

Heathkit®

FALL 1977

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New

THE HEATHKIT COMPUTERS

The "total system" computer products for home, hobby, educational and business applications. With powerful software to get you up and running fast, superior documentation and service support, sensational low prices too. They're the ones you've been waiting for! See pages 2-11.



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Introducing HEATHKIT

THE NEW VALUE STANDARD IN PERSONAL WITH EXCLUSIVE HEATH-DESIGNED SOFTWARE

Heath company has been interested and involved in personal computing since we first marketed an analog computer system all the way back in 1957. This continuing interest, along with recent technological developments that have made personal computing systems a practical reality to the general public, has resulted in two "total design" computer systems that give you more power, performance and reliability for your computer dollar. The Heathkit computer systems give you everything you need to get up and running fast, with complete peripherals, I/O accessories, memory expansion and easy-to-use systems software, plus documentation that's the finest available anywhere.

Total System Design! The Heathkit computer line, both hardware and software, has been designed from the ground up to be a total computing system that meets the needs of both the beginning and advanced computer hobbyist. The two mainframes are based on performance-proven microcomputers, the 8080A and the LSI-11. These CPU's were chosen because of their world-wide performance, reliability and

efficiency, and the tremendous amount of existing software, documentation and source materials that are available. The Heath-designed CRT terminal, paper tape reader/punch, and serial and parallel interfaces make total system setup fast and easy, and the Heath-designed software provided assures immediate usefulness and versatility.

Superior Documentation! Heath company is world-famous for the accuracy and clarity of its instruction manuals. The Heath computer line continues this well-deserved reputation. Assembly, operations and software manuals are written with easy-to-understand step-by-step instructions and full illustrations that leave nothing to chance or interpretation. Simply follow the instructions in the manual and you'll be up and running fast.

Service and Support! As in all Heathkit products, easy self-service and troubleshooting are definite benefits that can result in substantial cost-savings over the life of the product. These considerations, along with nationwide service and techni-



PERSONAL COMPUTERS . . .

COMPUTING SYSTEMS FEATURING TWO POWERFUL COMPUTERS PLUS FULL DOCUMENTATION AND SERVICE SUPPORT


cal assistance at Heathkit Electronic Centers or the Heathkit factory, mean that you have the most reliable protection for your computer investment available anywhere.

System Versatility! Both Heathkit computers offer full expansion potential and adaptability to meet any application. Mass storage capability is available in both audio cassette and paper tape format on the H8 and in paper tape format on the H11. Additional memory expansion boards can be added to either unit, along with an expanding number of I/O devices.

Continuing Development. Heath will continue to design and develop new compatible products to make their computer systems even more valuable to you. Coming in the future will

be—floppy disk storage, line printer, additional applications programs, additional memory, and self-instructional courses in programming. All Heathkit computer users are eligible for HUG™, the Heath User's Group. Heathkit H11 customers are also eligible to join DECUS™, the Digital Equipment Corporation User's Society.

We're confident you'll find the Heathkit computer line one of the most intelligent, sensibly developed and complete product lines available today. It offers you total versatility and expansion capability to go wherever your imagination and programming prowess takes you. And, in the Heathkit tradition, it offers the best price/performance and reliability combination you'll find anywhere.



LOW COST TERMINAL WITH FULL 67 KEY ASCII KEYBOARD.
80X 200X DISPLAY USING A 607 DOT MATRIX.
80 FULL LENGTH 80 CHARACTER LINES.
EMERGENCY FROM DISPLAY CINES 40 LINES OF 20 CHARACTERS.
PICTURE MODE FOR BASIC AND BINARY PLOTTING.
BOTH SERIAL AND PARALLEL INTERFACES.
8000 BYTE VOLATILE MEMORY 128 TO 3000 BARS.
20 IN. LOOP, 80-222 OR TTL LEVELS.
SCROLLING, AUTOMATIC LINE FEED & CARRIAGE RETURN.
KEYBOARD CURSOR CONTROL, TONE OUTPUT FOR BELL CHARACTER.
PAGE THROUGH PLUS MANY OTHER FEATURES AND STANDARD.
CAN BE USED WITH ANY SERIAL COMPUTER.

THE HEATHKIT H8 COMPUTER

The powerful, easy-to-use hobbyist's computer with the "intelligent" front panel featuring an octal entry keyboard and digital readout—plus a fully wired and tested 8080A CPU and systems software at no extra cost!

