Disk.
H-17-1, Shpg. wt. 2.5 Kg 579.95

See the complete line of All-In-One Software, including the new Zenith Electronic Typing Word Processing System, on pages 20-22.

The H8 gives you plug-in flexibility – at an affordable price

$559^95

- The Heathkit H8 Computer — 8080A-based with front keyboard and 7 plug-in board positions
- Built-in ROM monitor controls front panel program
- Get both hardware and software support from the same reliable source


Heavy-duty power supply, rugged steel chassis and securely mounted, braced circuit boards
Unique Heath-designed 50-pin bus on a heavy-duty printed circuit board
Modular PC boards slide into the H8 mainframe for easy memory, I/O expansion and easy service access
The H8's intelligent front panel provides the most informative display of any personal computer
Front keyboard provides direct access to registers and memory; one-button load and dump; single-instruction key for stepping through programs; I/O keys for communicating directly with any port

The Heathkit H8 — the computer that grows as you grow

With the H8, you get the flexibility to design your own computer system just the way you want it. With seven positions for plug-in modules, you can put together any combination of memory and I/O. Our large selection of H8 peripherals, accessories and software give you unmatchable versatility and flexibility.

And the low cost of an H8 Computer System makes it an ideal choice for both novices and advanced computerites.

The H8's 16-key front panel keyboard provides octal data entry, direct access to registers and memory, one-button program load and dump, and input/output keys to directly communicate with any port. You can directly monitor program activity with the nine-digit octal readout.

The features we pack into the H8 mean more value to you. A heavy-duty power supply lets the H8 handle up to 65K of memory (including I/O), while convection cooling means no fan is needed to keep the computer from overheating.

The CPU board, including the 8080A chip, clock, systems controller and ROM monitor, is fully wired and tested for easier kit assembly. Because the H8 is based on the world-famous 8080A CPU, you can choose from a wide variety of existing software programs that makes your computer immediately practical.

The value-packed 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. For 120/240 VAC, 50/60 Hz (switch-selected). Requires at least 4K of memory to operate.

See pages 19, 20 and 21 for optional memory, I/O accessories and software.

Kit H8, Shpg. wt. 14 Kg **559.95**

$949^95

Kit with single drive

- Get vast data storage and programming capacity
- Instant access to any program, easy loading
- Use the full capability of your H8 Computer

Make your H8 system more versatile by adding the Heathkit H17 Floppy Disk

Store hundreds of programs on a single disk and have immediate access to any one, anytime you need it. Update your data instantly. The H17 Floppy Disk System makes your H8 system a "total versatility" computer system.

The H17 stores up to 100K bytes of data on a standard, hard-sectored 40-track diskette just 5¼" in diameter. The disks are easier to handle — and easier to load — than paper tape or cassettes.

The H17 uses the famous WANGCO/SIEMENS 82 single-drive system, a performance-proven disk drive which provides accurate high-speed access to data. The WANGCO/SIEMENS 82 drive performs much better than most equivalent competitive drive systems. Specifications include a conservative 30 mS maximum track-step time and a typical random sector access time of less than 250 mS. The WANGCO/SIEMENS 82 drive system is supplied fully assembled and tested for the H17 Floppy Disk System.

To get even more data and program storage area from each disk, you can add the optional H17-1 Second Drive and make your H17 a versatile dual-drive floppy disk system. To use the H17 effectively, you need at least 16k RAM for the H8 and the H8-17 Operating System.

Add the H17 Floppy Disk System to your H8 Computer — and enjoy your H8 system's full capabilities.

Kit H17, Shpg. wt. 13 Kg **949.95**

WH17 Wired & tested version of above, Shpg. wt. 12 Kg **1095.00**

Optional Second Drive. Adds dual-drive versatility to the H17. Get a total of 200K bytes of available data and program storage area.

H17-1, Shpg. wt. 2.5 Kg **579.95**

Package of 5 Blank Diskettes for use with the H17.

HCS-61, Shpg. wt. 1 Kg **36.95**

Operating Software for H17 Floppy gets you up and running fast

Get your floppy disk system running fast with this specially engineered software. The H8-17 Operating Systems software includes a diskette containing the standard H8 software. This includes Extended Benton Harbor BASIC™, a 2-pass absolute assembler, a text editor to prepare source code for BASIC, Assembly and other languages, a console debugger for easy debugging of user machine language programs and a full set of disk utility programs to make file manipulation more convenient.

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. A file utility program allows bulk manipulation of files. And device independence permits direct communication between any program and any device.

Get the most from your H8 Computer and H17 Floppy Disk System with H8-17 Operating Software. Supplied on a standard diskette.

H8-17, Shpg. wt. 7 Kg **180.00**

Examine the manuals before you buy

Look before you buy, with no risk. Assembly, operations manuals for H8 Computer, H8-4, H14, WH8-16 and H19 hardware/peripherals and H8-17 software. Deduct $60.00 when you buy an H8 Computer. NOTE: Individual product manuals are included with each kit.

HM800 Manual Set, Shpg. wt. 5 Kg **60.00**

The H11A Computer runs your most complex programs

$2159.95 Kit

- "Half-size" CPU board gives space for up to 64K memory
- DEC PDP-11/03 compatible

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. Of course, one important feature is the price break the KD11-HA offers. That's why the H11A is the computer for you.

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.

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.

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 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 add optional memory and I/O accessories (see page 19).

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.

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. 20 Kg **2159.95**

Factory assembled and tested version of above.

WH11A, Shpg. wt. 20 Kg **2995.00**

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

The Floppy Disk System turns your H11/H11A into a real "Pro"!

$3159.95 Kit

- Z80/1771-based controller
- Head step time of 6 mS
- Capacity of 512K bytes

The H27 floppy disk system brings enormous power and versatility to the H11 (or H11A) computer system — at a price much lower than comparable floppy disk systems on the market. Here's what 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.

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 Z80/1771 controller in the H27 gets average access time down to 6 mS.

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

1. Built-in self-test diagnostic on power-up to protect existing programs.
2. Mechanical interlock to prevent accidental medial damage.
3. Write-protect function to protect important files and programs.
4. Reformatting procedure for writing in IBM 3740 standard format.

The H27 includes a single board interface/bootstrap that uses just one backplane slot. This leaves you with more space for memory and I/O devices.

The precision dual-drive system (Memorex drives) is housed in a rugged metal cabinet to provide years of reliable performance. Overall dimensions: 8" H x 18" W x 20" D. For 120/240 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. 43 Kg **3159.95**

Factory assembled and tested version of above.

WH27, Shpg. wt. 32 Kg **3995.00**

Pkg. of 5 Blank Disks. IBM 3740 format.

HCS-62, Shpg. wt. 1 Kg **44.95**

Complete Operating Systems Software for the H27

The HT-11 Operating System is a single-user, single task system. It includes:

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.

LINKER — converts object modules produced by the assembler or the FORTRAN compiler into a run time format.

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

PIP — file maintenance and transfer utility of the HT-11.

ODT — On-line Debugging Technique aids in debugging user programs.

BASIC INTERPRETER — high level conversational programming language.

MISCELLANEOUS PROGRAMS — DUMP program prints the contents of HT-11 files. **SRCOM** compares two files and prints a summary of their differences.

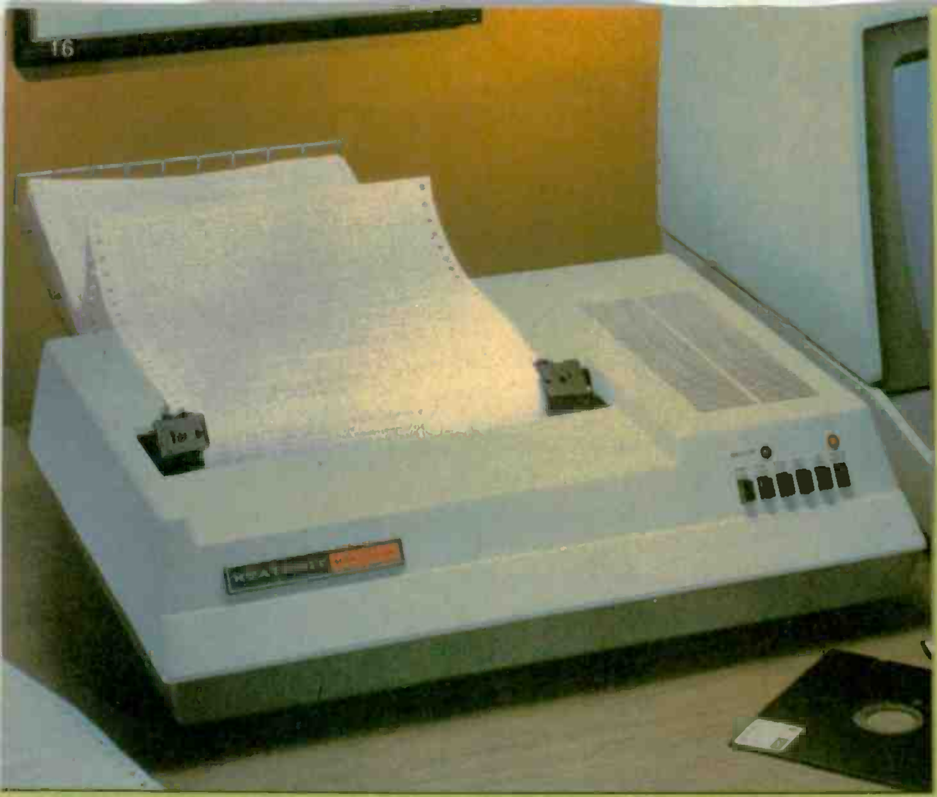
HT-11 requirements: a Heathkit H11 or H11A computer with 16K words of main memory, console terminal and interface, and Heathkit floppy disk drive, controller and interface.

***HT-11 Operating System with BASIC.** Shpg. wt. 6 Kg **425.00**

FORTRAN for HT-11 System. Binary software features ANSI standard 1966 FORTRAN IV with extensions for increased speed.

***HT-11-1.** Shpg. wt. 4 Kg **325.00**

*Note: The HT-11 Disk Operating System and HT-11-1 FORTRAN are compatible only with the Heath H27 or WH27 Floppy Disk Systems. See the Customer Software Sublicense Grant on page 21.



Low-cost, microprocessor-based Line Printer provides hard copy

Only
$899.95 Kit

- **Packed with extra features you won't find on comparably priced line printers**
- **Use with most any computer — RS-232C or 20 mA loop interfacing**

The Heathkit H-14 Line Printer brings hard-copy value and performance comparable to units costing much more — for hundreds of dollars less. Hard copy provides added convenience in reading, editing, debugging and modifying your computer program. The H-14 can also provide handy printed copies of address labels, lists or other data you need for any of your personal or business applications.

The H-14 prints the standard 96-character ASCII set (upper and lower case) on a 5 x 7 dot matrix print head. Uses readily available 0.5-inch nylon inked ribbon on 2-inch spools. Maximum throughput rate is 75 cps, with selectable 80, 96 or 132 character line length. 6 lines per inch spacing, 8 lines per inch software selectable. 110-4800 baud rates. Adjustable width sprocket feed handles edge-punched fan-fold paper from 2.5" to 9.5" wide, with a maximum thickness of 0.006 inch.

Whatever your computer system, the H-14 Line Printer provides extra value and performance — at a price that won't break your budget. Connects to H-8, H-11A Computers with standard RS-232C serial interface or 20 mA current loop. Handshaking provided by busy control signal. Includes 25-pin male EIA connector and matching paper catch. Dimensions, 4.80" H x 18.33" W x 14.33" D. For 120/240 VAC, 50/60 Hz. Requires H-8-17, H-8-18 or HC-8-14 software for H-8; HT-11 software for H-11A.

The Heathkit H-14 Line Printer is one of the lowest-cost microprocessor-based line printers available today

Kit H-14, Shpg. wt. 15 Kg 899.95

3200 sheets of 9½" x 11" Fan-Fold Paper for use with the H14.
HCS-2, Shpg. wt. 15 Kg 62.95

H-14 SPECIFICATIONS: Printing Speed: Initial time per full line is approximately 1.75 seconds on 60 Hz power line, 2.1 seconds on 50 Hz power line. Avg. throughput approx. 40 cps w/96 char. line. Print head temp. controlled by varying print speed. **Characters:** Impact prints 0-.11" high characters. **Format:** 80, 96 or 132 cpi (96 cpi software selectable only). **Forms Handling:** Sprocket feed with adj. widths, 2.5"/sec. slewing rate. form depth selectable from 0.0210" to 0.1365". **Ribbon System:** Standard typewriter ribbon w/automatic reversing mechanism. **Panel LED Indicators:** Power on/off, print head temp. **Operator Controls:** Power on/off, on/off line, fwd/reverse feed, top of form, wide characters. **Internal Controls:** 12-/240 VAC, 50/60 Hz operation, baud rate selection.

Choose from these Diablo printwheels

Courrier 10 (D. 38100), Pica w/slashed zero.
HCS-20, Shpg. wt. 1 Kg **11.95**
Courrier 72 (D. 38107), Pica w/unslashed zero.
HCS-21, Shpg. wt. 1 Kg **11.95**
Elite 12 (D. 38102), Elite w/unslashed zero.
HCS-22, Shpg. wt. 1 Kg **11.95**
General Scientific (D. 38141). Greek letters, superscripts, math symbols.
HCS-23, Shpg. wt. 1 Kg **11.95**
APL-10 (D. 38150). Special character set for APL computer language.
HCS-24, Shpg. wt. 1 Kg **11.95**
OCR-A (D. 38144). ANSI Standard OCR Type A font.
HCS-25, 1 Kg **11.95**
Prestige Elite Legal 12A (D. 38105). Elite w/legal symbols, incl. ®, © & ®.
HCS-26, Shpg. wt. 1 Kg **11.95**
Courrier Legal 10 (D. 38104). Pica w/legal symbols.
HCS-27, 1 Kg **11.95**

Ribbons for clear printouts

NEW! Ribbon for the H-14 Line Printer. Also fits ASR-33 printers.
HCS-52, Shpg. wt. 1 Kg .... **Pkg. of 3, 10.95**
Cloth Ribbons for WH-44 Diablo Printer.
HCS-50, Shpg. wt. 1 Kg .... **Pkg. of 3, 28.95**
Film ribbons for the WH-44 Diablo Printer.
HCS-51, Shpg. wt. 1 Kg .... **Pkg. of 3, 28.95**
Ribbon for the WH-24/TI-810 Line Printer and the LA-36 DECwriter II. Long-lasting ribbon makes dark, crisp impressions.
HCS-53, Shpg. wt. 1 Kg .... **Pkg. of 3, 28.95**

WH-24-1/TI-810 — get more performance without spending more

$2695.00

- Fully assembled and tested for fast system setup
- Optimized bi-directional printing system
- Prints up to 5 clear copies on up to 15-inch wide paper
- Includes upper and lower cases, with paper tray

The WH-24-1/TI-810 Line Printer is a high-quality, low-priced printer that can make a big impact on both your printing and your printer costs.

The WH-24-1's optimized 150 cps bi-directional printing minimizes printhead travel time and maximizes efficiency. Vertical and horizontal tabbing help produce maximized data, regardless of format.

A 256-character FIFO buffer lets you receive data at speeds from 110 to 9600 baud. Programmable forms length and a wide carriage handle multiple-part forms, tickets and reports from 3" to 15" wide. A 9 x 7 dot font prints clearer, more legible characters, and produces up to five high-quality copies.

The WH-24-1's adjustable tractor drives make it easy to operate. Once a form has been engaged by the tractor drives, alignment can be made at the main control panel. And adjustments for forms thickness control can be made by use of the printhead-to-platen adjustment while the WH-24 is printing.

The WH-24-1 has both rear and bottom paper/forms loading. And its status and fault indicators supplement extensive self-testing capabilities.

Includes upper and lower cases, as well as paper catch tray. Needs WHA-11-5 Serial I/O Card for use with H-11/H-11A Computers only; not required for other Heathkit Computer Systems.

WH-24-1/TI-810 Printer. Floor stand not included.
WH-24-1, Shpg. wt. 30 Kg **2695.00**

WHA-11-5, Serial I/O Card for H-11 and H-11A Computers, Shpg. wt. 1 Kg **229.95**

WH-24-1 SPECIFICATIONS: Printing: Technique: Seven-wire matrix, impact. **Method:** Bi-directional. **Speed:** 150 characters per second; 64 lines per minute (at 132 characters per line), up to 450 lines per minute (at 10 characters per line). **Characters:** 9 x 7 dot matrix. **Character Set:** 64-character ASCII. **Characters Per Inch:** 10. **Format:** Up to 132 characters per line maximum; 6 or 8 lines per inch (operator or software selectable). **Forms Handling:** 5 in/sec (127 mm) slewing rate. Paper feeds from rear or bottom. **Panel Indicators:** Power on/off, on line/off line, error, paper out LEDs. **Operator Controls:** Power on/off, on line/off line, forward and reverse feed, fwd. line and from feed, tab/reset. **Communications: Interfacing:** EIA Standard RS-232C Serial Interface. **Baud Rates:** 110, 150, 300, 1200, 2400, 4800 and 9600. **Parity:** Odd, even or ignore. **Operating Temperature Range:** 37 to 104 deg. F (5 to 40 deg. C). **Operating Humidity Range:** 5 to 90% (no condensation). **Power Requirement:** 120/240 VAC, 50/60 Hz, 200 watts. **Dimensions:** 8" H x 25.75" W x 20" D (20.3 x 65.4 x 50.8 cm), without floor stand or paper catch tray. **Net Weight:** 55 lbs. (25 kg).

Letter-quality daisy wheel printing for word processing systems

$4495.00

- The WH-44/Diablo 1640 Printer features famous daisy wheel printing quality
- 2-color and graphics capabilities
- Also available with optional keyboard for more versatility

The WH-44/Diablo 1640 Printer is designed for applications that require a serial printer, such as data communications or word processing systems. The 1640 combines the latest in microelectronic technology with its field-proven daisy wheel printer mechanism.

This printer produces the standard 96-character ASCII set, both upper and lower case. With bi-directional printing, maximum print speed is 45 characters per second. Adjustable horizontal and vertical tabs can be directly set in any position. Adjustable forms width means the Diablo 1640 will accept forms up to 15.5 inches (39.3 cm) wide. Adjustable forms length lets you set page length to your needs. Top of form control, combined with full forward and reverse paper motion, give you complete control of most any form.

Graphics capability is also featured, with 1/20" horizontal, 1/48" vertical incremental motion. 2-color printing capability provides more versatile, more striking document production, when used with two-color ribbons.

The serial interface provides RS-232C levels. With a 256-byte print buffer, the serial interface runs at standard baud rates from 110 to 1200, and is compatible with Bell 102, 113, 212 and equivalent acoustic modems.

Other extra-value standard features include ETX/ACK protocol, ribbon out, paper out and cover open sensors, self-testing capability and host program control through escape sequences.

Includes friction platen, power supply, operator control panel, HCS-22 Printwheel (Elite 12 with unslashed zero) and HCS-51 Film Ribbon. For 120/240 VAC. Dimensions, 9.25" H x 23.5" W x 15.75" D (23.5 x 59.69 x 40.0 cm).

Assembled and Tested Diablo 1640 RO Printer.
WH-44, Shpg. wt. 28 Kg **4495.00**

NEW! Diablo 1640 KSR Printer/Terminal. Includes full ASCII upper/lower case professional typewriter-style keyboard. Factory assembled.
WH-44K, Shpg. wt. 28 Kg **4795.00**

Bi-Directional Tractor Feed Accessory. Dual tractors, before and after print head, allow moving paper backward through printer for high resolution graphics, and provide much better registration for word processing and forms preparation.
HCA-1, Shpg. wt. 4 Kg **275.00**

NEW! Universal Floor Stand fits WH-24, and WH-44/WH-44K Printers. Raises printer to desk level for easier operation. Includes paper rack.
HCA-2, Shpg. wt. 13 Kg **159.95**

WH-44 SPECIFICATIONS: Printing Speed: 45 cps maximum. **Print Wheel:** Interchangeable 96-character daisy wheel. **Format:** Line length adjustable to 13.1" max. (132 chars. at 10 pitch, 158 chars. at 12 pitch). **Forms Handling:** Adj. forms width to 15.5 in. (39.3 cm) max.; form thickness selectable to 27/1000 in. (0.0686 cm) max. **Communications: Baud Rate Selection:** 110, 300, 600 or 1200 baud.

NEW SOFTSTUFF™ Affordable Software Tools

SOFTSTUFF, established by Heath Company, offers you a selection of software tools at affordable prices. All SOFTSTUFF programs have been checked and confirmed on the hardware indicated. Documentation, though not as extensive as standard Heath Company documentation, has been completely reviewed and judged acceptable. All SOFTSTUFF products come on a 5¼-inch diskette and require HDOS, unless otherwise stated. For value and performance . . . SOFTSTUFF is good stuff.

Full Screen Editor: The SOFTSTUFF text editor uses H89 or H19 screen as a window into a file. Cursor motion keys position the cursor so changes can be typed anywhere on the screen. Function keys perform character and line insert and delete, string search, move and copy single and multiple lines, and scrolling of text in the window. For H89 and H8 + H19.
HDOS Model #SF-9000, Shpg. wt. 1 Kg **59.95**

Text Formatter: Performs fill and justification (straight right margins) of text previously prepared by your editor. Page numbering, headers and footers, indents, hanging indents, centering and underlining. *INCLUSION* feature allows automatic insertion of up to 26 user defined strings and merging of documents.
HDOS/H19/H89. HDOS Model #SF-9001, Shpg. wt. 1 Kg **65.95**

Microsoft Macro 80: 8080/Z80 MACRO Assembler. Intel and Zilog Mnemonics supported. Relocatable linkable output. Package includes LINK 80 and Cross Reference List utilities. Complete documentation and HDOS common deck MACRO included. For H8 and H89.
HDOS Model #SF-8002, Shpg. wt. 1 Kg **84.95**

TELINK: A utility which provides file transfer between the H89 or H8/H19/H17 and Information Services (MicroNET). Features include user defined keys which provide for auto-login, mail check, etc. Full error checking and elapsed time clock on screen. Very easy to use. Use on other time sharing systems too.
HDOS Model #SF-9003, Shpg. wt. 1 Kg **49.95**

SORT: An extremely fast assembly language routine that sorts records up to 255 characters in length with user defined sort fields. Could be called by MBASIC or stand-alone. Source code provided.
HDOS Model #SF-8004, Shpg. wt. 1 Kg **35.95**

GENERAL LEDGER II: Includes powerful programs for entry, maintenance, reporting and analysis of accounting data. Requires Microsoft Basic.
HDOS Model #SF-9004, Shpg. wt. 1 Kg **149.95**
CP/M Model #SF-9104, (8" disk), Shpg. wt. 1 Kg **149.95**
Manually only, Model 595 2500: (Refunded when complete package purchased). Shpg. wt. 1 Kg **18.00**

SMALL BUSINESS INVENTORY: For complete inventory analysis. Requires Microsoft Basic and H-19 Terminal.
HDOS Model #SF-9005, Shpg. wt. 1 Kg **84.95**

Peripherals to expand your computer's versatility

Heathkit H19

Heathkit extra-value Professional Video Terminal

$1289 95 Kit

- Z80 microprocessor for power, versatility
- 8 user-function keys, 12-key numeric keypad for fast data entry

The H19 Professional Video Terminal is a top-of-the-line, general-purpose peripheral designed for use with the Heathkit H8 and H11A Computers, or with any other computer system using standard EIA RS-232 interfacing. The H19 is based on the powerful Z80 microprocessor, making this terminal ideal for a wide variety of high-speed data-handling tasks.

The H19's familiar typewriter format enables you to enter data from the keyboard right away. The Professional Video Terminal's 32 separate functions can be controlled from keyboard or computer. A special 12-key numeric pad, designed in calculator format, lets you make fast, easy arithmetic entries.

Baud rates of up to 9,600 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 printing format is 24 lines by 80 characters per line. The special-function 25th line is controlled by your computer software.

Addressable blinking cursor lets you make corrections and edit anywhere on the screen. Reverse video lets you emphasize any portion of the screen by reversing white on black. The 12″ diagonal CRT has outstanding resolution for a bright, clear readout. And it displays 33 different graphics characters that can be arranged for a variety of graphic displays and effects.

Kit H19, Shpg. wt. 25 Kg	1289.95
WH19, Factory Assembled and Tested, Shpg. wt. 20 Kg	1695.00

NEW! Pannelgraphix CRT Filter. Plastic cover makes video displays of the H-19 Terminal easier to see.

HCA-3, Shpg. wt. 1 Kg	14.95

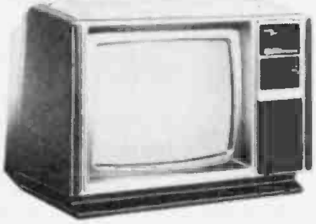
NEW! Sun-Flex® CRT Filter. Nylon anti-glare cover makes video displays stand out, cuts eye strain.

HCA-4, Shpg. wt. 1 Kg	24.95

H19 SPECIFICATIONS: CRT: 12″ diagonal with special P4 phosphor. **Display Size:** 6½″ high x 8½″ wide. **Character Size:** 0.2″ high x 0.1″ wide (approximately). **Character Set:** 128 characters total (96 ASCII characters and 33 graphics characters). **Character Type:** 5 x 7 dot matrix for upper and lower case, 5 x 9 dot matrix for lower case letters containing ing descenders. **Keyboard:** 80 keys (60 alphanumeric, 12 function) plus 12-key numeric pad. **Cursor:** Blinking, non-destructive underline or block inversion. **Tab:** Std. 8-column tab. **Erase Functions:** Erase to end of line, erase to end of page, erase page. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 13″ H x 17″ W x 20″ D (33 x 43.2 x 50.8 cm).

NEW

Add color to your computer system with the Heath/Zenith Color Display



Only $599 95 Assembled

- 13″ (diagonal) color display
- Accepts composite color video from computers, VCRs, cameras

Add a colorful new dimension to your video displays. The new Heath/Zenith 13-inch (diagonal measurement) Color Video Display is the ideal choice to complement your computer system, video cassette recorder or color camera.

Accepts composite NTSC-system color video and Hi-Z audio inputs. A built-in audio amplifier and speaker are also included.

Supplied with RCA-type phone jack for video input, miniature phone jack for audio input. 120 VAC, 60 Hz. Cabinet measures 14″ H x 20.25″ W x 14.75″ D.

GDZ-1320, Shpg. wt. 20 Kg	599.95

NEW

LEX-11 Modem

LEX-11 Modem

The NEW LEX-11 Modem means convenient data communications. **The LEX-11** is a stand-alone, acoustically coupled modem designed to operate at rates up to 300 bits per second on the dial-up telephone network. **The LEX-11** is compatible with the Bell System 103A modem.

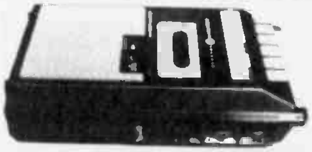
The LEX-11 is a versatile Modem with Answer and Originate modes (switch selected). When the Modem is in the originate mode, you initiate all communications. When in the Answer mode, the remote equipment initiates the communications.

The Modem may be operated in Full or Half Duplex (switch selected), and it has a test mode to allow you to verify its operation. **The LEX-11** connects to your terminal or computer through an RS-232-C standardized interface.

The LEX-11 is powered from a UL and CSA listed AC Adapter. A model is also available which permits battery operation so you can use the **LEX-11** from any location.

GDC-11, Shpg. wt. 1 Kg	259.95
GDC-11-B, Shpg. wt. 1 Kg	269.95

Cassette Recorder/Player Peripheral

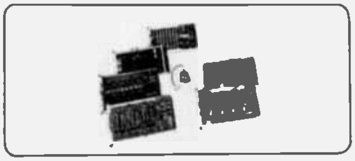


Required for use with H8 computer and H8-5 interface. Heath does not assume responsibility for improper software operation resulting from the use of other units.

ECP-3801, Assembled, 2 Kg	99.95
ECP-3802, 30-Min. Cassettes, Pkg. of 3, 1 Kg	10.95

Heathkit computer accessories gives your system new versatility

H-8 Accessories give your computer more capability



NEW! Boot up faster than ever with PAMGO ROM. Boot with 1 button on power-up/3 on reboot, instead of the usual eleven. PAMGO ROM is a 2078-compatible masked, programmed ROM. On power-up or reset, it sets the program counter to a 030 000 split octal default address. PAMGO ROM makes booting up a breeze.

H-8-9, Shpg. wt. 1 Kg **24.95**

NEW! Wire Wrapping Card for H-8. Similar to H-8-7 above, but much greater capacity. Includes punched, etched PC board with room for 80 16-pin wire wrapping sockets (also 96 14-pin, or other combinations of 14, 16, 24 or 40-pin sockets). Provisions for three 50-pin flat cable connectors. Includes bus connectors, heat sink, 5 V regulator and miscellaneous hardware. Uses HCA-6, HCA-7 below.

Kit H-8-10, Shpg. wt. 1 Kg **44.95**

NEW! Wire Wrapping Kit. With wire wrapping tool, 50 ft. roll of wire, pre-cut wire in 1"-4" lengths (50 wires per package), pre-stripped 1" on both ends.

Kit HCA-6, Shpg. wt. 1 Kg **21.95**

NEW! Wire Wrapping Socket Kit. Total of 36 three-level wire wrapping sockets (12# 14-pin, 10# 16-pin, 8# 18-pin, 3# 20-pin, 2# 24-pin, 1# 40-pin).

Kit HCA-7, Shpg. wt. 1 Kg **49.95**

NEW! HA8-2 Music Synthesizer System. Synthesizer board connects to your stereo system with two shielded cables (included). True D/A converter provides excellent 27.5-6,600 Hz frequency response, with up to 9 harmonics. Software lets you enter any song — right from conventional sheet music. Complete documentation shows how to use the synthesizer system for your maximum enjoyment. Software supplied on disk. Requires 24K min. memory, H17 Floppy Disk System and terminal.

HA8-2, Shpg. wt. 1 Kg **295.95**

SAVE ON WH8-16 16K Wired Memory Board. This board lets you expand your H8 Computer's memory power. Fully assembled and tested, and factory burned-in to eliminate memory problems.

WH8-16, Shpg. wt. 1 Kg .... Was 739.95, NOW **569.95**

Parallel Interface:
Connects H8 computer to any parallel device such as a paper tape reader/punch. Three parallel ports. Compatible with all Heath software.

Kit H8-2, Shpg. wt. 1.5 Kg **242.95**

Four Port Serial Interface:
Required to interface H8 computer to H14 line printer. Has four serial I/O ports, all supporting standard RS-232-C interface including MODEM controls. One port is switch programmable. Includes one WH8-41 cable for connection to H14.

Kit H8-4, Shpg wt. 1 Kg **259.95**

Factory Assembled and Tested Version of Above.

WH8-4, Shpg. wt. 1 5 Kg **442.95**

Adapter Cable for use with H8-4:
Provides EIA industry-standard electrical and mechanical interface between H8-4 and other peripherals Factory assembled and tested.

WH8-41, Shpg. wt. 1 Kg **31.95**

Serial I/O and Cassette Interface:
Connects the H8 to serial devices such as the H19 video terminal (page 18). Data rate from 110-9600.

Kit H8-5, Shpg wt. 1.5 Kg **159.95**

WH8-5, Assembled and Tested, Shpg. wt. 1 Kg **242.95**

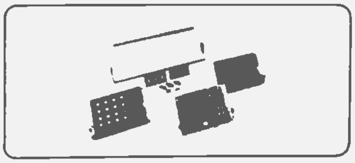
Adapter Cable for use with H8-5 Serial I/O and Cassette Interface. Connects H8-5 with other peripherals. Use with H8 Computer.

WH8-51, Assembled, Shpg wt. 1 Kg **32.95**

H8-7 Circuit Design Breadboard Card. Custom design your own analog or digital circuits for the H8 5 VDC power supply included. Reuseable.

Kit H8-7, Shpg wt 1 Kg **159.95**

H11A Accessories and Interfaces give you added flexibility



Increase your computing power and performance by adding one or several H11A accessories. The H11A Computer accepts up to seven accessory cards — more space for you to add the power and versatility you want from your H11/H11A Computer System.

4 K Memory Expansion Module. Plugs into the H11 or H11A backplane. Adds 4K x 16-bit word capacity to memory. Uses reliable 1K x 4 static MOS RAM chips. Access time is less than 500 nS. Contains decode circuitry for operation on 4K address boundaries, and has a handle for installation and removal.

H11-1, Shpg wt. 1 Kg **319.95**

Assembled and Tested Version of Above.

WH11-1, Shpg. wt. 1 Kg .... **Was $459.95, Now 395.00**

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 **93.50**

Parallel Interface. 16 diode-clamped latched data input lines, 16 latched output lines, 16-bit word or 8-bit byte data transfers. LSI-11 bus interface and control logic for interrupt processing and vectored addressing. Control status registers are compatible with PDP-11 software routines. 4 control lines: output data ready, output data accepted, input data ready and input data accepted logic operations. Maximum data transfer rate, 90K words/second under program control. Maximum drive capability, 25 ft cable This parallel interface is compatible with TTL and DTL logic devices.

Kit H11-2, Shpg wt. 1 Kg **189.95**

Assembled and Tested Version of Above.

WH11-2, Shpg. wt. 1 Kg **262.95**

Serial Interface. Universal asynchronous receiver/transmitter serial interface module for use between LSI-11 bus and serial devices, such as the Heathkit H19 Video Terminal (see page 18) or the H-14 line printer (see page 16). 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. Supplied with all mating connectors. To interface the WH-24/TI-810 Teleprinter to the Heathkit H11A Computer, order the WHA-11-5 Interface (see page 17 for description).

Kit H11-5, Shpg. wt. 1 Kg **199.95**

Assembled and Tested Version of Above.

WH11-5, Shpg. wt. 1 Kg .... Was 262.95, NOW **239.95**

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.

WH11-51, Assembled and Tested, Shpg. wt. 1 Kg **24.95**

16K Memory Module. 16K dynamic MOS RAM on a 5" x 8½" board On-board refresh, 570 nS cycle time and 250 nS access time. Fully expand memory with only two of these boards. Maximum memory capacity of H11A is 30K words.

WHA11-16, Shpg wt. 1 Kg **795.00**

Extended Arithmetic Chip. Adds powerful arithmetic instructions to the LSI-11, including fixed point multiply, divide and extended shifts, plus full floating point add, substract, multiply and divide. Helps minimize arithmetic subroutines and save memory space. This extended arithmetic chip, a 40-pin dual in-line IC, plugs into H11/H11A board

H11-6, Shpg wt 1 Kg **395.00**

Look over the Manuals before you buy. Complete manuals for H11A Computer, H11-2 Parallel Interface, H11-5 Serial Interface and H9 Video Terminal Get a first-hand look at the accurate, easy-to-follow Heathkit assembly manuals that take you, step-by-step, from unpacking to final plug-in. Know your H11A Computer inside out before buying And when you do buy the H11A Computer, we'll deduct $60.00 from the purchase price.

HM-1100 Manual Set, Shpg. wt 6 Kg **60.00**

Heathkit Disk-Based Software gives your system new versatility — in hobby or business applications

Heathkit software, designed especially for the H-8, H-88 and H-89 Computers, helps you do your work — or have fun — faster and easier than before. And when you buy any of our disk-based software packages, we'll supply you with any changes that are incorporated into the program for the next year — free of charge, when you sign and return the Software Sublicense Grant on page 21.

Heath Disk Operating Software (HDOS) for the H-17 Floppy System. Specially engineered to help get your system running fast. Loaded with convenience features, HDOS includes all of the following programs:

Extended Benton Harbor BASIC — an easier conversational programming language;

ASM Assembly Language — a two-pass absolute 8080 assembler that lets you create source programs using letters, numbers and symbols to generate efficient machine language code. It assembles the source program into a listing and an object program in binary format executable by your computer;

EDIT Text Editor, which converts your computer and terminal into a powerful typewriter for generating text and editing. It prepares the source code for H-8 Assembly Language and can be used to prepare reports, write and edit;

DBUG Console Debugger, an enhanced and extended version of the front panel monitor which allows the entry and debugging of user machine language programs via an external terminal. This console debugger features single or multiple stepping through programs, breakpointing, load and dump from tape storage. A user program is required to use the Console Debugger;

PIP — **a file utility** to copy, concatenate or transfer files between devices;

INIT — to format new or magnetically damaged diskettes;

SYSGEN — a utility to place the operating system itself on a diskette;

TEST — a diagnostic to help check out and maintain your floppy disk system.

HDOS features fully dynamic non-continuous allocation and de-allocation, for fast and efficient use of disk space. Its structure consists of a resident nucleus with two non-resident relocatable overlays, plus non-resident relocatable device drivers for efficient memory utilization. Utilities are included to make the system useable in a 16K single-drive system, although 32K (or more) of memory and two disk drives are highly recommended — and may be required for operation of some other software products used in conjunction with HDOS.

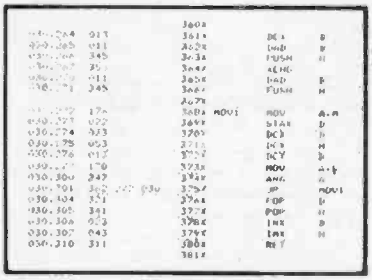
Get the most from your H-8 Computer and H-17 Floppy Disk System.

H-8-17, on 5.25" diskette, Shpg. wt. 7 Kg 180.00

Operating Systems Software Designed Especially for the Heathkit H-89 Computer. Diskette with features above.

H-89-17, Shpg. wt. 3 Kg 180.00

SEE PAGE 17 FOR MORE NEW SOFTWARE



NEW

Heathkit Software Source Listings give you more flexibility

Modify Heathkit software to suit most special applications. Learn the techniques used by professional programmers in developing systems software. In Assembly language. NOTE: No support — updates not supplied without charge.

Source Listings for Heath Disk Operating System. Includes all utilities and device drivers. **HOS-1-SL**, 5 Kg 235.00

Source Listings for the Read-Only Memory (ROM) of the H-17 Floppy Disk System.
H-8-51, Shpg. wt. 1 Kg 30.00

Source Listings for the ROM of the H-19 Professional Video Terminal.
H-19-1, Shpg. wt. 1 Kg 30.00

Listing for Cassette Extended Benton Harbor BASIC Language. H-8-60, 1 Kg 30.00

Listing for Cassette Assembly Language. H-8-54, 1 Kg 30.00

Listing for Cassette Text Editor. H-8-53, 1 Kg 30.00

Listing for Cassette Console Debugger. H-8-52, 1 Kg 30.00

(NOTE: All source listings are copyrighted. Reproduction prohibited.)

MICROSOFT™ BASIC™ — the most popular computer language. MICROSOFT BASIC is one of the most versatile languages available for the personal computer. Scores of practical programs are written in this BASIC. This version of MICROSOFT BASIC is specially written for use with Heathkit 8-bit systems, including the H-8, H-88 and H-89 Computers.

MICROSOFT BASIC features these capabilities:

Direct access to CPU ports and memory locations (INP, OUT, PEEK, POKE); an IF-THEN-ELSE control structure, which allows more highly structured programming — including editing during programming and random or sequential filing capabilities; a full range of mathematical and logical operators; and a DEF statement which allows user-defined functions which are not listed as intrinsic functions.

MICROSOFT BASIC also features powerful program edit facilities, including insertion, deletion, character change and search capabilities; versatile file management facilities, which include random files, sequential files and file manipulation; powerful string processing functions, including LEFT, RIGHT, MID, ASC, CHR and concatenation; extended statements, operators, functions and commands which are not available in most other BASICS — ERASE to eliminate arrays from a program, LINE INPUT to add lines to string variables without delimiters, SWAP to exchange the values of two variables, the TRON and TROFF debugging aids which help trace the execution of program instructions, and WIDTH to set the width of the printing terminal line; automatic line numbering and renumbering; branching, loops and subroutines to change the order of program line execution in various ways; PRINT USING for control of output formats; ON ERROR command for error trapping routines.

This software includes a variety of mathematical and logical functions as well, including double precision floating point number and double precision mathematics. Algebraic and trigonometric capabilities are also included.

MICROSOFT BASIC requires H-8-17 or H-89-17 Disk-Based Operating Systems Software, as well as a minimum of 32K memory.

H-8-21, Shpg. wt. 2 Kg 180.00

SEE PAGE 17 FOR MORE NEW SOFTWARE

NEW

MICROSOFT™ FORTRAN™ System

- **Powerful ANSI-66 FORTRAN IV Language Compiler**
- **Macro-Assembler, Linkage Editor, Cross-Reference Generator**
- **Linkable library of math, I/O, utility routines**

Designed especially for Heathkit disk-based computer systems, the MICROSOFT FORTRAN Operating System features the powerful ANSI-66 FORTRAN IV Computer Language, a cross-reference generator, the MACRO-80 Relocating Assembler, the LINK-80 Linkage Editor, the MICROSOFT FORTRAN Library and a linkable library, filled with floating point mathematical routines, plus I/O and utility routines.

The **MICROSOFT FORTRAN-80 Compiler** is a true native-code compiler which supports the full ANSI-66 FORTRAN IV Language, except for complex numbers. The compiler also includes many extensions to the FORTRAN language, to increase the utility and efficiency of the system — and it performs some object code optimization. An option to list the generated object code in 8080 Assembly Language is available.

MICROSOFT'S MACRO-80 Relocating Assembler generates relocatable object modules for use with the LINK-80 Linkage Editor. It accepts both Intel 8080 and Zilos Z-80 mnemonics, features both macro and conditional assembly, and will generate a sorted cross-reference listing — when used with CREF (included).

MICROSOFT'S LINK-80 Linkage Editor converts relocatable libraries or modules (such as those produced by MICROSOFT FORTRAN, COBOL, BASIC and Pascal languages — as well as by the MACRO-80 Assembler and Digital Research's PL/I Compiler) into runnable load modules for direct execution, or for disk storage. Capabilities include options to specify prommable code, and the ability to separately specify the origin address for code and data segments. An absolute symbol table listing of the generated load module may also be obtained.

MICROSOFT'S FORTRAN Library includes all FORTRAN mathematical, I/O and utility functions. Routines in the Library may be called by — and linked with — mathematical programs created by the MACRO-80 Assembler.

MICROSOFT FORTRAN-80 is one of the most powerful, sophisticated and impressive programming systems available to micro-computer users. Your computer system must have dual-drive floppy disk capability and minimum of 40K memory.

H-8-20, Shpg. wt. 2 Kg 180.00

H-8/H-88/H-89 Cassette Software

Cassette Operating System Software. Designed especially for Heathkit 8-bit computers used with cassette storage, this software helps you get ready to program easily and quickly — with features that make it easier to use and more practical than other systems. Automatic command completion simplifies typing; dynamic syntax checking instantly alerts you to errors; and a special user configuration lets you personalize your system.

This operating system includes: Benton Harbor BASIC, a conversational programming language which uses simple English statements and familiar algebraic equations to perform operations and solve problems; HASL-8 Assembly Language, a two-pass absolute assembler that lets you create source programs using letters, numbers and symbols to generate efficient machine language code. It assembles the source program into a listing and an object program in an executable binary format.

Also included are: the TED-8 Text Editor, which converts your computer and terminal into a powerful typewriter for generating and editing text. It prepares the source code for HASL-8 Assembly Language and can be used to prepare reports, write letters and edit manuscripts; and BUG-8 Console Debugger, an enhanced and extended version of the front panel monitor which allows entry and debugging of user machine language programs via an external terminal. It features single or multiple stepping through programs, breakpointing, load and dump from tape storage; and a full set of utility programs, including Dynamic File Allocation to permit unlimited file size and prevent squeezing of disks, file manipulation, and device independence for direct communication between any program and any device.

A minimum of 8K memory is required to run this software. Requires an H-8-5 Serial I/O and Cassette Interface to load with H-8; H-88-5 Cassette Interface is required to load with WH-89-CS. Interfacing standard with H-88, H-89.

H-8-18, for H-8, Shpg. wt. 5 Kg **35.00**

H-88-18, for H-88, H-89, WH-89-CS, Shpg. wt. 3 Kg **35.00**

Extended Benton Harbor BASIC™ Language. An easy-to-learn, easy-to-use conversational computer language. This enhanced version of Dartmouth BASIC includes strings and files. It provides even faster operation and includes character strings, additional convenience commands and math functions, dynamic storage allocation, access to 2 mS clock, keyboard interrupt processing, expanded error messages and recovery ability, LED display control and keypad support for your computer system.

Extended Benton Harbor BASIC features numeric data with over six digits of accuracy, and Boolean values which permit logical operations. It also features free format programs, enhanced expressions, math functions and conditional statement facilities.

A minimum of 12K memory is required to run Extended Benton Harbor BASIC. 16K memory is preferred if full use is to be made of its capabilities. Extended Benton Harbor BASIC supports the H-14 Line Printer and the H-8-4 Four-Port Serial Interface Board.

HC-8-14, Shpg. wt. 6 Kg **35.00**

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Customer's Signature

NEW

Zenith Electronic Typing — word processing that cuts your paperwork problems down to size

Zenith Electronic Typing makes word processing practical for the small, single-secretary office — as well as for large secretarial staffs. **Anyone who can** turn on a TV and type on a standard keyboard can increase their output by 50 percent or more, practically on the first day. All you need is common sense and standard secretarial skills.

There's nothing to program, no complicated computer programs to understand. A specially-developed self-instruction course, contained on a single floppy disk, shows you how to use the system — in as little as two hours. All training is done in your office, at your own pace — with the system itself.

Now you can type, make alterations, insert, rearrange, combine documents, correct errors and do much more — quickly, easily and accurately — to increase the speed and efficiency of even the best secretary:

Automatic Carriage Return at the end of each line of text eliminates concern about margins, so typing can continue at top speed.

Forward and Reverse Scrolling, along with two Search Modes, quickly locate the precise area where editing or revisions are needed.

Insertion Capabilities let you insert any word, sentence or paragraph — anywhere on the document.

Append Capability allows you to join separate paragraphs and sub-documents together, to create a new document.

Deletion Capabilities mean you can rapidly delete from any desired point to the end of the document. You can even make different revisions on different copies of the same document.

Automatic Replacement of a word, name or phrase with any other word, name or phrase — wherever it is repeated throughout a document.

Automatic Realignment of the entire text after additions, alterations or deletions saves hours of retyping time.

Automatic Centering on command means no counting or guessing.

Automatic Justification provides flush left and/or right margins, if desired.

Automatic Margins and Spacing are provided for most documents, with simple resetting for special parameters.

Horizontal Pitch Selection allows you to vary horizontal spacing between 6 and 12 characters per inch.

You can see your work and make corrections BEFORE one word is printed on paper. And by only retyping those characters, words or paragraphs that require changing — not the entire document — an enormous savings of time is achieved. Once you're satisfied that the document is letter perfect, the touch of another key automatically prints a clear copy of the document — on a separate printer (not included) — at an error-free rate of up to 450 words per minute.

For rapid manipulation of text, documents are stored on low-cost, lightweight 5.25-inch floppy diskettes. Up to forty documents can be stored on a single diskette, with an automatic index to keep track of each document. **Documents** can have names up to 24 characters long and may be created, copied, duplicated or deleted at will.

Zenith Electronic Typing is your solution to impossible deadlines, soaring clerical costs, overflowing files and laborious re-typing. Requires an H-89 Computer with 48K and a printer. You can also use equivalent Heathkit H-88/H-88-4 or H-8/H-17/H-19 Systems. Although any printer we offer will interface with the system, the WH-44 Diablo 1640 RO Letter-Quality Printer is recommended. Dual-drive floppy disk capability is also recommended.

H-8-40, Shpg. wt. 3 Kg **495.00**

Save with complete Word Processing packages

We make Zenith Electronic Typing an even better value, with discounts on word processing packages.

SAVE A BIG $200! Just buy a complete word processing system. Purchase Zenith Electronic Typing, any Heathkit computer and any printer in this catalog. Then, subtract $200.00 from the total (not including shipping and handling charges).

SAVE A BIG $100! Buy Zenith Electronic Typing and any printer in this catalog. Just subtract $100 from the total of your order (not including shipping and handling charges).

NEW

COBOL Programming introduces you to this popular business language

$\$199^{95}$

- Priced much lower than most other COBOL instruction courses
- COBOL — the language used in most all commercial data processing systems

Learn about COBOL — one of the most popular business computer languages. Most all commercial data processing systems, as well as all computer mainframes used by the Federal Government, use COBOL Language. COBOL is especially useful in any repetitive application which uses large quantities of reduplicative data. It's more efficient in these applications than BASIC, and gives the programmer far greater productivity than Assembly Language.

You'll find COBOL used in accounting functions, inventory control and other business applications. It's more self-documenting; you can see each step of each operation, because of the language's structure.

Now, it's easier than ever to learn about COBOL Language with the newest self-instruction course in this catalog. COBOL Programming, from Heath/Zenith Educational Systems, is designed for beginning programmers. And it also costs less than ever to learn about COBOL — the Heath/Zenith COBOL Programming Course is priced far below the competition.

This COBOL Course covers the basics of encoding, input characteristics, program hierarchy, identification, environment, data and procedure divisions. Both the ANS 74 and ANS 68 versions of COBOL are used in the program.

COBOL Programming uses the effective audio-tutorial learning method. You get a clearly written student handbook with diagrams, tables, illustrative programs and unit tests. The text covers these aspects of COBOL: a simple COBOL program; program variations; the structure and syntax of COBOL; simple arithmetic statements, comments and diagnostics; advanced arithmetic and control statements; additional data concepts; magnetic tape and disk concepts; and an applied COBOL program. A set of nine audio cassettes complements the student workbook, allowing you to see AND hear each concept as it's presented in this Heath/Zenith Educational Course.

A set of six practice COBOL programs is located at the end of the workbook. You can work on them at specified points in the program — or you may prefer to complete all of the exercises at the end of the program. A master COBOL coding sheet is also included. Use it as an aid in writing COBOL programs.

When you complete COBOL Programming, you'll be able to write COBOL programs, encoding arithmetic logic and control statements. The Heath/Zenith COBOL Programming package should take about 20 hours to complete. When you pass the optional final examination, with a score of 70 percent or better, you will earn a Certificate of Achievement.

Learn the programming language that thousands of businesses use world-wide. Order the Heath/Zenith COBOL Programming course today. A computer with a COBOL compiler is recommended; the H-8, H-88 and H-89 do not have COBOL compilers at this time.

EC-1105, Shpg. wt. 4 Kg **199.95**

HUG has over 500 exciting programs for your computer

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User's
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- Games
- Personal Finance
- Business Applications
- Computer-Assisted Instruction
- Utility

This software is now available to all HUG members through your local Heathkit Electronic Centre and by mail order. HUG software is available only to HUG Members. When ordering by mail, please use the special order form provided to you by HUG. If purchasing in person at one of our Heathkit Electronic Centers, please present your HUG membership Card.

NOT YET A MEMBER? — Drop into any Heathkit Electronic Centre and pick up an application form or send us a note asking that one be sent to you. HUG Membership applications are also included in all Heathkit computer products.

885-1008 Volume I Documentation	Shpg. wt. 1 Kg	**11.00**
885-1009 Tape I Cassette H8 Only	Shpg. wt. 1 Kg	**8.50**
885-1010 Adventure Disk H8/H89	Shpg. wt. 1 Kg	**12.00**
885-1012 Tape II BASIC Cassette	Shpg. wt. 1 Kg	**11.00**
885-1013 Volume II Documentation	Shpg. wt. 1 Kg	**14.50**
885-1014 Tape II ASM Cassette H8 Only	Shpg. wt. 1 Kg	**11.00**
885-1015 Volume III Documentation	Shpg. wt. 1 Kg	**14.50**
885-1019 Device Driver Disk H8/H89	Shpg. wt. 1 Kg	**12.00**
885-1022 HUG Editor (ED) Disk H8/H89	Shpg. wt. 1 Kg	**18.00**
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885-1024 Disk I H8/H89	Shpg. wt. 1 Kg	**22.00**
885-1025 Runoff Disk H8/H89	Shpg. wt. 1 Kg	**42.00**
885-1026 Tape III Cassette H8/H88	Shpg. wt. 1 Kg	**11.00**
885-1027 MORSE8 Cassette H8 Only	Shpg. wt. 1 Kg	**17.00**
885-1028 RTTY Cassette H8 Only	Shpg. wt. 1 Kg	**13.50**
885-1029 Disk II Games 1 H8/H89	Shpg. wt. 1 Kg	**22.00**
885-1030 Disk III Games 2 H8/H89	Shpg. wt. 1 Kg	**22.00**
885-1031 Disk IV MUSIC H8 Only	Shpg. wt. 1 Kg	**28.00**
885-1032 Disk V H8/H89	Shpg. wt. 1 Kg	**22.00**
885-1033 HT-11 Disk I	Shpg. wt. 1 Kg	**23.00**
885-1034 Character Ed Cassette H8 Only	Shpg. wt. 1 Kg	**13.50**
885-1035 ED/ASM/DEBUG Cassette H8 Only	Shpg. wt. 1 Kg	**13.50**
885-1036 Tape IV Cassette H8/H88	Shpg. wt. 1 Kg	**11.00**
885-1037 Volume IV Documentation	Shpg. wt. 1 Kg	**14.50**
885-1038 Wise on Disk H8/H89	Shpg. wt. 1 Kg	**22.00**
885-1039 WISE on Cassette H8 Only	Shpg. wt. 1 Kg	**11.00**
885-1040 PILOT On Cassette H8 Only	Shpg. wt. 1 Kg	**13.50**
885-1041 Sm Bus Pkg I (2 Disks) H8/H89	Shpg. wt. 1 Kg	**60.00**
885-1042 PILOT on Disk H8/H89	Shpg. wt. 1 Kg	**23.00**
885-1043 MODEM Heath to Heath H8/H89	Shpg. wt. 1 Kg	**25.50**
885-1044 Disk VI H8/H89	Shpg. wt. 1 Kg	**22.00**
885-1045 FOCAL Cassette H8 Only	Shpg. wt. 1 Kg	**13.50**
885-1047 Stocks H8/H89 Disk	Shpg. wt. 1 Kg	**22.00**
885-1048 Personal Account H8/H89 Disk	Shpg. wt. 1 Kg	**22.00**
885-1049 Income Tax Records H8/H89 Disk	Shpg. wt. 1 Kg	**22.00**
885-1050 M.C.S. Modem for H8/H89	Shpg. wt. 1 Kg	**22.00**
885-1051 Payroll H8/H89 Disk	Shpg. wt. 1 Kg	**60.00**
885-1052 Morse8 Disk H8 Only	Shpg. wt. 1 Kg	**22.00**
885-1054 SmBusPkg II 3 Disk H8/H19/H89	Shpg. wt. 1 Kg	**72.00**
885-1055 MBASIC Inventory Disk H8/H89	Shpg. wt. 1 Kg	**36.00**
885-1056 MBASIC Mail List H8/H89 Disk	Shpg. wt. 1 Kg	**36.00**
885-1060 Disk VII H8/H89	Shpg. wt. 1 Kg	**22.00**
885-1061 TMI Load H8 ONLY Disk	Shpg. wt. 1 Kg	**22.00**
885-1062 Disk VIII H8/H89 (2 Disks)	Shpg. wt. 1 Kg	**30.00**
885-1063 Floating Point Disk H8/H89	Shpg. wt. 1 Kg	**22.00**
885-1064 Disk IX H8/H89 Disk	Shpg. wt. 1 Kg	**22.00**
885-1065 Fix Point Package H8/H89 Disk	Shpg. wt. 1 Kg	**22.00**
885-1066 Disk X H8/H89	Shpg. wt. 1 Kg	**22.00**
855-1068 Disk XII MBASIC Games	Shpg. wt. 1 Kg	**22.00**
885-1069 Disk XIII Misc H8/H89	Shpg. wt. 1 Kg	**22.00**
885-1077 TXTCON/BASCON H8/H89 Disk	Shpg. wt. 1 Kg	**22.00**
885-1201 CP/M Volumes H1 & H2	Shpg. wt. 1 Kg	**25.50**
885-1202 CP/M Volumes 4 & 21 C	Shpg. wt. 1 Kg	**25.50**
885-1203 CP/M Volumes 21 A & B	Shpg. wt. 1 Kg	**25.50**
885-1204 CP/M Volumes 26/27 A & B	Shpg. wt. 1 Kg	**25.50**
885-1205 CP/M Volumes 26/27 C & D	Shpg. wt. 1 Kg	**25.50**

Learn to speak your computers' language

Heathkit Self-Instruction Pogram for ASSEMBLY Language

- **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. There is no need for programmed memory, no time wasted interpreting. So programs run much 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. You learn 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. You learn in a way that's fast, fun and thorough.

The Heathkit Program is designed for computers using the popular 8080/8085 microprocessor series and the Heathkit Z80 CPU. 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. And you'll be closer to the "heart" of your computer, to the machine operations that actually perform the tasks that you require in your hobby or business.

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.

EC-1108, Shpg. wt. 3.5 Kg ... 79.95

Heathkit Self-Instruction Program for BASIC Language

- **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 for your specific needs. 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.

EC-1100, Shpg. wt. 3.5 Kg ... 69.95

MONEY-BACK GUARANTEE — Programs on this page carry a complete refund of purchase price, if you're not satisfied.

COMPUTER CONCEPTS FOR SMALL BUSINESS

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.

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 task 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. 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. 2.5 Kg ... 99.95

NEW

PERSONAL COMPUTING PROGRAM

Gain the basic knowledge needed to begin a computer hobby with our new program

Do you own a computer — or are you considering buying one? The Heathkit Personal Computing Program can help. It introduces you to the fundamental concepts, capabilities and terminology of personal computing. With our new program, you'll learn some of the ways you can benefit from a computer.

Designed for the curious, motivated individual who is uninitiated to computing, the Personal Computing Program shows you how a computer can serve you.

You'll be able to determine if your particular problem can be solved by a computer, because you will understand what a computer can do. You'll be able to cut through the technical fog, and understand what different computer system components do — in easier, simpler terms.

The Heathkit Personal Computing Program is divided into five easy-to-understand units, which explain different parts of the personal computing system and put the system into perspective, so you can make an informed decision. You'll learn:

The Fundamentals of Computers: You'll examine the types of problems that can be solved by a computer, and how to apply the capabilities of a computer to your specific problems. You'll find out how the computers "understand" electronic data. Then, you will learn how to convert written words into electronic data.

Computer Hardware: When you complete this section, you won't be intimidated by long lists of specifications when you shop for computer system components. You'll be able to easily and simply compare different computers — because you will understand how each performs.

Interfacing: You'll learn how the computer communicates with other system components. You'll also be able to distinguish between analog data and digital data.

Personal Computing Systems: You will learn how to evaluate various types of small computer systems, by understanding how different combinations of components function.

Computer Software: When you read this section, you'll learn about different types of software, and how each type can solve different types of problems.

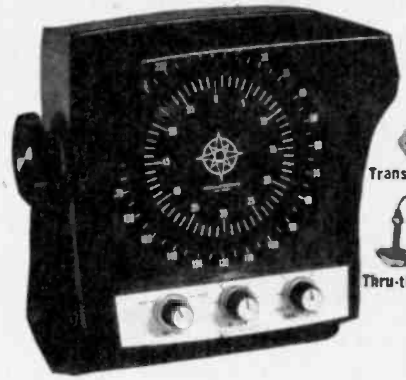
Instructing the Machine: The final section of this program shows you how you can control the computer system, by introducing you to BASIC Language Programming.

You don't need an extensive math, electronics or computer background to learn about personal computing with our new program. The easy-to-read 400-page text, supported and reinforced by three audio cassettes, makes personal computing clear and understandable to most individuals with high school backgrounds. The language used in the self-instruction program is carefully chosen to be informal, conversational and easy to understand.

When you complete your introduction to Personal Computing, pass the optional final examination with a score of 70 percent or better, and you'll earn a Certificate of Achievement.

EC-1000, Shpg. wt. 2.5 Kg ... 69.95

Money-saving marine equipment you can build yourself



Transducers for MI-1030 and MI-1031

Transom mount

Thru-the-hull

You can find more fish, know the water depth, with this deluxe Dual-range Depth Sounder

$209.95

- Features switch-selected 0-60 and 0-240 ft. ranges
- Cycolac® case with glare-free bezel and sun shield

For improved fishing and navigation, you need this deluxe Dual-range Depth Sounder. It shows water depth, type of bottom, schools of fish and individual fish. A high-pitched "beep" alerts you to shoals or objects projecting above any preselected depth from 5 to 240 ft. Features fixed noise rejection circuit, polarity protection and a super-bright neon indicator. Comes with quick disconnect power and transducer leads. Includes gimbal mount.

Kit MI-1031-1, with thru-hull transducer, 15′ coax, Shpg. wt. 4 Kg **209.95**

Kit MI-1031-2, with transom transducer, 25′ coax, Shpg. wt. 4 Kg **209.95**

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

Kit MI-1030-1, with thru-hull transducer and 25′ coax, Shpg. wt. 4 Kg **169.95**

Kit MI-1030-2, Single-Range Depth Sounder with transom transducer and 25′ coax for easy installation, Shpg. wt. 4 Kg **169.95**

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.

Fish Spotter™ Sounder gives you portability and economy

$234.95

- Barium titinate transducer
- Audible alarm announces fish

Features switch-selected 0-60′ and 0-240′ ranges. Noise rejection eliminates engine ignition interference; bright neon flasher for precise depth reading. Rugged aluminum cabinet. Portable suction-cup transducer bracket. Uses two 6V lantern batteries (not included). 7″ H x 6″ W x 11″ D.

Kit MI-2901, Shpg. wt. 4 Kg **234.95**

Scanning Transducer Bracket: (not shown). For use with MI-2901. "C" clamp mount. For 1⅜″ cylindrical transducer. **Kit MIA-2900-1,** Shpg. wt. 2 Kg **54.95**

Thermo Spotter helps you find where the fish are

Shows you the water temperature at any depth up to 100-ft. Lower the line, press spring loaded meter button for temperature readout, check depth on cable. Fish temperature charts (included) indicate kinds of fish likely at that level. Self-contained with submersible sensor. High-impact plastic take-up reel case. Uses one 1.5 V AA battery (not included). Increase your catch this year.

Kit MI-104, Shpg. wt. 1.5 Kg **79.95**

The Heathkit Seeker™ shows you exactly where to find fish — helps you navigate in any weather, too

$539.95

- Extra-wide beam transducer
- Shows three ranges — 5′ to 200′, 200′ to 400′ and 400′ to 600′

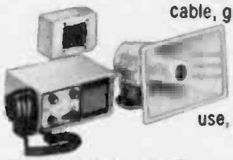
Helps locate the fish, and also provides a permanent record of the best spots and depths for easy relocation. Bottom recording accuracy also makes it valuable for navigating coastlines and mapping lake bottoms. Straight line recording system gives easier, more accurate chart reading and interpretation. A roll of paper (one included) lasts about 13 hours for continuous charting. Two-piece, weather-resistant case opens easily for paper replacement. Two lamps light the chart for easy night operation. Universal gimbal mount for easy installation and removal. Operates from boat's 12V battery system. Measures 8″ H x 11″ W x 7″ D.

Kit MI-2910-1, recorder with through-the-hull transducer and 30′ cable. Shpg. wt. 8 Kg **539.95**

Kit MI-2910-2, recorder with transom mount transducer and 30′ cable. Shpg. wt. 8 Kg **539.95**

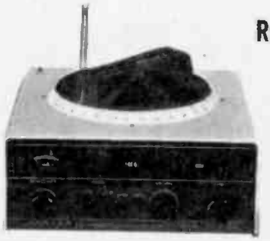
MIA-2910-1, Two Rolls Chart Paper. Shpg. wt. 1 Kg **21.95**

Heath Foghorn/Hailer for safe water fun



Has 55 W amp, deck horn, 20′ cable, gimbal mount. 12 VDC pos. or neg. ground. **Kit MD-19A,** 7 Kg **219.95**

Kit MDA-19-1, Optional speaker for intercom use, 1 Kg **39.95**



Radio Direction Finder for safe boating

Keeps you on course on 190-410 kHz long-wave beacon band or standard AM. Easy-to-read digital display. Finding bearings is easy — big azimuth ring is marked in 2° increments. Uses boat's 12-15 VDC electrical system, or becomes completely portable with 6 D cell batteries (not included). ±3° accuracy. Keeps you from getting lost.

Kit MR-1010, Shpg. wt. 7 Kg **399.95**

Digital Depth Sounder protects your hull

Dual range digital display reads depths from 2.5 to 199 feet. Red light signals clearance of 10 feet or less. Includes mounting bracket, 25′ cable. Don't run aground.

Digital Depth Sounder with through-hull transducer, **Kit MI-101-1,** Shpg. wt. 3.5 Kg **299.95**

Digital Depth Sounder with transom, transducer, Kit MI-101-2, Shpg. wt. 3 Kg **299.95**

NEW Digital Depth Sounder protects your boat and passengers

$249⁹⁵

- Detects depth changes from 2′ to 499′

Transom-mount transducer

Prevent costly boat repairs and personal injury with the new Heathkit Digital Depth Sounder. Automatic range selection constantly monitors water depths from 2′ to 499′. Crystal oscillator in unit sends depth changes to display every .9 second. Display tells you depth in .1′ increments from 2′ to 9.9′, and reads in 1′ intervals from depths 10′ to 499′. Automatic gain control self-adjusts the signal sensitivity for precise, accurate depth readings.

Five alarm settings insure your boat's and passengers' safety in harbors, rivers, and open water. You can set sounder to warn you visually and audibly of unexpected depth changes at the following levels: 2′, 4′, 10′, 20′, and 40′. Helps you avoid running aground and puncturing your hull.

Built-in keel offset automatically subtracts the keel depth, so you know the exact distance between keel and lake floor when sailing in the shallows.

Easy-to-read, 3 digit, LCD display with backlighting informs you of water's depth day or night, giving you clear readings on fishing and diving trips.

Won't crowd your dash — measures 2½″ H x 7.0″ W x 5½″ D. Gimbal mount lets you place unit on dash or overhead, and permits you to adjust it to a comfortable reading position.

Made from non-corrosive, weather-resistant materials of stainless steel, plastic, and aluminum for years of outdoor service. Parts mounted on glass-epoxy circuit board for easy assembly. Assembly time: about 8 hours. Back connector lets you use the MI-2917 kit with this unit.

Digital Depth Sounder with Thru-Hull Transducer.

MI-2916-1, Shpg. wt. 4 Kg **259.95**

Depth in Feet
499
HEATHKIT - Digital Depth Sounder
Model MI-2916

Digital Depth Sounder with Transom-Mount Transducer.

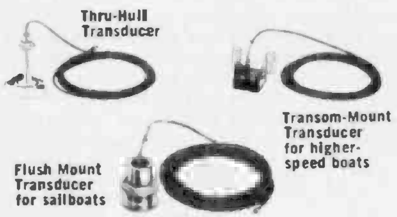
MI-2916-2, Shpg. wt. 4 Kg **249.95**

Digital Depth Sounder with Flush-Mount Transducer.

MI-2916-3, Shpg. wt. 4 Kg **269.95**

SPECIFICATIONS: Depth Ranges: 2.0′ to 9.9′ and 10′ to 499′. Autoranging. **Display:** LCD with auto night light. **Frequency:** 200 kHz. **Accuracy:** ±.5% +1 count. **External Control:** Off-On switch. **Alarm settings:** 2′, 4′, 10′, 20′, 40′. **Internal Controls:** Keel offset 0′ to 7′. **Operating Temperature Range:** 32°F to 122°F (0° to 50°C) **Power:** 10 to 17.7 VDC. **Average current:** 25 mA, 110 mA with night light. **Alarm:** Audible and Visual.

Transducers for Depth Sounder Systems listed at left. 25′ cable included.


Thru-Hull Transducer
Transom-Mount Transducer for higher-speed boats
Flush Mount Transducer for sailboats

NEW Digital Remote adds another alerting station to the MI-2916 Depth Sounder

$189⁹⁵

- Independent alarms and depth settings
- Same type of display and accurate calibrations

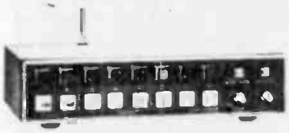
Place the Digital Readout Remote unit in your boat's cabin, flying bridge, or any other location on board. Provides an additional depth reading station that audibly and visually warns you of unexpected changes in depth. A 25′ cable carries power and depth sounder signals from the MI-2916 above to the remote for accurate depth readings and easy placement.

Has same Automatic Range Selection, Easy to Read, 3 digit, LCD Display, Dimensions and Mounting as Model MI-2916. Takes about 6 hours to assemble.

MI-2917, Shpg. wt. 2 Kg **189.95**

Depth in Feet
499
HEATHKIT - Digital Remote Readout
Model MI-2917

MR-1134 Marine-Band VHF Automatic Scanning Monitor



- Priority channel selection
- Large, lighted channel indicators

Lets you automatically monitor up to 8 marine frequencies on the 156-163 MHz VHF marine band. Listen to weather frequencies, marine emergency channels, harbor instructions, fishing reports, ship-to-shore and ship-to-ship communications, more. Includes channel lockout, priority scanning and more. Manual scanning too. A 4-pole crystal filter provides good selectivity (for crowded signal areas, use the optional 8-pole filter below. A built-in telescoping antenna brings in plenty of signals. AC or 12 VDC operation. No-instrument alignment. Order crystals below.

Kit MR-1134, Shpg. wt. 4 Kg **129.95**

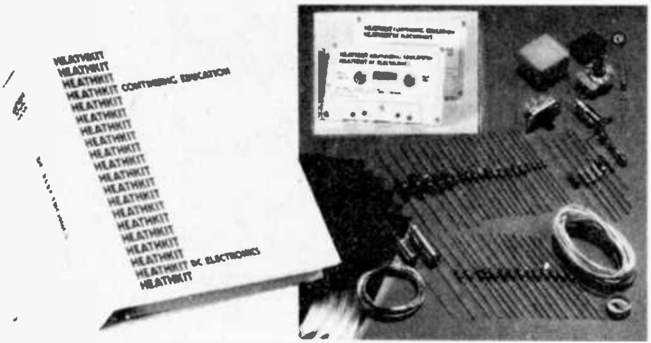
Crystals. You specify frequency. 4 wk. delivery. Crystal is returned postpaid. Order one for each frequency.

GRA-1100-1 .... **each 10.95**

GRA-1100-2, 8-pole crystal filter,
Shpg. wt. 1 Kg **21.95**

MR-1134 SPECIFICATIONS: Scanning Range: any 8 MHz segment of the 146-174 MHz frequency range. **Sensitivity:** 0.5 µV or less for 12 dB SINAD. **Adjacent Channel Rejection:** −40 dB typ. (−55 dB typ. with optional 8-pole filter. **Dimensions:** 3 3/16″ H x 8½″ D x 11 7/16″ W. **Net Wt.** 2½ Kgs.

Learn electronics the easy and economical Heathkit



DC Electronics

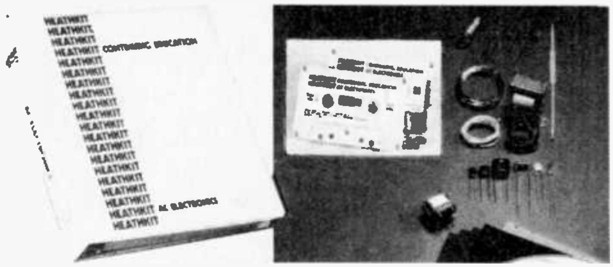
The basis for a complete understanding of electronics

DC Electronics is the first step you'll take toward understanding the fascinating world of electronics. as you would expect, the DC Electronics Program is simply and logically arranged and assumes no prior electronic knowledge. It begins at basic electron theory and goes on in detail with nothing omitted. Everything you need for successful completion and a high degree of understanding is included. The only other materials needed are a record or cassette player, a few basic hand tools, a VOM (such as the Heathkit IM-5248, p. 43) and the ET-3100 Trainer (listed on next page). Progressing at your own established pace, you learn in an unhurried environment free from pressure. And learning is easy too with simple, step-by-step "programmed" instructions. Audio aids help emphasize the text material and an optional final exam lets you test your overall comprehension.

The measure of any learning endeavor is of course, the new knowledge and abilities you gain as a result of your studies. When you have successfully completed DC Electronics, you will be able to accomplish the following:

1. Solve basic electronic problems involving current, voltage, resistance.
2. Explain the relationship between 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 components such as resistors, relays, switches, lamps, batteries, and capacitors.
5. Given a wiring diagram of a circuit containing components such as resistors, relays, switches, and capacitors, draw an equivalent schematic diagram.
6. Use a multimeter to measure current, voltage and resistance.
7. Convert from one metric prefix to another and to work with powers of ten.
8. Explain the construction, operation, and purpose of resistors, potentiometers, switches, fuses, relays, capacitors, inductors, and batteries.
9. Demonstrate basic safety procedures, designed to protect you and your test equipment.
10. Build and experiment with basic DC circuits of your own design.

Course EE-3101, Shpg. wt. 3 Kg	84.95
EEA-3101, Optional Cassettes, Shpg. wt. 1 Kg	11.95
SAVE $9.95! EES-3101, Program with Kit Trainer, Shpg. wt. 8 Kg	184.95
ECP-3801, Cassette Record/Player, (not shown, see p. 18). Shpg. wt. 2 Kg.	99.95



AC Electronics

Once you've mastered DC Electronics, you'll move on to the next phase of what comprises the nucleus of electronics technology.

With basic DC theory and operation behind you, you'll eagerly progress to this, the second of the Heathkit Continuing Education Series. AC Electronics covers the fundamentals and basic theory of alternating current in a simple, straightforward manner that can be easily understood. Included is everything you need for thorough, no-compromise learning. The only other materials you need are a record or cassette player, a few basic hand tools, a VOM (such as the Heathkit IM-5284, page 43) and the ET-3100 Trainer (listed on next page).

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.

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 the average or effective value of an ac sine wave when its peak or peak-to-peak value is known.
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 and 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 ac circuits which contain resistance, capacitance, and inductance.
14. Explain the operation of series and parallel resonant circuits.

AC Electronics, EE-3102, Shpg. wt. 3 Kg	84.95
EEA-3102, Optional Cassettes, Shpg. wt. 1 Kg	11.95
ECP-3801, Cassette Recorder/Player, (not shown, see p. 18). Shpg. wt. 2 Kg	99.95
SAVE $9.95! EES-3102, Program with Kit Trainer, Shpg. wt. 8 kg	184.95

NEW $84.95

Electronics for Hobbyists — made simple with this Heath Program

- **Optional experiments offer practical hands-on experience**

Learn about the electronics you have day-to-day contact with. With the Electronics for Hobbyists Self-Instruction Program, you'll be able to understand those do-it-yourself electronic projects in popular magazines. While not as extensive as the Electronic Fundamentals Series, Electronics for Hobbyists provides a good introductory background.

No prerequisite is required to start. You proceed at your own pace, so you can take the time to thoroughly digest each concept. The program is arranged in a logical manner, so it's easier for you to learn.

Electronics for Hobbyists is divided into seven units, each covering a part of the foundation that electronics is built upon. The easy-to-understand text material is backed up by examinations at the end of each unit — as well as by 26 optional experiments, which provide hands-on experience with electronic devices.

When you successfully complete the program, you will be able to:

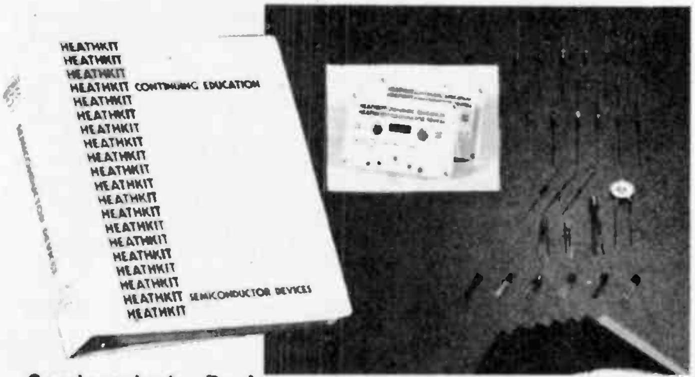
• Define voltage, current, resistance and power. • Find the value of voltage, current, resistance and power, when two of the above are known. • State the basic law of magnetism. • Define Direct and Alternating Current. • Explain the operation of a transformer. • Define inductance, henry, mutual inductance, inductive reactance and impedance. • Explain the operation of diodes, transistors and ICs. • Properly use a voltmeter, ammeter and ohmmeter. • Explain the operation of rectifiers, filters, power supplies, amplifiers and oscillators. • Explain the operation of digital circuits. • Understand logic elements, flip-flops, counters, shift registers, clocks and one-shots. • Explain how a digital computer operates. • Understand the relationships between computers, programming and software. • Understand the major electronic hobbies: experimentation and construction, shortwave listening (SWL), amateur radio, radio control models (R/C), personal computing and high-fidelity audio.

Score 70% or better on the optional final exam, and earn a Certificate of Achievement.

Included with the Program are a complete text in two binders, and electronic components for completing the 26 experiments. The ET-3100 Trainer (page 27) is helpful for completing the experiments.

EE-3140, Shpg. wt. 5 Kg	84.95

way with these proven self-instruction programs



Semiconductor Devices

A fascinating subject necessary for anyone going on in their study of electronics — the devices that reshaped every aspect of the industry

No education in electronics would be complete without including solid-state technology. Semiconductor Devices teaches you all about this comparatively-recent development that is prevalent in nearly everything electronic. Audio aids help emphasize the text material and you get hands-on experience with the interesting experiments. An optional final exam lets you test your overall comprehension.

Semiconductor Devices covers semiconductor fundamentals, diodes, zeners, bipolar 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 for the Semiconductor program 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.

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.

Semiconductors, EE-3103, Shpg. wt. 3 Kg	84.95
EEA-3103. Optional Cassettes, Shpg. wt. 1 Kg	11.95
ECP-3801, Cassette Recorder/Player, (not shown, see p. 18). Shpg. wt. 2 Kg	99.95
SAVE $9.95! EES-3103, Program with Kit Trainer, Shpg. wt. 8 Kg	184.95

Experimenter/Trainer provides hands-on learning experience

For the DC, AC, Semiconductor and Electronic Circuits 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 regulated and short-circuit protected, 1k and 100k linear potentiometers. Center tapped transformer provides 30 V rms, 60 Hz for line experiments.

Kit ET-3100, Shpg. wt. 2.5 Kg	109.95
ETW-3100, Factory Assembled Trainer. Shpg. wt. 3 Kg	209.95

HEATHKIT CONTINUING EDUCATION
HEATHKIT ELECTRONIC CIRCUITS

Electronic Circuits

Brings the knowledge you've gained in the first three programs to bear on the latest circuits used in solid-state electronics

This program covers the operation of common solid-state electronic circuits: basic amplifiers, typical amplifiers, operational amplifiers, power supplies, regulators, oscillators, pulse circuits, modulators and demodulators. It shows you how to analyze and design simple inverting and non-inverting amplifiers; the basics of oscillation and the operation of commonly used LC, RC and crystal oscillators. You learn about pulse circuits and multivibrators and study amplitude and frequency modulation including SSB. Learn how to use a voltmeter and oscilloscope to analyze the operation of electronic circuits. 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 take the optional final exam and score 70% or better, you will receive a Certificate of Achievement.

When you have completed this course, you will be able to:

1. Identify basic transistor amplifier circuits and describe their operation.
2. Discuss direct current amplifiers, audio amplifiers, video amplifiers, intermediate frequency amplifiers, and radio frequency amplifiers.
3. Explain the operation of differential amplifiers, comparators, summing and difference amplifiers, and active filter circuits.
4. Analyze inverting and non-inverting operational amplifiers.
5. Explain power supply rectifiers, filters, and regulation circuits.
6. Discuss the principles of oscillation, LC, RC, and crystal oscillators.
7. Discuss pulse shapers, multivibrators, Schmitt trigger, ramp generators.
8. Explain amplitude and frequency modulation, the heterodyne principle and modulation and detection circuits.
9. Construct a wide variety of modern electronic circuits.
10. Use voltmeter and oscilloscope to analyze electronic circuit operation.

Electronic Circuits, EE-3104, Shpg. wt. 4 Kg	109.95
EEA-3104, Optional Cassettes, Shpg. wt. 1 Kg	11.95
ECP-3801, Cassette Recorder/Player, (not shown, see p. 18). Shpg. wt. 2 Kg	99.95
SAVE $9.95! EES-3104, Program with Kit Trainer, Shpg. wt. 10 Kg	209.95

SAVE $49.80 on your Basic Electronics Education!

Order all four Basic Electronics Programs together with the ET-3100 Electronic trainer for a fundamental electronics education. If purchased separately, $474.75.

ETS-3114, Shpg. wt. 25 Kg	**424.95**

ET-3100/ETW-3100 SPECIFICATIONS: POWER SUPPLIES: Positive Supply Output: 1.2 to 15 volt DC, continuously variable. **Load 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 Requirements** 105-130 volts or 210-260 volts RMS, 50-60 Hz, 7 watts maximum. **Dimensions:** 12⅛" wide x 11¾" deep x 3½" high. **Net Weight:** 4 lbs.

Advanced Digital Techniques Learning Program

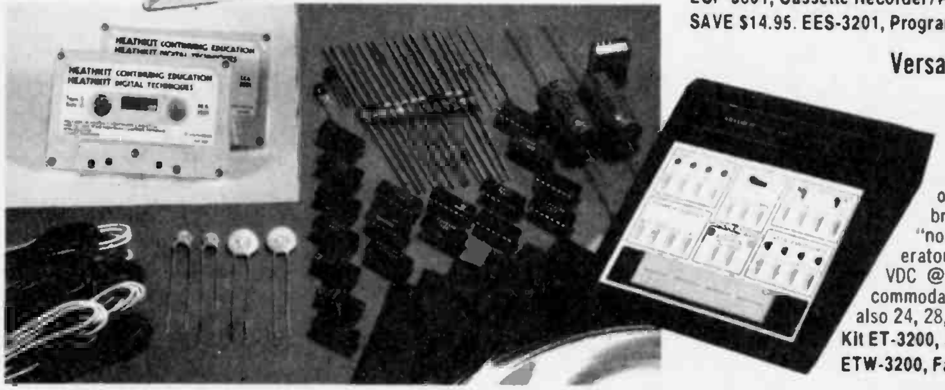
HEATHKIT CONTINUING EDUCATION
HEATHKIT DIGITAL TECHNIQUES
HEATHKIT DIGITAL TECHNIQUES

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.

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) however it can be completed by technically oriented people with a math or science background. 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 43) and an oscilloscope such as the IO-4105 (page 57) is necessary for some experiments.

If you choose to take the final exam, a passing grade of 70% or better earns you a Certificate of Achievement.

Digital Techniques, EE-3201, Shpg. wt. 5 Kg	114.95
EEA-3201, Optional Cassettes, Shpg. wt. 1 Kg	11.95
ECP-3801, Cassette Recorder/Player, Shpg. wt. 2 Kg	99.95
SAVE $14.95. EES-3201, Program with Kit Trainer, Shpg. wt. 10 Kg	229.95



Versatile Digital Trainer for EE-3201 Program

Provides the "hands-on" experience you need for understanding digital devices and operations. Lets you do all the experiments in the Heath Digital Techniques Program, develop projects, build and test prototypes, verify circuit operation and check digital IC's. Has solderless breadboard sockets, four binary data switches, 2 "no-bounce" switches, 3-frequency pulse clock generator and 4 LED's. Also has +12 VDC @ 100 mA, −12 VDC @ 100 mA and +5 VDC @ 500 mA supplies. Accommodates up to eight 14 or 16-pin dual-in-line ICs, also 24, 28, and 40-pin DIPs. For 120 VAC, 60 Hz.

Kit ET-3200, Shpg. wt. 2.5 Kg	129.95
ETW-3200, Factory assembled, Shpg. wt. 3 Kg	239.95

HEATHKIT CONTINUING EDUCATION
HEATHKIT SOLDERING

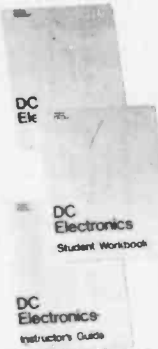
Learn to solder the easy Heathkit way.

- **Invaluable for Novice Kitbuilders**
- **Ideal for Company Training**

Heath's EI-3133 Soldering Manual and Kit teaches you the techniques necessary for high reliability soldering in all electronics applications. Whether you're a kitbuilder, hobbyist or experimenter, it's the perfect way to learn or brush up on 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 for really effective learning, a handy practice kit has been included. Great for individuals or schools and industry and a great first kitbuilding experience. Requires soldering iron and small hand tools.

Program EI-3133, Shpg. wt. 1 Kg	16.95

Classroom Versions of our Electronics Learning Programs for School Courses and Industry Training Programs


DC Electronics
DC Electronics Student Workbook
DC Electronics Instructor's Guide

Student Text Contains Comprehensive Coverage of Course Materials, Self-Test Questions and Programmed Instruction Reviews

Student Workbook Contains Detailed Chapter Examinations Keyed to Text and Laboratory Experiments

Instructor's Guide Contains Complete Course Outlines, Objectives, and Guide to Final Exam Preparation

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 progam 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. They provide a very economical method of developing professional materials for classroom use.

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.

Program	Text Shpg. wt. 1 Kg	Price	Workbook Shpg. wt. 1 Kg	Price	Instructors' Guide Shpg wt. 1 Kg	Price	Parts Shpg. wt. 1 Kg	Price
DC Electronics	EB-6101	26.95	EB-6101-40	11.95	EB-6101-50	15.95	EB-6101-30	24.95
AC Electronics	EB-6102	26.95	EB-6102-40	11.95	EB-6102-50	15.95	EB-6102-30	19.95
Semiconductor Devices	EB-6103	26.95	EB-6103-40	11.95	EB-6103-50	15.95	EB-6103-30	16.95
Electronic Circuits	EB-6104	31.95	EB-6104-40	13.95	EB-6104-50	15.95	EB-6104-30	39.95
Digital Techniques	EB-6201 (1.5 Kg)	34.95	EB-6201-40	16.95	EB-6201-50	15.95	EB-6201-30	34.95
Microprocessor*	EB-6401 (2 Kg)	34.95	EB-6401-40	16.95	EB-6401-50	15.95	EB-6401-30	84.95

*Requires EB-6401-60 cassettes, Shpg. wt. 1 Kg . 12.95

Microprocessor Self-Instruction Program

This program covers microprocessor basics, computer arithmetic, programming, interfacing and much more. It assumes a knowledge of electronics equivalent to Heath's Digital Techniques Program.

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 EE-3401/ET-3400 self-learning 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 instructions, branches, additional instructions, new addressing modes, arithmetic operations, stack operations and subroutines.