\$375⁰⁰



Designed with features for the Beginner and the Advanced Experimenter!

- Built-in extended ROM monitor controls front panel program
- Heavy-duty power supply handles to 32K memory
- Exclusive Heath 50-line fully-buffered bus has positions for up to 10 plug-in circuit boards
- 9-Digit front panel display has 3 readout modes
- Built-in speaker provides audible feedback for keyboard entry
- Convection cooled power supply—no fan needed
- Includes BASIC, assembler, editor and debug software

The Heathkit H8 Computer is a powerful 8-bit machine based on the famous 8080A chip. It's combination of unique features and low cost makes it an outstanding value among general-purpose computers on the market, and thanks to Heath's exclusive design, it's one of the most versatile.

The interrupt-controlled "intelligent" front panel on the H8 has 16-digit keyboard for octal data entry and 9-digit octal readout. The keyboard and display provide access to all memory, registers and functions providing far more information than conventional computers, and making the H8 an ideal trainer and learning tool. Functions of the front panel include display and alter of memory locations; display and alter of registers; dynamic monitoring during program execution; program

execution control; automatic tape load and store through a built-in routine that permits one-button program loading; and write or read any I/O port.

The exclusive Heath-designed 50-pin bus is fully buffered to reduce noise and crosstalk and "glitch" free to eliminate timing problems. The bus is implemented on a heavy-duty printed circuit mother board with wide, heavy copper foils for greater physical strength and reliability. The board has positions for up to 10 plug-in circuit boards that accept the CPU, memory, I/O and other accessory cards. There's plenty of room for expansion and all I/O bus connectors are supplied with the mother board so expansion is fast and easy when you want it.

The H8's built-in power supply is convection-cooled for adequate ventilation without noisy fans. Separate IC regulators provide distributed regulation with a heat sink on each circuit board for excellent heat dissipation. Switch-selectable 120/240 VAC, 50/60 Hz increases versatility.

The CPU board is fully wired and tested for easy system setup. It features the 8080A chip, clock, systems controller, ROM monitor and

full bus buffering. Seven vectored interrupts are available for quick response to I/O requests.

The H8 includes all system software in 1200 baud audio cassette format (see below for details). The H8 is housed in a rugged, heavy-duty metal cabinet with modern, high-impact structural foam side panels 16¼"Wx6½"H x17"D. Requires at least one H8-1 memory board.

Kit H8, Shpg. wt. 30 lbs. 375.00



Systems software included with the H8 in audio cassette form: Benton Harbor BASIC™, HASL-8™ 2-pass absolute assembler for creating efficient programs; TED-8™ line oriented text editor; and BUG-8™ powerful terminal console debug program. This software is also available in paper tape format (order H8-15, next page).



Compare these H8 power and performance features!

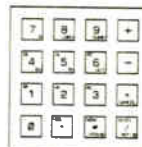
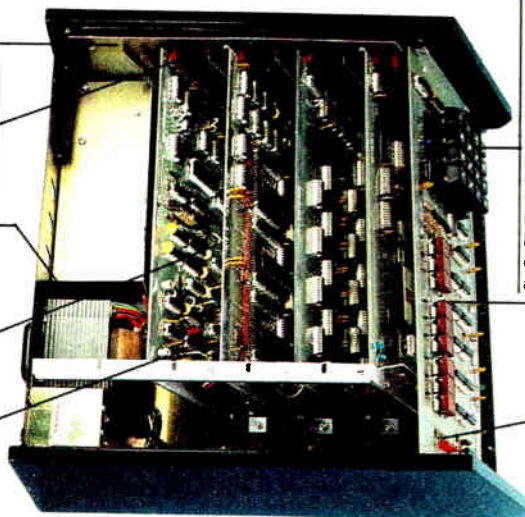
The Heath-exclusive 50-pin bus is implemented on a heavy-duty 10-position mother board with all I/O connectors supplied

Heavy-duty power supply is convection cooled to eliminate the need for noisy fans

Rugged steel chassis and securely mounted and braced circuit boards make the H8 a truly reliable and long-life machine

Bus lines are fully buffered to eliminate crosstalk and "glitch-free" to prevent timing problems

Modular circuit boards with unconfined heat sinks to enhance cooling and improve heat dissipation



H8 front panel provides direct-access to registers and memory; one-button load and dump; I/O keys for direct communication with any port.

Status Lights indicate:

- Power-On
- Interrupt-Enable
- Monitor
- Run



Memory Display



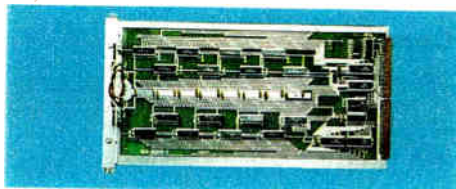
Register Display



I/O Port Display

Informative front panel displays are continuously updated even while program is executing giving you instant access to registers and memory for direct monitoring of program activity

H8 Accessories, Interfaces, Software and Manual Set

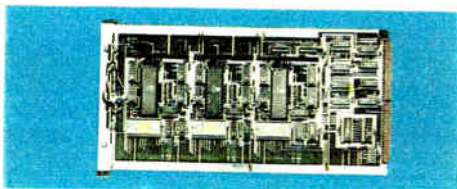


H8-1 Memory Board. 8K Static RAM card with 4K memory plugs directly into H8 bus. Maximum capacity, 8192 8-bit words. Access time, less than 450 nS. With on-board regulators, heat sinks and full buffering.

Kit H8-1, Shpg. wt. 2 lbs. 140.00

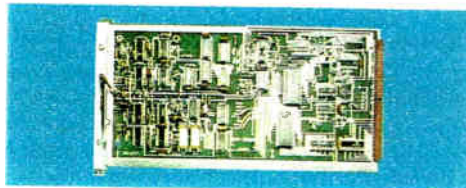
H8-3 Chip Set. Kit of eight IC's expands H8-1 to full 8K storage. With sockets.

Kit H8-3, Shpg. wt. 1 lb. 95.00



H8-2 Parallel Interface. Connects H8 to parallel devices such as paper tape reader/punch, line printer or your own devices. Has three independent parallel ports, each with 8 bits input and 8 bits output and universal handshaking capability. Compatible with all Heath software and peripherals, required to high-speed parallel interface the H10 paper tape reader/punch (page 8). 390 mS maximum transfer time. With diode-clamped inputs, buffered outputs and full interrupt capability.

Kit H8-2, Shpg. wt. 3 lbs. 150.00



H8-5 Serial I/O and Cassette Interface. Connects the H8 to serial devices such as the H9 video terminal (page 9) or the H36 DEC Writer II (page 10). Features jumper selectable data rate from 110 to 9600 baud, common input/output interfaces including 20 mA current loop and EIA RS-232C compatible levels. The cassette recorder interface permits use with the Heathkit ECP-3801 cassette recorder/player (page 10). Uses the popular Byte/Manchester of "Kansas City" standard recording format. Control lines for remote start and stop of two cassette units allow separate record and playback for easy program or file editing. Also has full interrupt capability.

Kit H8-5, Shpg. wt. 3 lbs. 110.00

Note: Proper operation of H8 software and H8-5 is assured only with the Heathkit ECP-3801 cassette recorder/player and ECP-3802 cassette tape. Heath is not responsible for improper operation associated with other cassette units.

Extended Benton Harbor BASIC™. A faster and more powerful version of the BASIC supplied with the H8. Includes character strings, additional convenience commands, math functions, dynamic storage allocation, access to real-time clock, keyboard interrupt processing and more. A minimum of 12K memory is required to run this BASIC, 16K memory is recommended.

H8-13 (1200 baud audio cassette). 1 lb. 10.00

H8-14 (fan fold paper tape). 1 lb. 10.00

Paper Tape Systems Software. A paper tape version of the H8 system software. Four fan-fold paper tapes, one each for Benton Harbor BASIC™, HASL-8™ assembler, TED-8™ editor and BUG-8™ debug. For H10 paper tape reader/punch (page 10) or other paper tape I/O equipment.

H8-15, Shpg. wt. 1 lb. 20.00



H8 Manual Set
only \$25

Price of manual set is refunded when you purchase an H8, simply enclose HM-800 saleslip with your order.

Here's your chance to LOOK before you buy, and with no risk! The HM-800 manual set includes the complete assembly and operations manuals for the H8 Digital Computer, H8-1 memory card, H8-2 parallel interface; H8-3 4K Expansion Chip Set; H8-5 Serial I/O and Cassette Interface; H9 Video Terminal and H10 Paper Tape Reader/Punch. The complete H8 software documentation is also included! All in handsome 3-ring binder that's handy for reference and additional information.

HM-800, Shpg. wt. 11 lbs. 25.00

NOTE: Manuals are included with each kit.