UNIT 10: INTERFACING EXPERIMENTS. Provides experiments with memory circuits, clock, address, decoding, data output, data input, peripheral interface adapter, audio output, key matrix and parallel-to-serial conversion, digital-to-analog and analog-to-digital conversion.

Each unit is complete with introduction, unit objectives, activity guide, experiment, examination and examination answers.

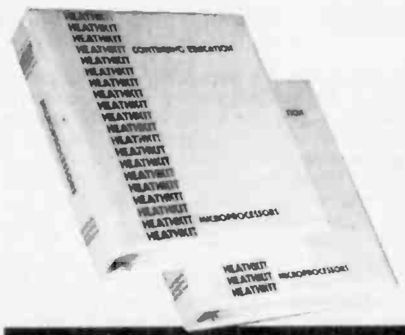
The EE-3401 is complete with 62 electronic components required to complete the experiments. These components include two 2112 256x4-bit RAM's, 6820 PIA interface chip, 1406 digital to analog converter, 741 and 301 op amps and a variety of other microprocessor-oriented devices. The ET-3400 Computer Trainer, this page, is required for the experiments in the Microprocessor Course.

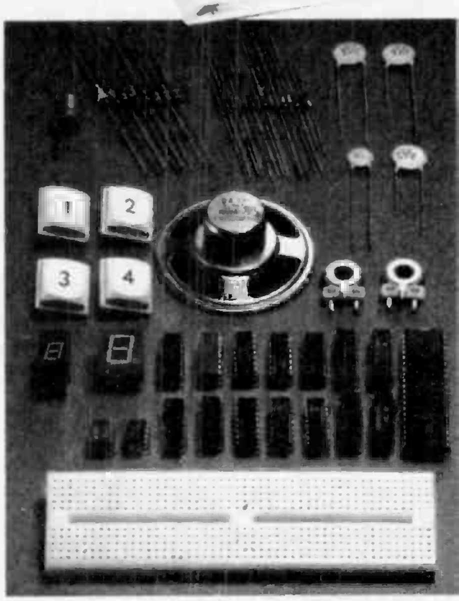
Upon completion of the program, if you choose to take the optional final exam, a passing grade of 70% or better earns you a Certificate of Achievement.

Program EE-3401, Shpg. wt. 6 Kg.
Reduced $50.00 .... Was 199.95 NOW **149.95**

EE-3401-1 slides. Optional 35 mm Slides duplicate the audio-visual flip charts in the EE-3401 program. Shpg. wt. 1 Kg **104.95**

EE-3401-2. Filmstrip. Optional 35 mm Filmstrip duplicates the audio-visual flip charts in the EE-3401 Program. 1 Kg **32.95**





Save $39.95

$459.95

SAVE when you order the Microprocessor Course with the Trainer.
If purchased separately, $499.90

ETS-3400, Course and Trainer Together,
Shpg. wt. 12 Kg .... Was 509.95 NOW **459.95**

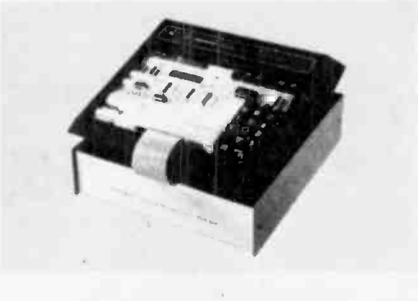
Digital Microprocessor trainer for experimentation and design

Functioning as a miniature digital computer, the ET-3400 Microprocessor trainer is essential for the experiments in the EE-3401 self-instruction program.

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.

All microprocessor address, control and data busses are buffered and terminated on the front panel for ease of connection to prototyped circuits. Built-in +5, +12 and −12 volt power supplies.

Kit ET-3400, Shpg. wt. 3 Kg **349.95**



Microprocessor Trainer Accessory

Provides additional I/O and memory expansion for the ET-3400

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. The memory can be expanded to 4K bytes with the optional 3K chip set. A serial I/O with EIA or 20 mA loop format provided in the ETA-3400 accessory lets you hook up a video terminal. The new ROM monitor/debugger program provided with the accessory 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 do actual programming using the BASIC language. Parts required to modify Trainer to work with Accessory are included. It is recommended that all the EE-3401 program experiments be completed before adding this modification kit. For 110-130 VAC, 60 Hz.

Kit ETA-3400, Shpg. wt. 4 Kg **264.95**

ETA-3400-1, Optional 3K Chip Set. Shpg. wt. 1 Kg **89.95**

NOTE: A terminal such as the H19 is required to use the new BASIC and monitor software. See page 18 for details on the H19.

NEW

Now microprocessor operation and programming is easy for anyone to learn — no electronics training needed

HEATHKIT
CONTINUING EDUCATION
INTRODUCTION TO MICROPROCESSORS

Microprocessors. An increasingly powerful part of our lives. Not only will you find microprocessors in computers — they can be found in many everyday products, from toys to typewriters. Do you want to know more about microprocessors? If you're eager to learn about microprocessors in the shortest, most effective way possible, the EC-6800 Introduction to Microprocessors Program — from Heath/Zenith Educational Systems — is for you. The Introduction to Microprocessors Self-Instruction Program will show you how to operate and program microprocessors. You'll learn what you need to know, without being swamped under by information you may never need or use.

Along with the optional ET-6800 Microprocessor Trainer, this Heath/Zenith program is the fastest, most economical way to learn about microcomputers.

The Introduction to Microprocessors is a sub-set of our popular EE-3401 program. It's much more economical — and much faster. That's because the EC-6800 Introduction to Microprocessors teaches only operation and programming, and skips the complex subject of digital interfacing.

Compare the Introduction to Microprocessors Program to the Microprocessor Programming and Interfacing Program with the chart below:

Area of Comparison	EC-6800 compared with	EE-3401
You learn:	Programming	Programming and Interfacing
No. of pages	600	1,000
No. of chapters	7	10
Flip Charts	No	Yes
Cassettes	No	Yes
Chapter Test Questions	Yes	Yes
Programming Experiments	Yes	Yes
Interfacing Experiments	No	Yes
Electronic Parts	No	Yes
Final Examination	Yes	Yes
Trainer Interfacing	No	Yes
Price	$39.95	$149.95

The Introduction to Microprocessors Program is truly for the layman. No background in electronics is needed to learn about programming microprocessors. In fact, no prerequisites of any kind are required or assumed.

When you complete the program, you will know how to program a microprocessor by learning the following:

1. A firm foundation in number systems, codes and computer arithmetic, including binary arithmetic, two's complement arithmetic, Boolean operations, the decimal, binary, octal and hexadecimal numbering systems — as well as binary codes.
2. Microcomputer basics, including terms and conventions, operation, program execution and addressing modes.
3. Programming basics, including branching, conditional branching and algorithms.
4. The 6800 Microprocessor — including architecture, instruction set, new addressing modes, stack operations, subroutines, input/output (I/O) operations and interrupts.
5. Hands-On Programming, which includes programming experiments which cover the subjects taught in the other units.

The programming experiments, which can be performed on the optional ET-6800 Microprocessor Trainer described below, give you hands-on experience and make learning more fun.

If you choose to take the optional final examination, pass the exam with a score of 70 percent or better — and you will earn a Certificate of Achievement.

EC-6800, Shpg. wt. 3 Kg **39.95**

NEW

Trainer makes learning microprocessor operation and programming easier than ever

$^{\$}169^{95}$

- **Never before has such a powerful microprocessor trainer been available at so low a price**

The ET-6800 Microprocessor Trainer from Heath/Zenith Educational Systems helps you perform the experiments in the Heath/Zenith EC-6800 Introduction to Microprocessors Program, described above.

Functioning as a miniature digital computer, the ET-6800's built-in 1K Ready-Only Memory (ROM) monitor program controls the trainer's operation.

Address and data readout are provided by a six-digit hexadecimal 7-segment LED display.

A 17-key hexadecimal keyboard gives you access to memory locations to display contents, then step forward or backward to examine others, to change a location, to examine and/or alter any of the internal registers of the CPU, to set break points for program debugging, or to reset the CPU. The keyboard includes keys from O-F and Reset. The 1-F keys are dual-function keys and also enter commands.

The ET-6800 employs an 8-bit parallel, NMOS, bus-oriented CPU — with 256 bytes of NMOS Random Access Memory (RAM).

A +5 volt DC power supply is built into the ET-6800, so no separate power supply is needed. And a rugged, attractive cardboard cabinet holds the price to an absolute minimum.

Everything you need to get hands-on experience in programming microprocessors is yours in the ET-6800 Microprocessor Trainer. For 120 VAC, 60 Hz. Draws only 12 watts. Overall Dimensions, 3.75" H x 8" W x 10" D (9.53 x 20.32 x 25.40 cm).

Kit ET-6800, Shpg. wt. 8 Kg **169.95**

Heathkit Programs make learning electronics easier

Heathkit Advanced Electronics Self-Instruction Programs eliminate the legwork for you. They come complete with components so you can perform tried and tested experiments based on an easy-to-understand text. So, learning is faster, more fun . . . and more economical, too. Large, illustrated visual materials make learning even more effective. And the optional Heathkit ET-3300 Electronic Trainer gives you actual hands-on experience with the electronic components and ciruits discussed in the Advanced Electronics programs. Whether you are a technician/engineer interested in self-improvement, a student seeking advanced electronics knowledge, or a hobbyist interested in new electronic developments, these programs are designed to meet your needs in the most economical way.

Learn about Op Amps, one of today's most important ICs

A 385-page text, reinforced by test questions and experiments, teaches you how to measure and compute common op amp parameters, how to design basic op amp linear circuits; how to design integrator and differential circuits; and how to design and predict the performance of op amp constant current sources; as well as current-to-voltage and voltage-to-current converters. Even the popular Norton and BIFET op amps are covered. Components are included for conducting experiments. Desirable options for the experiments are the ET-3300 Lab Breadboard (below) and an oscilloscope like the Heathkit IO-4105 (page 57), a multimeter like the Heathkit IM-1104 (page 46), and a frequency generator like the IG-1271 (page 46). The Basic Electronics Series (EE-3101 through 3104, pages 26-27) or equivalent makes Op Amps easier.

EE-101, Shpg. wt. 2.5 Kg	59.95
Kit ET-3300, Breadboard, wt. 3 Kg	169.95
ETW-3300, Assembled Breadboard, 3 Kg	299.95
SAVE $10.00! EES-101, Program with Kit Breadboard, Wt. 6 Kg	219.90

This in-depth program makes learning Active Filters easy

A 300-page text helps you learn to design active filters with op amps, to plot and predict frequency responses, to design and breadboard first-order low-pass and high-pass filters, to design second-order and high-order filters, bandpass and state variable filters. It's helpful to complete EE-101 (above), or have equivalent knowledge first. Desirable are the ET-3300 Breadboard (at right) or the ET-3100 Trainer (page 27) (NOTE: The ET-3100 cannot be used with the other Advanced Programs), an oscilloscope like the IO-4105 (page 57), a multimeter like the IM-1104 (page 46) and a frequency generator like the IG-1271 (page 46).

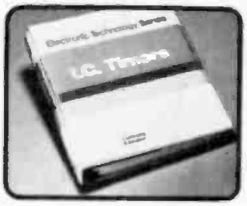
EE-102, Shpg. wt. 2.5 Kg	44.95
Kit ET-3300, Breadboard, Shpg. wt. 3 Kg	169.95
ETW-3300, Assembled Breadboard, Shpg. wt. 3 Kg	299.95
SAVE $10.00! EES-102, Program and Breadboard, Wt. 6 Kg	204.90

SAVE $40.00 on your Advanced Electronics Education!

Order all four Advanced Electronics Programs (Op Amps, Active Filters, IC Timers and Phase-Locked Loops) together with the ET-3300 Breadboard kit. If purchased separately, $434.75

EES-1014, Shpg. wt. 14 Kg	394.75

Our newest program introduces you to the IC Timer



This new Heathkit Program helps you learn common IC timers, how each works, what they do and where to use them. You'll learn to use them for logic functions, in output drive circuits, time-delay relay circuits, wide-range pulse generators, voltage/frequency converters, free-wheeling, power-fail oscillators, sine-wave/square-wave oscillators, universal appliance timers, speed alarms, burglar alarms, alarm indicators, power monitor error detectors, phase-locked loops and precise clock sources. Included are a 348-page text and parts for the optional experiments. Also useful for the experiments are the ET-3300 Breadboard (below), an oscilloscope like the IO-4105 (page 57) and a multimeter like the IM-1210 (page 53). It's helpful to complete EE-3201 Digital Techniques (page 28) or equivalent.

EE-103, Shpg. wt. 2.5 Kg	69.95
Kit ET-3300, Breadboard, Shpg. wt. 3 Kg	169.95
ETW-3300, Assembled Breadboard, 3 Kg	299.95
SAVE $10.00! EES-103, Program and Breadboard, Wt. 6 Kg	229.90

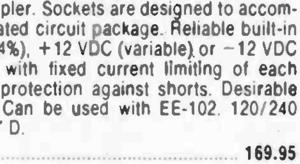
Learn Phase-Locked Loops with this self-instruction program

You need to know about phase-locked loops to understand many state-of-the-art electronic devices. PLLs are widely used in television and FM receivers, CB and 2-meter transceivers. So this extensive 268-page self-instruction text helps you learn the general principles of PLLs and their building blocks – the phase detector, loop filter and voltage-controlled oscillator. Optional experiments at the end of each unit give you hands-on experience with PLLs. Necessary parts are included. Also helpful are the optional ET-3300 Breadboard (below), a DC voltmeter like the IM-5284 (page 43) and a single-channel oscilloscope like the IO-4105 (page 57). To get more from the program, we recommend a dual-channel scope like the IO-4205 (page 57) and an audio signal generator like the IG-5218 (page 47).

EE-104, Shpg. wt. 2.5 Kg	89.95
Kit ET-3300, Breadboard, Shpg. wt. 3 Kg	169.95
ETW-3300, Assembled Breadboard, 3 Kg	299.95
SAVE $10.00! EES-104, Program and Breadboard, 6 Kg	249.90

The Lab Breadboard makes learning electronics easier

Ideal for performing the experiments in the Programs on this page, or use it to do your own experimenting, to test electronic components, or to design prototype circuits.

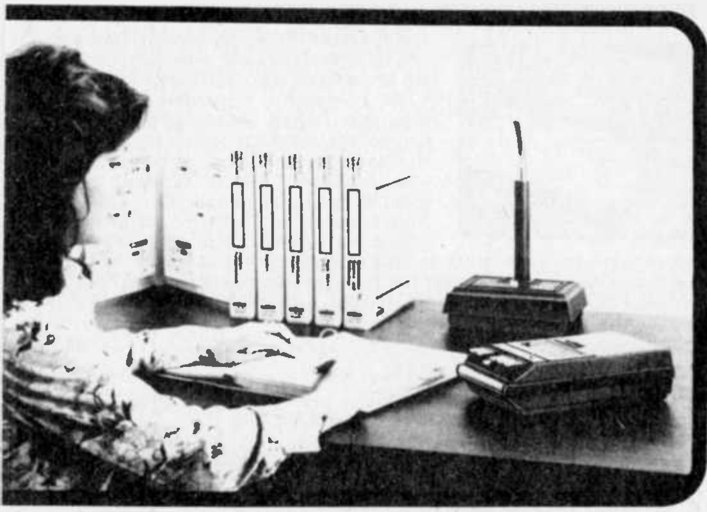


$169.95 Kit

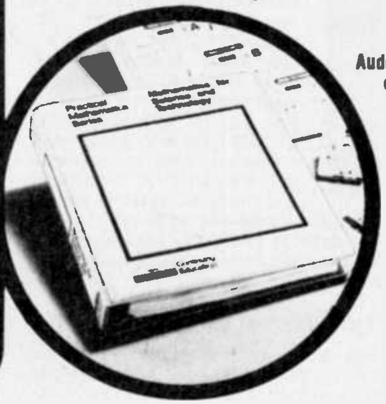
The Heathkit ET-3300 Laboratory Circuit Breadboard is a great convenience tool for electronics learning or circuit design. Solderless sockets make breadboarding easier and simpler. Sockets are designed to accommodate any size dual in-line integrated circuit package. Reliable built-in power supply provides +5 VDC (±4%), +12 VDC (variable) or −12 VDC (±2%) power to the Breadboard, with fixed current limiting of each supply at rated current providing protection against shorts. Desirable with EE-101, EE-103 and EE-104. Can be used with EE-102. 120/240 VAC, 60/50 Hz. 3.5" H x 12" W x 12" D.

Kit ET-3300, Shpg. wt. 3 Kg	169.95
Fully Assembled Laboratory Circuit Breadboard.	
ETW-3300, Shpg. wt. 3 Kg	299.95

Practical math programs for the skills you need every day



A unique new learning method makes it easy to learn the basic math skills you use every day. The new method – audio tutorial – uses cassette tapes to guide you through simplified text material. You hear the instructions while you are reading and carrying them out.



Audio tutorial makes learning faster, easier and more fun. Now you can review the math you learned in high school and first-year college. You can relearn those important algebraic concepts on which so much of modern engineering is based. Even learn trig and statistics.

Audio tutorial and Heath make it easy!

Math Tutorials for Science and Technology

Get a quick review of the fundamental mathematical skills that you need in your work every day. In 12 self-contained programmed workbooks, you get a complete review of the mathematical skills you learned in high school and college.

The course covers arithmetic and signed numbers, powers and roots, scientific notation, arithmetic in scientific notation, units and rounding, graphs, ratios and proportions, introduction to algebra, solving equations, triangle trigonometry, vectors, probability and statistics.

Upon completion of this program you will receive a Certificate of Achievement.

EM-1, Shpg. wt. 3 Kg 69.95

Learn the algebra you need 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.

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 and seven cassette tapes are included. This program covers integer arithmetic, substance of algebra, proportional reasoning, graphs, divisions and multiples, fractions, roots and real numbers. Upon completion of the program, you'll receive a Certificate of Achievement.

EM-3, Shpg. wt. 3 Kg 89.95

Algebra provides a working knowledge of algebra. Eight modular sections, a workbook and 10 audio cassettes are housed in two attractive binders. The program covers polynominal arithmetic, factoring, algebraic functions, exponents and radicals, linear equations and inequalities in one variable, quadratic equations and inequalities in one variable, probability, sets and operations. When you complete the program you'll receive a Certificate of Achievement.

EM-4, Shpg. wt. 3.5 Kg 89.95

Intermediate Algebra covers advanced problems and theories. The text material and nine audio cassettes are provided. This program covers functions, relations and inverses, graphs and variation, linear relations, quadratic relations, systems of equations and inequalities, determinants, logarithms, sequences and series. Complete the program and receive your Certificate of Achievement.

EM-5, Shpg. wt. 3 Kg 89.95

Learn the fundamentals of trigonometry

You need trigonometry to analyze alternating current, as well as more complex mathematical, circular and angular problems – and we make understanding this college-level material easier than ever.

The Trigonometry Program includes two three-ring binders for the text, and nine cassette tapes to reinforce the text material. It's a natural step forward from algebra, and requires the successful completion of our EM-5 Intermediate Algebra course (left) or equivalent knowledge. A basic knowledge of geometry is helpful, too.

You'll learn about circular functions, graphs of circular functions, identities and proofs, inverse functions, conditional equations, right triangle trigonometry, the solution of right triangles, polar coordinates and parametric equations, vectors and complex numbers.

You can learn first-year college trigonometry in depth – taking the time you need to really learn trig fundamentals. Supplement what you learn in school, and earn a Certificate of Achievement from Heath.

EM-6, Shpg. wt. 3.5 Kg 89.95

Descriptive Statistics and Probability Distributions

Designed especially for people who need to know statistics – but don't have a strong math background. Abstraction and symbolism are kept to a minimum, while concepts, rules and processes are thoroughly presented.

Before starting Descriptive Statistics and Probability Distributions, you should complete our Algebra Fundamentals course (EM-3, left) or have equivalent knowledge.

This self-instruction program includes seven units of text in a three-ring binder, with another binder containing seven cassette tapes.

You'll learn about frequency distributions and graphs, special frequency distributions, frequency polygons, measures of central tendency, measures of variability, basic probability, the binominal distribution and the normal distribution. Completion brings a Certificate of Achievement.

EM-7, Shpg. wt. 3 Kg 89.95

Inferential Statistics advances your knowledge

Our new Inferential Statistics Program introduces you to more advanced statistical concepts and problems. You'll gain knowledge about sampling and sample statistics, hypothesis testing, estimating population parameters, the t distribution, linear correlation, linear regression, the chi square distribution, the F distribution and nonparametric tests. Completion entitles you to a Certificate of Achievement from Heath.

EM-8, Shpg. wt. 4 Kg 89.95

Heathkit Pack-17™ R/C Systems

Get more value with 5- and 8-Channel Open-Gimbal Transmitters

Exciting 5-Channel Dual Open-Gimbal Stick R/C Transmitter.
Kit GDA-1919-1, Shpg. wt. 2 Kg 199.95

8-Channel Dual Open-Gimbal R/C/ Transmitter.
Kit GDA-1205-OG, Shpg. wt. 2.5 Kg 299.95

8-Channel Single-Stick Transmitter.
Kit GDA-1205-S, Shpg. wt. 3 Kg 319.95

Open-Gimbal Stick Conversion Kit. Get open-gimbal control. Easy-to-install.
Kit GD-1419, Shpg. wt. 1 Kg 54.95

High-quality Heathkit Servos, Receivers and Batteries

Kit GDA-1205-5, Sub-Min. Servo. Shpg. wt. 1 Kg	49.95
Kit GDA-1205-4, Miniature. Servo. Shpg. wt. 1 Kg	49.95
Kit GDA-1205-8, Hi-Torque. Servo. Shpg. wt. 1 Kg	54.95
Kit GDA-1205-2, Receiver with 1 Frequency Module. 1 Kg	124.95
Kit GDA-1205-3, Receiver Battery Pack. 1 Kg	25.95

For really big savings choose a complete R/C system

Buy a complete Heathkit R/C system and pay much less than if you had purchased the components separately. The following systems include transmitter, receiver, one frequency module for each, receiver battery and four servos (choose miniature, sub-miniature or both). Specify frequency desired.

5-Channel Open-Gimbal Stick System: Includes the GDA-1919-1 Transmitter plus items listed above. Save big when you get the complete system.
GDS-1919, Shpg. wt. 5 Kg 499.95

8 Channel Dual Open Gimbal System. Includes GDA-1205-OG and items listed
GDS-1205-OG, Shpg. wt. 7 Kg 579.95

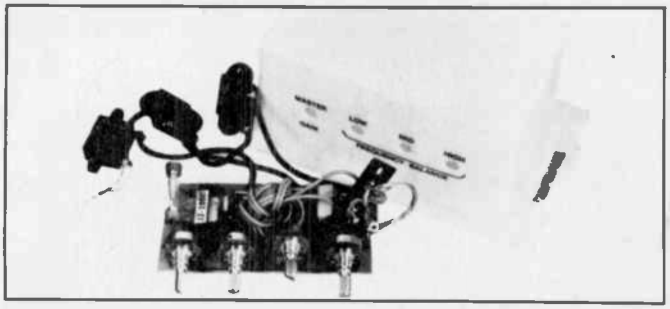
8 Channel Single Stick System. Includes GDA-1205-S Transmitter and items listed
GDS-1205-S, Shpg. wt. 7 Kg 599.95

Cessna 172 Skyhawk Flight Pack. Plane, engine and accessories only.
RP-1172, Shpg. wt. 4 Kg 149.95

Special Note: For complete descriptions and listing of Heathkit R/C equipment please see our Spring/Summer Catalogue, number 002.

Beginner kits that are fun and practical

Jana Electronic Kits



Jana Electronic kits are low cost, practical and fun kits, designed for the beginner and experimenter. Each kit is supplied with an introduction sheet which contains procedures for soldering and component handling. Kits come complete with circuit boards where applicable. Your assembled kit can be installed in its plastic shipping box to provide you with a neat, attractive finished product. Select one or more of these kits from the list below and put yourself and your family into the fun and rewarding world of kit building.

Automatic Headlight Reminder – Novel circuit to remind you to turn headlights off if they are left on when ignition is off.
GDC-1301, Shpg. wt. 1 Kg 9.95

0-24 Volt Power Supply – Variable 1 amp regulated and filtered DC power supply.
GDC-1315, Shpg. wt. 1 Kg 35.95

Single Channel Colour Organ – Dancing lights are possible by connecting this to your Hi-Fi and adding a light bulb.
GDC-1316, Shpg. wt. 1 Kg 14.95

Electronic Siren – Police siren simulator which is ideal for games and toys.
GDC-1317, Shpg. wt. 1 Kg 10.95

Shimmer Strobe Light – Shimmer light is great for special lighting effects.
GDC-1318, Shpg. wt. 1 Kg 15.95

Xenon Strobe – Super strobe effects are possible with this bright Xenon strobe. Control to vary flash rate.
GDC-1322, Shpg. wt. 1 Kg 25.95

LJ-12016A 3-Channel Colour Organ – 3-Channel colour organ which will handle up to 300 watts per channel. Master gain control and individual controls for each channel.
GDC-1323, Shpg. wt. 1 Kg 29.95

Roulette Wheel – Great party item – duplicates the real Vegas game, electronically. 10 LED indicators.
GDC-1325, Shpg. wt. 1 Kg 21.95

FM Mini Broadcaster – Will deliver sound picked up from a microphone or record player and deliver it to any nearby FM receiver.
GDC-1329, Shpg. wt. 1 Kg 32.95

Famous Logix Experimenter Kits

1
2
ENSEMBLE SUPER ELECTRONIQUE
SUPER ELECTRONIC THING
3

① **Computer Kit with plans for over 50 different programs.** The ideal way to learn about fascinating computers! Educational fun kit includes all the parts needed to build a basic computer and do 50 programs including weather predicting, math calculations, chess and electronic music. No soldering – snap-in parts for easy, safe use. With 112 page instruction manual. Less batteries.
GHP-600, Shpg. wt. 3 Kg 31.95

② **Super Electrics** with over 140 experiments – Build and experiment with such things as Electro-Magnets; Amplifier; Galvinometer; Reversible tri-polar motor and Compass.
GHP-7700, Shpg. wt. 2 Kg 21.95

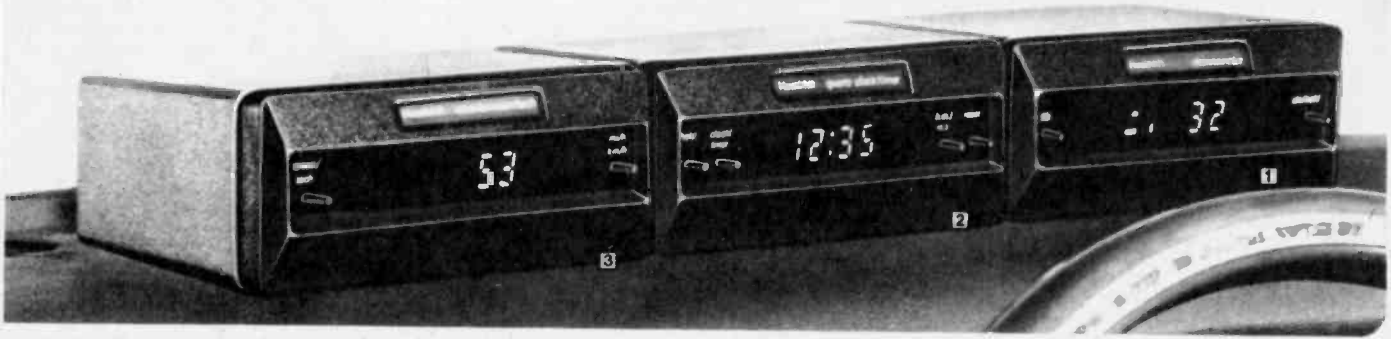
③ **Super Electronic Thing kit with over 100 fascinating experiments.** Solid-state lab experimenter kit with fully illustrated manual for over 100 experiments including AM and Shortwave radios, burglar alarms, pollution detector and more. No-solder snap-fit assembly. An ideal introduction to the exciting field of electronics. Less batteries.
GHP-7200, Shpg. wt. 2 Kg 24.95

Electronics with over 40 experiments. Solid-state Lab Experimenter kit for over 40 exciting experiments. Detailed instruction manual shows you how to build a lie-detector; burglar alarm; metronome; pollution detector; rain detector and more. Over 100 components with no-solder, snap-fit assembly. Less batteries.
GHP-7100 Shpg. wt. 1 Kg (not shown) 16.95

Radiotronics Kit. A complete laboratory and fun course in radio technology. Build an integrated circuit radio with speaker cabinet and antenna. Also contains other numerous experiments and constructions in electronics. No soldering – snap-fit assembly. Less batteries.
GHP-8100, Shpg. wt. 2 Kg (not shown) 31.95

Crystal Radio Kit. An easy-to-assemble kit that is fun to make. Contains all the parts to build a crystal radio. No batteries or soldering.
GHP-900, Shpg. wt. 1 Kg (not shown) 6.95

Digital readout car accessories from Heath



1 Car Thermometer shows inside and outside temperatures

$\$159^{95}$

Easy-to-read digital display shows temperatures as you drive

It's ideal for R-V's, campers, motor homes, any 12-volt vehicles. 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 Farenheit 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. 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. 1 Kg 159.95

2 Car clock/timer with digital quartz precision

$\$84^{95}$

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

It 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).

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. 1 Kg 84.95

GC-1406 Digital Readout Quartz Clock (Not Shown). Same as GC-1415, but does not include timing functions.

Kit GC-1406, Shpg. wt. 1 Kg 59.95

3 Tachometer/Speedometer shows speed and engine rpm

As low as
$\$74^{95}$

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 or rpm 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 control, 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. 1.5 Kg 84.95

Kit CI-1265, For Cars with CS-2048 Cruise Control. Shpg. wt. 1.5 Kg 74.95

Front Wheel drive cars, without CS-2048, cruise control, will also require the adaptor kit CSA-2048-1, listed below.

Heathkit/Dana Speed Control makes driving more comfortable

Just accelerate to your desired speed, set the control and the CS-2048 Speed Control automatically maintains your desired speed uphill, downhill, around curves and on straightaways. You can take your foot off the gas pedal, relax and pay attention to the road. Retard and resume controls let you slow down or pass cars without affecting the set speed. Use with most domestic cars, trucks, light vans. Use on many foreign cars, trucks with appropriate adaptors below. 12 VDC, neg. gnd. only.

CS-2048, Shpg. wt. 3 Kg 139.95

CSA-2048-1. 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 below.
Shpg. wt. 1 Kg 10.95

CSA-2048-2. Servo cable, throttle linkage adaptor hardware and magnet pair for '75-'79 Honda Civic, '75-'79 Honda CVCC and '77-'79 Honda Accord.
Shpg. wt. 1 Kg 26.95

CSA-2048-3. Servo cable, throttle linkage adaptor hardware and vacuum tee for '75-'79 Toyota Corollas.
Shpg. wt. 1 Kg 23.93

CSA-2048-4. Throttle linkage adaptor hardware and vacuum tee for '73-'79 Toyota Corona, Celica, Crown and Mark II, '75-'78 Toyota Pickup, '75-'77 Datsun 610/710, '77-'79 Datsun 810, '75-'79 Datsun 280-Z/ZX.
Shpg. wt. 1 Kg 10.50

CSA-2048-5. Servo Cable, magnet pair, throttle linkage adaptor hardware, vacuum tee and engagement switch mounting post for the following fuel-injected cars: '76-'80 Volkswagen Rabbit, Dasher, Scirocco and Audi Fox.
Shpg. wt. 1 Kg 26.95

CSA-2048-6. Servo cable, magnet pair and throttle linkage adaptor hardware for '75-'80 Datsun B-210/210, '77-'80 Datsun F-10/310. 1 Kg 22.95

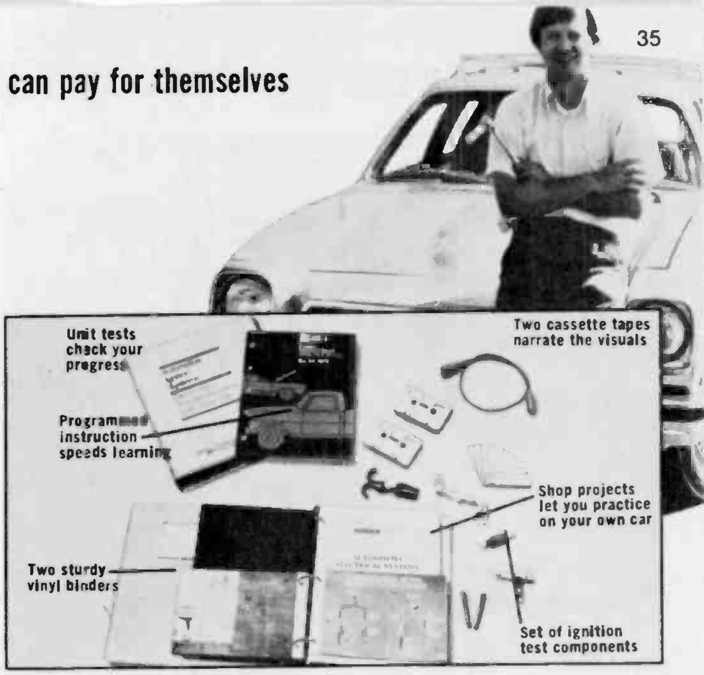
RESUME
ON
OFF
SET SPEED

IMPORTANT NOTE: While the CS-2048 comes fully assembled and tested, with a detailed manual, installation requires a certain amount of mechanical proficiency. Modifications must be made to the throttle linkage, and work must be performed under the vehicle. If you're uncertain of your abilities, you may want to employ a qualified auto mechanic to install your Speed Control.

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

Use these Programs to keep your car out of expensive repair shops. Not only could one repair job save you more than the cost of the Programs, but you'll also save money with a car that performs better – that's an important consideration in these times of high fuel costs. Our proven audio-visual techniques make learning easier and more interesting than ever. Optional experiments give you hands-on experience so you really learn how to make the actual repairs.

Unit exams test your progress
Complete programmed instruction
Clear color visuals
Cassettes narrate the visuals
Learn at your own pace


Unit tests check your progress
Two cassette tapes narrate the visuals
Programmed instruction speeds learning
Shop projects let you practice on your own car
Two sturdy vinyl binders
Set of ignition test components

WINNER
Highest award of the Society for Technical Communications

Teaches you to repair today's complex automobile electrical systems

- **Learning is easier and more effective because you see and hear each step**
- **Audio cassettes, programmed-instruction and experiments aid your learning**

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

1. **BASIC AUTOMOTIVE ELECTRICAL PRINCIPLES,** including batteries, positive and negative charges, Ohm's Law, series and parallel circuits, and use of a VOM to measure voltage, current and resistance.
EA-11, 2.5 Kg **44.95**
2. **AUTOMOTIVE STARTING SYSTEM** – how motors work, how to correct common starting problems, starter relay, solenoid and motor testing, voltage drop on starter motor, how to locate opens, shorts.
EA-12, 2.5 Kg **44.95**
3. **AUTOMOTIVE CHARGING SYSTEM** and operation of components such as voltage regulator and alternator, how to energize alternator field, test voltage regulator, and use an engine analyzer like the CM-1050 on page 38.
EA-13, 2.5 Kg **44.95**
4. **ACCESSORY AND BODY ELECTRICAL CIRCUITS** that power the lights and accessories such as seat belt system, and instrument panel, determine if system can handle another accessory, and use wiring diagrams.
EA-14, 2.5 Kg **44.95**

Upon completing the Automotive Electrical Systems Program, you'll have the knowledge, experience and confidence to correct almost any auto electrical problem that arises. You'll have the know-how you need to avoid repairs. **When you pass** the optional final exam with a 70% or better score, you will earn a Certificate of Achievement.

SAVE $19.85. Four modules together, EAC-1, Shpg. wt. 9 Kg **159.95**

Learn professional auto tune-up, with our Ignition and Tune-up Program

NEW

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

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

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

Program includes jumper leads, ignition tester, universal coil adapter, spark plug adapter, ignition pliers, plug gauge/gapping tool, feeler gauge set, tune-up chart book, and 24" x 17" plug chart. Completion of shop projects requires engine analyzer like the CM-1050 on page 38, timing light like the CI-1096 on page 37, and ignition analyzer like the CO-2600 on page 38. Also useful is Instrument Package below.

EA-2000, Shpg. wt. 6 Kg **129.95**

High-quality Small Accessory Auto Instruments. Compression tester, vacuum pressure gauge and vacuum "T" fitting.

EAC-2-1, 1 Kg **24.95**

Classroom version of Automotive Electrical Systems Program

EB-10, Auto Textbook, Shpg. wt. 2 Kg **22.95**
EB-10-30, Parts Pack, Shpg. wt. 1 Kg **39.95**
EB-10-40, Student Workbook, Shpg. wt. 2 Kg **15.95**
EB-10-50, Instructor's Guide, Shpg. wt. 1 Kg **10.95**
EB-10-60, Cassette Tapes, Shpg. wt. 1 Kg **31.95**
EB-10-70, Filmstrips, Shpg. wt. 1 Kg **46.95**

NEW Save energy–tune up with Heathkit auto instruments

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

Affordable portable Engine Analyzer with digital accuracy

$179.95

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

Heath brings you the new CM-1550 Engine Analyzer — a versatile, accurate and portable self-powered 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, to 200 volts in two ranges, ±1.5%; Resistance to 2.0 megohms, ±1.5%, in three ranges; and Direct Current, to 20 amps, ±3%.

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, 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.

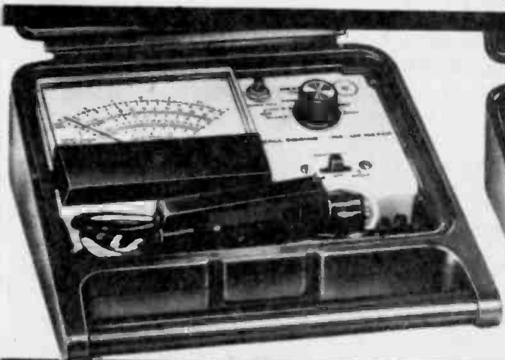
The CM-1550 assembles easily in two or three evenings, with just one circuit board. It can be easily calibrated from internal references — no special tools required. For any spark-ignited engine, standard or electronic ignition. Convenient, light plastic carrying case included.

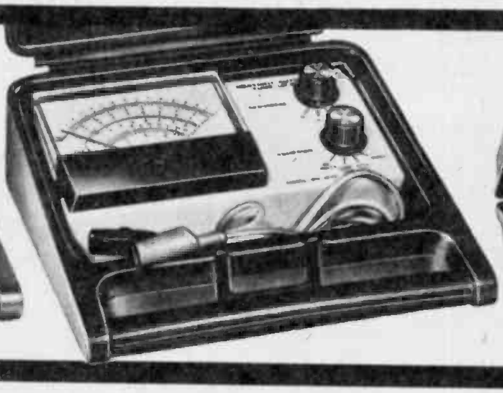
Kit CM-1550, Shpg. wt. 2 kg. 179.95

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

CMA-1550-1, Shpg. wt. 1 kg. 23.95

CM-1550 SPECIFICATIONS: Dwell Meter: 4 dwell scales: 4 cyl., 0° to 90°; 5 cyl., 0° to 72°; 6 cyl., 0° to 60°; 8 cyl., 0° to 45°. **Operating Temperatures:** 0° to 140°F (−18°C 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, others blank. **Dimensions:** 3½" H x 12½" W x 8" D.





Universal Small Engine Tune-up Meter

Handy, easy-to-operate meter helps you keep all your small engines running at top efficiency. Ideal for garden tractor, lawn mower, motorcycle, snowmobile, outboard motors, small cars, etc. Can be used with all small engines including Briggs and Stratton. Test volts, ohms, dwell & continuity on 1 to 4 cylinder, 2 & 4 cycle engines. Built-in tach and snap-on pickup for easy and convenient use and setup. Uses three 1.5 volt "C" batteries (not included). Has large easy-to-read color-coded meter and self-contained carrying case for easy portability and storage.

Kit CM-2045, Shpg. wt. 2 Kg 89.95

CM-2045 SPECIFICATIONS: Voltmeter: 0-20 V DC. **Ohmmeter:** 0 to 100 kΩ (10 kΩ center scale.) **Tachometer:** Two ranges: 0-3000 rpm, 0-15000 rpm. **Dwell Meter:** Four scales: 1 cylinder, 90°-360°; 2 cylinder, 40°-180°; 3 cylinder, 30°-120°; 4 cylinder, 20°-90°. **Power:** three 1.5 V "C" batteries. **Dimensions:** 9⅛" H x 9⅜" W x 5¼" D.

Economy Three-In-One Tune-up Meter

Combines a distributor cam dwell meter, an electronic tachometer and a direct-current 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. It has just two leads to connect to the engine and draws its power from car battery. Complete with leads, instructions and high-impact case for easy portability and storage.

Kit CM-1073, Shpg. wt. 2.5 Kg 89.95

CM-1073 SPECIFICATIONS: Dwellmeter: 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. **Voltmeter:** Direct reading scale 0-20 VDC. **Power Requirement:** 10 mA approximate average current. **Meter:** 4½", 1 mA (100 degree movement). **Accuracy:** ±3% of full scale. **Dimensions:** 4¼" H x 8½" W x 7¼" D.

Exhaust Analyzer For Better Tune-ups

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 specific requirements for exhaust emissions. Comes with all cables and tubing for easy connection.

Kit CI-1080, Shpg. wt. 3 Kg 139.95

CI-1080 SPECIFICATIONS: Meter Scales (3): 11.5-15.0 Air-Fuel Ratio. 70%-90% Combustion Efficiency. 0-8% Carbon Monoxide. **Exhaust Type:** From 4-cycle gasoline engines. Not for use with catalytic converters. **Accuracy:** Within 1 Air-Fuel Ratio depending on fuel used. **Meter:** 4½", 100-0-100 µA. **Connectors:** Battery cord, 7 feet. Sensor cord, 21 feet. Exhaust flexible tube, 30 inches. **Power Requirement:** 6-volt or 12-volt car battery, less than 150 mA. **Weight:** 4 lbs., 12 oz.

Keep your car in top shape all year 'round

MODEL CI-1040
12 VOLT SYSTEMS

$59.95

With Inductive Pickup

$124.95

Built-in meter measures distributor advance or engine RPM

Value-priced Timing Light provides a flash so bright it can be seen even in daylight

Features a handy inductive pickup that clips directly around the #1 sparkplug wire without removing wire, using adapters, etc. (Recommended for GM-HEI and other systems, where high voltage may be present.) Has a super-bright xenon flash bulb that can be seen easily even outdoors. Can be hooked up while the engine is running, and won't interfere with other auto test equipment either. Comfortable pistol-grip handle, insulated blue-plastic housing. Polarity protected. Powered by your car's battery or a separate 12-volt supply. With all cables, pickup and clips. 6½" H x 2" W x 10" L.

Kit CI-1040 Shpg. wt. 1.5 Kg **59.95**

CI-1040 SPECIFICATIONS: Useful Light Range: Up to 2 ft. in daylight. **Triggering:** Current pickup coil. **Power Requirement:** 12 VDC battery or separate 12 VDC power supply. **Dimensions:** 6½" H x 2" W x 10" L.

Heathkit Capacitive-Discharge Ignition System Improves your car's performance

- **Helps you get longer life from plugs and points**
- **Improves gas mileage to save you money and energy**

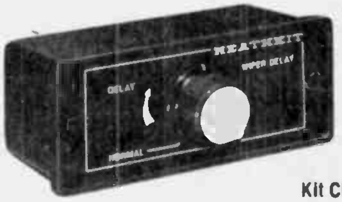
CAPACITIVE DISCHARGE

$79.95

Get up to 50,000 miles between tuneups 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. Further extends plug life and the tune-up interval. External override button switches to conventional system. Build it in a couple of hours, install in less than that. 3⅛" H x 3¾" W x 6" D.