THE HEATHKIT H11 COMPUTER

Two of the finest names in electronics, Heath Company and Digital Equipment Corporation (DEC) combine to bring you the world's first 16-bit computer priced within reach of the general public!

\$1295⁰⁰



Heathkit / Digital Equipment Corp. H11 Digital Computer

- Uses the performance-proven LSI-11 CPU
- Executes the famous 400+ PDP-11/40 Instruction Set and powerful software
- Fully wired and tested DEC KD11F board
- 4096 x 16 read/write MOS semiconductor memory

- Mechanically superior bus with 38 high-speed lines
- Single-level, vectored automatic priority interrupt
- Efficient switching power supply with built-in cooling fan
- Backplane guide assembly for μ P and up to six I/O and memory modules

The new Heath/DEC H11 personal computer combines the advanced performance-proven hardware and software of the famous LSI-11 with Heath's expertise in kit design and documentation to bring you a personal computer of almost incredible power and performance. Equivalent commercial versions of the H11 would cost literally \$1000's of dollars more!

The LSI-11 bus has 38 high-speed lines containing data, address, control and synchronization lines. Sixteen lines are used for time multiplexing of data and addresses. All data and control lines are bidirectional, asynchronous, open-collector lines providing a maximum parallel data transfer rate of 833K words per second under direct memory access operation.

The fully wired and tested KD11F board contains the CPU with eight general registers which serve as accumulators, index, autoincrement/autodecrement registers or stack pointer; and a 4096x16 MOS semiconductor memory. Additional cards can be added to expand memory up to 20K in the H11 cabinet (32K words total).

The backplane/card guide assembly holds the microcomputer and up to six I/O and memory modules. All LSI-11 bus data, control and power connections are routed on the printed circuit backplane to each module location. The backplane/card guides are fully compatible with all standard DEC LSI-11 accessories.



An efficient, well-designed power supply provides the required DC voltage for the LSI-11 as well as all accessory modules. The supply features overvoltage and overcurrent/short circuit protection, power fail/automatic restart and a built-in fan for quiet cooling. The dual primary power configuration can be connected for 115 V, 60 Hz or 230 V, 50 Hz AC.

Other features of the H11 include single-level, vectored, automatic priority interrupt, real-time clock input, ODT/ASCII console routine/bootstrap resident in microcode. The H11 is supplied with versatile PDP-11 software (described below) which uses the famous PDP 11/40 instruction set with over 400 commands.

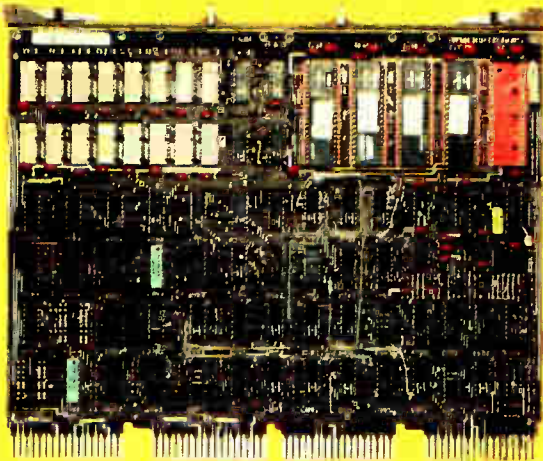
The H11 is housed in a rugged metal cabinet with structured foam side panels, 6½"Hx19"W x17"D. For 110/220 VAC, 50/60 Hz.

Kit H11, Shpg. wt. 34 lbs.1295.00

PDP-11™ software included with the H11 consists of: ED-11 editor; PAL-11S relocatable assembler; LINK-11S link editor; Absolute Loader; ODT-11X debug program; IOX executive program; DUMP AB and DUMP R; BASIC and FOCAL™ (4K and 8K versions). The software requires a minimum of 3K memory, with 12 to 16 K total recommended for maximum capability. See software License agreement, next page.

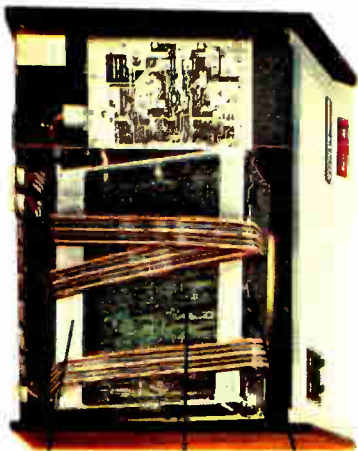
NOTE: DEC, DIGITAL, FOCAL and PDP are registered trademarks of Digital Equipment Corporation.

H11 Accessories, Software and Manual Set



Fully Wired and Tested KD11F Circuit Board. The "heart" of the LSI-11 is the standard DEC LSI-11 microcomputer board. The 16-bit CPU functions are contained in 4 silicon gate N-channel MOS LSI integrated circuit chips for high reliability and superior performance. The 4096-by-16 read/write MOS semiconductor memory is composed of LSI 4K dynamic RAM chips for fast access time with low power consumption. The board is fully wired and tested to facilitate kit assembly and provide greater reliability and less chance of error.

The compact, efficient power supply uses less power to operate and generates less heat than conventional supplies. Has overvoltage and overcurrent/short-circuit protection, plus automatic power-up- and power-down sequencing for high reliability and long life operation. A built-in quiet-running fan provides efficient cooling and prevents heat buildup.



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

Card cage swings up for easy access and service even when the H11 is operating.

Accessory boards slide directly into card guide and are held securely in place. All card connectors are supplied for easy expansion.



H11-2 Parallel Interface. Required for interfacing the H11 to the H10 Paper Tape Reader/Punch (page 8). Also for other LSI-11 backplanes. With connectors

Kit H11-2, Shpg. wt. 2 lbs. 95.00



H11-5 Serial Interface. For use between LSI-11 bus and serial devices such as the H9 video terminal (page 9) or LA36 DEC Writer II (page 10). Includes all mating connectors. For H11, other LSI-11 backplane machines. With connectors

Kit H11-5, Shpg. wt. 2 lbs. 95.00

H11-6 Extended Arithmetic Chip. Adds powerful arithmetic instructions to the LSI-11, including fixed point multiply, divide and extended shifts plus full floating point add, subtract, multiply and divide. Helps minimize or eliminate arithmetic subroutines, speeds up program execution and eases program development. Saves memory space too. 40-pin dual inline package IC plugs into socket on KD11F board.

H11-6, Shpg. wt. 1 lb. 159.00



H11 Manual Set
only \$25

Price of manual set is refunded when you purchase an H11, simply enclose HM-1100 saleslip with your order.

Complete assembly and operations manual for H11, H11-1, H11-2, H11-5, H9, and H10. Also includes complete software documentation.

HM-1100 Manual Set, Shpg. wt. 12 lbs. ... 25.00

NOTE: Manuals are included with each kit.



H11-1 4K Memory Expansion Module. Plugs directly into H11 backplane, adds 4K x 16-bit word capacity to H11 memory. Access time, less than 500 nS. Fully compatible with PDP 11/03 and other LSI-11 backplane machines.

Kit H11-1, Shpg. wt. 2 lbs. 275.00

HEATH/DEC Software License Agreement:

This form MUST accompany your H11 computer order.

CUSTOMER SUBLICENSE GRANT

HEATH COMPANY (hereinafter referred to as HEATH) pursuant to a license agreement with Digital Equipment Corporation (hereinafter referred to as DIGITAL) does hereby grant to CUSTOMER a non-transferable and non-exclusive sublicense to use the Binary Software Program(s) PTSP-11 Paper Tape System, FOCAL/PTS Language Processor, BASIC/PTS Language Processor (hereinafter singularly and/or collectively

referred to as "Software") on the following terms and conditions.

Software is furnished to CUSTOMER for use on a single CPU only and may be modified, or copied (with the inclusion of DIGITAL'S copyright notice) only for use on such CPU. The CUSTOMER shall not provide or otherwise make available the Software or any portion thereof in any form to any third party without the prior approval of DIGITAL. Title to the ownership of the Software shall at all times remain with DIGITAL.

THE HEATHKIT H10 PAPER TAPE READER/PUNCH

- Solid-state reader with stepper motor
- Precise ratchet/solenoid drive for high accuracy and consistent punching
- Totally independent punch and reader
- Copy mode for easy tape duplication
- Heavy-Duty Built-in power supply
- For Heathkit H8 and H11 computers, others too

\$350⁰⁰

H10 Deluxe Paper Tape Reader/Punch

The H10 paper-tape reader/punch is a general-purpose mass storage peripheral using reliable low-cost paper tape. It's fully compatible and styled to match the H8 and H11 computers, and it works reliably with any other computer through a parallel interface. The H10 uses standard 1" wide roll or fan-fold 8-level paper tape. Standard punched paper tape gives you the reliability, durability and trouble-free handling you need for effective mass storage of programs and data.