Kit CP-1060, Shpg. wt. 1.5 Kg **79.95**

Windshield Wiper Delay Kit



Eliminates constant wiper arm movement when an occasional sweep is sufficient. Lets you vary the time between sweeps. Molded plastic case mounts on or under dash. Great for driving in mist or fog.

Kit CH-1068, Shpg. wt. 1 Kg **29.95**

Extra-versatile Timing Light with Built-in Advance Meter and Tachometer

The CI-1096 incorporates a timing light, advance meter and tachometer in one compact, lightweight unit. Merely 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 and the meter indicates engine RPM. The 250° meter movement measures mechanical or vacuum advance up to 60° from 1500 to 4500 RPM and indicates engine speed to a maximum of 4500 RPM. Inductive pickup clips around the #1 sparkplug wire for quick connection. Powered directly from your car's battery or from a separate 12 VDC power supply. Functions with all types of ignition systems.

Kit CI-1096, Shpg. wt. 2 Kg **124.95**

Battery-Operated Timing Light/Tachometer

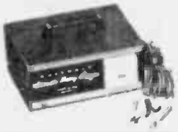
$149.95

Operates on its own rechargeable batteries for safety, convenience and portability

The CI-1098 professional-quality timing light operates from its own rechargeable power supply and requires only a single inductive pickup connection to the #1 spark plug wire on your car's engine. It's also ideal for use on boats or other vehicles where battery placement may be inconvenient or inaccessible. The compact, high-impact housing lets you keep your hand at a safe distance from moving engine parts while you aim the light into narrow spaces. The built-in high voltage power supply and xenon flash tube provide a much brighter flash than conventional lights that operate from spark plug voltage only. The timing flash can be seen up to two feet away even in daylight. The built-in tachometer has 2000 RPM and 6000 RPM full-scale ranges that are selected by a handy finger switch. The two-color switch position matches the tachometer scale for quick, easy range selection. Includes rechargeable battery and battery pack. To recharge the battery, simply connect the charger to the timing light.

Kit CI-1098, Shpg. wt. 2 Kg **149.95**

10-Amp Automatic Battery Charger



Keeps your car battery at full charge for easier starts. Won't operate unless correctly connected, can't overcharge battery.

Kit GP-21 Shpg. wt. 6 Kg **94.95**

GP-21 SPECIFICATIONS: Charge Rate: 10 amperes maximum at 120 VAC line. **Output Voltage:** Between 13.2 VDC and 13.6 VDC. **Power Requirements:** 105-130 VAC, 60 Hz. **Dimensions:** 5½" H x 9" W x 6⅝" D.

The Ignition Analyzer That Can Pay For Itself!

Whether you use it at home or in your auto repair shop, the CO-2600 pays off in substantial savings of time and money. Save when you build it yourself, save when you keep your cars running at top performance and efficiency!

Deluxe Ignition Analyzer

$849^95

- Pushbutton Selection of Individual Cylinders
- Parade, Superimpose, and Individual Patterns
- Solid-State Construction

Designed for the auto hobbyist yet perfect for the professional garage operation, 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 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 or 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. 38 Kg	849.95
COA-2600-2, Alternator Test Adaptor. Shpg. wt. 1 Kg	19.95
COA-2600-3, Scope Cart. Shpg. wt. 12 Kg	69.95
Kit COA-2500-1, Low-cost Timing Light for CO-2600 only. Shpg. wt. 1.5 Kg	32.95

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:** Minimum 2 to 1. **Operating Temperature Range:** 32°F to 104°F. **Tachometer:** 1000 rpm, 3000 rpm, or 6000 rpm. **Voltmeter:** 2 or 20 VDC. **Power Requirements:** 110/130 or 220/260 VAC 50/60 Hz. **Weight:** 53 lbs. **Dimensions:** 12⅞" H x 25¼" W x 14⅛" D.

Companion Timing Light

Deluxe timing light and distributor advance meter designed specifically for use with the CO-2600. Measures advance to 60°.

Kit COA-2600-4, Shpg. wt. 1.5 Kg 94.95

Versatile Heathkit Ignition Analyzer

$329^95

- Built-in rpm Indicator
- Clamp-on inductive pickup for easy hookup

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.

Kit CO-1015, Shpg. wt. 10 Kg 329.95

CO-1015 SPECIFICATIONS: Power Requirement: 120/240 VAC, 60/50 Hz, 16 W. **RPM Range:** 400-5000. **Cylinders:** 3, 4, 6 or 8. **Vertical Expand:** Approx. 2 to 1. **Horizontal Expand:** Approx. 10 to 1. **Sweep Length:** ±5% over entire RPM range. **Intensity:** Fixed. **Presets:** Focus, Astigmatism, Trigger Adjust, Tach Cal. **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 Engine Analyzer

$169^95

- Works with any ignition system
- Tests accessories and all electrical wiring

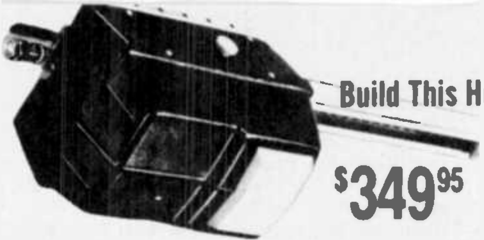
This professional-grade instrument tests conventional, magneto, transistorized, and most capacitive discharge ignition systems — both positive and negative ground, any voltage, on any 3, 4, 6 or 8-cylinder engine.

Also tests storage battery, generator or alternator, voltage regulator, starter, distributor, ignition circuit (points, condenser and coil), accessories and all the electrical wiring. Operates on 3 standard "C" batteries (not supplied). Has convenient carrying handle. Comes complete with leads and accessories.

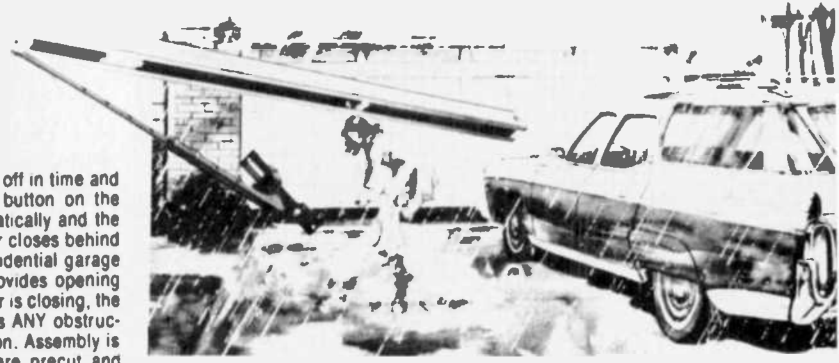
Kit CM-1050, Shpg. wt. 4 Kg 169.95

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 Supplied:** Two 8" two-conductor test cables. One 2' alligator to alligator lead. One 2' alligator to push-on connector lead. One calibration cable. **Accessories Supplied:** 90-ampere shunt. 0.25 Ω resistor assembly. One insulation-piercing alligator clip. Two #10 solder lugs. Dimensions: 7½" H x 10½" W x 8¾" D.

Build This Heathkit Garage Door Opener for Year-Round Safety and Convenience



$349.95



- **Stop Fighting Heavy Garage Doors in Bad Weather**
- **Door instantly reverses and returns to full open if obstructed**

The GD-3309 garage door opener is an investment that really pays off in time and labor saved, convenience and extra security. Simply touch the button on the wireless transmitter in your car – your garage door opens automatically and the garage light turns on. Touch the button again, and the garage door closes behind you. Has a powerful ⅓ hp motor that opens even the heaviest residential garage doors (up to 7½' maximum height). The adjustable slip clutch provides opening safety, stopping the door automatically if obstructed. When the door is closing, the important safety reverse feature takes over. If the door encounters ANY obstruction it stops and reverses instantly, and returns to full open position. Assembly is really easy, there's absolutely no soldering! Connecting leads are precut and push-on connectors are already installed. A separate doorbell-type switch and 20' cable let you operate the unit from anywhere you may choose.

Kit GDS-3309, Transmitter, Receiver, Mechanism. Shpg. wt. 26 Kg	349.95
Kit GDA-3209-2, Adaptor for jamb and pivot doors. 1.5 Kg	24.95
GDP-3001, Transmitter. 1 Kg	44.95
GDP-3003, Receiver. 1 Kg	59.95

GD-3309 SPECIFICATIONS: Overall Size: 120" L x 12" H x 9" W. **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 TRANSMITTER:** Powered by standard 9-volt battery. **RF Frequency,** 915 MHz

Advanced Electronics For Added Reliability

The fully assembled transmitter and receiver in the GD-3309 system incorporate the latest in solid-state electronics for improved security and reliability. The units are binary coded with 1024 code combinations, so you can set and change your own code anytime. The improved electronics provides greater immunity to external signals too – helps prevent false operation from other garage door openers, CB and Amateur transmitters, television, radios, etc.

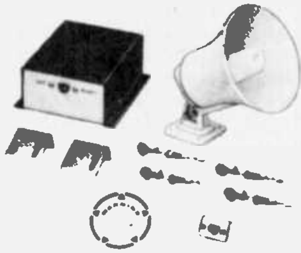
Security Products Protect Your Car

Heathkit Ultrasonic Automobile Intrusion Alarm

- **It's on duty when you're not there**
- **Alarm delay lets you enter & reset**

Protect your automobile and its contents with this reliable alarm. When unauthorized entry occurs, the GD-1558 waits 10 seconds and then begins sounding the horn. The kit is very easy to assemble. Installation requires just three connections. Optional horn relay kit adapts to cars without relay. Only 4¾" W x 3⅜" D x 1⅜" H, operates from your car's battery.

Kit GD-1558, Shpg wt. 1 Kg	99.95
Kit GDA-1558-1, Horn Relay Kit, Shpg. wt. 1 Kg	8.95



Protect your Car with this Mobile Security System

- **5-15 second adjustable delay**

Protects your car and the valuables in it! An optional horn relay adapts the GD-1157 to cars whose horns do not use a relay or use a plug-in relay. Optional siren accessory provides attention-getting "yelp" sound instead of car horn. With all switches and hardware. Alarm unit, 2⅛" H x 4¾" W x 5" D. For 12 VDC negative ground only.

Kit GD-1157, Shpg wt 1 5 Kg	59.95
Kit GDA-1157-1, Optional Siren Accessory 1 Kg	39.95
Kit GDA-1157-2, Optional Horn Relay, 1 Kg	8.95

THEFT ALERT 500A–1

Silent Vehicle Alarm System

THEFT ALERT

The all new Theft Alert 500A-1 consists of a small transmitter installed in the vehicle which can be triggered like any conventional vehicle alarm. However, the Theft Alert 500A-1 comes with unique piezo-electric "Micro Door Sensors" which, when simply glued to the door post, actually "hear" the thief jimmy or open the car door.

The instant a thief tries to break into your car, the transmitter sends a coded radio signal through your existing auto antenna to the attractive, compact Pocket Pager which beeps its warning of a theft in progress. The Theft Alert's 1 watt of power provides a range of over 1 mile, depending on antenna, terrain and atmospheric conditions. Assembled.

GDC-500-A1, Shipping wt. 2 Kg .... **149.95, ea.**

PAGE ALERT 4000

Silent Vehicle Alarm

Similar features to Theft Alert 500A-1, however, the 4000 has 4-watts of power for a range of up to 5 miles, depending on antenna, terrain and atmospheric conditions. The Page Alert 4000 also includes a special paging feature which transforms the unit into an immediate area paging system for use at home or at business. Assembled.

GDC-4000, Shipping wt. 3 Kg .... **199.95, each**

page alert 4000
4 watts power

PAGE ALERT 4444

Silent Vehicle Alarm & Pocket Pager System

page alert 4444

All of the features of the Page Alert 4000 plus more. The transmitter has two modes of operation – Page and Security. The Pocket Pager has two L.E.D.s marked Page and Security. When the transmitter is in the Security mode, a break-in will cause the Security L.E.D. to light when the Pocket Pager sounds. When the transmitter is in the Page mode, the Page L.E.D. comes on when the Pocket Pager sounds. A unique and low cost security and personal paging system. Assembled.

GDC-4444, Shipping wt. 3 Kg .... **249.95, ea.**

RATE CODE CHART

	First Letter of Your Postal Code																
	A	B	C	E	G	H	J	K	L	M	N	P	R	S	T	V	X	Y
Montreal	11	3	15	3	2	1	2	2	2	2	2	3	5	6	6	7	10	14
Ottawa	11	3	15	3	2	2	2	1	2	2	2	2	5	5	6	7	10	14
Mississauga	12	4	16	4	2	2	2	2	1	1	1	2	4	5	6	7	10	14
Winnipeg	13	6	12	6	5	5	5	5	4	4	4	3	1	2	3	5	10	12
Edmonton	14	7	13	7	7	6	6	6	6	6	6	5	3	3	1	3	10	16
Vancouver	9	8	14	8	7	7	7	7	7	7	7	6	5	4	3	1	10	15

FREIGHT RATE CHART

	RATE CODE															
UP TO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Kg	1.00	1.00	1.05	1.15	1.20	1.25	1.40	1.65	1.90	1.30	1.20	1.25	1.40	1.65	1.05	1.15
1.5 Kg	1.15	1.15	1.20	1.30	1.40	1.45	1.65	1.95	2.20	1.85	1.40	1.45	1.65	1.95	1.20	1.30
2 Kg	1.30	1.30	1.35	1.50	1.55	1.70	1.85	2.20	2.50	2.35	1.55	1.70	1.85	2.20	1.35	1.50
2.5 Kg	1.40	1.40	1.50	1.65	1.75	1.90	2.10	2.50	2.80	2.90	1.75	1.90	2.10	2.50	1.50	1.65
3 Kg	1.55	1.55	1.70	1.80	1.95	2.10	2.30	2.75	3.10	3.40	1.95	2.10	2.30	2.75	1.70	1.80
3.5 Kg	1.77	1.77	1.85	2.00	2.10	2.35	2.55	3.05	3.40	3.95	2.10	2.35	2.55	3.05	1.85	2.00
4 Kg	1.85	1.85	2.00	2.15	2.30	2.55	2.75	3.30	3.70	4.45	2.30	2.55	2.75	3.30	2.00	2.15
6 Kg	2.10	2.10	2.30	2.50	2.75	3.00	3.25	3.80	4.25	6.75	2.75	3.00	3.25	3.80	2.30	2.50
8 Kg	2.35	2.35	2.60	2.85	3.15	3.45	3.80	4.35	4.85	9.05	3.15	3.45	3.80	4.35	2.60	2.85
10 Kg	2.55	2.55	2.85	3.20	3.60	3.90	4.30	4.85	5.40	11.35	3.60	3.90	4.30	4.85	2.85	3.20
12 Kg	2.80	2.80	3.15	3.60	4.00	4.40	4.80	5.35	5.95	13.70	4.00	4.40	4.80	5.35	3.15	3.60
14 Kg	3.05	3.05	3.45	3.95	4.45	4.85	5.35	5.90	6.55	16.00	4.45	4.85	5.35	5.90	3.45	3.95
16 Kg	3.30	3.30	3.75	4.30	4.85	5.30	5.85	6.40	7.10	18.30	4.85	5.30	5.85	6.40	3.75	4.30
20 Kg	3.60	4.80	5.10	6.65	7.35	8.00	8.90	9.75	25.14	27.35	20.23	24.03	19.85	22.92	16.75	20.83
24 Kg	4.00	5.20	5.65	7.50	8.30	9.10	10.05	10.95	25.14	27.35	23.22	32.97	25.40	22.92	17.50	25.23
28 Kg	4.45	5.65	6.30	8.40	9.25	10.20	11.25	12.15	29.45	31.80	23.22	32.97	25.40	27.22	18.05	25.23
32 Kg	4.70	5.90	6.60	8.85	9.75	10.75	11.85	12.80	29.45	31.80	23.22	32.97	25.40	27.22	18.05	25.23
45 KA	15.82	15.75	15.87	18.93	24.68	22.75	25.80	28.99	31.81	34.69	24.68	34.37	25.80	28.99	18.05	27.27
68 Kg	18.23	17.23	18.05	22.08	29.95	28.35	33.30	36.33	38.95	41.47	29.95	42.30	33.30	36.33	18.05	31.30
90 Kg	20.18	18.00	23.88	26.27	34.88	33.95	40.80	43.42	45.55	47.74	34.88	50.37	40.80	43.42	23.88	40.20
115 Kg	22.06	20.42	28.56	29.73	40.15	39.55	48.30	52.55	55.87	59.60	40.15	59.00	48.30	52.25	28.56	45.80
135 Kg	23.35	23.88	31.68	33.20	44.75	45.15	55.80	60.25	63.29	67.25	44.75	67.67	55.80	60.25	31.65	51.55

HOW TO ORDER

1. By Mail. Complete the simple order form, including the reverse side, if you wish to use our Revolving Charge Plan. Always use your name as on your catalogue label whenever you order. Enclose cheque or money order, or, request Revolving Charge. Include freight costs, as described below. Fill out section 2 of the order form if you want the goods shipped to another address.

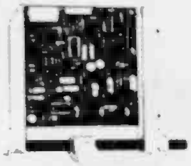
2. To Order by Telephone. For kit or parts orders on Revolving Charge Plan, COD, or, Commercial Accounts, telephone numbers for the Heathkit Electronic Centres are listed on the back page of this catalogue. If you wish to order from the Factory, call 416-273-3797, 8:30 AM — 4:30 PM, weekdays.

3. At Electronic Centers. Call personally to your store in Edmonton, Montreal, Mississauga, Ottawa, Vancouver and Winnipeg. See the full range of kits, assembled and operational. All kits are ready for immediate purchase and technically qualified staff are available for assistance, advice, and service.

FREIGHT COSTS

To the left are two tables for the calculation of Freight costs which should be included in your order to avoid Collect charges. First, locate the rate code chart and determine the rate code from the point of shipment to destination (first letter of your Postal Code). Second, once you have established the rate code, use the Freight Rate Table and the total weight of your order to determine freight costs. Include this amount in the line marked "Freight", in order to calculate the total order cost. The goods will be shipped by the route and carrier best suited. All orders must include insurance.

These Heath-approved tools will make your kitbuilding easier and faster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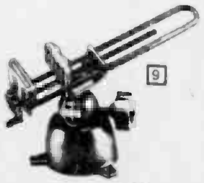
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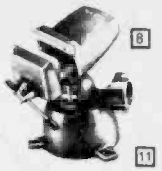
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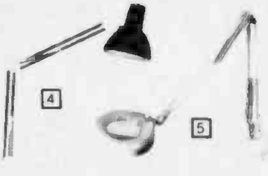
11

1

2
3-WIRE
SOLDERING IRON

3
ELECTRONIC TOOL KIT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[1] **GDP-7791 — 37½ Watt Unger Soldering Iron.** Ideal for technicians and kit builders alike. Includes a #7153 tip and a #7235 element. Heat range of 700° to 850°F.

GDP-7791, 1 Kg	13.95
GDA-7153, Replacement tip	2.45
GDA-7235, Replacement element	9.95

[2] **Ungar 135, Soldering Iron.** This 3-wire soldering iron is designed to eliminate static induced currents for all general purpose soldering and voltage sensitive components. 35 WATTS — 120V. Temp Range — 750-850°F; flexible 3-wire cord; ⅛ tip.

Kit GDP-135, Shpg. wr. 1 Kg	19.95

[3] **Kit builders' tool set.** Set includes adjustable wire stripper; diagonal cutting pliers; long nose pliers; ⅛ in. screw driver; Philips screw driver; ¼" nut driver; Weller WP-25 soldering iron spare tip; soldering aid; and solder in a handy plastic carrying case/storage tray.

Model GH-205, 2 Kg	54.95

[4] **Z-Lyte extension lamp.** Lamp features a 45" reach and 360° sweep; vented shade and movable base clamp. C.S.A. Approved. Incandescent bulb not included.

Kit GDP-203, 2.5 Kg	24.95

[5] **Illuminated Magnifier.** Fluorescent lighting and 5" diameter 3 diopter lense take the strain out of close work at your bench. Requires 22-watt T-9 Circline Fluorescent tube (not included).

GDP-200A, Magnifier with screw clamp. 4 Kg	99.95
GDP-200B, Magnifier with vertical bracket. 4 Kg	99.95
GDP-200C, Magnifier with horizontal brackert. 4 Kg	99.95
GDA-200-1, T-9. 22 watt circline fluorescent tube. 1 Kg	13.95

Optional lens increases magnification from ¾ to 2¾ times.

GDA-200-2, Auxiliary lens. 1 Kg	29.95

[6] **3-Heat Soldering Iron Kit.** Handy stand with metal cage keeps iron safe and secure. 3 heat ranges for all types of circuit work. With six foot power cord. 120 VAC.

Kit GH-17A, Shpg. wt. 2 Kg	69.95

[7] **Circuit Board Holder** — Perfect for kitbuilding. This "third hand" holds most any shape or size of circuit board in just the right position. The right arm is spring loaded to facilitate quick change. Support tilts 220 degrees.

GDP-1254, 1 Kg	31.95

[8] **Vertical Jaw Vise Head** — For most standard hobby applications. Nylon jaws open to 2¼" and provide a firm grip, without marring the object to be worked on.

GDP-1253, 1 Kg	24.95

[9] **Wide Opening Vertical Vise head** — Holds bulkier items — model parts, chassis, etc. — firm and secure in any position. Jaws open to 6½. Neoprene pads reversible and replaceable.

GDP-1255, 1 Kg	24.95

[10] **Vacuum Base** — Attaches securely to any smooth nonporous surface with just a half-turn of the mounting lever. Powerful rubber suction pad holds without marring tabletop. Perfect for tabletop applications where permanent mounting is not practical. Overall height 3 3/16". Base dimensions 5" x 4¼".

GDP-1252, 1 Kg	31.95

[11] **Standard Height Base** — Designed for permanent installation and normal application. Three mounting lugs let you attach it securely to the work surface. As with above base, choose desired vise head from three styles listed above.

GDP-1251, 1 Kg	22.95

HANDY ORDER FORM FOR DIRECT-TO-YOU DELIVERY

HEATH ZENITH

HEATHKIT ORDER FORM

☐ FACTORY: 1480 DUNDAS ST. E., MISSISSAUGA, ONT.
☐ 1400 SAUVE OUEST, #1508, MONTREAL, P.Q.
☐ 3058 KINGSWAY, VANCOUVER, B.C.
☐ 1478 DUNDAS ST. E., MISSISSAUGA, ONT.
☐ 866 MERIVALE RD., OTTAWA, ONT.
☐ 12863 - 97 ST., EDMONTON, ALTA.
☐ 1315 PORTAGE AVE., WINNIPEG, MAN.

① ORDERED BY

NAME ________________ (Initial and Surname) Address Ref ________ (From Address Label)
STREET ________________
CITY ________ PROV ________
CODE ________________

② DO NOT FILL IN UNLESS YOU WANT THE GOODS TO BE SHIPPED TO AN ADDRESS DIFFERENT FROM ①

NAME ________________
ADDRESS ________________
CITY ________ PROV ____ CODE ______

If you wish to order and charge to your Chargex or Master Charge Account just fill in below

VISA

________ Sign your name ________ Amt. of order
________ Print Name Exactly As It Is On Your Card
Good thru ________ Enter Date Above Bank ________
________ Enter Above The Exact Number On Your Card

IF YOU HAVE A FRIEND WHO WOULD LIKE A FREE CATALOGUE PLEASE PRINT THE NAME AND ADDRESS BELOW

NAME ________________
STREET ________________
CITY ________ PROV. ______ CODE ______

QUANT	MODEL	DESCRIPTION	WEIGHT	PRICE EACH	TOTAL

TERMS:

- **Cash Orders.** Do not send currency or stamps. Send personal check, money order, etc.
- **C.O.D.** For orders of $10 or more, a 20% deposit is required. Balance will be collected at delivery time and payment must be made in cash. (C.O.D. fees will be added to your order and collected on delivery.)
- **Heath Revolving Charge Plan.** No money down. Up to 18 months to pay. Credit up to $2500 (maximum account balance) and two convenient monthly payment plans available. Down payments are encouraged to reduce your monthly payments and finance charges. Follow instructions on the reverse side of order blank. Be sure to sign charge agreement.

charg-a-kit

- **Commercial Accounts.** Net 30-day terms available to well-rated companies.
- **Educational Accounts.** Net 30-day terms available to educational institutions. Authorized purchase order is required.
- **Heathkit Continuing Education Quantity Discounts.** EE, EI and EC Products:- 10-24, 5%; 25-49, 10%; 50-99, 15%; 100 +, by quotation. KIT TRAINERS:- 10-24, 5%; 25-99, 10%; 100-249, 13%; 250 +, by quotation. WIRED INSTRUMENTS AND TRAINERS:- 5-9, 5%; 10-34, 10%; 35-49, 15%; 50-249, 20%; 250 +, by quotation.
- **Quantity Discounts.** For discount information on purchases of 10 or more of any one kit contact our Contract Sales Dept.
- **Note:** Quantity discounts apply to single items only — not combination packages, special offers or systems. All credit orders subject to Heath Credit approval.

TYPE OF ORDER

Payment in Full Enclosed ☐ C.O.D 20% Enclosed ☐
Revolving charge ☐ Ad-on ☐
Acct No ________

**PLEASE NOTE:
A 20% deposit must be included with all C.O.D. orders over $10.00.**

IS THIS YOUR FIRST ORDER?

☐ YES ☐ NO

004

Total Amount of Order	
Allowance if offered	
Sales Tax B C Man. Quebec	
Shipping Charges	
Shipping Insurance Include $1 00 for every $100 00 or part thereof of order value. Maximum $3 00	
TOTAL ▲	
Sales Tax Ontario	
TOTAL	
LESS C.O.D. Deposit Down Payment	
Unpaid Balance	

NOTE: ONTARIO LAW REQUIRES RESIDENTS TO PAY SALES TAX ON TOTAL INDICATED BY ▲

HEATH REVOLVING CHARGE PLAN AND AGREEMENT

ABOUT HEATH'S REVOLVING CHARGE PLANS: The "Cash Price" of merchandise on Heath's Revolving Charge Plans includes the cash price as listed on the page describing the merchandise, plus applicable sales tax, shipping charges, and less any advertised allowances. Regular or extended terms are the two plans available for your use. To use the extended plan, the balance must be at least $400. The amount of your monthly installment can be determined from the chart at the right. The periodic rate for the *finance charge is 2%* per month and is equal to an *annual percentage rate of 24%* before deducting payments & credits or adding purchases made during the current billing period. No down payment is required on new orders to those who qualify, but one may be remitted if desired.

HOW TO OPEN AN ACCOUNT: Just fill out the credit application, sign the Revolving Charge agreement, and mail to Heath with your order.

ADD-ON PURCHASES: List items you want on order blank, check the add-on box, and give your account number. Sign the Revolving Charge agreement, and send to us.

NOTICE TO BUYER: 1. Do not sign the contract before you read it. 2. No *FINANCE CHARGE* if paid in full in 30 days from cycle billing closing date as shown on statement.

Regular Revolving Charge	
Pay Monthly	Charge up to
$10	$150
15	200
20	250
25	300
30	350
35	400
40	450
45	500
50	550

Extended Revolving Charge	
Pay Monthly	Charge up to
$25	$400
30	500
35	600
40	700
45	800
50	900
55	1,000
60	1,100

Add $5 for every $100. or a portion thereof over $1,100

Finance Charge

A credit service charge of 24% per year (2% per month will be added to your account each month, based on your previous month's balance).
(examples)

Monthly balance	Service charge
50.00	1.00
100.00	2.00
200.00	4.00
400.00	8.00
800.00	16.00
1,000.00	20.00

HEATH charg-a-kit REVOLVING CHARGE

In consideration of my being permitted to purchase merchandise and services from HEATH COMPANY (hereinafter called the "Company") on the Heath Company Revolving Charge Plan, I hereby agree to the following terms and conditions:

1. I shall pay for all purchases made by me or under my authority in one of two methods outlined in paragraphs 2 & 3 below.
2. I may pay the full balance of the account each month, with no service charge added.
3. I may elect to make payment on a monthly basis, in which event I agree to pay such monthly amount, plus service charge as shall be specified and required by the terms applicable to this agreement from time-to-time and communicated to me, it being understood any monthly payment made by me shall be applied firstly on account of service charges (if any) and secondly on account of the purchase price of merchandise or services in order of purchase, it being also understood that upon default in payment, either in whole or in part, of any monthly payment owing, at your option, the entire amount owing under the account shall immediately become due and payable.
4. Until payment is made, I agree that title to the merchandise shall remain in your name, that I will not sell, remove or encumber the same without your written consent, that I assume and shall be responsible for all loss or damage to said merchandise and that upon the default of payment or payments, or the sale, removal, or encumberance of the merchandise without your written consent you may, at your option, take back the merchandise and retain as compensation for use and depreciation thereon, any payments theretofore made by me without prejudice to my liability to pay for any such merchandise as is not retaken by you, or affirm the sale and hold me liable for the full unpaid balance on my account.
5. All purchases made by me or in my name shall be subject to the terms of this agreement which shall be deemed to be part of each bill of sale, identified by the account number herein contained or such other number which may be given to me. All purchases shall be subject to the approval of the Credit Department of the Company.

I acknowledge that I have read and fully understand this agreement and its terms of payment, that it is subject to approval of the Credit Department of the Company and that there are no other agreements regarding this account other than the terms and conditions herein contained.

Date Signature

CREDIT STATEMENT Revolving Charge Plan desired ☐ Regular ☐ Extended

(IMPORTANT: PLEASE FILL IN COMPLETELY. OMISSIONS AND ERRORS CAUSE DELAYS.)

Family or last name (print)	Usual first name and initials	Social insurance number	Telephone	Wife's name

Present address (permanent address)	City	Postal Code	How Long	Own ☐	Rent ☐	Living with parents ☐	Monthly Payment $	Mtg/Rent
Previous address	City	Postal Code	How Long		Your age		No. of dependent children	

Employed by	Address	Phone	How Long	Position	Income $
Previous Employer	Address	Phone	How Long	Position	Income $
Wife's Employer	Address	Phone	How Long	Position	Income $
Your bank	Address	Type of Account	Account No.	Loan Balance	Loan payment

CREDIT REFERENCES	Address	Account No.	Present balance	Loan payment
	Address	Account No.	Present balance	Loan payment
	Address	Account No.	Present balance	Loan payment

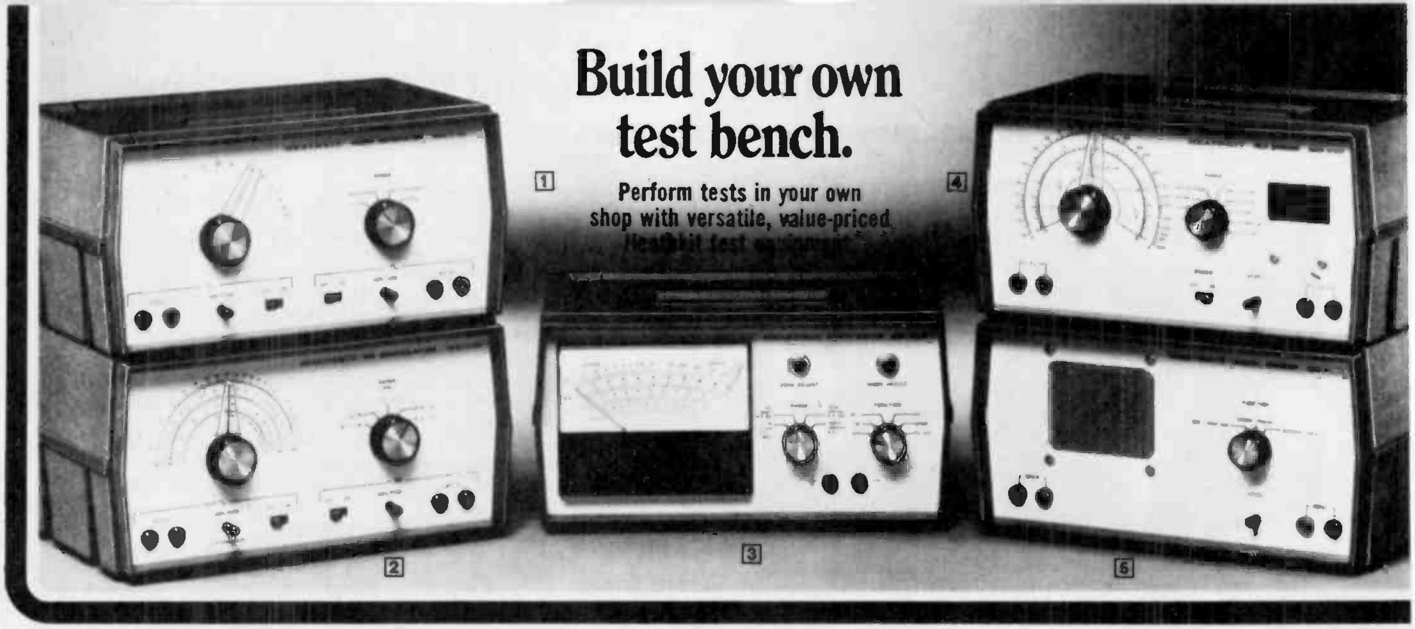
NEAREST RELATIVE (DO NOT LIST THOSE WITH WHOM YOU ARE LIVING)	**ADDRESS**	**RELATIONSHIP**

The undersigned consents to the obtaining of credit and/or personal information as may be required at any time in connection with the credit hereby applied for or any renewal or extension thereof and to the disclosure of any credit information concerning the undersigned to any credit reporting agency or to any person with whom the undersigned has or proposes to have financial relations

Date Signature

Build your own test bench.

Perform tests in your own shop with versatile, value-priced Heathkit test equipment.



Here's REAL Value!

Heath's 5280 Series of test instruments is an excellent low-cost way to assemble a truly versatile test bench. Whether you're doing hi-fi servicing, working on television equipment, or just experimenting, each 5280 Series instrument represents real value.

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. Construction is rugged and assembly time is greatly reduced by single circuit board assembly.

Kit IG-5282, Shpg. wt. 2.5 Kg **74.95**

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. 2.5 Kg **79.95**

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:** 11″ W x 5¾″ H 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. 2.5 Kg **79.95**

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:** 11″ W x 5¾″ H 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. 2.5 Kg **79.95**

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:** 11″ W x 5¾″ H x 7¾″ D. **Weight:** 3½ lbs.

SPECIAL 5% DISCOUNT

Order the IPA-5280-1 Power Supply and any three 5280 Series Instruments and you can deduct 5% from the total price (excluding shipping and handling charges).

5 Signal Tracer for audio circuits

Quickly trace receiver and transmitter circuits to reveal component and stage failures. Flip the probe to its straight through (DC) position and you can easily locate defective circuitry in all types of audio components and systems. In the audible ohmmeter position, the IT-5283 changes tone depending on the test point voltage or resistance and allows you to easily trace signal flow through logic circuits. Includes probe.

Kit IT-5283, Shpg. wt. 2.5 Kg **79.95**

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:** 11″ W x 5¾″ H x 7¾″ D. **Weight:** 3¼ lbs.

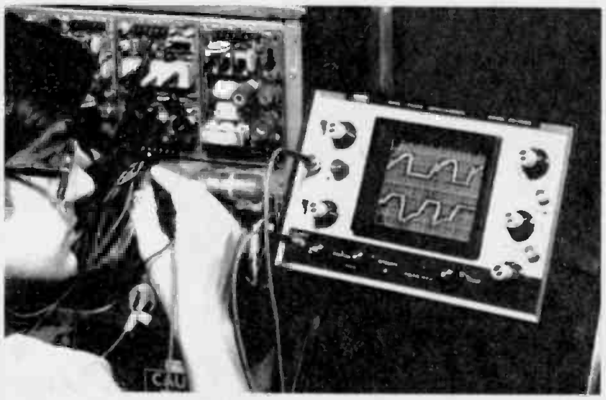
5280 Series Power Supply

(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. 1.5 Kg **49.95**

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.

This Heathkit Test Instrument Program gives you a thorough

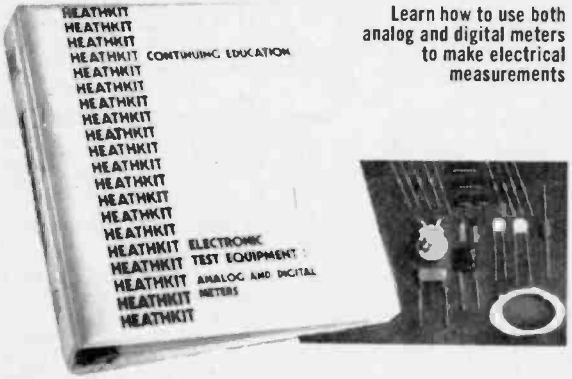


This new Heathkit Continuing Education Program is designed to give you a thorough understanding of modern test equipment and its many and varied uses. It uses the same PROVEN and EFFECTIVE techniques of the other Heathkit programs — programmed instructions with self-test reviews and quizzes, electronic components for "hands-on" experiments using the optional ET-3100 electronic trainer and the test equipment related to the material. It's an ideal way to learn about instruments for your electronics hobby or self-improvement for your vocation.

The program teaches you what test equipment is, how it works, how to specify it and how to use it. The complete program consists of five separate modules, with each module containing all the parts and text materials to implement the experiments relating to that module. The Modules consist of: 1. Electronic Meters Analog and Digital; 2. Oscilloscopes; 3. Frequency Generation and Measurements; 4. Special Measuring Instruments. The final Module is the optional exam covering the material learned in the first four modules.

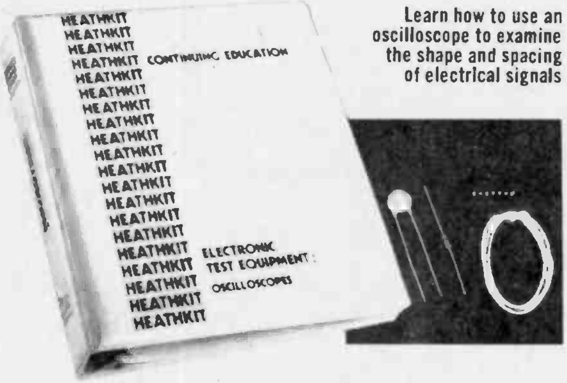
Completion of the first four programs — AC and DC Electronics, Semiconductor Devices and Electronic Circuits — or equivalent knowledge is required for understanding and completing this program.

1 Module 1 — Analog and Digital Meters


HEATHKIT CONTINUING EDUCATION
HEATHKIT ELECTRONIC TEST EQUIPMENT: ANALOG AND DIGITAL METERS

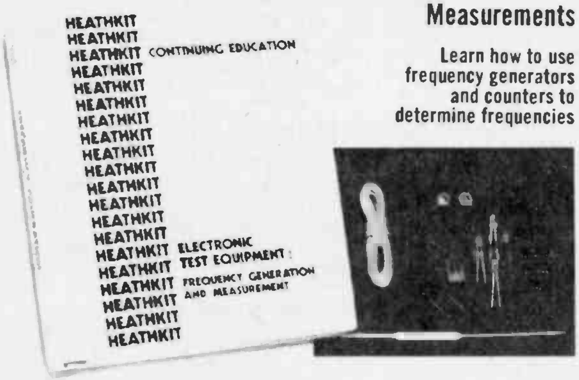
Learn how to use both analog and digital meters to make electrical measurements

2 Module 2 — Oscilloscopes


HEATHKIT CONTINUING EDUCATION
HEATHKIT ELECTRONIC TEST EQUIPMENT: OSCILLOSCOPES

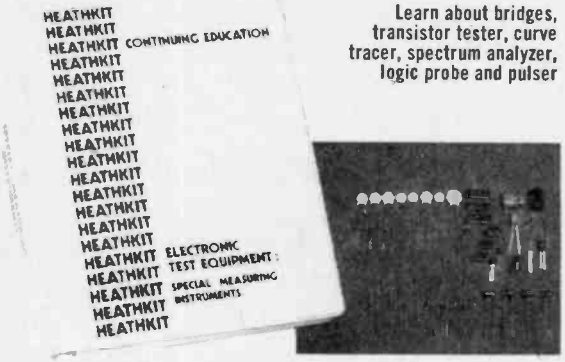
Learn how to use an oscilloscope to examine the shape and spacing of electrical signals

3 Module 3 — Frequency Generation and Measurements


HEATHKIT CONTINUING EDUCATION
HEATHKIT ELECTRONIC TEST EQUIPMENT: FREQUENCY GENERATION AND MEASUREMENT

Learn how to use frequency generators and counters to determine frequencies

4 Module 4 — Special Measuring Instruments


HEATHKIT CONTINUING EDUCATION
HEATHKIT ELECTRONIC TEST EQUIPMENT: SPECIAL MEASURING INSTRUMENTS

Learn about bridges, transistor tester, curve tracer, spectrum analyzer, logic probe and pulser

background in understanding and using test equipment

The information contained in the Test Equipment Self-Instruction Program is authoritative, up-to-date and thorough. It will provide you with an excellent background in understanding test equipment plus the ability to operate it accurately and efficiently.

A knowledge of test equipment is essential for radio and TV service, electronic design, engineering, almost any occupation dealing with electronics. If you're a Ham, hi-fi buff; or just like to tinker and experiment with electronics, knowing about test equipment and how to use it can be beneficial.

1 Module 1 — Analog and Digital Meters

This first learning module consists of two clearly written texts, one describing analog meters and the other digital meters. The unit on analog meters covers types of movements and how they are used to measure voltage, current and resistance; the operation of the volt-ohm-milliammeter (VOM) and the electronic VOM. The unit on digital meters covers analog to digital conversion; compares analog to digital meters and discusses factors to consider when selecting your own meter. Upon completion of these units, you will be able to:

1. Use both analog and digital meters to make electrical measurements.
2. Explain how the sensitivity of a meter is determined.
3. Explain how high input impedance is achieved in an electronic meter.
4. Describe the uses of high-voltage ohms and low-voltage ohms positions of an ohmmeter.
5. Explain the advantages of a digital meter over an analog meter.
6. Give the advantages of an integrating meter over a non-integrating meter.
7. Explain the operation of integrating and non-integrating meters.
8. Describe how current and resistance are measured with a digital multimeter.
9. Explain what is meant by resolution, sensitivity and accuracy.
10. List three types of probes used with meters and explain what each does.

The program includes parts for "hands-on" experiments using the optional ET-3100 trainer (page 27). Both digital and analog meter should also be used for most effective learning.

Program EE-3105-1, Shpg. wt. 2 Kg **34.95**

2 Module 2 — Oscilloscopes

Oscilloscopes 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 with an oscilloscope, you can actually see and interpret them. This module discusses the components and circuits which make up the oscilloscope. It also discusses the function and operation of various controls and how to interpret various scope displays. Upon completion of this module, you will be able to:

1. Identify the various parts of a Cathode Ray Tube from a drawing of the CRT.
2. Explain deflection sensitivity and bandwidth.
3. Identify the difference between horizontal and vertical deflection circuits.
4. Explain the purpose of blanking and unblanking.
5. Explain the difference between triggered and free-running sweeps.
6. Describe the operation of a delayed sweep.
7. Identify three ways a dual-trace presentation can be obtained.
8. Explain the difference between chop and alternate methods of dual-trace development.
9. Explain the operation and uses of both storage and sampling oscilloscopes.
10. Identify various oscilloscope controls and explain the uses of each.
11. Describe the use of lissajous figures for making phase and frequency measurements.