The reader reads tape up to a maximum rate of 50 characters per second. A full sensitivity adjustment on each channel permits any color, thickness, quality (oiled or unoled) paper tape to be used. Sensitive Darlington photo transistors and an incandescent lamp reader head provide reliable reading. The powerful stepper motor drive insures accurate tape positioning and movement.

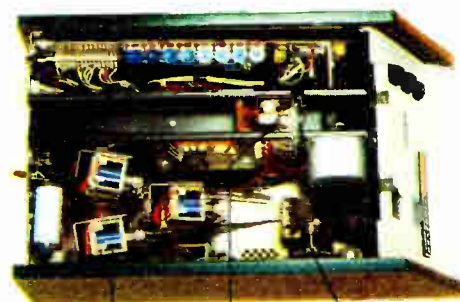
The punch operates up to maximum speed of 10 characters per second. Ratchet/solenoid drive and solenoid control of punches provide high-accuracy and consistent punching.

Controls include power on-off, read and punch start. A feed control feeds blank tape through the punch for leader tape, a copy control provides fast, easy tape duplication.

Interfacing is provided by separate 8-bit parallel input and output buses with standard TTL logic levels and handshaking lines for both reader and punch. A rear panel 24-pin interface connector and mating cable are supplied.

Accessories include holder for roll paper tape, chad collector tray and collector box for fan-fold tape, 8" roll 900 ft. blank paper tape. Cabinet with metal top and rugged steel chassis. 12-5/8"Hx9 3/4"Wx19-5/8"D. For 110-130 VAC, 60 Hz or 220-240 VAC, 50 Hz.

Kit H10, Shpg. wt. 29 lbs. 350.00



Heavy-duty solenoids for reliable, long-life operation.

Precision machined punch block for accurate, consistent punched holes.

Advanced reader design with stepper motor and solid-state sensors for accurate reading.

H10-2, Three Rolls Blank paper tape, each 8" diameter, 900-ft. min.

H10-2, Shpg. wt. 5 lbs. 10.00

H10-3, Three Boxes Fan-Fold Tape, Approx. 1000 ft. each.

H10-3, Shpg. wt. 5 lbs. 10.00

DIGITAL AND HEATH JOINTLY AND SEVERALLY DISCLAIM ALL IMPLIED WARRANTIES WITH REGARD TO THE SOFTWARE LICENSED HEREUNDER, INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS; and any stated express warranties are in lieu of all obligations or liability on the part of either DIGITAL or HEATH for damages, including but not limited to special, indirect or consequential

HEATH COMPANY

By _____

CUSTOMER

By _____

William E. Johnson

Customer's Signature

THE HEATHKIT H9 VIDEO TERMINAL

- Low-cost complete ASCII terminal
- Bright 12" CRT display for easy reading
- Short and long-form display formats
- Includes all standard serial interfaces
- Fully assembled and tested control board and wiring harness for easy assembly

\$530⁰⁰



H9 Long and Short-Form Video Display Terminal

The H9 video terminal is a general-purpose peripheral designed for use with the Heathkit H8 or H11 computers. It provides keyboard input and a CRT for the convenient entry and display of computer programs and data. It can be used with any computer in dedicated stand-alone applications or in time-sharing systems.

Character format is standard upper case 5x7 dot matrix. The long form display is twelve 80-character lines. The short form display is forty-eight 20-character lines in four 12-line columns. An automatic line carry over feature executes line feed and return when line exceeds character count on both long and short-form displays. A built-in oscillator/speaker generates a 4800 Hz tone and serves as audible end-of-line warning.

Auto-Scrolling is featured in both long and short-form. In the long form, as the line enters at bottom, the top line scrolls off screen; in the short form, as the column enters from the right, the left column scrolls off screen. Auto-scrolling can be defeated with a front panel

switch. The cursor mark indicates the next character to be typed for accurate positioning. Cursor controls include up, down, left, right and home. Serial data baud rates are selectable from 110-9600. Baud rate clock output and reader control are available on the rear panel connector.

The **erase mode** permits automatic full page erase or erase to end of line starting at cursor position. A transmit page function allows a full page to be formatted, edited and modified, then transmitted as a block of continuous data.

The **plot mode** permits graphs, curves and simple figures to be displayed. Plotting can be accomplished via the front panel keyboard or from external inputs.