This program includes parts for "hands-on" experiments using the optional ET-3100 Electronic Trainer (page 27). An oscilloscope is also required for making various measurements.

EE-3105-2, Shpg. wt. 1.5 Kg **29.95**

3 Module 3 — Frequency Generation and Measurements

This module covers frequency generation, measurement and counting. A knowledge of frequency characteristics is essential for virtually any electronic circuit troubleshooting and repair. When you complete this module, you will be able to:

1. Express frequency values in Hz, powers of ten and wavelength.
2. List three different passive frequency meters and describe the operation of each.
3. List four types of active frequency meters and describe the operation, advantages and limitations of each.
4. Given the center frequency and half-power frequencies of a resonant circuit, calculate the Q, bandwidth and bandpass of the circuit.
5. Given a dip meter reading and capacitor value, calculate the value of an unknown inductor.
6. Given a wavemeter reading and a heterodyne zero-beat reading, calculate an unknown frequency value using harmonics.
7. Given two adjacent transfer oscillator null point frequencies, calculate an unknown frequency.
8. List three advantages of electronic counters over other frequency measuring systems.
9. List three potential sources of counter error.
10. List five sections of a general purpose electronic counter and explain the function of each.
11. List the four basic modes of counter operation.
12. List three methods used to increase the frequency range of electronic counters.
13. Describe three methods of calibrating electronic counters.

You will also learn how to use and describe audio, RF and function generators, name the five common waveforms used in circuit testing, compute amplifier output voltage and gain, determine the frequency of a triangle waveform generator, percentage of modulation and more. The program includes parts for "hands-on" experiments using the optional ET-3100 Electronic Trainer (page 27). Various frequency generators and frequency counter are also required.

EE-3105-3, Shpg. wt. 2 Kg **44.95**

4 Module 4 — Special Measuring Instruments

This module covers some of the more specialized test instrumentation available for making measurements on solid-state devices, digital circuits, etc. You will learn what these special devices can measure and some basic techniques for using and interpreting these measurements. Upon completion of this module, you will be able to:

1. List three types of measurements that can be made with bridge circuits.
2. Describe the operation of a balanced bridge.
3. Calculate the unknown value of resistance in a Wheatstone bridge.
4. List the tests that can be made with a transistor tester.
5. State which tests can be made in-circuit and which must be made out of circuit.
6. State whether in or out-of-circuit tests are more accurate.
7. List the drawbacks of the transistor tester.
8. Explain the purpose of a curve tracer.
9. Describe how the presentation is developed on a curve tracer.
10. List the tests that can be performed with a curve tracer.
11. List the advantages and disadvantages of a curve tracer.
12. Explain how the spectrum analyzer displays a signal.
13. List the two basic types of spectrum analyzer
14. List the requirements for a usable spectrum analyzer.
15. Explain how those requirements are obtained.
16. List the primary applications of the spectrum analyzer.
17. Interpret the presentation of the spectrum analyzer.
18. State the purpose of a logic probe.
19. Explain the use of the logic pulser.

The program includes parts for "hands-on" experiments using the optional ET-3100 Electronic Trainer (page 27). The special purpose test instrument discussed are also required.

EE-3105-4, Shpg. wt. 1.5 Kg **44.95**

5 Module 5 — Final Exam for Test Instruments

This module contains the final exam to your test of knowledge of the four learning modules in the program. Upon passing this final exam (passing grade 70%), you will receive a Certificate of Achievement.

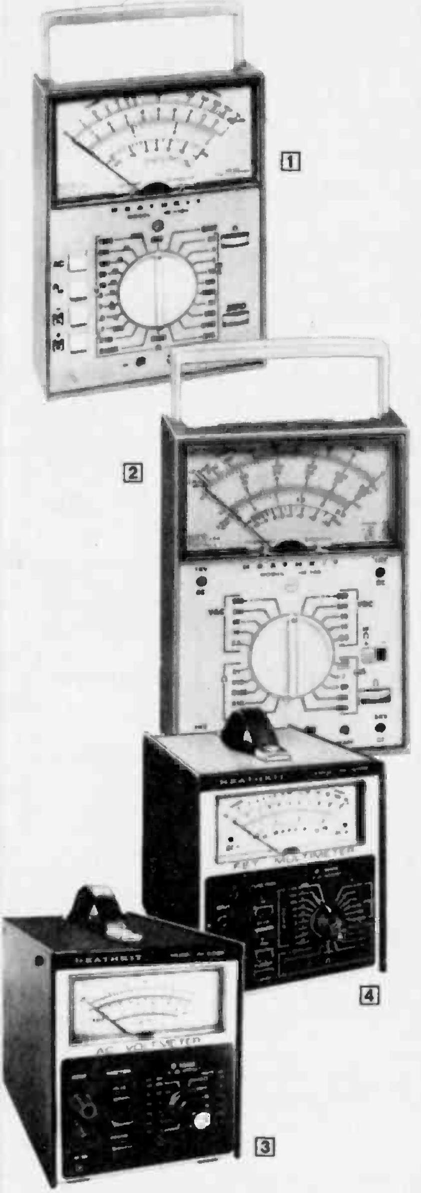
SAVE $14.85 — Buy all five Modules Together

Purchase the complete Test Instruments Learning Program at the same time and save $14.85. The complete program consists of all four modules as described and the final exam module. If purchased separately, $154.80.

EE3105, Shpg. wt. 7 Kg **139.95**

Various test instruments are required for each module of this learning program. See pages 43-58 for our complete line of quality test equipment.

Heathkit Test Instruments Offer Top



1 Solid-state Taut-Band FET VOM. Provides the input characteristics and measuring capabilities of a VTVM with the versatility and portability of a VOM. The 4½" taut-band meter is diode-protected for outstanding ruggedness and reliability. Has 9 AC and DC voltage ranges; 6 current ranges; seven resistance ranges and 9 dB ranges. Extra-wide frequency response makes the IM-1104 useful for audio measurements and in many other applications where conventional DVM's could not be used.

Kit IM-1104, Shpg. wt. 2 Kg **199.95**

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. 1.5 Kg **159.95**

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 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. 4 Kg **159.95**

Assembled SM-5238, Shpg. wt. 4 Kg **279.95**

IM/SM-5238 SPECIFICATIONS: Voltage Range (full scale): 1 millivolt to 300 volts AC, 12 ranges. **Decibel Range:** −70 dB to +40 dB, 12 ranges in 10 dB steps with variable offset. **Input:** 10 megohms, 30 pF, negative input grounded to chassis. **Frequency Response:** Voltage Range, 10 Hz to 1 MHz, ±2 dB. 10 Hz to 500 kHz ±1 dB, dB range, 10 Hz to 250 kHz ±1 dB. **Outputs:** DC (proportional to input volts), 1 volt full scale. DC (proportional to log of input volts), 3 volts full scale. AC (amplified output), 1 volt peak, full scale. **Scales:** 0-10 volts; 0-3.16 volts; −20 to +10 dB. **Accuracy:** Voltage Ranges, 4% of full scale at 1 kHz plus accuracy of calibration standard. dB ranges, ±0.5 dB at 1 kHz plus accuracy of calibration standard. **Power Requirement:** 100-135 VAC, 200-270 VAC, 50/60 Hz, 20 watts.

4 Quality FET Multimeter. Measures AC and DC volts, current and resistance. Features auto-polarity for added convenience, high and low voltage/ohms functions for in and out of circuit checks of semiconductor devices and resistance measurements.

Kit IM-5225, Shpg. wt. 4 Kg **239.95**

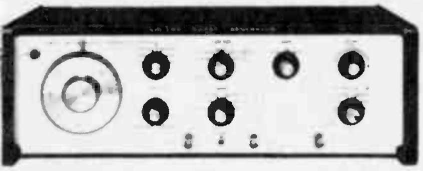
IM-5225 SPECIFICATIONS: DC Volts: nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 full-scale. **AC Volts:** nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 volts full-scale. **DC Current:** six ranges 0-.01, 0.1, 1, 10, 100, 1000 milliamperes full-scale. **AC Current:** six ranges 0-.01, 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:** 5¾" W x 6⅞" H x 11¼" D. **Weight:** 5¾ lbs.

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.

Kit IG-1275, Shpg. wt. 7 Kg **529.95**

IG-1275 SPECIFICATIONS: Output: 50-ohm source — short circuit protected. ±10 volts open circuit. ±5 volts into 50-ohm load. **Output Flatness:** ±0.1 dB to 300 kHz. ±0.5 dB to 3 MHz. **Frequency:** 0.003 Hz through 3 MHz in 6 range steps on primary decade. **Sine Distortion:** Less than 1%, $\times 10^1$. Less than 0.5%, $\times 10^2$, 10^3, 10^4. Less than 0.75%, $\times 10^5$. Harmonics 30 dB down $\times 10^6$. **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:** 15" wide, 11⅞" deep, 5⅜" high.

*Applicable only on top decade of each frequency range. The IG-1275 requires a triggered sweep oscilloscope for calibration.



5

- Easy to Operate front panel controls
- Short-circuit-proof output amplifier
- Rugged case with carrying handle

HEATH charg-a-kit REVOLVING CHARGE

Performance, High Reliability and Superb 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.

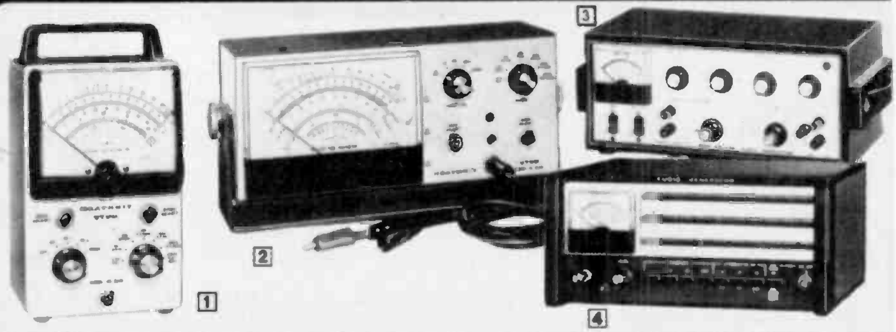
Kit IM-5218, Shpg. wt. 2.5 Kg **109.95**

IM-5218 SPECIFICATIONS: Meter Scales: DC & AC (rms): 0-1.5, 15, 60, 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 4 11/16″ 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. 3 Kg **119.95**

IM-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:** 1½V, "C" cell (not supplied). **Power Requirement:** 120/240 VAC, 60/50 Hz, 10 W. **Dimensions:** 5″ H x 12 11/16″ 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. 5 Kg **199.95**

SG-5218, Assembled and Tested. 5 Kg **369.95**

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.

PKW-4, Wired Replacement Probe for IM-5228. 5218, 18 or 28. Wt. 1 Kg 20.95

Convert your IM-5228, 5218, 18 or 28 to instant-on solid-state operation.

IMA-18-1, Wt. 1 Kg 49.95

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.

Kit IG-1272, Shpg. wt. 5 Kg **269.95**

SG-1272, Assembled. 5 Kg **389.95**

IG/SG-1272 SPECIFICATIONS: Output Voltage: 0.003 to 10 volts RMS. **Output Load:** 600 ohms. **Hum and Noise:** 0.01% or less. **Frequency Range:** 5 Hz to 100 kHz. **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. **Weight:** 9.5 lbs.

Versatile, low-cost Heathkit Function Generator

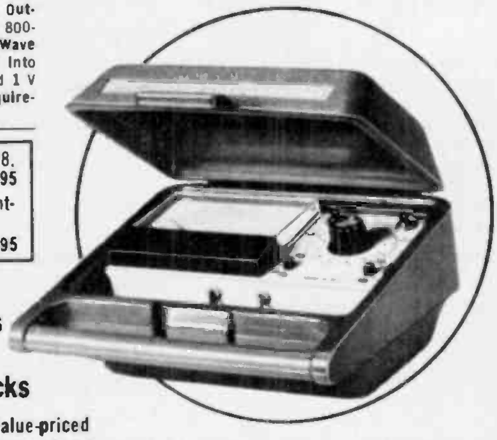
Generates highly accurate sine, square or triangle waveforms over a frequency range of 1 Hz to 1 MHz. The frequency multiplier and front panel tuning control set any frequency fast and easy. The output amplifier supplies a 10 volt (p-p) signal into a 50 ohm load. A calibrated step attenuator adjusts 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 triggered scope is necessary for calibration.

Kit IG-1271, Shpg. wt. 3.5 Kg **229.95**

Assembled SG-1271, wired version of the IG-1271 in same attractive blue & white styling (not shown), Shpg. wt. 3.5 Kg **329.95**

IG-127t 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



$\$74^{95}$

- 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. 2 kg 74.95

IM-5217 SPECIFICATIONS. OC 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:** 9⅜″ W x 5⅜″ H x 9″ D.

Heathkit test equipment gives you reliable measurements

Accurate, reliable Heathkit Strip Chart Recorder

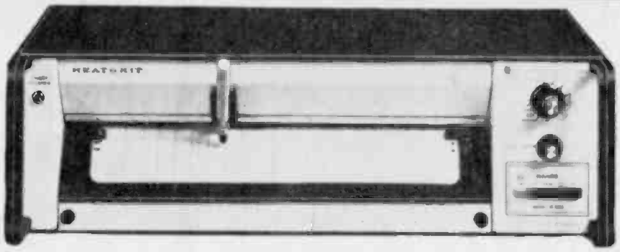
$\$559^{95}$ Kit

- Less than 0.5% error, full scale
- Rear panel connector for total recorder control from a remote location

Now available in both kit and assembled versions, the IR-5204/SR-204 belongs in your lab. Digital chart drive provides 10 chart speeds, English or Metric. Select four calibrated input spans. And you get extras that others charge more for — remote capability, pushbutton chart advance, electric pen lift with disposable pens, a built-in switchable input filter.

Kit IR-5204, Shpg. wt. 10 Kg	559.95
SR-204, Assembled and tested, Shpg. wt. 10 Kg	749.95
Dual-Pen Lab-Quality Recorder. Uses ONLY pens listed with IR-5207 below.	
SR-206, Assembled and tested, Shpg. wt. 18 Kg	2199.95

IR-5204/SR-204 SPECIFICATIONS: Chart Width: 10 inches (25 cm with optional metric drive). **Chart Speeds:** 10, 5, 2, 1, 0.5, 0.2, 0.1, 0.05, 0.02, 0.01 in/min (cm/min with metric conversion installed). Balance Time: 0.5 sec for full scale (filter out). **Overshoot:** Less than 1% of full scale. **DC Input Ranges:** 10 mV to 100 V full scale (12.5 mV to 125V full scale, metric). **Maximum Common Mode Input Voltage:** 400 V. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 5 11/32" H x 17 13/32" W x 12 5/16" D (13.5 x 44.2 x 31.3 cm).



Pens for IR-5204/SR-204 Strip Chart Recorder. Disposable nylon tip.

SU-406-92, Red Pen, Shpg. wt. 1 Kg	4.50
SU-406-93, Blue Pen, Shpg. wt. 1 Kg	4.50

Chart Paper for IR-5204/SR-204 and SR-206 Recorders. All 120' long.

Inch-calibrated paper with 0.1" divisions, 0-100 R to L. **SU-445-17,** Shpg. wt. 1 Kg	8.95
Centimeter-calibrated paper, offset 4 cm on R, 0-100 R to L. **SU-445-18,** Shpg. wt. 1 Kg	10.95
Centimeter-calibrated paper, 2 cm divisions, 0-250 R to L. **SU-445-21,** Shpg. wt. 1 Kg	10.95

Precision X-Y Chart Recorder gives you extra versatility, extra accuracy for the most demanding uses

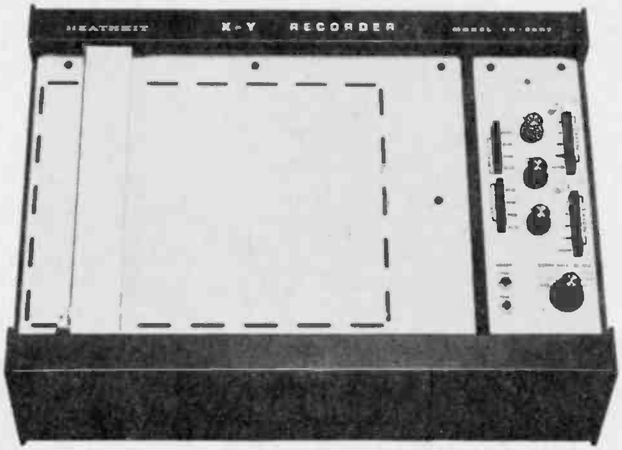
$\$799^{95}$ Kit

- Accurate to ±0.5 percent of full scale
- Adjustable line frequency filtration
- Electric pen lift to zero coordinates
- Complete front panel controls for easy operation

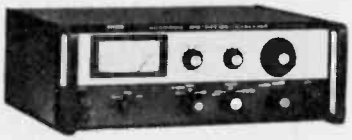
Precise enough for your most demanding measurements, the IR-5207/SR-207 is easy to set up and operate. Front-panel controls assure easy-operating convenience in any application. Front panel input filters with pushbutton controls let you tailor filtering to your exact requirements. Select ranges from 1 mV to 10 V. The integral paper holddown can be used in horizontal and vertical positions, and accepts any paper that fits the graph table. Electric pen lift. For 120/240 VAC, 50/60 Hz.

Kit IR-5207, Shpt. wt. 13 Kg	799.95
SR-207, Assembled and tested, 14 Kg	1159.95
Disposable Nylon Tip Pens for IR-5207/SR-207 Chart Recorder.	
Red Pen for chart speeds under 1 in/min. **SU-205-6,** 1 Kg	4.95
Blue Pen for chart speeds over 1 in/min. **SU-205-7,** 1 Kg	4.95

IR-5207/SR-207 SPECIFICATIONS: Chart Size: 8½" x 11" (21.59 x 27.94 cm). **Sweep Speeds:** 0.02, 0.1, 0.2, 1 and 2 in/S (0.04, 0.2, 0.4, 2 and 4 cm/S). **Balance Time:** >1 sec. for full-scale deflection. **Range:** 1 mV to 10 V. **Maximum Common Mode Input Voltage:** 400 V. **Dimensions:** 5⅜" H x 17⅜" W x 12¼" D.



Professional-quality Heathkit Distortion Analyzers



Outstanding sensitivity and bandwidth to let you measure Total Harmonic Distortion at levels as low as 0.03%, from 5 Hz to 100 kHz, with 5% full scale accuracy. Can also function as an AC voltmeter, with 1 mV to 300 V full scale capability. Not for use in strong RF fields. For 120/240 VAC, 50/60 Hz. 5⅜" H x 15" W x 11½" D.

Kit IM-5258, Shpg. wt. 8 Kg	379.95
Intermodulation Distortion Analyzer. Same as above, except measures IMD instead of THD. Also features dB measurement capability.	
Kit IM-5248, Shpg. wt. 7 Kg	249.95

Rugged Heathkit Bi-Directional Wattmeter for servicing

$\$189^{95}$ Kit

- Covers 100 mHz to 1 gHz without costly slugs or elements
- Ideal for servicing radios and communications equipment

The Heathkit IM-4190 Bi-Directional Wattmeter can help you service two-way radios, as well as VHF and UHF communications equipment. This rugged meter measures forward and reflected power in transmission lines between 100 mHz and 1 gHz. Features easy-to-read front panel meter, N-type coax connectors for easy hookup and N to PL-259 adapters. Dimensions, 4½" H x 4¼" W x 4⅝" D (11.4 x 10.8 x 11.8 cm). Requires 9-volt battery (not included).

Kit IM-4190, Shpg. wt. 2 Kg	189.95
SM-4190, Assembled and tested, Shpg. wt. 2 Kg	319.95

The Heathkit IM-2400 brings quality to hand-held frequency counters

$\$229^{95}$

NEW

New engineering and sub-miniaturization bring you the first hand-held Heathkit Frequency Counter — the new IM-2400. The most compact Heathkit Frequency Counter ever combines in-the-field versatility with bench-standard accuracy.

The IM-2400 measures frequencies from a large portion of the radio spectrum — from 50 hertz to 512 megahertz, in two ranges. Accuracy and long-term stability are assured with a crystal-controlled 10 megahertz time base. The excellent typical sensitivity of 10 millivolts, RMS (guaranteed sensitivity of 25 millivolts, RMS) over the entire range means you'll be able to read weak signals, too. Measure frequency by connecting the IM-2400 directly. Or, for counting without any connections, use the optional SMA-2400-1 Swiveling Telescopic Antenna (described below). Full voltage protection is built into the IM-2400 Counter for worry-free operation. **The big, 7-digit LED display** is easy to read and gives you better resolution.

You get true portability with the Heathkit IM-2400 Hand-Held Frequency Counter. The batteries are located INSIDE the housing. **Five rechargeable** 1.2 volts DC, AA-size nickel-cadmium batteries are included with this frequency counter — making the IM-2400 an even better value. And use line current — and recharge the batteries at the same time — with the available battery eliminator/chargers below (PS-2404 for 120 VAC, required for proper operation). **For bench use,** the IM-2400 includes a pivoting stand which supports the counter at a more convenient viewing angle.

Kit, IM-2400, Shpg. wt. 2 Kg **229.95**

NEW! Swiveling Telescopic Antenna for IM-2400, IM-2410 Counters. Also use on many 2-meter transceivers. Right angle version, with BNC connector included.

SMA-2400-1, Assembled, Shpg. wt. 1 Kg **12.95**

NEW! 120 VAC Battery Eliminator/Charger for IM-2400 Counter.
PS-2404, Shpg. wt. 1 Kg **9.95**

2372300
RANGE
TIME BASE

Shown with optional SMA-24001 Swiveling Telescopic Antenna

Performs as well on the service bench as in the field

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

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

Heathkit digital frequency counter IM 2410
803200
POWER

IM-2400 SPECIFICATIONS: Display: 8-digit LED display. **Frequency Ranges:** 10 hertz to 50 megahertz, 20 megahertz to 225 megahertz. **Maximum Sensitivity:** 25 millivolts, Root Mean Square (RMS). **Typical Sensitivity:** 10 millivolts, Root Mean Square (RMS). **Input Impedance:** 1 megohm, shunted by less than 24 picofarads. **Input Protection:** 150 volts AC, up to 100 kilohertz — derating to 5 volts AC from 160 megahertz to 225 megahertz. **Internal Time Base Frequency:** 3.58 megahertz. **Stability:** +1 part per million (ppm). **Temperature Stability:** +10 parts per million (ppm), from 0 to 40 degrees Celsius. **Gate Time:** 1 second or 0.1 second, switch selectable. **Frequency Resolution:** +1 hertz from 10 hertz to 50 megahertz with gate time set at 1 second; ±10 hertz from 10 hertz to 50 megahertz with gate time set at 0.1 second; ±10 hertz from 20 megahertz to 225 megahertz with gate time set at 1 second; ±100 hertz from 20 megahertz to 225 megahertz with gate time set at 0.1 second. **Power Requirement:** 120/240 volts AC, 50/60 Hz, 25 Watts maximum. **Dimensions:** 3.38 inches H x 7.25 inches W x 9.5 inches D (8.57 x 18.42 x 24.13 cm).

NEW

Another Heathkit instrument breakthrough — a truly versatile 10 Hz-225 mHz Digital Frequency Counter for this low price!

$\$199^{95}$

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

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

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

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

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

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

For even easier use, the IM-2410's pivoting stand places the counter at a more convenient viewing angle.

Additional features of the IM-2410 Frequency Counter include a rugged and compact cabinet — made of metal for greater durability and better RFI (Radio Frequency Interference) shielding — as well as a locking swing-down bail to elevate the front of the counter to a more desirable viewing angle. Complete voltage protection assures worry-free operation.

Exceptional accuracy and simplified operation combine to make the IM-2400 a valuable instrument for the engineer, technician and hobbyist alike.

Kit IM-2410, Shpg. wt. 3 Kg **199.95**

Heathkit TV/radio test equipment gives you top quality

Get world-famous Heathkit reliability in a high-quality Yoke/Flyback Tester – and spend a lot less money – with the new portable IT-5235

$169⁹⁵ Kit

- **Simple good/bad ring test checks yokes, flybacks and coils**
- **Quick, reliable measurement of drive signals in horizontal circuits**
- **Portable and lightweight with easy one-knob tuning**

Why spend twice as much for a comparable model when you can get world-famous Heathkit quality at an affordable price? The new IT-5235 Yoke/Flyback Tester offers simple and reliable performance in a portable, lightweight package designed for TV service technicians.

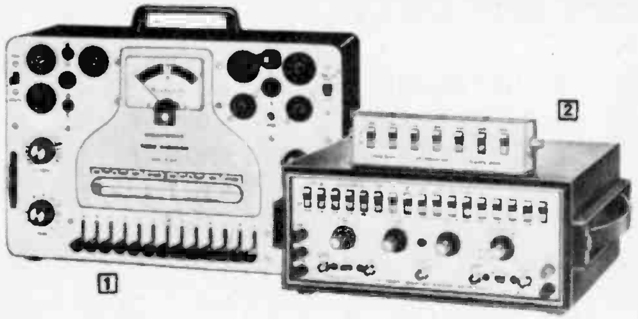
A dynamic good/bad ring test checks horizontal and vertical windings of yokes, flybacks, horizontal linearity coils, efficiency coils and general mid-frequency (10 to 100 kHz) coils. Testing can be conducted in or out of circuit. You can get measurements of drive signals in horizontal circuits, as well as focus and anode voltage measurements with the optional IMA-100-10 HV probe (listed below).

Use the IT-5235 on solid-state and tube-type TV's anywhere! It's lightweight (just 6 pounds) and portable, and can be operated on 110 or 240 VAC. One-knob tuning with color-coded controls, jacks and inputs provide easy, accurate measurements. Calibration requires only an oscilloscope. Test leads and convenient storage compartment included.

Kit IT-5235, Shpg. wt. 4 Kg	**169.95**
ST-5235, Assembled, Shpg. wt. 4 Kg	**239.95**
IMA-100-10, High-Voltage Probe, 1 Kg	**24.95**

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.

YOKE / FLYBACK TESTER



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. 6 Kg	**314.95**

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, 50/50 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.

Kit IG-5257, Shpg. wt. 8 Kg	**399.95**

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

$224⁹⁵ 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 set-up. Can be connected to a transmission line. Battery operated (batteries not included).

Kit IM-4180, Shpg. wt. 3.5 Kg	**224.95**
SM-4180, Assembled and Tested, Shpg. wt. 3 Kg	**409.95**
Kit IMA-4180-1, Battery Charger/Eliminator, 1 Kg	**44.95**
SMA-4180-1, Assembled and Tested, Shpg. wt. 1 Kg	**84.95**

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 10⁵⁄₁₆" W x 7³⁄₁₆" 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.

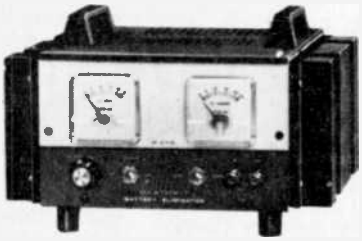
Kit IM-5210, Shpg, wt. 1 Kg	**49.95**

Top Value Heathkit Test Instruments

Reliable Power Supply/ Battery Eliminator

Provides variable 9-15 volt output capable of 12 amps continuous, 20 amps intermittent

$\$279^{95}$



Provides clean, accurate voltage source necessary for the reliable service of Ham, Marine, and CB communications gear. Features include two easy-to-read front panel meters which continuously monitor both current and voltage. Front panel adjustment allows continuously variable voltage selection from 9 to 15 VDC and a two position norm/standby switch.

Kit IP-2715, Shpg. wt. 14 Kg **279.95**

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.

$\$259^{95}$ Kit

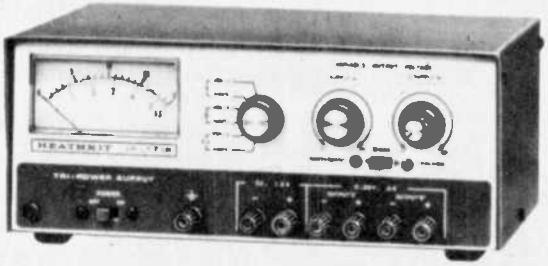
Easy-to-use General-purpose Power Supply. Provides 0-400 VDC output at 0-100 mA continuous (125 mA intermittent). The front panel voltmeter measures from 0-400 or 0-150 volts, the front panel ammeter from 0-150 mA. For 120/240 VAC, 50/60 Hz. 5⅛" x 13¼" W x 11" D.

Kit IP-2717, Shpg. wt. 9 Kg **259.95**

SP-2717, Assembled and Tested. 9 Kg **419.95**

General-Purpose Power Supply (not shown)

Kit IP2728, 1-15 VDC regulated. Shpg. wt. 3 Kg **59.95**



Tri-Output Power Supply ideal for digital circuits

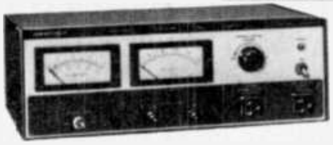
Combines fixed 5 VDC output with two continuously adjustable 0-20 VDC outputs for circuit designs requiring more than one voltage supply. The outputs of the two 20 VDC variable supplies and the fixed 5 VDC output can be interconnected in any combination to provide both positive and negative voltages with a fixed reference, or they can be allowed to "float" at no reference level. A clutch-coupled control allows the two 20 VDC supplies to "track" each other at any specified voltage difference. The 20-volt supplies can provide up to 0.5 amperes each. All outputs are short-circuit proof, with automatic current limiting. They can be operated independently, in series or in parallel.

Kit IP-2718, Shpg. wt. 6 Kg **179.95**

Assembled SP-2718, Shpg. wt. 6 Kg **349.95**

IP-2718 SPECIFICATIONS: Regulation: Load: less than 0.1% variation from no load to full load on 20-volt supplies, less than 2% variation from no load to full load on 5-volt supply **Line:** less than 0.2% variation for line voltage change of 10 volts on 20 volt supplies, less than 0.15% variation for line voltage change of 10 volts on 5-volt supply. **Power Requirement:** 100-135 or 200-270 VAC, 60/50 Hz, 100 watts full load **Dimensions:** 4½" H x 10¾" W x 9" D

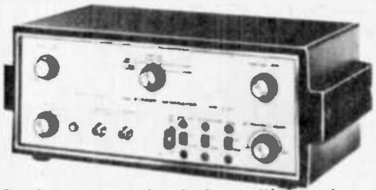
$\$249^{95}$



Variable Isolated AC Power Supply. Provides continuously variable 0-140 VAC output, with complete isolation from AC power line. Input voltage is 120 VAC, 60Hz. The output voltage is 0-140 Volts at 60 Hz. Has front panel ammeter and voltmeter. Output current is 3 A max. 5½" H x 15" W x 10½" D.

Kit IP-5220, Shpg. wt. 13 Kg **249.95**

Versatile FM Stereo Generator



Provides stereo signals for multiplex adapter adjustments...RF carrier for tuner & receiver adjustments...phase test function for subcarrier transformer adjustment...a 19 kHz pilot signal for receiver lock-in ranges...plus built-in sweep and marker signals. With test leads. For 120/240 VAC.

Kit IG-5237, Shpg. wt. 5 Kg **234.95**

Heathkit Audio Load (Not Shown.) Provides audio loads of 2, 4, 8, 16 or 32 ohms for audio amplifiers. 4" H x 9" W x 9" D.

Kit ID-5252, Shpg. wt. 3 Kg **109.95**

handy index

AMATEUR RADIO 59-67
AUTOMOTIVE 34-39
BEGINNERS KITS 2, 4, 33
AMATEUR BOOKS 60
CLOCKS 4
CLOCK RADIO 3
COMPUTERS 11-23
EDUCATION—ELECTRONIC 26-31
—AUTOMOTIVE 35
—COMPUTERS 22-23, 29-30
—MATHEMATICS 32
—TEST EQUIPMENT 44-45
DIGITAL SCALE 7
GAMES 5
GARAGE DOOR OPENER 39
HEATHKIT ELECTRONIC CENTRES 80
INTERCOMS 2
INSTRUMENTS 43-58
MARINE 24-25
METAL LOCATORS 2
OSCILLOSCOPES 56-58
RADIO 2, 3, 79
R/C MODELING 33
SCANNERS 25
SECURITY SYSTEMS—HOME 6
—AUTO 39
SMOKE DETECTOR 6
STEREO 68-76
TELEVISION 76-79
TOOLS 40
WEATHER 8-9

Digital Thermometer

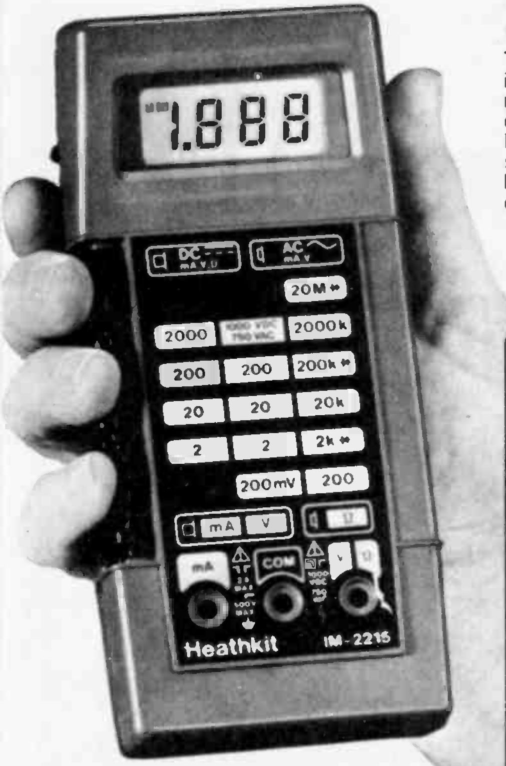
A unique, extremely useful tool for the home, office, laboratory or anywhere a quick temperature reading is needed. A bright, easy-to-read four digit LED display provides temperature readout over a range from 32°F to 212°F (or switch to read 0-100°C) in 1/10th degree increments. Power is supplied by standard 9V battery. A flashing decimal point provides a low battery warning. Fully assembled. Less battery.

GD-1226, Shpg. wt. 1 Kg **104.95**

BOOKS

Visit your Heathkit Electronic Centre and see their complete selection of Sams, Tab, AARL and other books and magazines.

New hand-held DMM gives you convenience and value



One of the lowest-priced hand-helds — offers top performance, easy operation

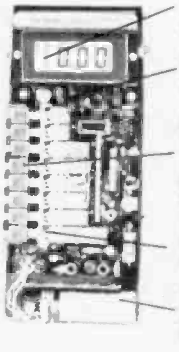
The new IM-2215 brings you the features you need in a hand-held DMM at a great low price. Measurement functions include AC and DC volts, AC and DC current, and resistance. Special alternating high-to-low resistance test voltage makes it ideal for measuring semiconductors and in-circuit resistance. Easy 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. A pivoting stand is included 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. 1 Kg **159.95**

Rugged Leather Carrying Case with Belt Loop. IMA-2215-1, Shpg. wt. 1 Kg **26.95**

PS-2350, 120-volt AC outlet cord. Shpg. wt. 1 Kg **8.95**

PS-2450, 220-volt AC outlet cord. Shpg. wt. 1 Kg **24.95**



3½-digit liquid-crystal display is easy-to-read in direct sunlight

A single printed circuit board makes kit assembly easy and fast

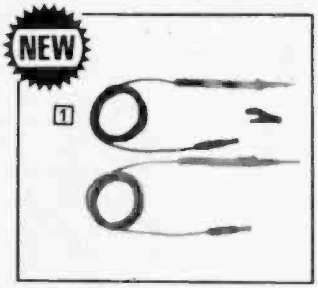
All dual-slope and analog-to-digital conversion circuitry is contained on a single MOS/LSI IC for simplicity and stability

Pushbutton range and function switches allow easy one-hand operation

Separate voltage and current inputs provide circuit protection for the units under test

IM-2215 SPECIFICATIONS: DC VOLTAGE: Ranges: ±200 mV, ±2 V, ±20 V, ±200 V, ±1000 V. **Accuracy:** Lab standards ±(.25% of reading +1 count). **Built-in standards:** ±(.35% of reading +1 count). **Input Impedance:** 10 megohms on all DC voltage ranges. **Overvoltage Protection:** 1000 VDC, 750 VAC on all DC ranges. **AC VOLTAGE: Ranges:** 200 mV, 2 V, 20 V, 200 V, 750 Vrms. **Accuracy (50 and 60 Hz):** Laboratory **standards:** ±(.5% of reading +3 counts). **Built-in standards:** ±(.6% or reading +3 counts). **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. **OC CURRENT: Ranges:** ±2 mA, ±20 mA, ±200 mA, ±2000 mA. **Accuracy:** ±(.75% of reading +1 count) on all DC ranges. **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: ±(1.5% of reading +3 counts). **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). **Overvoltage Protection:** 300 volts DC or AC, on all ranges. **Dimensions:** 2" H x 3¼" W x 7½" L.

NEW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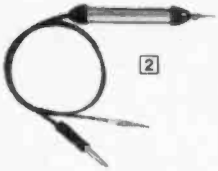
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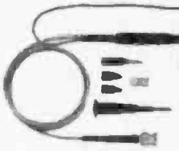
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SU-511-50
50Ω
1 WATT
6

① **New Test Lead Set.** 2000 V rms, 20 amp max. Includes 1.5 meter black and red cables each terminated by two 4mm shielded plugs, red sprung hook, red prod, black shrouded croc clip.
PKW-200, Shpg. wt. 1 Kg **27.95**

② **RF Probe** provides RF voltage measurement for any 10 or 11 megohm DC input voltmeter. Linear frequency response from 1000 Hz to over 100 MHz. Includes 10 MΩ banana plug, 11 MΩ phone plug.
Kit PK-3A, Shpg. wt. 1 Kg **15.95**

③ Combination X1, X10 Scope Probe. DC to 15 MHz (X1) and DC to 80 MHz (X10) bandwidths. X10 rise-time. 3-position slide switch, 4.5' cable.
PKW-105, Assembled & tested, Shpg. wt. 1 Kg **54.95**

④ Scope Demodulator Probe for distortion checks, RF & IF. 30V rms max., 500 VDC max. Banana/BNC option. **Kit 337-C**, Shpg. wt 1 Kg **19.95**

⑤ **Low capacitance Scope Probe** for direct or X10 attenuated operation; options for 3.3 or 1 megohm input resistance. Banana plug/BNC wiring option.
Kit PK-1, Shpg. wt. 1 Kg **19.95**

⑥ 50-Ohm Termination. DC to 1 GHz; 1 W. SWR: 250 MHz, 1.2:1, 600 MHz, 2.1 **SU-511-50**, 1 Kg **35.95**

ACCESSORY CABLES

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

SU-501-3, 3 ft., BNC/BNC, assembled, 1 Kg **11.95**

SU-501-6, 6 ft., BNC/BNC, assembled, 1 Kg **11.95**

SU-503-3, 3 ft., BNC/Banana, assembled, 1 Kg **11.95**

High-Accuracy 3-Digit Auto-Ranging Multimeter

$\$489^{95}$

- 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

1.000
HEATHKIT

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. DC accuracy is ±0.2%; 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. 5 Kg	**489.95**
IMA-2212-1, Optional Rechargeable Battery Pack for in-field use. 2 Kg	**79.95**

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 HOLO 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

$\$129^{95}_{\text{Kit}}$

DIGITAL MULTIMETER
HEATHKIT

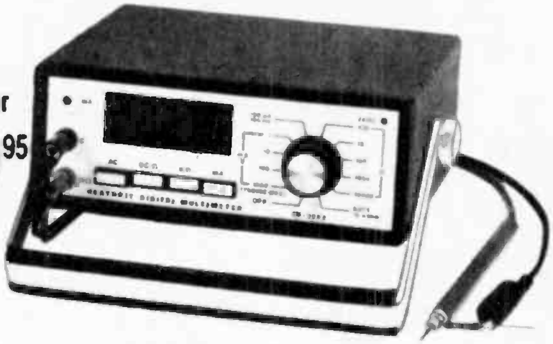
You get four overlapping AC & DC voltage & current ranges and five resistance ranges. Features overload protection on all ranges, 120 or 240 VAC operation, isolated floating ground, attractive heavy-duty case to withstand rugged use, universal banana jack inputs.

Kit IM-1210, Shpg. wt. 2.5 Kg	**129.95**
SM-1210, Factory assembled and calibrated. 2.5 Kg	**249.95**

IM-121D 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″ O. **Weight:** 3.3 pounds (1.5 kg). **NOTE:** Specifications are based on 30-minute warmup.

Portable Digital Multimeter

$\$369^{95}$

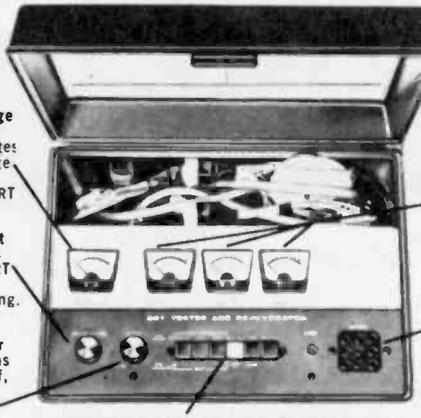


Features 26 ranges, 100% overrange capability, separate voltage and current inputs, overload protection. Battery or AC operation.

Kit IM-2202, Shpg. wt. 4 Kg	**369.95**

IM-22D2 SPECIFICATIONS: DC VOLTAGE — Overload Capability: 300 V on 100 mV & 1V ranges; 1000 V on 10 V & 1000 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 mA/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).

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

Pushbutton Operation for all tests and processes.

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

$\$199^{95}$ Kit

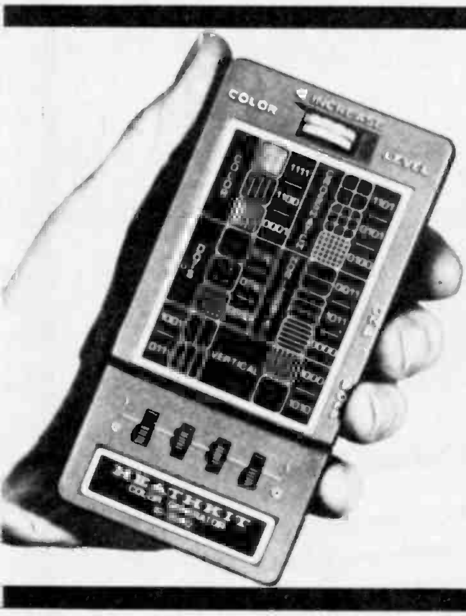
Low-Cost CRT Tester/Rejuvenator brings your old and worn TV picture tubes back to life

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. With 4' heavy-duty test cable.

Kit IT-5230, Shpg. wt. 5 Kg 199.95

Factory assembled version of above.
ST-5230, Shpg. wt. 5 Kg 349.95

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:** 105-135 VAC, 60/50 Hz (50 watts maximum at 60 Hz). **Dimensions:** 5.12"x10"x13.5" HDW.



$\$104^{95}$

Pushbutton on-off with battery-saver circuit to preserve battery life

Color level control adjusts the intensity of the three color levels

16 different pattern selections, including rainbow, dots, cross-hatch, horizontal and vertical lines

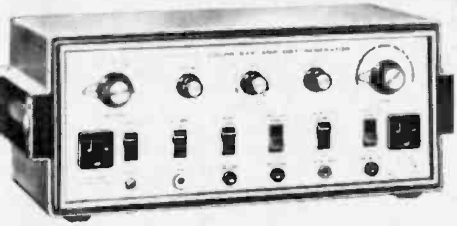
Portable Color Alignment Generator for in-the-field service

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 it in your service shop today!