The **H9 serial interface** provides EIA RS-232C levels, a 20 mA current loop and standard TTL levels. Parallel interfacing includes standard TTL levels, 8 bits input and 8 bits output and 4 handshaking lines for connection to H10.



**Long-form Display—
Twelve 80-character
lines**



**Short-Form Display—
forty-eight 20-char-
acter lines in four
columns**



**Plot Mode—Curves,
graphs and simple
figures**

Ultra-compact size, only 12½"Hx15-¾"Wx20-¾"D, makes the H9 ideal for desktop or console applications. For 110 VAC, 60 Hz or 230 VAC, 50 Hz.

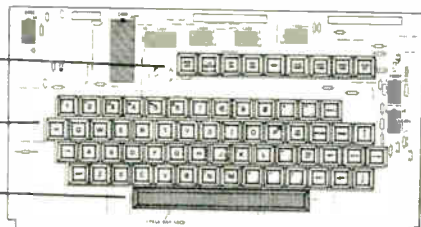
Kit H9, Shpg. wt. 50 lbs. **530.00**

Full ASCII 67-Key Keyboard

Function keys are positioned away from keyboard to prevent miskeying.

Standard typewriter keyboard for easy, more accurate input.

Wide, easy-to-use space bar aids accurate typing.



The printed circuit control board for the H9 video terminal is fully assembled and tested, to provide added reliability and simplified kit assembly. There's also a wiring harness with connectors to greatly reduce point-to-point wiring.



SAVE on Complete Computer Systems

You can choose a complete computer system consisting of the H8 or H11 computer, one major peripheral, plus memory and accessories, and deduct 5% from the purchase price (excluding shipping and handling charges). Choose one of the Heath-recommended systems below (which already have the discount calculated for you), or "roll your own" with system components you select!—or choose the special HS-11 Computer system and SAVE EVEN MORE!

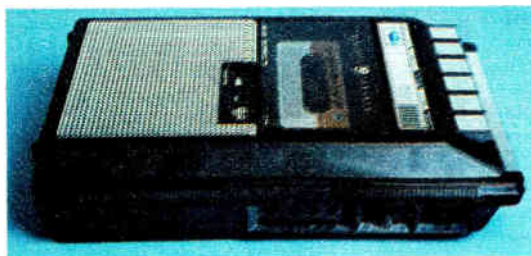
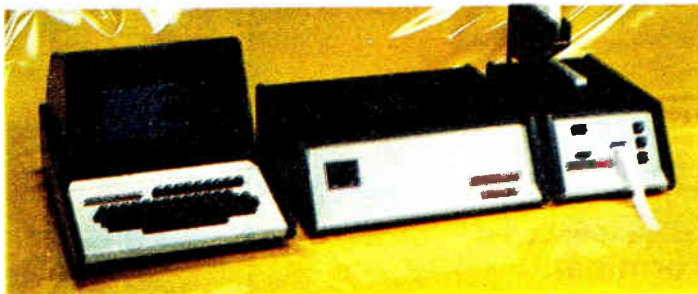
H8 System One: The minimum recommended H8 system. Includes H8 computer, one H8-1 4K memory, H8-3 4K Chip Set, H8-5 Serial I/O and Cassette Interface, H9 Video Terminal and ECP-3801 Cassette Recorder/Player. If purchased separately, \$1305.00. **Heath System Price is \$1239.75**

H8 System Two: A deluxe H8 System. Includes H8 Computer, Two H8-1 4K Memories, Two H8-3 4K Chip Sets, H8-5 Serial I/O and Cassette Interface, H9 Video Terminal, ECP-3801 Cassette Player/Recorder and H8-13 Extended BASIC in Cassette Form. If purchased separately, \$1550.00. **Heath System Price is \$1472.50**

H11 System One: The minimum recommended H11 System. Includes H11 Computer, H11-1 4K Memory (for a total of 8K memory), H11-2 Parallel Interface, H11-5 Serial Interface, H9 Video Terminal and H10 Paper Tape Reader/Punch. If purchased separately, \$2640.00. **Heath System Price is \$2508.00**

H11 SPECIAL SYSTEM OFFER! A deluxe H11 system discounted even MORE than 5% to really save you money! Consists of H11 Computer, H11-1 4K Memory (for a total of 8K memory), H11-2 Parallel Interface, H11-5 Serial Interface, H10 Paper Tape Reader/Punch and H36 LA36 DEC Writer II. If purchased separately, \$3605.00.