Kit IG-5240, Shpg. wt. 1 Kg 104.95

SG-5240, Factory assembled version of above. Shpg. wt. 2 Kg 169.95

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.



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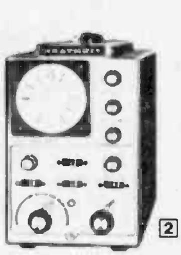


2

Easy to use and accurate — makes color TV service a breeze.

1 Color Bar and Dot Pattern Generator for easy service

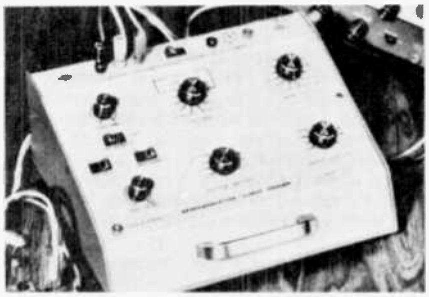
Provides 12 patterns plus a clear raster for purity adjustments, and patterns are available in the exclusive Heath 3x3 display or the familiar 9x9. Has RF output for channels 2 through 6, variable up to 50,000 µV, variable plus and minus going video, front panel gun shorting switches and lead piercing 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. 4 Kg 219.95

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 the standard 9x9 display or the exclusive Heath 3x3 format. Has tuning for channels 2-6, RF output variable to 50,000 µV, plus or minus going video signals, front panel sync output, lead-piercing grid jacks, and front panel gun shorting switches.

Kit IO-4101, Shpg. wt. 6 Kg 359.95

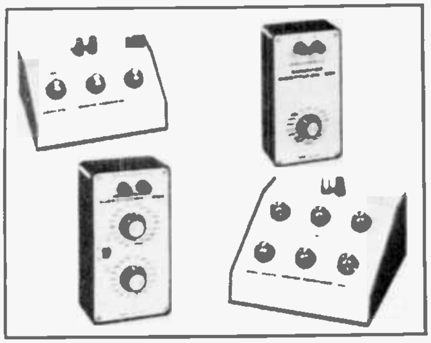


High-performance Heathkit Curve Tracer tests semiconductors quickly, easily

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

Kit IT-3121, Shpg. wt. 5 Kg. **199.95**

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



1 Decade Capacitance Box functions as a wide-range capacitor for design work. Covers 100 pF to 0.111 μF in 100 pF increments. Rated 400 VDC.

Kit IN-3127, Shpg. wt. 1 Kg **47.95**

2 Resistor Substitution Box provides switch selection of 36 10% tolerance, 1-watt resistors from 15 ohms to 1 megohm.

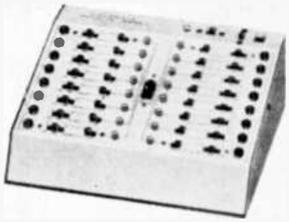
Kit IN-3137, Shpg. wt. 1 Kg **34.95**

3 Capacitor Substitution Box provides switch selection of 18 EIA standard capacitors from 100 pF to 0.22 μF. All capacitors are rated at 600 VDC – except the three lowest and two highest values, which are rated at 500 and 400 V respectively.

Kit IN-3147, Shpg. wt. 1 Kg **26.95**

4 Decade Resistance Box is variable multiplier/shunt, variable resistor, or arm with AC and DC bridges. Covers 1 Ω to 999,999 Ω in 1-ohm steps.

Kit IN-3117, Shpg. wt. 1.5 Kg **89.95**



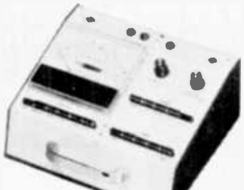
This deluxe Heathkit Digital IC Tester is designed to save you checking time

Quality "zero-force" insertion socket, exclusive "bounce-free," mercury stepping switch, input-output jacks for each pin, neon indicators. Install 14- or 16-pin ICs in any position. Ideal for use with Digital Techniques Program (page 28). A 'must' for anyone working with digital integrated circuits.

Kit IT-7400, Shpg. wt. 3 Kg **159.95**

IT-7400 SPECIFICATIONS: Pull-up Resistors: externally connected, with patch terminals. **Patch Terminals:** one at each pin. **Selector Switches:** two at each terminal, one for +5, step, or off; the other for gas discharge or ground. **Gas Discharge:** allows direct driving of neon indicator lamp for high voltage decoder driver. **Power Supply:** 5 VDC regulated, ±5%, 300 mA and 3.6 VDC, switch selected. **Power Requirement:** 120/240 VAC, 60/50 Hz.

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



- **Tests diodes, FETs, transistors, SCRs, triads**

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

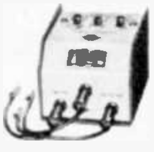
Kit IT-3120, Shpg. wt. 2.5 Kg **119.95**

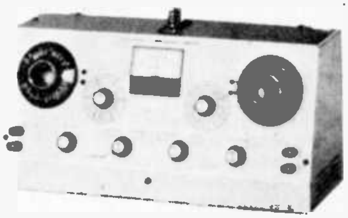
IT-3120 SPECIFICATIONS: Out-of-circuit Accuracy: ±5% for DC beta and leakage. **In-Circuit Accuracy:** indicates good or bad transistor, FET, diode, SCR or triac. **Diode Test:** Tests for forward conduction and blocking. **Unijunction Transistor Test: Measures**, Ieb_2s, Ib_2b_1s and emitter current. **Power Requirement:** Two 1½ V alkaline cells (not supplied). **Dimensions:** 5" H x 9⅟₁₆" W x 8⅛" D.

Take this portable Transistor/Diode Checker with you anywhere

Checks high and low power transistors (NPN and PNP) for shorts, opens, leakage and current gain; diodes for forward and reverse current; tests continuity. Uses two 1.5 V "C" cells (not included). 3⅛" H x 3⅛" W x 3¾" D.

Kit IT-3127, 1 Kg **29.95**





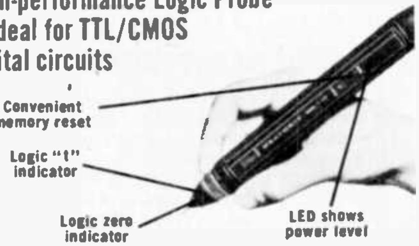
High-accuracy Heathkit Impedance Bridge gives you easier, better measurements

The Heathkit IB-3128 Impedance Bridge features four separate bridge circuits to give you more accurate measurement of resistance, capacitance, low and high inductance, dissipation factor of capacitors and quality factor of inductors. It also has a direct reading 100-0-100 microammeter, front panel binding posts for easier test setups, a built-in DC power supply and a 1000 Hz AC generator. The kit requires headphones or an oscilloscope for alignment. For 120/240 VAC, 50/60 Hz. The IB-3128 is a quality instrument that belongs on your test bench. It's an easy-to-build kit, too.

Kit IB-3128, Shpg. wt. 5 Kg **284.95**

IB-3128 SPECIFICATIONS: Detector: Vacuum tube detector and amplifier, using built-in meter. Terminals for external detector. **Resistance:** 0.1 ohm to 10 megohms. **Capacitance:** 100 pF to 100 μF. **Inductance:** 0.1 mH to 100 H. **Dissipation Factor:** (D) 0.002 to 1. **Storage Factor:** (Q) 0.1 to 1000. **Accuracy:** 0.5% decade resistors used. **Dimensions:** 8" H x 17" W x 6" D.

High-performance Logic Probe is ideal for TTL/CMOS digital circuits



Detects and indicates high and low logic levels in TTL or CMOS circuitry. Detects logic signals to 100 mHz, polarity and presence of single pulses as short as 10 nSec. Includes power leads, mini-clips and ground clip. ¾" H x 1" W x 9¼" L.

Kit IT-7410, Shpg. wt. 1 kg **64.95**

ST-7410, Factory Assembled, Wt. 1 Kg **129.95**

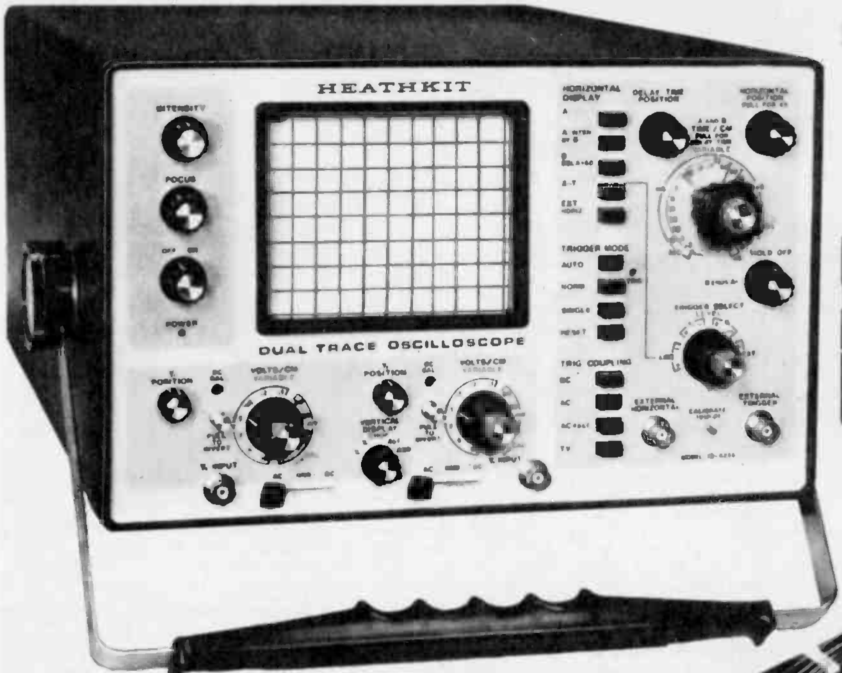
High quality instrument Test Probes

30 kV High-Voltage Probe multiplies DC ranges of any 10-megohm meter by 100. 1000 megohm input.
Kit IMA-100-10, Shpg. wt. 1 Kg **24.95**

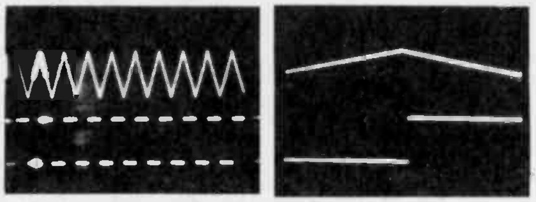
30 kV HV Probe. x 100 measurement for meters with 11-megohm input (including probe resistance).
Kit IMA-100-11, Shpg. wt. 1 Kg **24.95**
SMA-100-11, Factory Assembled, 1 Kg **36.95**

30 kV Probe provides x1000 attenuation for meters with 1-megohm input inpedance.
Kit IMA-100-1, Shpg. wt. 1 Kg. **24.95**

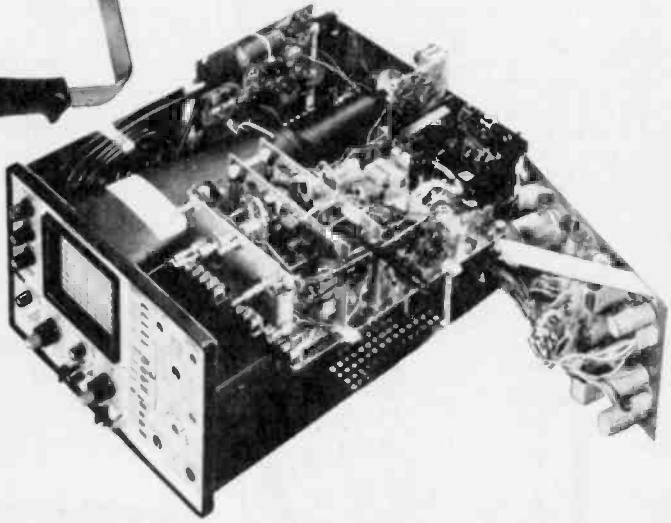
DC-35 MHz DUAL-TRACE DELAYED-SWEEP SCOPE



$^{\$}1559^{95}$ 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.



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).



Swing-out circuit boards for easy servicing and access to components. Unit can be operated even with boards swung out.

NO OTHER MANUFACTURER OFFERS ALL THESE FEATURES AT THIS PRICE! • Smooth rolloff allows observation of signals beyond 50 MHz • Less than 10 nS rise time for observation of 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 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 IG-4505 or IOA-4510-1 on page 58 and a DC voltmeter.

Kit IO-4235, Shpg. wt. 24 Kg 1559.95

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 pretriggered 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. **GENERAL: CRT: Type,** 8x10 cm mesh expanded with internal graticule. **Acceleration Potential:** 10 kV regulated. **Phosphor:** P31. **Voltage Range:** 100 to 135 VAC/200-270 VAC switch selected. 85 watts. **Internal Supplies:** fully regulated. **Operating Temperature Range:** 10° C to 40° C. **Dimensions:** 7¾" H x 13¾" W x 19¾" D (without handle).

HEATHKIT DUAL TRACE OSCILLOSCOPE

Lab Quality Oscilloscope — Dual-Trace, DC-15 MHz with vertical delay lines

$\$1199^{95}$

Vertical input sensitivity of 1 mV/cm is provided over the entire bandwidth. With a x10 probe waveforms to 10 mV can be read — not the 50 or 100 mV found on other scopes.

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. IO-4510 calibration requires a precise source of square waves such as IOA-4510-1 or IG-4505 on page 58.

Kit IO-4510, Shpg. wt. 17 Kg	1199.95

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: Single:** 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. **GENERAL: CRT: Type:** 6 x 10 cm spiral PDA. **Graticule:** 6 x 10 cm illuminated, variable by front panel control. **Power: Voltage Range:** 100 to 140 VAC/200 to 280 VAC, switch selected, 75 watts. **Operating Temperature Range:** 10°C to 40°C. **Dimensions:** 6.4" H x 12.9" W x 19.3" D (handle extended). **Weight:** 24 lbs.

HEATHKIT
OSCILLOSCOPE

DC to 5 MHz Oscilloscope — Dual-Trace or Single-Trace

The new 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). Trigger controls include selection of normal or automatic modes, switch controlled AC or DC coupling and front panel input of external triggering signals. A special TV position on the trigger selector control allows low frequencies to pass while rejecting the high frequencies, 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 by the time/cm switch. A variable control provides for precise settings between steps. The horizontal amplifier accepts external inputs from DC to 100 kHz.

The fully regulated power supply supplies accurate voltage and current even under varying line and load conditions. Partial mu-metal shielding helps eliminate display errors caused by stray magnetic fields.

Kit IO-4205, (Dual-Trace) Shpg. wt. 13 Kg	449.95
Kit IO-4105, (Single-Trace) Shpg. wt. 13 Kg	379.95

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:** 110-130 VAC, or 220-260 VAC, 50/60 Hz, 50 watts. **Dimensions:** 13" W x 8" H x 17" D.

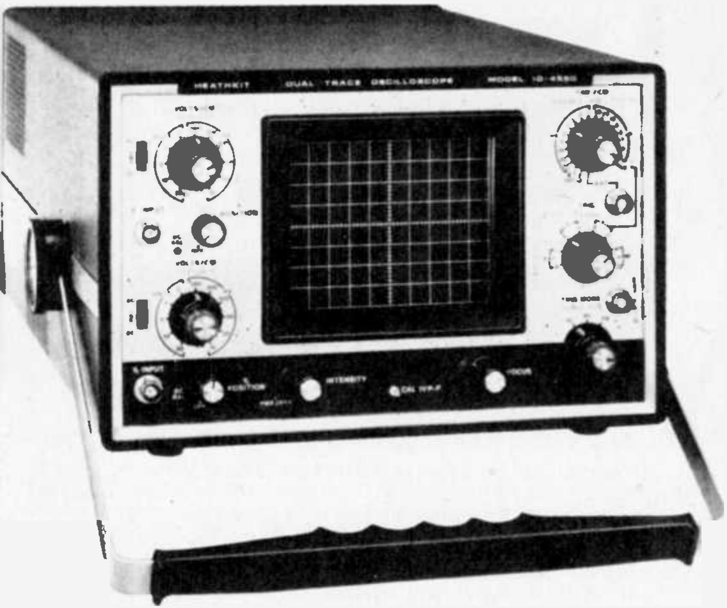
$\$49^{95}$

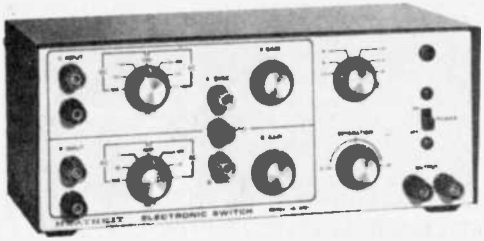
Heathkit 40 kV High-Voltage Probe Meter

Makes TV tube voltage measurements fast and convenient. Measures DC voltages up to 40 kV with ±3% accuracy. The on-off switch on the handle protects the meter during hookup and when the probe is not in use. Easy operation, easy assembly. 1½" H x 1⅞" W x 15" D.

Kit IM-5210, Shpg. wt. 1 Kg	49.95

Dependable Heathkit Oscilloscopes and accessories





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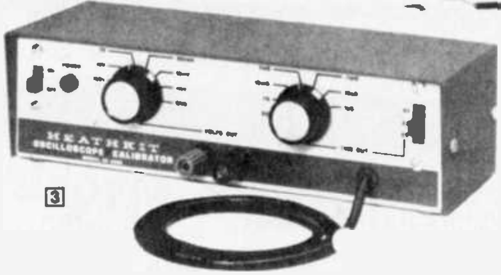

3

Dual-Trace DC-10 MHz 'Scope is ideal for TV service and design

The IO-4550 is an excellent choice for TV service, electronics experimentation and design. Its extra-bright trace allows easy reading even in high ambient light; its two vertical input channels have a maximum sensitivity of 10 mV/cm for accurate measurements.

Input channels are displayed, chopped or alternate, as selected by the time base switch. A trigger select switch and level control allow the time base to be precisely triggered at any point along the positive or negative slope of the signal. The digitally controlled time base provides automatic triggering so no stability control is necessary and fewer adjustments are required.

The fully regulated high voltage power supply assures operation to specifications on standard line voltages from 100 to 270 volts. Complete mu-metal shielding helps prevent interference from stray magnetic fields.

Improved circuitry and just 4 printed circuit boards make the IO-4550 an easy kit to assemble. Calibration requires a precise source of square waves such as IOA-4510-1 (with additional 6 volt power source) or IG-4505.

Kit IO-4550, Shpg. wt. 13 Kg **649.95**

IO-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 1 MHz. **Connector:** BNC. **TRIGGER: Internal: Automatic:** Adjustable over 10 divisions. **Normal:** Adjustable over 10 divisions. **Slope Selection:** + or —. **External: Automatic:** Adjustable over 0.8 V. **Slope Selection:** + or —. **Impedance:** 1MΩ 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:** 100-135 VAC/200-275 VAC switch selected, 70 watts at 120 VAC (240 VAC). 6.9" H x 12.9" W x 19.3" D (without handle).

HEATH
charg·a·kit
REVOLVING CHARGE

1 Top-value Scope Switch for dual-trace capability

Gives any single beam 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. Frequency response — DC-5 MHz + 1½ dB, –3 dB.

Kit ID-4101, Shpg. wt. 2.5 Kg **109.95**

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 5⁵⁄₁₆" D.

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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 IO-4530. 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 IO-4530.

Kit IOA-4510-1, Shpg. wt. 1 Kg **24.95**

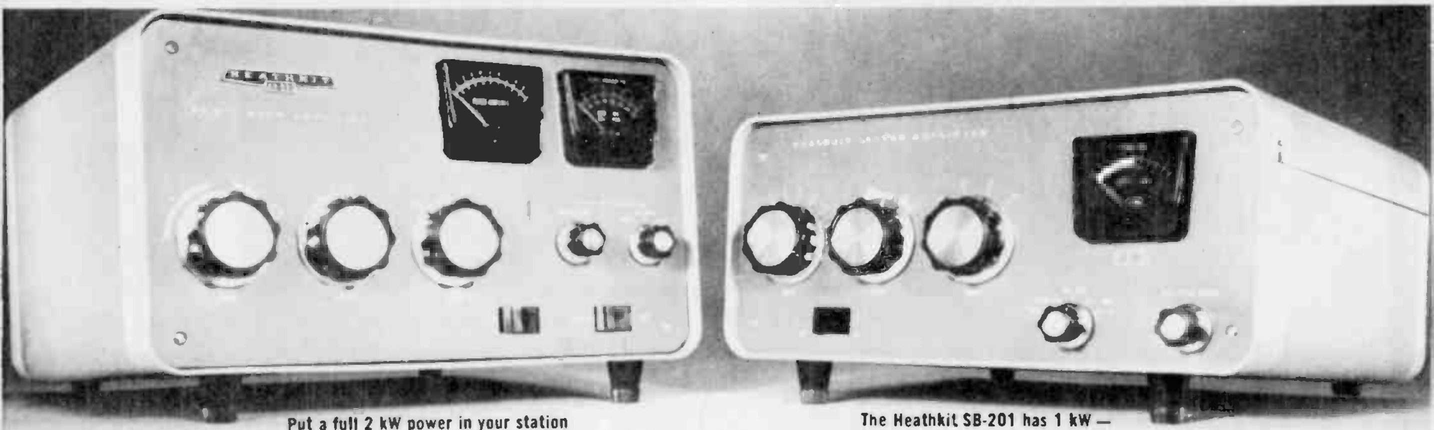
3 Deluxe Calibrator for scopes to 35 MHz bandwidth

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...order the IG-4505.

Kit IG-4505, Shpg. wt. 2 Kg **84.95**

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 IMΩ 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.

Heathkit Linears – the power packed performers



Put a full 2 kW power in your station with the SB-221

The Heathkit SB-201 has 1 kW — great for SSB

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

$1099 95

- 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.

Kit SB-221, Shpg. wt. 30 Kg **1099.95**

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

$759 95

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

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.

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. 22 Kg **759.95**

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.). **Size:** 6⅝" H x 14⅞" W x 13⅜" D.

Change up to five antennas at the flip of a switch in your shack

New Heathkit Remote Coax Switch makes antenna changing a snap!

$159 95

- Saves on expensive coax feedline
- Handles full legal power
- Erasable front panel label

New bargain-priced Remote Coax Switch replaces four coax feedlines from the shack to your antennas. Not only do you save money on expensive coax feedline, but what convenience! You can select any of 5 antennas simply by turning a knob on the control panel — without even budging from your chair to change connections on the back of your rig. The SA-1480 lets you operate across the entire band up to 150 MHz . . . and at low SWR. It's a mere 1.05:1 below 30 MHz, and 1.20:1 below 150 MHz. The Remote Coax Switch is rated for full legal power, too. Loss at 100 MHz is less than .2 dB. To protect your equipment against lightning damage, a special ground position grounds all five antennas. **Heath engineers have designed the SA-1480** with silver-plated switch contacts to help reduce SWR and to give greater reliability. SWR is further reduced by a specially-shielded switch box, which also protects the switch from the elements. Bright LED's indicate which antenna is in use, and a convenient erasable front panel allows you to label antennas for accurate switching. The easy-to-build kit includes U-bolt assembly for mounting on antenna mast or tower. The solenoid housing includes SO-239 connectors. 50-70 ohm impedance. 120/240 VAC, 50/60 Hz.

Kit SA-1480, Shpg. wt. 4 Kg	**159.95**
IDA-1290-1, 50-ft. 8-wire cable, 1 Kg	**15.95**
IDA-1290-2, 100-ft. 8-wire cable, 2 Kg	**26.95**
IDA-1290-3, 150-ft. 8-wire cable, 3 Kg	**39.95**

Reliable, money-saving amateur accessories

$\$139^{95}$

For VHF use

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

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

- 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 9V battery (not included) or on 120 VAC with the optional converter below.

Kit HM-2141, Shpg. wt. 1.5 Kg	139.95
Kit PS-2350, AC Adapter for HM-2141, Shpg. wt. 1 Kg	8.95

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 6⅝" D.

$\$129^{95}$

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

For HF use

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

- 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. 1.5 Kg	129.95
Kit PS-2350, AC Adapter for HM-2140, Shpg. wt. 1 Kg	8.95

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 6⅝" 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. 2 Kg	99.95

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

Another Heath value — a better dip meter at lower cost. The Colpitts oscilator 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. 2 Kg	94.95

HEATH'S REFERENCE LIBRARY OF LATEST AMATEUR RADIO PUBLICATIONS

Radio Handbook (Sams), EDP-117	31.75
Amateur Tests and Measurements (Sams), EDP-119	6.75
73 Dipole and Long Wire Antennas (Sams), EDP-180	8.75
73 Vertical, Beam and Triangle Antennas (Sams), EDP-181	8.75
So You Want to be a Ham (Sams), (6th Ed.), EDP-515	8.75
Ham Handbook for Beginners (Glen Emo), P-100	7.50
ARRL Single Sideband for the Radio Amateur, P-102	5.50
ARRL Antenna Book, P-103	6.50
ARRL Radio Amateurs' VHF Manual, P-104	5.50
ARRL Understanding Amateur Radio, P-105	6.50
ARRL Hints and Kinks for the Radio Amateur, P-106	5.50
ARRL A Course in Radio Fundamentals, P-107	5.50
ARRL Radio Amateurs' License Manual, P-110	4.25
ARRL Great Circle Map, P-112	5.50
ARRL Log Book, P-113	2.75
ARRL Mini Log, P-114	1.75
ARRL Radio Amateurs' Handbook (1980), P-116	13.25
Ham Handbook for the Advanced (Glen Emo), P-117	9.50
ARRL FM and Repeaters for the Radio Amateur, P-118	6.50
Foreign Call Book, P-120	19.95
U.S. Call Book, P-121	21.95
ARRL Electronics Data Book, P-122	5.00
ARRL The Radio Amateurs' Operating Guide, P-123	5.00
CARF Radio Regulations Handbook, P-124	7.99
CARF Certificate Study Guide, P-125	7.99
ARRL Code Kit, P-128	11.95
ARRL Solid-State Design for the Radio Amateur, P-129	9.50
ARRL Learning How to Work With Integrated Circuits, P-130	2.95
CARF Advanced Certificate Study Guide, P-131	7.99
ARRL Getting to Know Oscar, P-132	4.25
ARRL Radio Frequency Interference, P-133	4.25
ARRL Solid State Basics, P-134	6.50
ARRL Satellite Communications, P-136	5.75
ARRL Antenna Anthology, P-137	5.50
Repeater Directory (A.R.R.L.), P-138	1.95

Station Accessories

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. 1.5 Kg 79.95

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:** 5⅟₁₆" H x 2¼" W x 6½" D.

Kit HM-2102 (not shown), same as above, except 50-160 MHz and 25 to 250 watts. 2 Kg 79.95

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. 1 Kg 29.95

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 Kg 24.95

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. 1.5 Kg 39.95

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. 1.5 Kg 79.95

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 Kg 69.95

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 Kg 29.95

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. 2 Kg 79.95

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.

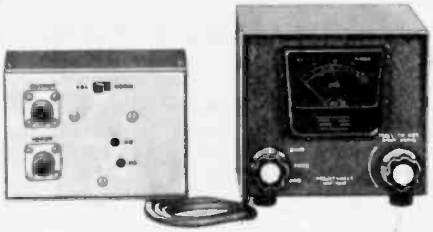
Kit HD-1274, Shpg. wt. 1.5 Kg 36.95

10 **Heath's HD-1234 coax switch** switches up to 4 different antennas. Handles up to 2 kW PEP, grounds all outputs not in use, and has an operating range to 250 MHz. 50 ohms impedance.

Kit HD-1234, Shpg. wt. 1 Kg 21.95

11 **NEW! Six-Socket Multiple Outlet Box** puts power where you need it. Has 6 outlets — five switched, one unswitched. Maximum 10 amp load. Includes fuse, fuse holder and 6-foot long cord. For 120 VAC.

Kit HD-1360, Shpg. wt. 1 Kg 25.95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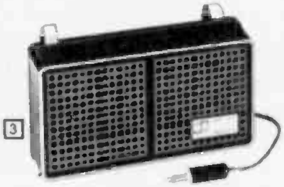
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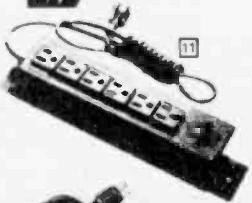
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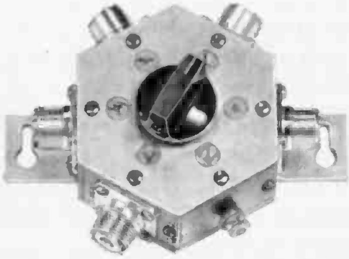
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9

Antennas and accessories that get your signals out

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.

This handsome addition to your shack features a continuously variable inductor to give you an infinite number of impedance settings. A counter on the front panel indicates inductors settings. The eraseable front panel allows you to make notations of band settings for ease of operation.

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 handling power input of up to 2000 watts PEP on side-band and 1000 watts on CW.

It won't take you long to get your SA-2040 on the air – the easy-to-build kit is a two-evening project. 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.

Kit SA-2040, Shpg. wt. 7 Kg **279.95**

SA-2040 SPECIFICATIONS: Frequency Coverage: 3.5-30 MHz. **Power Input Capability: SSB:** 2000 watts PEP; **CW:** 1000 watts. **Input Impedance:** 50 phm. **Output Impedance:** Wide Range. **Cabinet Dimensions:** 5⅝" H x 14 13/16" W x 13 15/16" D.

Quality HF and VHF Amateur Antennas from HEATH

10-40 Meter trap vertical – Omni-directional – 7, 14, 21, 28 MHz, 50 ohm feed, with SO-239, less than 2:1 VSWR at resonance, 1 kw, mounts to 1½" mast – less coax – Height 203" – 80 mph wind rating.

HDC-1040, Shpg. wt. 7 Kg **129.95**

10-80 Meter trap vertical – Omni-directional – 3.5, 7, 14, 21, 28 MHz – 50 ohm feed with SO-239, less than 2:1 VSWR at resonance, 1 kw, mounts to 1½" mast, less coax – Height 282", 80 mph wind rating.

HDC-1080, Shpg. wt. 8 Kg **159.95**

Two Meter, 8 element Yagi – gain 10 db – VSWR 1.3.4 – Beamwidth 48° – front-to-back ratio 22 db – impedance 50 ohm with SO-239 – 150 watts – boom 135" – snap-out elements.

HDC-2080, Shpg. wt. 6 Kg **49.95**

Two Meter, 6-element Yagi Heavy Duty – 138 – 174 MHz – Gain 9.5 db – VSWR 1.25:1 – Front-to-back ratio 15 db – band width ± 4% – Boom length 90" – wind rating 85 mph with ½" ice.

HDC-2060, Shpg. wt. 7 Kg **84.95**

Two Meter, 8-element circular polarized Yagi – Gain 10 db – VSWR 1.3:1 – Front-to-back ratio 22 db – impedance 50 ohms with SO-239 – 150 watt – Boom length 135".

HDC-2010, Shpg. wt. 9 Kg **79.95**

Two Meter, Colinear base – gain 6 db – VSWR 1.2:1 – impedance 50 ohms with SO-239 – 500 watt – mounts on 1½" mast – height 9'.

HDC-2000, Shpg. wt. 5 Kg **54.95**

Two Meter, ⅝ Mobile – Gain 3 db – base loaded 48" – Stainless Steel whip – trunk lid and roof mounts including 17' coax with PL-259.

HDC-2200, Shpg. wt. 2 Kg **34.95**

Two Meter, ⅝ Mobile – Same specs as HDC-2200 but with magnetic mount.

HDC-2201, Shpg. wt. 4 Kg **49.95**

The Double Bazooka Coax Folded Dipole Antenna

P-300 80 M Antenna, Shpg. wt. 2 Kg **39.95**

P-301 20 M Antenna, Shpg. wt. 1.5 Kg **29.95**

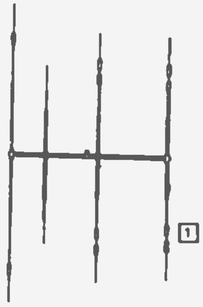
Improve your SWL listening with these low-cost additions

Superex Headphones. These quality low-cost headphones are ideal for use with SWL receiver. Feature excellent sensitivity, wide headband for comfort. 600 ohms impedance.

GD-396, assembled. Shpg. wt. 1 Kg **14.95**

Long-wire SWL antenna. Really helps you pull in stations! 75' long wire with 30' lead-in, all insulators and hardware for easy setup. A must for serious listeners.

GRA-72, Shpg. wt. 1 Kg **10.95**



NEW

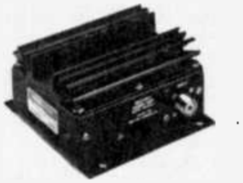
1 New Heathkit SA-7010 4-Element Tri-Band Yagi. The new SA-7010 is the easiest-to-assemble Tri-Band antenna ever. An easy-to-follow, Heathkit manual means you can be on the air in as little as 3 to 4 hours.

Three active elements on each band give you good 8.3 dB actual gain over a dipole on 10, 15 or 20 meters. Front-to-back ratio is 25 dB, minimizing interference. A separate 10-meter reflector assures correct monoband spacing. Energy transfer is more efficient, with VSWR of less than 1.5:1 at resonance on each band. Full legal power. 15' boom, 31' longest element. 17'5" turning radius. 5.8 sq. ft. wind area.

SA-7010, Shpg. wt 21 Kg **399.95**

2M Mobile Amps

40 W 2M Amp for mobile transceivers



Delivers solid 40 W minimum for 10 watts in. Has antenna changeover relay and sensing circuitry for completely automatic T/R switching, tuned input/output circuits provide low spurious radiation. Special emitter ballasted configuration – withstands VSWR's of up to 3.1.

Kit HA-202A, 2 Kg **104.95**

HA-202A SPECIFICATIONS: Power Output: 20 W @ 5 W. in. 40 W @ 10 W in. 50 W @ 15 W in. **Impedance:** 500 nom. **Input VSWR:** 1.5:1 max. **Max. Stable VSWR:** 3:1. **Harmonic and Spurious Radiation:** –60 dB or better. **Standby Current:** 1 mA. **Power Requirement:** 12-16 VDC, 7 A max. **Size:** 3" H x 4¼" W x 5½" D.

10 W Amp for your 2-meter hand-held

The HA-201A delivers up to 10 W for a 1½ W input, 8 W for a 1 W input. Fully automatic operation, solid-state transmit/receive switching, tuned input and output for maximum efficiency and reduced spurious emissions. Withstands infinite VSWR load. Easy assembly. Comes with SO-239 connectors for easy hookup.

Kit HA-201A, 1 Kg **59.95**

HA-201 SPECIFICATIONS: Power Output: (at 13.6 VDC input): 8 W @ 1 W in; 10 W @ 1.5 W in. **Input/Output impedance:** 500. **Power Requirements:** 12-16 VDC, 2.2 A max. **Size:** 2¾" H x 4⅝" W x 5⅛" L.

Hand-Held 2-Meter Transceiver

- **8 CHANNELS WITH SINGLE CRYSTAL FOR EACH CHANNEL**
- **SIMPLEX OPERATION PLUS ± 600 kHz OFFSETS**
- **1-WATT AUDIO OUTPUT FOR CLEAN, CLEAR RECEPTION**

Two meters is the exciting place to be in Amateur Radio today, and our new VF-2031 8-channel 2-meter FM transceiver is one of the BEST ways to work it! This compact, hand-held unit gives you the features, value and versatility you simply won't find on other units in this price range!

A minimum of 2 watts out gives you plenty of power for local two-way communications or repeater access. Frequency stability is 0.005% or better for accurate signals. Spurs are down a full 60 dB, so you never have to worry about causing interference with other units or accidentally accessing repeaters. A separate built-in microphone and speaker plus well-designed FM circuitry contribute to better audio on both transmit and receive.

A single crystal controls both receive and transmit on each channel for extra versatility. The simplex/offset switch has three positions – 0, +600 kHz and –600 kHz – so you have a choice of three transmit frequencies for each channel. To operate with the full capabilities of the VF-2031, simply buy eight crystals in any 2 MHz segment of the VF-2031's 143.5 to 148.5 frequency coverage (both offset crystals are supplied) and you'll have 8 receive and 24 transmit channels! That's true money-saving versatility. And with the optional auto-patch encoder (VFA-2031-3 below) you can even access telephone lines through repeaters with auto-patch input to add **telephone versatility** at remarkable low cost.

The VF-2031 includes a nickel-cadmium battery pack and 120/140 VAC battery charger. Under normal operation, the batteries will last 7 to 10 hours on a full charge. The charger will fully recharge the batteries in approx. 14-24 hours. The VF-2031 drops right into the charger compartment for easy and convenient charging. Other accessories supplied with the VF-2031 include a "rubber duckie" antenna and earphone for private listening.

The VF-2031 has volume and squelch controls, universal BNC-type output connector and 3-position simplex/offset switch. It's compact and lightweight and has a rugged, high-impact case. Compare features and specs and you'll find the VF-2031 to be one of the most versatile and value-packed 2-meter rigs around! Order yours today. Requires VTVM for alignment. Not recommended for beginning kitbuilders.

Kit VF-2031, Shpg. wt. 2 Kg **359.95**

Fitted Holster-Style Carrying Case for VF-2031.
VFA-2031-2, Shpg. wt. 1 Kg. **31.95**

Auto-Patch Encoder. Lets you access telephone lines from repeaters with touch-tone inputs to make telephone calls.
VFA-2031-3, Shpg. wt. 1 Kg. **46.95**

Crystals for VF-2031. Specify crystal frequency. You receive crystal postpaid by return mail. Order one crystal for each frequency you need. 4 weeks delivery.
VFA-2031-4, Postpaid **10.95**

$359^95

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

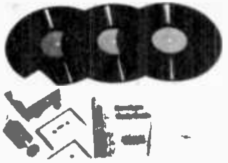
Built-in separate speaker and microphone for audio clarity

Optional auto-patch encoder lets you access telephone lines from repeaters with auto-patch inputs

Continuous Tone Encoder. Accesses most repeaters. Builds right into VF-2031.
VFA-2031-5, Shpg. wt. 1 Kg **49.95**

External Microphone. PTT MIC with coiled cord will plug right into VF-2031 to let you transmit without removing unit from hoster.
Kit VFA-2031-6, Shpg. wt. 1 Kg **59.95**

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 or 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. **Usuable Bandwith:** 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 Impecance:** 8 ohms. **Size (Overall):** 9⅛″ H x 3 5/16″ W x 1⅞″ D. **Transceiver Weight:** Including batteries: 2 lbs.



Ham starter group

$54^95

Includes 2 C.A.R.F. handbooks, HD-1416 practice oscillator, 3 code-teaching records or two cassettes

HDP-22, Complete group with records, Shpg. wt. 3 Kg	54.95
HDP-122, Complete group with cassettes, Shpg. wt. 2 Kg.	54.95
HDP-32, Records only. Shpg. wt. 1 Kg.	18.95
HDP-132, Cassettes only. Shpg. wt. 1 Kg.	21.95
HDP-42, Books – C.A.R.F. Certificate Study Guide and Radio Regulation Handbook, Shpg. wt. 1 Kg	15.98
HD-1416, Oscillator & key, Shpg. wt. 1 Kg	24.95

Heathkit HD-1416 Code Practice Oscillator

$24^95

The low-cost, FUN way to learn Code!

The unit operates from a single inexpensive 9-volt transistor battery (not supplied) and comes complete with telegraph key and phone jack. Has built-in speaker, volume and adjustable internal tone control. Ideal first time kit.

Kit HD-1416, Shpg. wt. 1 Kg **24.95**

LOW
PASS
FILTER
0
MHz
30
54
db
60
100

ASSEMBLED LOW PASS FILTER

PDC-132, >60 dB down at 50 MHz, 100 dB down at 60-65 MHz, rated at 150 watts.
PDC-132, Shpg. wt. 1 Kg **34.95**

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

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

$\$499^{95}$

- 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 volume 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. 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. 8 Kg	499.95
Kit PS-23, AC Power Supply, Shpg. wt. 9 Kg	129.95

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

$\$449^{95}$

- 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 11.5/15 VDC. 6¾" H x 12¾" W x 12" D.

Kit HR-1680, Shpg. wt. 7 Kg	449.95
Kit HS-1661, Matching Speaker, 2.5 Kg	49.95

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

$\$259^{95}$

- 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. 3 Kg	259.95
Kit HWA-7-1, AC Power Supply, Shpg. wt. 2 Kg	36.95

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; 1µV 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.

HEATHKIT
SSB TRANSCEIVER
PHONES
MIC.
BAND

Heathkit HW-101—the best buy in Ham Radio today

old throughout the world

verage
all bands
signals

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the perfect
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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.

See between pages 16 and 17 for details of
special offers at our up-coming

"KIT-BUILDERS WORKSHOP"

Kit HW-101, Shpg. wt. 10 Kg	749.95
SBA-301-2, 400 Hz CW crystal filter, Shpg. wt. 1 Kg	69.95
Fixed Station AC Power Supply.	
Kit PS-23, 9 Kg	129.95
Kit HS-1661, Matching Speaker, 2.5 Kg	49.95

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. **Size:** 6 5/16" H x 14 9/16" W x 13⅜" D.

Put extra punch in your SSB signal with the BW Clipper!

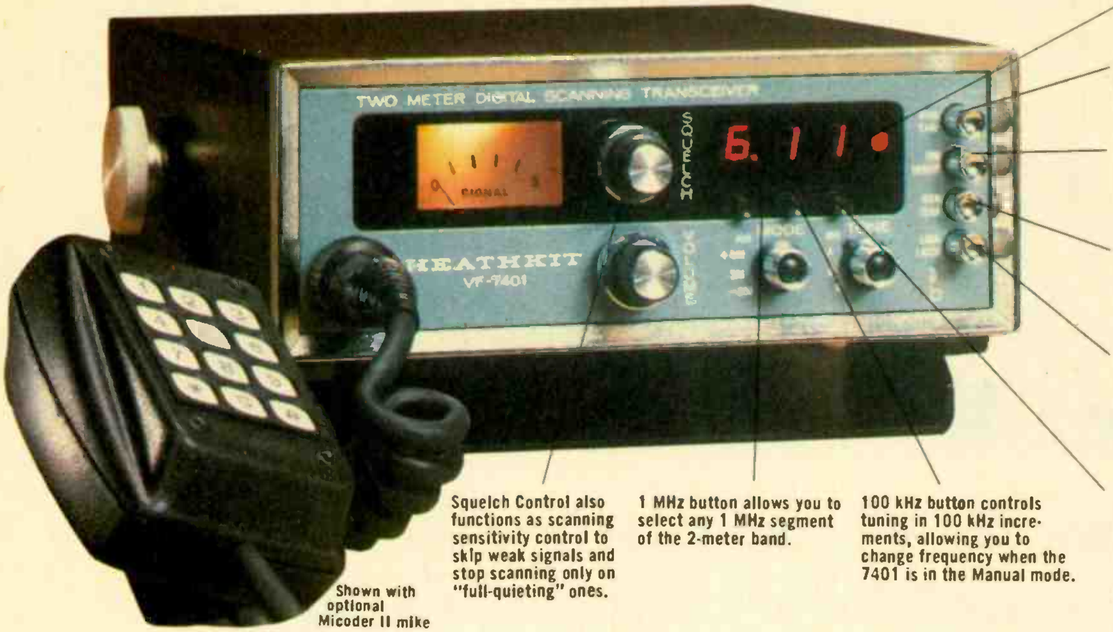
$259.95

- **Increase your average SSB output 66%**
- **True RF processing**
- **Very easy to install**

Increase your average SSB output to a little below key down CW output with the Heath-recommended HDP-1220 BW Clipper. Designed for your Heath SB100/101/102 or HW-100/101 transceiver, it installs in the IF strip of your rig for true RF processing. IC gives you hard, symmetrical clipping. SSB filter like the one in your rig keeps audio and signal narrow and clean. Installs in 15 to 30 minutes with just three cables (no non-reversible modifications). Fully assembled. 2" H x 6" W x 4" D. **HDP-1220,** Shpg. wt. 1 Kg 259.95

NEW

New Digital Scanning Transceiver makes Two more fun



LED indicates 5 kHz position

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

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

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

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

Squelch Control also functions as scanning sensitivity control to skip weak signals and stop scanning only on "full-quieting" ones.

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

100 kHz button controls tuning in 100 kHz increments, allowing you to change frequency when the 7401 is in the Manual mode.

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

Shown with optional Micoder II mike

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

$569.95

- Continuously adjustable, 15-watt output
- Scanning capability
- Preprogrammed power-up on any channel
- Detachable microphone

Throw away your repeater guide! Never again will you have to search through all that tiny print looking for a repeater as you drive through unfamiliar territory. The new Heathkit VF-7401 2-Meter FM Digital Scanning Transceiver will find all of the local activity for you. This exciting new transceiver scans the entire 2-meter band in 1 MHz segments. When it finds an active channel, it stops. It will remain on that channel, when you select the Scan/Lock mode, until you reset it by pressing the 10 kHz button. Or, set your VF-7401 in the Scan/Latch mode, and it will resume scanning when the received transmission ends.

Of course, you don't have to put up with every weak signal that reaches your antenna. If you hate "picket-fencing," use the VF-7401's squelch control as a scanning sensitivity control. You can adjust the receiver to stop scanning for "full-quieting" signals only. Or, open the squelch when there are 2-meter band openings. Your VF-7401 will find that "2-meter DX" for you without the tedious task of flipping through every individual channel.

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

Another unique feature of your new VF-7401 is the ability to "power-up" on a pre-programmed frequency. While you're building your rig, you can program in your favorite simplex or repeater frequency. Then, every time you turn your 7401 on, before it begins to scan, you'll be able to monitor your favorite frequency for activity first. You can also wire in any repeater offset without the need for crystals. You have +600 kHz, −600 kHz and 0 (simplex), too.

The VF-7401 is a continuously adjustable, 15-watt (nominal), solid-state, narrow-band FM transceiver. Its fully-synthesized digital circuitry provides full-band coverage without the need for additional crystals. Featuring a hot receiver, the new VF-7401 incorporates a double-tuned front end with MOSFET RF amplification, dual-conversion, 8-pole crystal IF filtering for perfect bandpass shaping and outstanding adjacent channel selectivity, IC limiting, Quad detection, and excellent audio quality.

Another feature you've asked the 200 Hams at Heath to provide is a detachable microphone. So, you got it — with a sturdy 4-pin DIN connector. And if you choose your 7401 with the optional Micoder II Microphone/Auto Patch Encoder (described on page 61) you don't have to worry about microphone batteries anymore. The Micoder II now draws its power from the rig, eliminating the need for a mike battery.

The VF-7401 includes a gimbal-mount bracket for mobile installation as well as home QTH use. The rig requires a 13.8 V, 3 amp continuous, 4 amp intermittent, power source such as a charging automobile electrical system, or the optional VFA-7401-1 AC Power Supply (see below). Check the features and check the specs. You'll agree that, once again, there's more for the Ham at Heath. The VF-7401 proves it — a great transceiver at a great price . . . plus the fun and pride of building it yourself.

VFS-7401-1, Transceiver and PTT Microphone, Shpg. wt. 6 Kg	**569.95**
VFS-7401-2, Transceiver and Micoder II, Shpg. wt. 6 Kg	**599.95**

VF-7401 SPECIFICATIONS: Receiver: Sensitivity: 0.5 µV for 12 dB SINAD (or 15 dB of quieting). **Squelch Threshold:** 0.3 µV or less. **Audio Output:** 1.5 watts at less than 10% THD; 2 watts maximum output (typical). **Image Rejection:** −50 dB or greater. **Spurious Rejection:** −50 dB or greater. **IF Rejection:** −80 dB or greater. **Internally Generated Spurious Signals:** Below 1 µV equivalent. **Bandwidth:** 6 dB at 15 kHz minimum and 60 dB at 30 kHz maximum. **Modulation Acceptance:** 6.5 kHz minimum. **Transmitter: Power Output:** 15 watts nominal to a 50 Ω ∠ 0° (resistive) load at 25° C and 13.8 VDC. **Harmonic and Spurious Output:** +60 dB. **Modulation:** FM, 0-7 kHz, adjustable. **Duty Cycle:** 100% with infinite VSWR. **Tone Encoder:** 3 tones, 70 to 200 Hz, approx. 700 Hz deviation. **Transmitter Offset:** −600 kHz, +600 kHz, −1 MHz (AUX). AUX offset programmable without additional crystals. **General: Frequency Coverage:** Any 4 MHz segment from 143.5 to 148.5 MHz. **Frequency Increments:** 5 kHz. **Frequency Stability:** +.0015%. **Operating Temperature Range:** +15° F to +125° F (−10° C to +50° C). **Operating Voltage Range:** 12.6 to 16 VDC (13.8 VDC, nominal). **Current Consumption: Receive Mode:** 550 mA max., squelched; 750 mA max., full rated audio. **Transmit Mode:** 4A max. at 13.8 VDC. **Dimensions:** 2¾" H x 7¼" W x 10¼" D (7.0 x 18.4 x 26.0 cm).

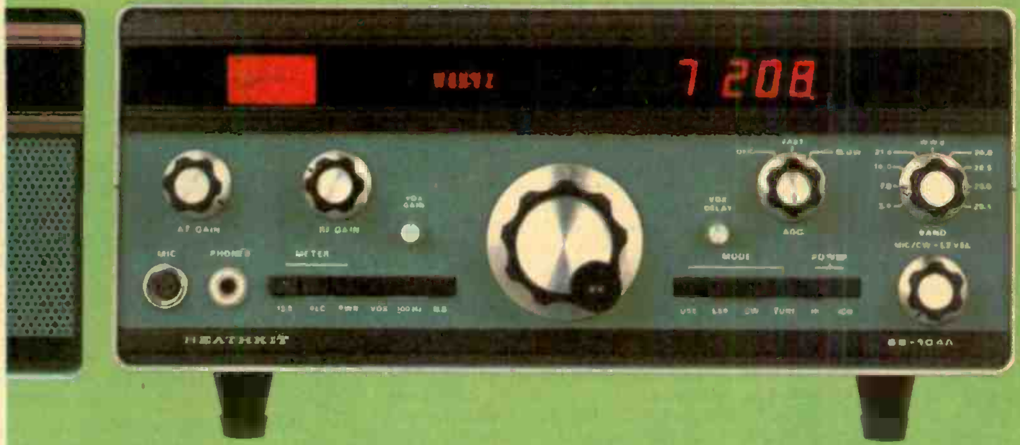
VFA-7401-1, Power Supply, Shpg. wt. 3.5 Kg	**79.95**

VFA-7401 SPECIFICATIONS: Output Voltage: 13.8 VDC; regulated (adjustable from approximately 12-15 VDC). **Output current:** 3.0 amperes continuous, 4.0 amperes maximum for 20 minutes. **Output Regulation:** Better than 1.5% from no load to full load (3.0 amperes). **Output Ripple:** Less than 2 mV peak-to-peak. **Power Requirement:** 110 to 130 VAC or 220 to 260 VAC 50/60 Hz, at 85 watts (full load).

The Heathkit SB-104A—the ultimate in solid-state technology

BULLETIN

Due to popular demand, Heath Company has decided to continue production of the famous SB-104A, SSB TRANSCEIVER. HEATH CANADA will maintain its special Close-Out Price of $999.95 on the SB-104A, while existing inventories last. Upon receipt of new inventory, the price will increase to $1,299.95.



LAST CALL NEW LOW—LOW PRICE LIMITED QUANTITY

NOW ONLY
$999.95

- Readout accuracy within ±200 Hz
- Broadband technology eliminates pre-tuning
- Your choice of 100 watts or 1 watt "QRP" on all bands
- Front-end and transmitter IF boards come pre-assembled

From the moment you power up you'll begin to 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.

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 preassembled and tested, incorporates individual preselector filters for each band, features balanced first and second mixers, and plays a large part in the 104'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 reproduction. And to make your QSOs more enjoyable, by reducing the nuisance of QSB, you can switch select either fast or slow AGC action.

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

Add the matching SB-614 Station Monitor, SB-634 Five-Function Console, SB-604 Speaker and your SB-104A becomes the center of your ultimate station. Operates from a charging 12 VDC auto electrical system or the PS-1144 Power Supply.

Kit SB-104A, Shpg. wt. 15 Kg .... Was 1199.95 **NOW 999.95**

Noise Blanker for SB-104A. Kit SBA-104-1, Shpg. wt. 1 Kg 42.95

400 Hz CW Crystal Filter for SB-104A. Kit SBA-104-3, Shpg. wt. 1 Kg 84.95

Matching Speaker. Cabinet is large enough to house the PS-1144 Power Supply, too. Connector plug and cable included. 7⅛" H x 10⅛" W x 14" D.
Kit SB-604, Shpg. wt. 4 Kg 89.95

Fixed Station Power Supply. 120/240 VAC; provides 13.8 VDC required by SB-104A. Mounts inside SB-604 speaker cabinet.
Kit PS-1144, 13 Kg 189.95

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 14$^{13}/_{32}$" W x 13⅞" D.

SB-614 Station Monitor checks your signal

Monitors transmitted SSB, CW, & AM signals up to 1 kW from 80-6 meters. Shows nonlinearity, insufficient or excessive drive, poor carrier or sideband suppression, regeneration, parasitics and key clicks. Manual includes 40 CRT displays including: 21-transmit envelope patterns, 7-trapezoid patterns, 6-RTTY cross patterns and 6-CW patterns. The SB-614 Station Monitor operates on 120/240 VAC, 60/50 Hz. Its attractive cabinet, which matches the SB-104A, measures 7¼" H x 10¼" W x 15¼" D.

Kit SB-614, Shpg. wt. 8 Kg **339.95**

HEATH charg-a-kit

See page 42 for complete details on the Heath Revolving Charge Plan. Just fill out the credit application form and include it with your order. No down payment required on new orders for those who qualify.

SB-634 Five-function Station Console

Features 24-hour digital clock; ten-minute ID timer; RF wattmeter with 200 or 2000 watt full scale ranges; SWR bridge with sensitivity control; phone patch that can be used manually or with VOX control. Wattmeter impedance is a nominal 50 ohms. The phone patch provides at least 30 dB isolation. Frequency range of the SB-634 Station Console is 1.8 to 30 MHz. Wattmeter accuracy is ±10% of full-scale reading. Input impedance is 600 Ω. Includes UHF-type SO-239 connectors. 120/240 VAC, 60/50 Hz. 7¼" H x 10¼" W x 15¼" D.

Kit SB-634, Shpg. wt. 6 Kg **389.95**

NEW

New higher-power Pro-Series Amplifier — the most powerful Heathkit amp ever!

$\$949^{95}$

- More power at a budget-pleasing price
- Dynamic head room of more than 2.5 dB for better dynamic range
- Complete speaker protection (patent pending)

250 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.025% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

Heath Company helped pioneer the field of high-power amplifiers. Now, advances in high-power output devices, new design technology and extensive listening tests make the Heathkit AA-1800 Pro-Series Audio Amplifier one of the best high-power amps available. The wider dynamic range achieved by new recording techniques require power and headroom to reproduce the full sound spectrum, without clipping peaks. People who listen to the AA-1800 find accurate, clearly defined music — at a wallet-pleasing price.

From the power cords to the speaker outputs, more value is built into the AA-1800. A wire-frame chassis, similar to those used in computers, makes the AA-1800 a more durable unit in a smaller package, with excellent ventilation. This new chassis simplifies the easy 24-hour kitbuilding experience, too. Two line cords with remote AC switching relieve your preamp from the need to switch high currents. Convection cooling means no fans and quieter operation. Individually fused power supply lines, along with rugged output devices, eliminate electronic dissipation limiters — which can cause tweeter-damaging clicks and pops. LEDs for each channel indicate full power output.

Input level controls let you attenuate the input signal to balance your system, and reduce output noise. Inputs, level controls, speaker outputs and line fuse are all mounted on the rear panel for easy access.

Complete speaker protection includes a speaker turn-on delay — which keeps power-up and power-down transients away from the speakers. In fact, the AA-1800's speaker protection system is so effective, we've applied for a patent. Thermal circuit breakers protect the system from excessive heat.

Designed in the striking Pro-Series style, the AA-1800 can be mounted in any EIA Standard 19-inch rack, such as the AE-1705 Pro-Series Rack (see opposite page). Large side handles are provided for easy rack mount installation.

Kit AA-1800, Shpg. wt. 32 Kg **949.95**

AA-1800 SPECIFICATIONS: Frequency Response: 20 Hz-20 kHz, ±0.1 dB; 3 Hz-100 kHz, ±1 dB (at 1 watt). **Total Harmonic Distortion plus Noise:** Less than 0.025%, from 250 mW to 250 Watts, into 8 ohms. **IM DISTORTION (SMPTE Method):** Less than 0.02% from 250 mW to 250 Watts. **TIM (DIM 100):** Less than 0.03% (3.18 kHz square wave and 15 kHz sine wave mixed 4 to 1, f(c)=100 kHz), measured at rated output. **Hum and Noise (Unweighted):** −85 dB (1 watt ref.). **Full Power Trip Frequencies of Speaker Protection Circuit:** Less than 16 Hz, more than 30 kHz. **Low Frequency Damping Factor:** Greater than 100. **Input Sensitivity:** 110 mV (for 1 W @ 8 ohms). **Input Impedance:** 20 kilohms, shunted by less than 50 pF. **Channel Separation:** 60 dB min., 20 Hz to 20 kHz. **Power Requirement:** 120 VAC, 60 Hz, 1200 Watts. **Dimensions:** 7″ H x 19″ W x 16.75″ D (17.75 x 47.26 x 41.55 cm). **Net Weight:** 50 lbs. (22.68 kg).

NEW

Pro-Series Active Audio Processor expands dynamic range, reduces noise without introducing distortion

$\$399^{95}$

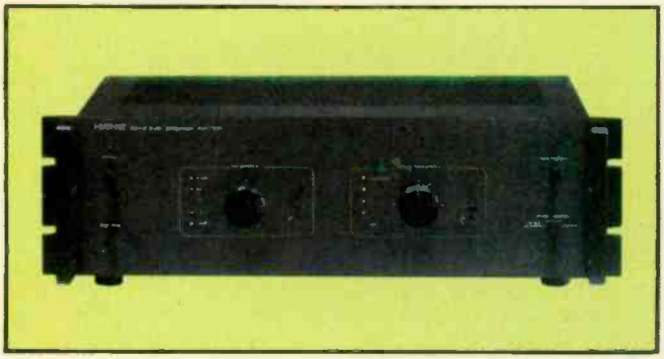
- Increases dynamic range by up to 17 dB
- Expanded tape monitoring facilities
- Beautiful Pro-Series Styling

Declare war on noise in your audio system! The new Heathkit Pro-Series Active Audio Processor reduces high-frequency noise and increases the dynamic range of source material. Its single-ended design makes it compatible with any program source, because it does not require pre-processing.

The AD-1706 incorporates a dynamic range expander and a noise reduction circuit to increase the dynamic range of program sources as much as 17 dB. Your music comes through with added realism, better definition and lower background noise, while maintaining full frequency response and low distortion, even at live-performance volume levels.

Any program source can be processed through the unit to gain up to 7 dB of dynamic range expansion, restoring dynamic range lost in recording and broadcasting — and up to 10 dB of noise reduction to drastically reduce hiss and surface noise. The expander circuit decreases low-level signals, and amplifies louder signals proportionately to achieve a wider dynamic range. A front panel switch turns on a 7 kHz, linear phase, 12 dB per octave rolloff high-frequency filter. This filter helps reduce noise from AM radio, TV, 78 rpm recordings and 8-track tapes.

More front panel LEDs indicate both relative noise reduction and dynamic range expansion more precisely. The AD-1706 connects between the tape output and tape monitor jacks of your preamplifier, integrated amplifier or receiver. Its tape monitor replaces your current tape monitoring facilities. And expanded capabilities of the built-in tape monitor mean you can apply processing before OR after recording.



Kitbuilding is fast and easy, with printed circuit boards and a color-coded wiring harness to simplify assembly. And when you're finished, the AD-1706's striking black cabinet makes it a perfect addition to your Heathkit Pro-Series Audio System. Or, order the AEA-1800-2 Oak-Finish Cabinet and make your Audio Processor an integral part of your component system.

With rugged construction and dependable solid-state circuitry, the Active Audio Processor can greatly improve any stereo system, for years to come.

Kit AD-1706, Shpg. wt. 9 Kg **399.95**

Oak-Finish Cabinet for AD-1706 Pro-Series Active Audio Processor.
AEA-1800-2, Shpg. wt. 3 Kg **64.95**

AD-1706 SPECIFICATIONS: Rated Input: 200 mV. **Input Impedance:** 100K ohms. **Gain:** Expander off, 0 dB (unity gain), +0.25 dB. Expander on, −4 dB to +4 dB (dependent on program level and control setting). **Frequency Response:** 20 Hz to 20 kHz. **High Filter:** 7 kHz, 12 dB/octave rolloff, linear phase. **Noise Reduction:** 3 dB typical at 2 kHz, 10 dB typical between 4 kHz and 15 kHz. **Sensitivity:** 500 μV for notch to open. **Hum and Noise:** −70 dB, 20 Hz-20 kHz (200 millivolt reference). **Channel Separation:** 50 dB at 1 kHz (5 kilohm input termination). **Output Impedance:** 500 ohms. **Input Overload:** 5 VRMS minimum at 1 kHz. **Total Harmonic Distortion:** 0.1% from 20 Hz to 20 kHz. **Power Requirement:** 120/240 VAC, 50/60 Hz, 15 Watts. **Dimensions:** 5.75″ H x 19″ W x 14″ D (14.6 cm H x 48.3 cm W x 35.6 cm D). **Net Weight:** 12.5 lbs. (5.7 kg).

Heathkit Pro-Series Audio Components put beautiful, studio quality sound in your living room

1 Outstanding Pro-Series Stereo FM/AM Tuner

One of the world's finest. It's loaded with features that add up to better reception with less noise and distortion. Super-sensitive 5-gang FM front end and FM IF/Stereo Demodulator are factory assembled and aligned for easier kitbuilding. Bandwidth can be extra-wide for less noise, better separation — or narrow for minimal interference in crowded signal areas. Multipath switch lets you meter multipath distortion. For 120/240 VAC. 5.75" H x 19" W x 14" D.

Kit AJ-1600. Shpg. wt. 12 Kg	**659.95**
AJA-1600-2, dolby FM Noise Reduction Module. Shpg. wt. 1 Kg	**74.95**
AEA-1800-2, Oak-Finish Cabinet, Shpg. wt. 3 kg	**64.95**

AJ-1600 SPECIFICATIONS: FM: **Sensitivity:** 1.8 μV mono, 3.5 μV stereo. **Selectivity:** 80 dB. **S/N Ratio:** 83 dB mono, 75 dB stereo. **Harmonic Distortion:** 0.1% @ 1 kHz. **Image Rejection:** 100 dB **Capture Ratio:** 1.2 dB. **Stereo Separation:** 45 dB @ 1 kHz. **AM: Sensitivity:** Ext. Antenna, 30 μV. **Selectivity:** Alt. Channel, −70 dB. **Image Rejection:** 70 dB.

2 Preamplifier with quality design, special features

Dual turnover tone controls. Built-in infra-sonic filter reduces rumble and low-frequency noise. 3 phono inputs, including one for moving coil, cartridges. Selectable cartridge capacitance for flatter frequency response. Record from one deck to another while listening to another source or tape. Adapter switch for equalizer, noise reducer, 3 switched, 3 unswitched outlets handle up to 1500 watts. 120/240 VAC. 5.22" H x 19" W x 11.25" D.

Kit AP-1800, Shpg. wt. 13 Kg	**599.95**
AEA-1800-2, Oak-Finish Cabinet, Shpg. wt. 3 Kg	**64.95**

AP-1800 SPECIFICATIONS (in accordance w/IHF-A-202): **Phono Input Sensitivities:** Moving Coil or Magnet, 33/67/130 μV; High-Level, 87 mV. **Hum and Noise:** Moving Coil Phono, −70 dB; Magnet Phono, −75 dB; High-Level, −85 dB. **Input Impedance:** Moving Coil, 100 ohms; Phono, 47K ohms; High-Level, 50K ohms. **Frequency Response:** Phono (RIAA), +0.2 dB, 20 Hz to 20 kHz; High-Level, +0, −0.2 dB, 20 Hz to 20 kHz. **Total Harmonic Distortion:** Phono, 0.03%; High-Level, 0.02%, 20 Hz to 20 kHz. **Intermodulation Distortion:** 0.02% maximum. **Crosstalk:** −90 dB. **Stereo Separation:** 50 dB @ 1 kHz.

3 AD-1701 Graphic Output Indicator

Monitors peak power with LEDs to help avoid overloads and speaker damage. 6-position range switch for a wide range of sensitivities. Extremely fast response time. For 120/240 VAC. Dimensions, 2" H x 19" W x 13" D.

Kit AD-1701, Shpg. wt. 7 Kg	**299.95**
AEA-1800-3, Oak-Finish Cabinet, Shpg. wt. 1 Kg	**29.95**

4 Proven Heathkit Pro-Series Stereo Amplifier

125 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.05% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

Clearly, accurately reproduces music. TIM, less than 0.05%. Speaker turn-on delay, thermal circuit breaker assure full protection. Amplifier, power supply are fully assembled. 120 VAC, 60 Hz. 7.125" H x 19" W x 13" D.

Kit AA-1600, Shpg. wt. 24 Kg	**599.95**
AEA-1800-1, Oak-Finish Cabinet, Shpg. wt. 3 Kg	**64.95**

AA-1600 SPECIFICATIONS (IHF-A-202): **Freq. Response:** +1 dB, 7 Hz-50 kHz @ 1 watt. **Hum and Noise:** −90 dB. **Separation:** 70 dB min. **Input Impedance:** 30K ohms, shunted by 50 pF.

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. 34 Kg	**399.95**

Quality Heathkit components enhance your audio system

1 Active Audio Processor reduces noise, expands range

The Heathkit AD-1304 Active Audio Processor is specifically designed to eliminate 10 dB of high-frequency noise and add 7 dB of dynamic range expansion to any program source. Three high-frequency dynamic filters and a sensitivity control reduce noise without removing music, while a separate expander increases dynamic range. Switchable 7 kHz, linear phase, 12 dB per octave filter for 78-rpm recordings, AM radio or 8-track tapes. LEDs keep track of the processing. For 120/240 VAC, 50/60 Hz.

Kit AD-1304, Shpg. wt. 6 Kg **319.95**

AD-1304 SPECIFICATIONS: Rated Input: 200 mV. **Input Impedance:** 100K ohms. **Frequency Response:** 20 Hz to 20 kHz, –0.2 dB. **Total Harmonic Distortion:** 0.1% from 20 Hz to 20 kHz. **Hum and Noise:** –70 dB. **Output Impedance:** 500 ohms. **Dimensions:** 4½" H x 17½" W x 8⅛" D.

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2 Audio Equalizer gives you complete, precise tone control

The Heathkit AD-1305 Audio Equalizer uses five slide controls per channel to completely control tone, providing precise corrections without overlapping. A center detent allows exact 0 dB setting, bypassing each band. A tone flat switch bypasses the equalizer. And the AD-1305's tape monitor allows you to equalize a receiver's tape monitor circuit without losing monitoring capability. Use the AD-1305 to equalize for acoustics, differences in cartridge and speakers, deficiencies in sources, even to filter old or scratchy records or broadcasts. Easy to assemble, only 3 circuit boards. Includes handsome case. 120/240 VAC. 4⁹⁄₁₆"H x 17½"W x 8"D.

Kit AD-1305, Shpg. wt. 5 Kg **229.95**

AD-1305 SPECIFICATIONS: Input Impedance: 100K ohms. **Ranges of Frequency Control:** 30-125 Hz, 125-500 Hz, 500-2,000 Hz, 2,000-8,000 Hz, 8,000-32,000 Hz. **Total Harmonic Distortion:** 0.05% from 20 Hz-20 kHz at 1.5 V output. **Rated Output:** 1.5 VRMS.

Audio Control Center adds flexibility to your system

- Use the AD-1307 Control Center to monitor the output of your power amplifier

Features peak-responding meters to monitor power output, terminal strips for versatile amplifier and speaker hookups, headphone jacks for conventional phones and a hookup for electrostatic headphones. Has four switched and four unswitched AC outlets, with a total of 1500 watts, for flexible control of other components. For 120/240 VAC. 4½" H x 17½" W x 8½" D.

Kit AD-1307, Shpg. wt. 5 Kg **229.95**

Introducing the exciting new Heathkit AR-1650 – the finest Stereo Receiver kit you can buy!

The AR-1650 features a 5-section FM tuning capacitor to give you maximum rejection of unwanted signals for lower noise and cleaner sound. Interference is further minimized by an attenuator switch that reduces strong signals from the antenna. 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. A special Precision Tuning System (PTS) automatically corrects mistuning and makes it easier to find exact center tune.

The AR-1650 gives you total control to adjust the sound to your specific preference. Separate bass, midrange and treble controls let you adjust the entire frequency range. A tone flat switch bypasses tone controls. 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. Walnut veneer cabinet is standard.

Kit AR-1650S, Natural Aluminum front panel, wt. 30 Kg **1389.95**

Kit AR-1650B, Black front panel, wt. 30 Kg **1399.95**

Kit AJA-1600-2, Dolby FM Module, wt. 1 Kg **74.95**

SPECIFICATIONS: FM Section Stereo: Sensitivity: 3.5 μV (16.1 dBf) usable; 36 μV (36.1 dBf) @ 50 dB signal-to-noise. **Frequency response:*** ±0.5 dB, 20 Hz to 15 kHz. **Signal-to-noise ratio*:** 73 dB. **Total Harmonic Distortion*:** 50 dB S/N: 0.5%. **FM Section Mono: Frequency response:** ±0.5 dB, 20 Hz to 15 kHz. **Sensitivity*:** 1.8 μV (10.3 dBf) usable; 2.5 μV (13.2 dBf @ 50 dB signal-to-noise). **Selectivity*:** Wide IF bandwidth: 40 dB; Narrow IF bandwidth: 80 dB. **Image Response Ratio*:** 100 dB. **AM Section: Sensitivity*:** External antenna: 30 μV; radiated: 250 μV/Meter. **Signal-to-noise Ratio*:** External antenna: 50 dB; Radiated 45 dB. **Total Harmonic Distortion:** 400 Hz, 90% Mod: 0.5%. **Frequency response*:** +1 to –3 dB from 40 Hz to 3.5 kHz. **Preamp*: Frequency response:** Phono: RIAA ±.2 dB from 20 Hz to 20 kHz; Aux: +0 to –.2 dB from 20 Hz to 20 kHz. **Total Harmonic Distortion:** Phonos: .1%; Aux: 0.05%. **Input Sensitivity:** Phonos: 0.67 mV; aux: .67 mV. **Maximum Input Signal:** Phonos: 150 mV; Aux: 10 V. **Intermodulation Distortion:** .05%. **Amplifier*: Total Harmonic Distortion:** less than .05%. **Intermodulation Distortion:** less than .05%. **Frequency Response:** 0 dB to –.2 dB, 20 Hz to 20 kHz. **Input Sensitivity:** 0.12 V. **Hum & Noise:** –90 dB. **Dimensions:** 7" H x 21¾" W x 16⅞" D.

*IHF Standards

5% discount on complete system

Choose: 1. a receiver and a pair of speakers. Or: 2. an amp, pair of speakers and a tape deck, tuner or turntable. Deduct 5% from the total cost (excluding shipping and handling).

QUALITY Dual TURNTABLES

with ULM (Ultra Low Mass)

ULM a major break-through in turntable technology

The advantages of an ultra-low-mass tonearm/cartridge system have been known for years.

The low inertia of such a system would permit the stylus to overcome all the notorious built-in flaws of records. The stylus would be able to ride record warps without digging in or taking off. It could move side-to-side with the eccentricities of the groove without being deflected. In short, tracking would be as accurate as the inventors of the record had always hoped.

The potential for such a system has existed ever since the development of the dynamically-balanced Dual tonearm with its gyroscopic gimbal suspension, straight-line tubular design and unique system for setting tracking force.

All that was required was a cartridge that weighed substantially less than any in existence. Dual's engineering initiative and the subsequent collaboration between Dual and Ortofon has now produced a cartridge weighing just 2.5 grams.

At the same time, the mass of the Dual tonearm was further reduced so that a perfectly matched tonearm/cartridge system would result.

Together, the ULM tonearm and ULM cartridge have a total effective mass of just 8 grams. That's less than half the effective mass of conventional tonearms and cartridges. Equally important, the resonant frequency of the ULM tonearm/cartridge system falls within the optimum range of 8-10 Hz.

The stylus can maintain its trackability precisely, regardless of record warp or eccentricity. Stylus and record life are extended. Distortion is greatly reduced. Above all, the sound is audibly improved.

And this is only one of the major advances in record playback technology to come from Dual this year.

All Dual turntables feature ULM Tonearm — Illuminated strobe — Damped cue-control — Rotating single-play spindle — Pitch control — Calibrated anti-skate control — Four point tonearm gimbal — Base with dust cover — Ortofon ULM magnetic cartridge. Extra cartridge head and cartridge weights are supplied so conventional cartridges can be used.

Dual 1257, Multi-play Belt Drive Turntable plays up to 6 records — Tonearm length 8¼" — Platter size 10⅝" — Rumble > 68 dB — Wow/flutter ± 0.05% — Pitch control range 6% — High torque synchronous motor — Cartridge. Ortofon ULM 50 — Frequency response 10 Hz — 25 KHz — Output voltage > 0.7 mv — Channel separation > 25 dB — Tracking force 1.5 — 2.5 gm.

ADP-1257S, Shpg. wt. 9 Kg **239.95**

Dual 506, Semi-Automatic Belt Drive Turntable — Automatic tonearm lite and motor shut-off at end of play — Tonearm length 8¾" — Platter size 12" — Rumble > 70 dB — Wow/flutter ± 0.04% — Pitch control range 6% — High torque synchronous motor — Cartridge Ortofon ULM 50 — Frequency response 10 Hz — 25 KHz — Output voltage 0.7 mv — Channel separation 25 dB — Recommended tracking force 1.5 — 2.5 gm

ADP-506S, Shpg wt. 10 Kg **269.95**

Dual 522, Single-Play Automatic Belt Drive Turntable — Features automatic start/stop and continuous repeat. All other specifications are identical to the model 506.

ADP-522S, Shpg wt. 10 Kg **299.95**

Dual 606, Semi-automatic Direct Drive Turntable — Features CMOS regulator circuit and servo frequency generator for unvarying speed accuracy — Mechanical sensor locates 12" and 7" lead-in grooves — Automatic shut-off at end of record — Tonearm length 8¾" — Platter size 12" — Rumble > 75 dB — Wow/Flutter ± 0.03% — Pitch control range 10% — D.C. Electronic motor — Cartridge Ortofon ULM 55 — Frequency response 10 Hz — 25 KHz — Output voltage > 0.7 mv — Channel separation > 25 dB — Recommended tracking force 1.0 — 1.75 gm.

ADP-606-S, Shpg. wt. 10 Kg **399.95**

Dual 622 — Single-play Automatic Direct Drive Turntable — Features automatic start/stop and continuous repeat. All other specifications are identical to the model 606.

ADP-622S, Shpg. wt. 10 Kg **429.95**

Sanyo Stereo Cassette Decks

RD-5008

An excellent, affordable cassette deck with all the 'most wanted' features. The single capstan drive tape transport is rugged and reliable, driven by a high torque DC motor, engineered for accuracy and long life. Features Dolby® Noise Reduction — Cr 02/Normal Tape Selection — 5-point LED Level Indicators — Full auto-stop — Viscose damped cassette door — Digital tape counter — Silver front panel with wood grain metal cabinet.

ADP-5008 Shpg. wt. 6 Kg **219.95**

0.1% WRMS Wow and Flutter — 60 dB Signal-to-Noise ratio — 30 — 14,000 Hz (± 3 dB, Cr 02 tape) frequency response.

RD-5350 This top-of-the-line cassette deck will produce recording from FM and discs that are virtually indistinguishable from the original source. The precision tape transport is driven by Sanyo's new Phase Locked Loop DC servomotor, providing very smooth, accurate tape motion. Features PLL DC Servomotor — Dolby® Noise Reduction — Superhard Permalloy Head — Extended Range VU Meters and Peak Level LEDs — Separate Equalization and Bias Switches — Record Mute — Output level control — Full Auto/Stop — Air Damped Cassette Door — Silver front panel, with wood grained metal cabinet.

ADP-5350, Shpg. wt. 7 Kg **449.95**

0.04% WRMS Wow and Flutter — 64 dB Signal-to-Noise ratio — 30 — 17,000 Hz (± 3 dB, Cr 02 tape) frequency response.

RD-5035 Now . . . a deck with METAL TAPE capability priced for the audiophile on a budget. Extended frequency response, increased dynamic range and significantly lower distortion are just some of the performance advantages of this fine deck. Features — Sendust Record/Playback Head — Separate Equalization and Bias switches — Illuminated VU Meters — Dolby® Noise Reduction — Full Auto/Stop — Air Damped Cassette Door — Digital Counter — Brushed Silver front panel with wood grain metal cabinet.

ADP-5035, Not shown, Shpg. wt. 7 Kg **319.95**

0.08% WRMS Wow and flutter — 62 dB Signal-to-noise ratio — 30 — 19,000 Hz (± 3 dB Metal Tape) frequency response.

*Registered trademark of Dolby Laboratories, Inc.

Stereo Headphones

Features separate volume control on each headphone and a stereo/mono switch; black speaker casings; black vinyl earpads and headband; impedance 8 ohms; response 20 — 20,000 Hz; 10 ft. curly cord, with stereo phone plug.

ADP-4360, Shpg. wt. 1 Kg **29.95**

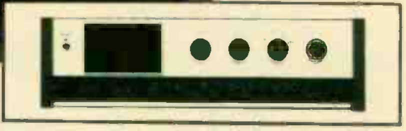
Superbly designed receivers for thrilling sound

102.1
HEATHKIT

Its specs make the AR-1515 a receiver that's outstanding in its price-range

$\$1159^{95}$

70 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.08% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ



Secondary controls — all except volume, input selection, stereo/mono and tuning — are concealed behind a hinged door.

From its half-inch tall LED frequency readouts to its extraordinary low distortion, the Heathkit AR-1515 is an outstanding AM/FM stereo receiver.

Digital readout is only the beginning. With 1.8 μV sensitivity, the FM section is one of the world's finest. The optional AD-1504 Dolby Module allows you to enjoy the reduced noise and increased dynamic range of Dolbyized FM broadcasts. The AM section is probably the finest in any receiver — dual-gate MOSFET's in the front end and a computer-designed 9-pole filter for outstanding selectivity.

The amplifier section meets the same high standards. Harmonic distortion is an infinitesimal 0.08%! Frequency response is +0, −1 dB from 8 Hz to 45,000 Hz and +0, −3 dB from 4 Hz to 80,000 Hz! That extra margin of performance assures clean, wide-range sound without audible strain or struggle on even the most complex musical passages. And you'll hear the music over a background of silence — hum and noise are 65 dB below full output in phono and 80 dB below full output on high-level sources.

The AR-1515 is even easy to build! Obviously the AR-1515 is a complex and sophisticated receiver, but its well thought out, modular design and color-coded wiring harnesses simplify assembly.

Kit AR-1515, Shpg. wt. 22 Kg	1159.95
Dolby FM Module, Kit AD-1504, Shpg. wt. 1 Kg	79.95

AR-1515 SPECIFICATIONS: AMPLIFIER — Frequency Response: +0, −1 dB, 8 Hz to 45 kHz; +0, −3 dB, 4 Hz to 80 kHz. **IM Distortion:** less than 0.08% from 0.25 to 70 watts (full output). **Damping Factor:** Greater than 60. **Input Sensitivity:** Phono 1 & 2, 2 mV. Aux., Tape & Dub., 200 mV. **Input Overload:** Phono, greater than 100 mV, Aux., Tape & Dub., greater than 10 V. **Hum and Noise:** Phono (2 mV reference), −65 dB. Aux., Tape & Dub., (200 mV reference) −80 dB. **FM Sensitivity:** 1.8 μV*. **Selectivity:** 100 dB*. **Image Rejection:** 90 dB*. **Harmonic Distortion:** 0.3%. **Intermodulation Distortion:** 0.1%. **Signal to Noise Ratio:** 70 dB*. **Spurious Rejection:** 90 dB*. **Separation:** 40 dB or greater at mid-frequencies; 35 dB at 100 Hz; 20 dB at 10 kHz. 20 dB (nominal) at 15 kHz. **Harmonic Distortion:** 0.35% with 100% modulation. **AM: Sensitivity:** 5 μV. **Selectivity:** 20 dB. **Power Requirement:** 120/240 VAC, 50/60 Hz. **Dimensions:** 6 3/16" H x 21½" W x 15" D.

*Rated IHF (Institute of High Fidelity) Standards. Dolby is a trademark of Dolby Laboratories.

This medium-priced AM/FM Stereo Receiver gives you a lot of value for your money

TUNING
VOLUME
BALANCE
HEATHKIT AR-1429

$\$699^{95}$

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

Here's 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!

Take the incredibly low distortion figure of 0.1% for example: Sound so pure and clean you won't believe it costs so little. Consider these specs too: Phono hum and noise is −79 dB for 10 mV input, FM sensitivity is a low 1.8 μV and stereo separation is 40 dB. The circuit designs reflect the outstanding performance too. A true complementary-symmetry power amplifier provides minimum distortion even at high power levels. 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.

The AR-1429 also has the features of a high-priced unit. 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. All controls are placed on the front panel for convenience and the planetary-drive tuner smoothly moves a lighted pointer to the station you desire. The attractive log tuning scale has large, easy to read numbers and "blacks-out" when the power is off. Signal and tuning meters make tuning easy and accurate. 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 Dolbyized FM broadcasts now offered by many stations.

The AR-1429 with its solid walnut end panels is a beautiful addition to any decor. Kit assembly is easy with modular circuit board construction and color-coded wiring harnesses. You'll find it hard to beat the AR-1429 without spending a lot more money.

Kit AR-1429, Shpg. wt. 15 Kg	699.95
Kit AD-1504, Optional Dolby FM Module, Shpg. wt. 1 Kg	79.95

AR-1429 SPECIFICATIONS: AMPLIFIER — Frequency Response: −1 dB, 5 Hz to 45 kHz. **Damping Factor:** 60. **Input Sensitivity:** Phono, 2 mV; Aux. Tape and Tape Mon., 200 mV. **Hum and Noise:** Phono, −65 dB (−79 dB for 10 mV input); Aux., Tape and Tape Mon., −75 dB. **Phono RIAA* Equalization:** ±1 dB (30 Hz to 20 kHz). **FM SECTION — Sensitivity:** 1.8 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.

*Rated IHF (Institute of High Fidelity) Standards. Dolby is a trademark of Dolby Labs.

Low Kit prices–high Heathkit quality

BASS
TREBLE
BALANCE
VOLUME
HEATHKIT AR-1219

Clean, clear sound delivery for your system from a value-priced receiver

$399.95

A low cost receiver with expensive looks and features — the right choice for your first system

15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

Low price — expensive performance

Hard to believe — yes. But when it comes to giving you performance at an economical price the AR-1219 is hard to beat! That's because we've taken years of audio engineering experience and packed them into a simple, low-cost receiver that really performs!

Just 15 watts per channel, but careful engineering of the AR-1219's amplifier section has made sure that the annoying colorations and imperfections, evident in most low cost systems, just aren't there! Intermodulation distortion is less than 0.5% at full power and less than 0.2% at 1 watt. Hum and noise? — imperceptible. –60 dB for phono, and 65 dB down for tape. And with its channel separation of 55 dB, you'll be assured of a spacious stereo performance no matter which program source you may select.

Impressive Features Too!

But impressive specifications aren't all the AR-1219 has to offer. There are also plenty of operating features which really add up! Bass, treble, balance and volume controls aid selectively in the precise control of your musical environment. Each is large enough to be adjusted easily and all exhibit a solid, expensive feel. For private listening there's a headphone jack and speaker disconnect switch. And, for extra convenience, a tape-monitor switch.

High performance tuners

Rounding out the AR-1219 are two tuner sections which exhibit performance and specifications almost unheard of in receivers in this price class. AM sensitivity is 100 μV per meter and FM — 2 μV. Channel separation is typically 40 dB and quality ceramic filters in the IF section improve FM selectivity. An extra-wide slide rule dial assures easy and accurate tuning for both AM and FM. And a stereo pilot lamp.

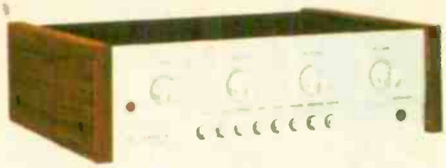
Kit AR1219, Shpg. wt. 9 Kg **399.95**

AR-1219 SPECIFICATIONS: AMPLIFIER — Frequency Response: ±1 dB, 7 Hz to 100 kHz. **IM Distortion:** less than 0.5%, full power; less than 0.2% at 1 watt. **Damping Factor:** Greater than 30. **Input Sensitivity:** Phono: 2 millivolts; Tape: 190 millivolts. **Hum and Noise:** Phono, –60 dB; Tape, –65 dB. **FM SECTION — Sensitivity:** 2 μV*. **Selectivity:** 60 dB*. **Image Rejection:** 50 dB*. **Stereo Separation:** 40 dB typ., 35 dB minimum. **Signal to Noise*:** 65 dB (65 dB). **Power Requirement:** 120/240 VAC, 60/50 Hz. **Dimensions:** 3⅞″ H x 17″ W x 13″ D.

*Rated IHF (Institute of High Fidelity) Standards.

GOOD FIRST-TIME KITS FOR BEAUTIFUL SOUND

15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.



AA-1219 Stereo Amplifier

AA-1219 features the same excellent specifications found in the amplifier section of the AR-1219 Receiver. Intermodulation distortion is less than 0.5% at full power and less than 0.2% at 1 watt. Phono hum and noise are –60 dB, channel separation 55 dB — beautiful high fidelity. Styled to match AJ-1219.

Kit AA-1219, Shpg. wt. 7 Kg **269.95**

AJ-1219 AM/FM Stereo Tuner

The pre-assembled and aligned FM front end provides 2 μV sensitivity with extremely low cross modulation and no overload, even on strong signals. A phase-lock-loop multiplex circuit provides excellent stereo separation with minimum distortion. Handsome metal case with stained walnut-veneer end panels. If your budget is limited, but you still want outstanding performance, this is your choice.

Kit AJ-1219, Shpg. wt. 6 Kg **269.95**

ENJOY THESE OLD-TIME RADIO SHOWS ON CASSETTES

ONLY $4.98 PER SHOW

COMEDY

RR-11	Ozzie and Harriet	—"Ozzie, The Storyteller" with Bing Crosby
RR-12	Abbott and Costello	—Includes all-time classic "Who's On First?"
RR-20	W. C. Fields	—"The Day I Drank A Glass of Water"
RR-28	Amos 'N Andy	—"Kingfishs Travel Bureau" (4/47)
RR-33	Bob and Ray	—"Bits and Pieces" — Their Best Comedy Routines
RR-103	Amos 'N Andy	—"Marriage Go Round"
RR-123	Bergen & McCarthy	—Last Show
RR-128	Baby Snooks	—"The Opera" (Best of Series)
RR-136	Pabst Blue Ribbon Town	—Groucho Marx and Jack Benny go at it
RR-203	Fibber McGee & Molly	—"Jury Duty" — All-Time Classic

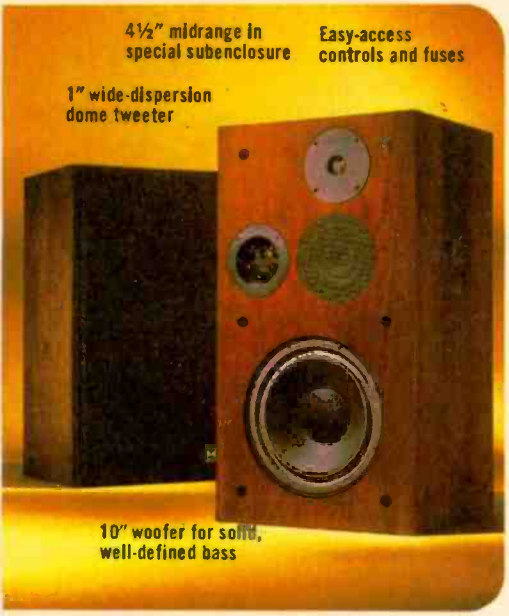
SPECIALTY

RR-96	Famous Moments in Sports	—from boxing, football, baseball, olympics, etc.
RR-97	50 Radio Commercials	—Radio's Golden days
RR-99	CBS News Roundup	—Pearl Harbor Attack (12/7/41)

MYSTERY & DRAMA

RR-46	The Green Hornet	—"A Matter of Evidence"
RR-48	Inner Sanctum	—"Only The Dead Die Twice"
RR-62	The Shadow	—"Death From the Deep", w/Orson Welles
RR-67	Lights Out	—"Cat Wife", w/Boris Karloff (1938)
RR-74	Academy Award	—"The Maltese Falcon" — w/Bogart, Greenstreet, Astor
RR-153	Suspense	—"Sorry Wrong Number"
RR-211	The Shadow	—"The Shadow's Revenge" 1938 Classic

Innovative speaker designs for beautiful sound systems


4½" midrange in special subenclosure
Easy-access controls and fuses
1" wide-dispersion dome tweeter
10" woofer for solid, well-defined bass

This 3-way system produces beautiful sound you have to hear to believe

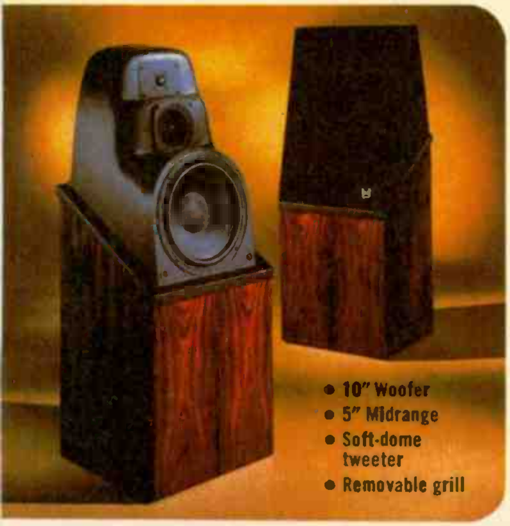
$299.95 each

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. Poor imaging (a constantly-shifting blur of sound) is a common problem in bookshelf speakers. To create a sharply focused sound "image", 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! The AS-1373 is a great combination of efficiency and power handling characteristics. Although it can be driven by as little as 10 watts, it's rated at 200 watts max. (the woofer can withstand up to 400 watts of pulse power). So, 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. The AS-1373 is easy-to-build, even for first-time kitbuilders. Assembly requires just a couple of evenings per system, and you'll have a truly great sounding stereo pair! 8 ohms impedance.

Kit AS-1373, 31 Kg .... **each 299.95**

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.



The Speaker System you've waited for is now available for immediate delivery

$999.95
Sold in pairs only

Designed for minimum transient distortion — an improvement in sound reproduction you can really hear.

The ASX-1383 uses the same revolutionary design concept found in speaker systems costing much more. This linear phase design aligns each driver's radiating surface in the same plane so that the entire sound output — bass, treble and midrange frequencies — reaches your ears at the same time. The result is a clarity and richness of sound that you simply have to hear to believe. A unique curved baffle eliminates edges and corners and the defraction which causes transient distortion and ragged frequency response. The result is a spaciousness and open sound combined with outstanding stereo dispersion and imaging. You'll get great sound and excellent stereo definition no matter where you sit in your listening room. The drivers used in the ASX-1383 provide full frequency response with excellent dynamic range. The ASX-1383 uses a 10" high-compliance long-throw woofer, a 5" high-compliance long-throw midrange and a soft-dome high-compliance 1" tweeter. The soft-dome tweeter provides the smoothest high frequency response of any tweeter we've seen.

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 complements the cabinet. Sold in matched pairs only. We believe they're amongst the finest speakers you can buy.

Kit ASX-1383, 52 Kg .... **pair 999.95**

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, 4000 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.

Low-priced Stereo Mike Mixer Console for "pro" style tapes

- 0.5% Maximum distortion
- 40-20,000 Hz response
- Use with most mikes

Wide frequency response and low distortion give you clean, life-like mixing capability. Each of the TM-1626's two outputs has its own master level control and meter. Two high-level auxiliary inputs and four mike inputs. Each input can be switched to left, off, or right channel. For 120/240 VAC, 50/60 Hz. Dimensions: 5 3/16" H x 16" W x 9⅞" D.

Kit TM-1626, Shpg. wt. 6 Kg **299.95**

Solid-state mono amplifier makes the ideal beginner kit

$49.95

3.25 WATTS, MINIMUM RMS, INTO 8 OHMS WITH LESS THAN 1.5% TOTAL HARMONIC DISTORTION FROM 40-20,000 Hz.

A low-cost amplifier for monaural sources. Use the AA-18 with a record player having ceramic cartridge, a tape player, a monophonic AM or FM tuner or any signal input of at least 250 millivolts. If you have an efficient 8-ohm speaker (such as our AS-1332), you'll be surprised at the volume the AA-18 delivers. Metal case. 2⅝" H x 7 11/16" W x 5 5/16" D. 120/240 VAC, 60/50 Hz.

Kit AA-18, Shpg. wt. 2 Kg **49.95**

Choose quality Heathkit speakers to enhance your audio system

Heathkit speakers give you great stereo sound performance for your money

$569^{95} each

When you're ready to move up into the realm of ultimate sound experience, the Heathkit AS-1348 is the speaker for you. Once you've heard it, you'll ask yourself how you ever settled for anything less. Designed to stand with the finest stereo components, the AS-1348 offers the bass power and extra-wide dynamic range to reproduce almost any kind of music realistically. Its bass power makes the AS-1348 ideal for rock and disco music, where high sound pressure levels (SPLs) are desired.

The Heathkit AS-1348 combines a massive 15" slot-loaded woofer, two 4½" midrange speakers and three 1" tweeters in a precision-designed cabinet for quality sound reproduction from 22 Hz to 22 kHz. Handles up to 250 watts, with individual protection for woofer, midranges and tweeters. 14-position attenuation control adjusts response characteristics to any listening area. Fully-assembled acoustic suspension enclosure with walnut and oak veneer finish. Removable acoustically transparent grille cloth. The AS-1348 does justice to the finest stereo systems. Order your speakers today.

Kit AS-1348, Shpg. wt. 50 Kg .... each 569.95

AS-1348 SPECIFICATIONS: Frequency Range (−10 dB): 22 Hz to 22 kHz. **Frequency Response:** ±3 dB, 28 Hz to 20 kHz. **Impedance:** 8 ohms nominal. **Recommended Amplifier Power:** 8 watts min. to 250 watts (fused for larger amplifiers). **Crossover frequencies:** 500 Hz (12 dB/octave) woofer-to-midrange and 3000 Hz (6 and 12 dB/octave) midrange-to-tweeter. **Dimensions:** 38" H x 24" W x 15" D.

Choose the Heathkit speaker that best suits your stereo reproduction needs

1 2-way Sound Column Speaker System

$259^{95} each

The Heathkit AS-1344 Speaker sounds outstanding, no matter where you sit in the room. Two 1-inch dome tweeters and two 6½-inch full-range drivers are mounted in separate arrays on adjacent sides of the cabinet to provide well-balanced sound.

Both woofers are located well above the floor for solid, well-defined bass response. No midbass boom or resonance means midrange frequencies come through loud and clear. The tweeters deliver a full 10 to 20 dB more off-axis response than conventional tweeters for bright, clean highs.

Kit AS-1344, Shpg. wt. 26 Kg .... each 259.95

AS-1344 SPECIFICATIONS: Frequency Range (−10 dB): 35 Hz to 22 kHz. **Frequency Response:** ±3 dB, 55 Hz to 20 kHz. **Recommended Amplifier Power:** 9 watts min. to 100 watts (fused for larger amplifiers). **Crossovers:** 4000 Hz mechanical (on woofer) and 12 dB/octave electrical on tweeter. **Control:** 2-position tweeter level, flat and −3 dB. **Impedance:** 4 ohm nominal. **Dimensions:** 40" H x 11" W x 11" D (102 cm H x 28 cm W x 28 cm D).

2 High-efficiency 2-way speaker system

The Heathkit AS-1342 doesn't need much amplifier power to produce great sound, making it ideal for smaller sound systems. The AS-1342 uses an 8-inch woofer and a 2 x 6-inch horn-type tweeter that can be mounted either horizontally or vertically for the best frequency dispersion — a Heathkit exclusive! Includes a continuous tweeter level control and a factory-assembled enclosure. Frequency response, ±3 dB, 60 Hz to 14,000 Hz.

Kit AS-1342, Shpg. wt. 15 Kg .... each 129.95

AS-1342 SPECIFICATIONS: Frequency Range (−10 dB): 40 Hz to 16 kHz. **Frequency Response:** ±3 dB, 60 Hz to 14 kHz. **Impedance:** 8 ohms nominal. **Recommended Amplifier Power:** 3 watts min. to 25 watts (fused for larger amplifiers). **Crossover Frequency:** 2500 Hz (12 dB/octave). **Dimensions:** 22¼" H x 12" W x 10½" D.

Budget Priced full range three-way Bookshelf system

$239^{95} each

This full-range 3-way system features a 10" woofer, a 4½" midrange speaker and a 1" dome tweeter. The woofer-to-midrange crossover frequency is 750 Hz (6 dB/octave) to ensure a smooth-sounding midrange; while the midrange to tweeter crossover is 4000 Hz (6 and 12 dB/octave). Adjust the AS-1363's sound to suit your listening room with two-position midrange and tweeter switches. Each driver is individually fused for protection. Impedance is 8 ohms. Handles 5.6 to 100 watts amplifier power.

Kit AS-1363, Shpg. wt. 25 Kg .... each 239.95

Heathkit Speaker Components

Build your own custom speaker system, using Heath components. Each model listed below provides only the speakers and crossover network components for one speaker. Refer to the appropriate system on these pages for complete specifications.

AS-1342 — PK1, Shpg. wt. 6 Kg	**84.95**
AS-1344 — PK1, Shpg. wt. 7 Kg	**139.95**
AS-1348 — PK1, Shpg. wt. 23 Kg	**299.95**
AS-1363 — PK1, Shpg. wt. 15 Kg	**129.95**
AS-1373 — PK1, Shpg. wt. 10 Kg	**189.95**

5% discount on complete Heathkit stereo systems

Choose: 1. a receiver like the AR-1650 and a pair of speakers like the ASX-1383's. Or: 2. an amplifier, pair of speakers and a program source (tape deck, tuner or turntable). Add up the cost of the individual components, then deduct 5% (excluding shipping and handling).

The same big 5% discount also applies to any accessories you order with your system — extra speakers, cabinets, tapes, phono cartridges, etc. — No limit!

It's just another way we give you great sound for less money.

Selected Zenith Products for your Entertainment Pleasure

Integrated AM/FM/Stereo FM Receiver with Cassette Tape Recorder-Player with Dolby*

AM/FM/Stereo Tuner-Amplifier features 12 watts minimum RMS power/channel from 60 to 20,000 Hz into 8 ohms with 0.8% or less total harmonic distortion; Tuning Meter; Hi and Lo Filters; detent Bass, Treble, Balance and Volume Controls; Stereo FM Indicator; Speaker Switch; Headphone Jack. **Cassette Tape Player Recorder** features Record Level Controls; Vu Meters; *Dolby Noise Reduction System; CrO$_2$/Normal Switch; Mic Jacks; Microphone; Record and Dolby On Indicators; Digital Counter and Damped Tape Door. Cabinet of simulated walnut finish. **Dimensions:** 6.45" H; 19.7" W, 12.62" D.

*Dolby is a trademark of Dolby Laboratories Inc.

ARZ-6065, Shpg. wt. 13 Kg. Factory assembled and tested. **369.95**

Programmable Belt-Drive Turntable

A high-performance programmable automatic Turntable – plays single records manually or up to six records automatically. **FEATURING: 2-speed belt-drive 24-pole synchronous motor.** Low-mass "S" shaped Tone Arm with adjustable counterbalance. Shure Magnetic Cartridge with Diamond stylus; damped Cue Control; Adjustable Anti-Skate Control; Automatic Shut-off. Hinged Dust Cover. Base is simulated wood with Walnut finish. **Dimensions:** 6⅝" H, 16⅛" W, 15⅛" D.

ADZ-9025, Shpg. wt. 7 Kg. Factory assembled and tested. **149.95**

3-Way Allegro Tuned-Port Speaker System

FEATURING 12-inch Woofer with high-temp. 2 inch voice coil; 5 inch Midrange in Sub-Enclosure; 3½" horn Tweeter with phasing plug; Crossover Frequencies: 600 Hz and 2000 Hz; Frequency Response: 35-20,000 Hz; Front mounted Midrange and Tweeter Level Controls; Impedance: 8 ohms; Maximum Power Handling Capability 100 watts.

Enclosure: Grained Walnut wood veneer on durable wood products.

Dimensions: 28" H, 17" W, 12" D.

ASZ-4000, Shpg. wt. 22 Kg. Factory assembled and tested. .... **each, 299.95**

Integrated Stereo System featuring AM/FM/ Tuner-Amplifier, Automatic Changer, Cassette Tape and Allegro Speaker

AM/FM/ Tuner-Amplifier features 5 watts minimum RMS power per channel, from 100 to 15,000 Hz into 8 ohms with 1% or less total harmonic distortion; Tuning Meter, Hi Filter; Bass, Treble, Balance and Loudness Controls; detent Volume Control; Stereo FM Indicator; Headphone Jack. **Automatic Record Changer** features Ceramic Cartridge with Diamond Stylus; Cue Control; Dust Cover. **Cassette Tape Recorder-Player** features Automatic Level Control; digital Counter; automatic shut-off; Mic Jacks. Comes complete with Allegro 1000 two-way speaker systems. **Response:** 60 to 15,000 Hz; Cabinet of simulated wood with Walnut finish. **Dimensions:** 9.9" H, 22.0" W, 14.9" D. Speaker dimensions: 20.5" H, 13.5" W, 7.8" D.

ACZ-4031, Shpg. wt. 29 Kg. Factory assembled and tested. **499.95**

Zenith Video Director Programmable VCR

14-DAY AUTO RECORDER

With the new Zenith 14-Day Auto Recorder, the programmable timer can be set to record 4 different programs on different channels over a 14-day period. Daily or weekly repeats of a program are possible, up to 5 hours recording time on one L830 cassette. The Zenith Video Director Programmable features Remote Video Action Control with Speed Search, 3-Times Forward Speed and Stop Action. Plus, microprocessor controlled 14-position VHF/UHF Electronic Tuning for more convenience and greater reliability, a new Index Function and Audio Dubbing that allows you to add your own sound to previously recorded tapes.

REMOTE VIDEO ACTION CONTROL

Now you can have more control over video recording and playback than was ever possible before. Right from your easy chair. With Zenith Video Director, featuring Remote Video Action Control.

5 HOURS RECORDING/PLAYBACK

In the β III mode, you can get up to 5 hours recording and playback time on one L830 video cassette. This allows you to tape shows, dramas, specials, sports events, etc. to savor the second time around.

SEE ALL OF THESE FEATURES AND MORE DEMONSTRATED AT YOUR HEATHKIT ELECTRONIC CENTRE.

DROP IN TODAY FOR A DEMONSTRATION
GDZ-9700 Factory assembled and tested.

Put the excitement back in your television viewing

Thrill your family. Bring giant-screen excitement to your living room. The Heathkit Screen Star has a sharp, clear picture 8 times larger than the one you now watch!*

$3595.95

HEATH charg-a-kit REVOLVING CHARGE

- Three-tube projection for a brighter, more vivid picture
- 6-foot diagonal high-reflectivity, washable viewing screen for a big, bright, lifelike image
- 5 watts of low-distortion sound
- Built-in self-service adjustments
- Uses a mere 150 watts for great energy efficiency

Heath puts its world famous quality, performance and reliability into a TV Projection System you can build yourself! The Heathkit Screen Star TV brings the theater-like realism of sporting events, movies and specials into your living room.

Three-tube projection, with high-resolution 127 mm f1.0 lenses, gives you a brighter, more vivid color picture — and provides a wider viewing angle from the screen. The color picture is projected onto a 6-foot diagonal, high-reflectivity viewing screen. The easy-care screen is washable to maintain high reflectivity and a bright color picture, and is designed for years of enjoyment. Mount the screen to any wall with its mounting brackets. Or to make your screen free-standing and portable, order the optional GRA-4000-1 Screen Stand (below).

You can move the Screen Star from room to room. The projector's smooth-rolling casters let you move the projector anywhere, easily — and can be stored when not in use. And with the optional GRA-4000-1 Screen Stand, the lightweight screen is just as portable. Just put the screen about 8 feet in front of the projector and enjoy.

The Screen Star's electronics provide bright, clear, lifelike images for years to come. First, Heath makes sure the best signal gets to the GR-4000. An internal UHF/VHF splitter means you need only one 75-ohm antenna connection to your Screen Star. Combined with complete shielding of the tuners, this makes the Screen Star ideally suited to hook up to your cable television system as well as to your own external antenna system. Either way, you'll have sharp giant screen television viewing.

We've even designed a video input/output panel, with an auxiliary 120 VAC outlet, that lets you directly connect a video cassette recorder to your Screen Star for giant screen instant replays. Direct connection assures higher-quality video.

You get a crisp, colorful picture from the energy-efficient Screen Star. Quick warm-up picture tubes bring the picture up fast — without high energy consumption or cost. Automatic fine tuning and an exclusive Heath LC filter keep your picture in tune, from channel to channel. In fact, the IF amplifier never needs realignment. Special black level clamps faithfully reproduce every scene, whether it's outdoor sun or midnight, by maintaining constant blacks and greys for accurate brightness levels. A ferro-resonant power transformer and bridge-type low-voltage power supplies maintain proper voltage regulation for constant brightness and picture size — even during brownouts.

The Screen Star is Heath's easiest-to-build solid-state color TV. Picture tube, yoke and lens units, as well as the high-voltage supply, UHF and VHF tuners, are factory-assembled for easier kitbuilding. A simple and thorough Heathkit Assembly Manual makes kitbuilding a snap. Built-in self-service features, like a troubleshooting meter and built-in crosshatch generator help you save on service costs. And expert Heathkit technical assistance is available if you need it.

Get the most beautiful picture with breath-taking big-screen realism. Get solid-state reliability and the Heathkit self-service advantage. Order your Screen Star Projection TV today. Your television viewing will never be the same again!

Kit GR-4000, Shpg. wt. 78 Kg	**3595.95**
GRA-4000-1, Shpg. wt. 9 Kg	**129.95**

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

The Screen Star Color TV's portable projection unit uses the highest-quality f1.0 lenses to beam a brighter, clearer picture. And easy-rolling casters let you move it anywhere when not in use.

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

GR-4000 SPECIFICATIONS: **AFT Pull-In Range:** 0.7 to −1.8 MHz. **Video IF Bandwidth:** 4.08 MHz at 6 dB down. **Peak Picture Sensitivity:** Greater than 100 dB. **Video Cassette Recorder:** 1V composite video in/out at 75 ohms, .75 VRMS audio in/out at 600 ohms. **30 dB Sound Quieting:** Greater than 100 dB at 1 Volt. **Audio Output:** 5 Watts into 8 ohms with less than 0.5% Total Harmonic Distortion. **Projector Dimensions:** 28″ H x 16¼″ W x 32″ D. **Screen Dimensions:** 45″ H x 60″ W. **Power Requirement:** 120 VAC, 60 Hz.

Beautiful, programmable 25" diagonal big-screen color

A completely automatic home television viewing system is yours with the Heathkit GR-2001

VALUE PRICED
ONLY
$999^95

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

The Heathkit GR-2001 Computer TV System – one of the finest sets you can buy anywhere! This fully-computerized, programmable color TV allows you to turn on your set, pre-program it for an entire evening's viewing, and then just sit back and relax. The optional GD-1185 Programmer automatically changes to the right channel at the right time. You can program up to 32 channel changes in two 12/24-hour periods.

For even more automatic operation, the optional GD-1184 antenna rotator control lets you rotate your antenna to get the best reception. You can select up to 8 separate antenna headings, with up to three stations on each heading.

With all of this programming convenience, the GR-2001 is one of the best performing color TVs on the market. Dozens of circuit improvements and refinements help produce a picture that's vivid, accurate, bright and sharp. The 25' (diagonal) rectangular picture tube is fully shielded to maintain better color purity, and features a black matrix screen. The phase-locked loop vertical and horizontal oscillators provide a picture so rock-steady and adjustment-free we've eliminated conventional horizontal and vertical hold controls. And the audio circuitry has been improved to provide true high-fidelity sound, with 50 Hz to 15 kHz frequency response (±1 dB).

Comprehensive, fully-illustrated assembly manuals guide you through the easy, step-by-step kit assembly of the GR-2001. And famous Heathkit self-service features will let you keep your GR-2001 in perfect shape for years to come.

Our custom-installation option lets you build your GR-2001 into a wall, mount it in your own custom cabinet or order one of our beautifully constructed cabinets on page 79.

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

Kit GR-2001, 67 Kg **999.95**

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

GRA-2000-7, Shpg. wt. 1 Kg **19.95**

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

Our special warranty service plan for solid-state TV modules: During the 90-day warranty period, modules with defective components will be serviced at no charge for parts and labor. If the problem is due to a construction error, the inspection and service charge is $8.50 per module. After the 90-day warranty expires, the service fee is $8.50 per module plus parts. All picture tubes warrantied for 2 years.

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

Kit GRA-2001-9, Shpg. wt. 1 Kg **24.95**

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. A front-panel keyboard and on-screen readout make it easier for you to enter any time or channel you want. The GD-1185 TV Programmer is the ultimate in convenience – setting our GR-2001 apart from other sets on the market – and it's a Heathkit exclusive. Requires GRA-601 Clock to operate.

Kit GD-1185, Shpg. wt. 4 Kg **329.95**

GRA-2001-6 Remote Control (not shown). Lets you adjust the volume of your GR-2001, turn the set on or off, adjust tint, scan up or down – even turn the optional programmer on or off – all from up to 20 feet from your set.

Kit GRA-2001-6, Shpg. wt. 2 Kg **169.95**

Easy-to-build On-Screen Digital Clock for your GR-2001 Computer Color TV. Displays the time in hours, minutes and seconds, in 12 or 24-hour formats, on your television screen. Easy-to-read 1" high white digits can be adjusted with the channel numbers to remain on permanently or automatically reappear at approximately selected intervals. A useful, versatile addition to your GR-2001 Computer Color TV System.

Kit GRA-601, Shpg. wt. 1 Kg **49.95**

Automatic Antenna Rotor Control. Provides better reception by automatically rotating your antenna to get the strongest signal on each channel.

Kit GD-1184, Shpg. wt. 3 Kg **129.95**

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

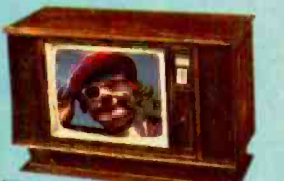
GDA-1184-1, Shpg. wt. 5 Kg **79.95**

ZENITH Programmable Video Director VCR – The ideal companion to your Heathkit Colour Television. Now available at your Heathkit Electronic Centre. See page 76 for details.

Fine-furniture Cabinets for your GR-2001 color television

Simulated TV pictures

1



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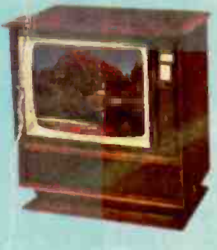

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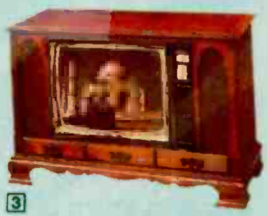

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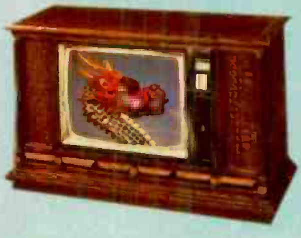


1 **Contemporary cabinet.** Constructed of wood solids and veneers. Oiled walnut finish. Dual speaker capability. Assembled and finished. 28⅜" H x 46 13/16" W x 20 9/16" D (25⅜" D with cup).
GRA-602-25, Shpg. wt. 41 Kg **299.95**

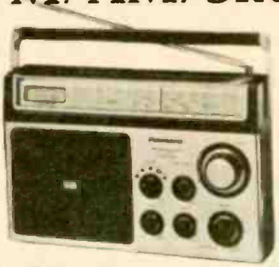
2 **Compact contemporary cabinet.** Constructed of wood solids and veneers. Oiled walnut finish. Assembled. Cutout for one speaker. 34⅜" H x 33⅞" W x 20⅝" D (24⅛" D including cup).
GRA-608-25, Shpg. wt. 41 Kg **254.95**

3 **Early American cabinet.** Distressed maple finished wood solids and veneers. Winsor Antique Gold hardware. Assembled and finished. Twin speaker capability. 31 3/16" H x 47 13/16" W x 20½" D (23 9/16" D including cup).
GRA-603-25, Shpg. wt. 38 Kg **369.95**

4 **Mediterranean cabinet.** Crafted of wood solids and veneers. Dark oak finish, Antique Gold hardware. Assembled and finished. Accepts two speakers. 30 5/16" H x 49 15/16" W x 20⅛" D (23 15/16" D including cup).
GRA-604-25, Shpg. wt. 38 Kg **339.95**

Panasonic "Command Series" FM/AM/Shortwave Radios

1



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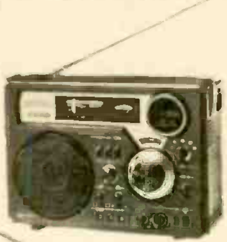

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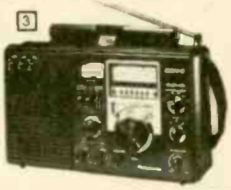

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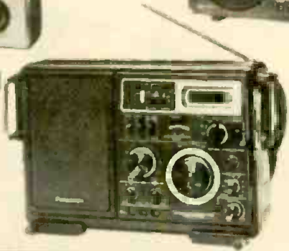

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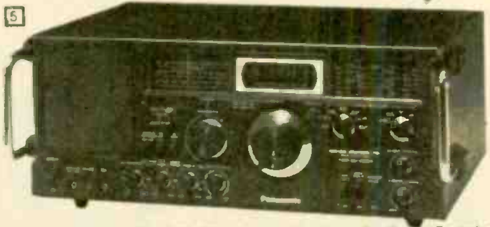

1 RF-1350 AC/Battery Portable 5-Band Radio for Local and International Reception

- FM/AM PLUS SW_{1-3} covering the entire shortwave spectrum from 1.6 MHz to 30 MHz • Fine tuning control for zeroing in on distant stations • Separate bass and treble controls • Large 12 cm (5") PM dynamic speaker • Dual-use meter aids tuning and indicates battery strength • Tuning dial light • Fixed AFC on FM • Jacks for earphone/external speaker, phono and ground terminal • Operates on four "D" size batteries (not included). FACTORY ASSEMBLED.

GDC-1350, Shpg. wt. 3 Kg **199.95**

2 RF-2200 AC/Battery Portable FM/AM Shortwave Radio

- Six SW bands approximately 4 MHz wide spanning 3.9 ~ 28 MHz, plus FM/AM • *Calibrated* frequency-linear tape tuning dial • All-gear drive system, no "backlash" • 2-speed tuning for fast operation • Two crystal markers (500 kHz/125 kHz) provide for precise calibration • Double superheterodyne system reduces interference, improves stability • Wide/Narrow band switch • BFO switch for clear reception of SSB and CW transmissions • RF gain control: AFC for drift-free FM • Separate bass and treble tone controls • 180° gyro antenna, also whip antenna • Comes with AC power cord, shoulder strap and private earphone • Operates on four "D" size batteries (not included). FACTORY ASSEMBLED.

GDC-2200, Shpg. wt. 4 Kg **299.95**

3 RF-2600 AC/Battery Portable FM/AM/Shorwave Radio with All-Band Digital Frequency Display

- 5-digit electronic fluorescent digital display for precise frequency readings • SW coverage 3.9 ~ 28 MHz divided into four bands of 6 MHz • I^2L circuitry ensures accurate tuning down to 1 kHz • Separate bass and treble controls • BFO pitch control: RF gain control • AFC switch for drift-free FM reception • Calibrator for checking SW frequencies • Wide/Narrow bandwidth switch • Double superheterodyne system for superior sensitivity and interference rejection • 10 cm (4") PM dynamic speaker • Tuning/battery check meter • Built-in AM antenna: telescopic whip antenna for FM/SW • Comes with AC power cord, shoulder strap and earphone • Operates on six "D" size batteries (not incl.). FACTORY ASSEMBLED.

GDC-2600, Shpg. wt. 4 Kg **339.95**

4 RF-2900 AC/Battery Portable FM/AM/Shortwave Radio with All-Band Digital Frequency Display

- 5-digit electronic fluorescent digital display for precise frequency readout on FM/AM and three SW bands covering 3.2 ~ 30 MHz • Double superheterodyne system for superior selectivity and sensitivity • Special I^2L circuitry ensures accurate tuning down to 1 kHz. • Dual switch for W/N bandwidth and FM/AFC • Two-speed tuning, all-gear drive • Tuning/battery strength meter • Variable BFO pitch control for clear SSB and CW transmissions • RF gain control for AM and SW • 10 cm (4") PM dynamic speaker • Speaker bass and treble tone controls • Built-in AM antenna, also FM/SW telescopic whip antenna • Comes with AC power cord, shoulder strap, and private earphone • Operates on six "D" size batteries (not included). FACTORY ASSEMBLED.

GDC-2900, Shpg. wt. 4 Kg **449.95**

5 RF-4900 AC/Battery FM/AM/Shortwave Communications Receiver with All-Band Digital Frequency Display

- Complete shortwave coverage from 1.6 MHz to 30 MHz in 8 bands • All-band 5-digit electronic fluorescent digital display • I^2L circuitry for accurate tuning down to 1 kHz • Double superheterodyne system • FET RF amplifier for improved image rejection, cross modulation and sensitivity • Wide/Narrow bandwidth selector – AFC on FM • Fast/Slow tuning knob for SW_{2-3} • Separate SW calibration knob • BFO pitch control for SSB and CW reception • RF gain control: ANL (Automatic Noise Limiter) • 10 cm (4") PM dynamic speaker. • Earphone/ext. speaker, rec-out and aux. jacks and quick hook-up antenna terminals, antenna trimmer • Comes with AC power cord, headphone converter and earphone • Terminal for 12 V DC operation • Operates on eight "D" size batteries (not included). FACTORY ASSEMBLED.

GDC-4900, Shpg. wt. 8 Kg **799.95**

Prices Effective Sept. 15, 1980
Subject to change without notice

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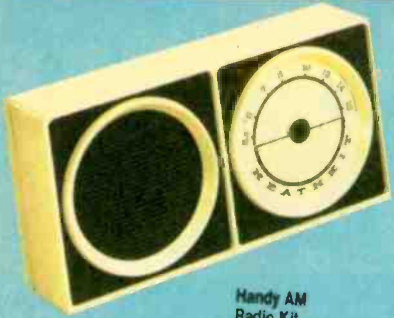
Announcing the "Clearance Corner". **Heathkit Electronic Centres now have a "Clearance Corner" with Discontinued Products, Demo Units, Over Stock Items, etc. at Clearout Prices. Drop in and see what's available or contact your nearest store for a list.**



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Sure you can build a kit! These easy-to-build, first-time kits are not only fun to build . . . but they're practical too!

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6 easy steps to building your first Kit

kit builders guide
STEPS TO EASY HEATHKIT ASSEMBLY
PARTS PICTORIAL

1 **AS SOON AS YOUR KIT ARRIVES** . . . open the carton and take out your Kit Builder's Guide—it will answer all your questions! Read this little booklet first, and you'll know right away you can build your new Heath unit easily . . . even if you've never worked with any electronic equipment before! It shows you step by step how to unpack your kit . . . identify all the parts . . . mount them on the chassis or circuit board . . . the few simple tools you need . . . how easy it is to solder . . . everything you need to know with full illustrations so you can't make a mistake!

2 **THEN, LOOK AT YOUR HEATHKIT ASSEMBLY MANUAL** . . . it's the easiest-to-follow set of instructions you've ever seen!

When you follow your manual step-by-step, you can't miss! It actually draws you a picture of every part in your kit. Then it tells you—again, with pictures—just what parts to mount on your circuit board, and the best way to do it. It tells you when to solder, and when *not* to solder. Just check each step off as you complete it, and you'll always know just where you were in case you're forced to set it aside for awhile . . . you can pick it up just where you let off when you were interrupted!

3 **NOW CHECK YOUR PARTS—EVERYTHING YOU NEED IS INCLUDED** . . . Each kit includes the parts, wire and even the special kind of solder you need. You don't have to go out and buy extra parts — because everything's included in your kit!

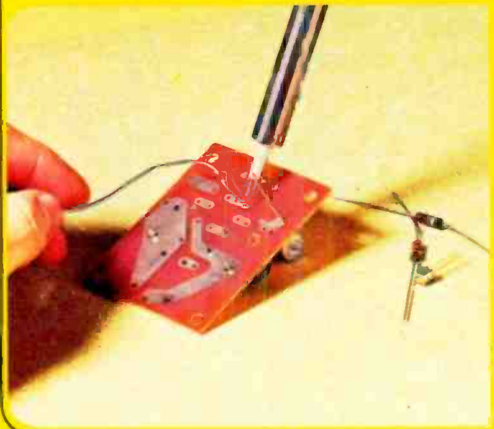
Just check your parts against the parts list . . . circuit board, cabinet, hook-up wire, solder . . . even a handy nut-starter is included for your convenience. All you need is a few common tools you probably already own.

4 **YOU'RE READY TO START BUILDING YOUR KIT.** You've read your Kit Builder's Guide if you're a "first timer" . . . by now, you know the resistors from the capacitors, and you've got all your tools laid out in a well-lighted place. With your Manual open, select the first parts you'll be using, and follow the step by step words and pictures.

You're into the wiring with no problem at all. The instructions tell you whether to solder, or just fasten the wire with your pliers. And when you do solder, you just follow the simple guide in your Kit Builder's booklet—you'll be an "expert" after your first two or three connections!

5 **KEEP GOING—YOU'RE DOING GREAT!** One step at a time does it, and before you know it, EUREKA! You're finished! The manual tells you how to double-check everything . . . then turn your kit on.

6 **CONGRATULATE YOURSELF!** You've built your first kit from Heath and IT WORKS! Now ask yourself . . . could buying a ready-made, mass-produced item in the store give you the same feeling of pride and satisfaction? You've got a hand-crafted, beautifully designed piece of equipment that *you know inside and out!* There's nothing like that feeling . . . and remember:



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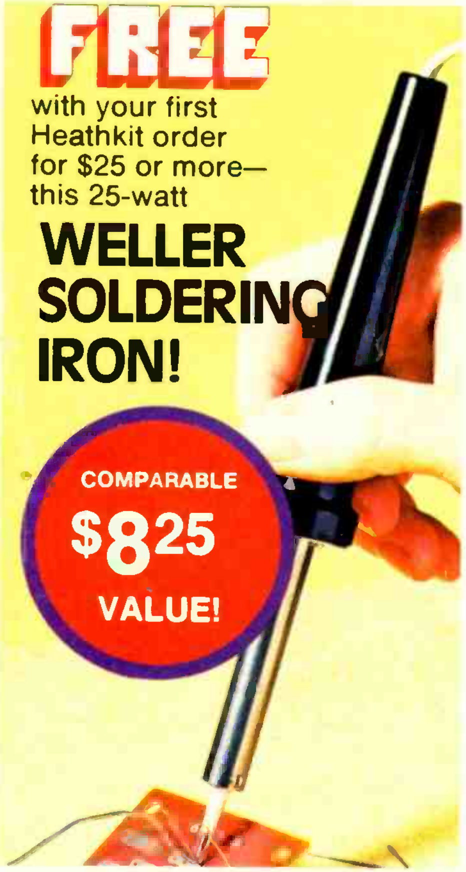

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Dear Friend,

It may be revolutionary, but...in these days of mass-produced mediocrity, Heath re-introduces Quality. And Craftsmanship. And above all, Pride.

I'm not one of those people who always wants to turn back the clock and go back to the "good old days", but I do feel strongly that we have lost a great deal of the pride of craftsmanship that was once so important to all of us.

That's what Heath is all about! And that's our design approach for every new Heath project we offer.

Every week, when our designers and engineers meet, we look at their ideas together. We don't think of our products as a "full line" where we have to have an expensive model, a medium-priced model and a budget model. We look at what's available in the market place and decide if we can create a product that's either completely unique, or simply a better value.

Only when we agree that a product makes sense for our customers as well as for ourselves, do we put a design team on it. We check their progress regularly, to make sure they're on target. Therefore, by the time they've finished, we know we've got a good thing going. The job, however, is still far from finished!

The next step is to create the Assembly Manual that goes with it. Anyone who's ever built a Heathkit product can tell you, our Manuals are the finest, clearest, easiest-to-follow set of instructions ever!

They're pre-tested too. Each kit is assembled again and again by our own people. Not just engineers, but writers...sales people...our top executives. We're not satisfied until we're 100% sure the kit is 100% foolproof. That's why we can say...

We won't let you fail!

We know what we've built into a kit and the Assembly Manual. We know that if you follow one-step-at-a-time, you can do it and do it right! Once you do, you'll know what we mean when we talk about Quality, Craftsmanship, and Pride.

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Sincerely,

B. Winks, General Manager

P.S. Here is your chance to obtain your first Heathkit at a considerable saving: choose from our 10 specially selected first-time kits at up to 25% discount and receive your free soldering iron with any purchase from this catalogue of $25 or more. Please use the order form on the back cover.

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10 Selected Kits for First-Time Kit Builders

1 **The 'Informer'** — looks like a book but is really an ultrasonic alarm. Protects your home from its library shelf. Can activate indoor buzzer alarms, outdoor bells, table or floor lamps. Built-in time delay between light and alarm. Shpg. wt. 2.5 Kg.
GD-39 Catalogue Price $99.95
First-time Kit Builders Special **$79.95**

2 **Portable VOM** — ideal for fast in-the-field checks. Has four AC, DC and Ohms ranges for most common measurements. Special 1½ volt ohmmeter is ideal for checking semi-conductors. Ideal for car buffs, boaters, campers — any away-from-the-bench situation. Shpg. wt. 2 Kg.
IM-5217 Catalogue Price $74.95
First-time Kit Builders Special **$65.00**

3 **Portable Rechargeable Fluorescent Light** — provides illumination anywhere you go, with a wide "flood of light" to help you see. Eliminates fire hazards and mess of gasoline fueled lanterns or lamps. Great for emergencies too — its a good idea to keep one in your home or car. Shpg. wt. 3 Kg.
GD-1246 Catalogue Price $64.95
First-time Kit Builders Special **$48.00**

4 **Timing Light** — another money-saving Heathkit design that every driver should own. With a flash so bright it's visible at high noon, this timing light comes complete with cables for connecting to your car's battery and special inductive pickup for spark plug. Assemble it in one evening, use it for years afterwards. Shpg. wt. 1.5 Kg.
CI-1040 Catalogue Price $59.95
First-time Kit Builders Special **$44.50**

5 **Metal Locator** — find a needle in a haystack or better yet, a valuable coin with this highly sensitive Heathkit Metal Locator. Features visual and audible signals from its built-in meter and speaker. Build it easily in just a few evening sessions; use it on all your treasure-hunting expeditions where it can more than pay for itself! Shpg. wt. 2.5 Kg.
GD-348 Catalogue Price $169.95
First-time Kit Builders Special **$139.00**

6 **Digital Readout Electronic Scale** — gives your weight in big, bright easy-to-read digits. Transistor circuitry and transducer, no mechanical weights or springs to go out of adjustment. Checks weight up to 300 lb in 0.2 lb increments or up to 136 kg in 0.1 kg increments. Digital readout can be detached for remote operation. Battery operated. Shpg. wt. 4 Kg.
GD-1186 Catalogue Price $169.95
First-time Kit Builders Special **$149.00**

7 **Electronic Door Chimes** — a one-octave "keyboard" lets you programme any tune up to 16 notes. Celebrate a season, birthday, anniversary, special party — whatever you like. Change notes by simply rearranging leads. Electronically synthesized sound with controls for tuning, volume, speed and decay characteristics. Easy assembly, ideal for first-time builders. Shpg. wt. 1.5 Kg.
TD-1089 Catalogue Price $59.95
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8 **Home Heat Control** — saves up to 20% on your fuel bills! Automatically reduces room temperature during one or two preprogrammed periods. Over-ride switch. Shpg. wt. 2.5 Kg.
GD-1776 Catalogue Price $84.95
First-time Kit Builders Special **$69.00**

9 **CD Ignition System** — this capacitive-discharge ignition system improves performance and assures fast, easy starts in all kinds of weather. Helps you get longer life from plugs and points — get up to 50,000 miles between tune-ups. Easy to build, goes together in one evening. Shpg. wt. 1.5 Kg.
CP-1060 Catalogue Price $79.95
First-time Kit Builders Special **$69.00**

10 **Digital Electronic Clock** — the alarm clock for today, it wakes you with a considerate electronic "beep" and lets you go back for as many 9-minute catnaps as you like. Displays time in either 12- or 24-hour format. Automatic dimming, AM/PM, power-failure and alarm on indicators. So easy to build — and great value too! Shpg. wt. 1.5 Kg.
GC-1107 Catalogue Price $49.95
First-time Kit Builders Special **$45.00**

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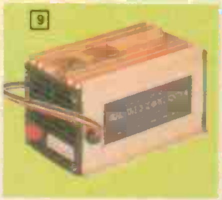
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