YOU SAVE \$255! Special System Price is \$3350.00
HS-11 Computer System. Shpg. wt. 78 lbs. **3350.00**



Cassette Recorder/Player Mass Storage Peripheral

Heath-recommended cassette recorder for use with H8 computer and H8-5 serial I/O and cassette interface. Provides complete mass storage capability on easy-to-handle standard cassettes. Assembled and tested, not a kit.

NOTE: Proper operation of the H8-5 and H8 software is assured only with the use of the ECP-3801 cassette recorder/player and ECP-3802 tape. Heath does not assume responsibility for improper operation resulting from the use of other cassette units.

ECP-3801, Shpg. wt. 4 lbs. **55.00**

Heath-recommended high output, low noise, premium-grade audio recording tape. Pack of three 30-min cassettes.

ECP-3802, Shpg. wt. 1 lb. **per pack 5.00**



**SENSATIONAL
 LOW
 MAIL-ORDER
 PRICE!**

\$1495.00

Fully Assembled

LA36 DEC Writer II Keyboard Printer Terminal

The LA36 is an advanced technology teleprinter offering fast, reliable operation at one of the best price/performance ratios in the industry. It features a 7x7 dot matrix print head for crisp, clear character formation; switch selectable 10, 15 and 30 cps printing speeds; variable width forms handling from 3" to 14-7/8" wide; adjustable left and right hand tractors for precise margin positioning; half or full duplex operation; ANSI-standard multi-key rollover and a typewriter-like keyboard.

Handles up to 6-part forms with a .020" maximum pack thickness. Print format is 132-column, with 10 characters per inch horizontal spacing and 6 lines per inch vertical spacing. Uses the entire 128 character ASCII upper/lower case set with 96 printable characters. A CAPS-lock key simplifies data entry. A parity check on output prints a replacement character, strappable to odd, even or none with mark or space. Also has last-character visibility feature.

The integral 20 mA current loop interface makes the LA36 compatible with both the H8 and H11 computers, as well as most

other hobby and personal computers. Operates on 90-132 VAC or 180-264 VAC for reliable performance even under brown-out conditions. With connecting cable and integral stand for easy setup. Overall size, 27½"Wx33¼"Hx 24"D.

The H36(LA36 DEC WRITER II) is shipped Motor Freight, prepaid to your nearest terminal within the Continental U.S. Include your phone number on order for notification of arrival. Arrangements for home delivery at extra charge at your option. NO C.O.D. ORDERS ACCEPTED.

H36 DEC Writer II..... **1495.00**

H36-1 Fan-fold Paper for H36. Standard 14-7/8"x11" white and green, single-part, lined paper. 3450 sheets per carton.

H36-1, Shpg. wt. 50 lbs. **30.00**

H36-2 EIA Interface. Provides EIA RS232-C or CCITT-V24 interface for LA36. 9-ft. cable with 25-pin data-set type connector is also supplied. (DEC designation, LAXX-KG.)

H36-2, Shpg. wt. 1 lb. **65.00**

HUG®—The Heath User's Group

Get even more fun and excitement from your personal computer by joining the Heath User's Group (HUG). The group provides a newsletter, program library and puts you in contact with other Heath computer owners. Details are included with each computer and peripheral. H11 computer owners are also eligible for DECUS, the Digital Equipment Computer User's Society.

NEW HEATHKIT SELF-INSTRUCTIONAL COMPUTER COURSES



These Heathkit self-instructional courses are designed to help you get the most from your computer investment, whether you buy your computer hardware from Heath or anywhere else. While many predeveloped software programs are available, the only way to realize the full value of your personal computer is to learn programming yourself. These courses use the PROVEN Heathkit individual learning techniques to give you a thorough understanding of programming, even if you have no prior knowledge or experience. They'll show you exactly how to make your personal computer system really personal!

BASIC PROGRAMMING SELF-INSTRUCTIONAL COURSE

This course teaches you how to program your computer using the popular BASIC language. BASIC (Beginner's All-Purpose Symbolic Instruction Code) is essential for hobby and personal computing; it is also widely used in education and business. The course covers all formats, commands, statements and procedures plus the creative aspects of computer programming, so you can make practical use of it in solving problems and creating your own unique programs. Like other Heathkit self-instructional courses, it uses programmed instructions backed by practical hands-on

computer experiments and demonstrations to reinforce and personalize the text material. An optional final exam (passing grade 70%) brings you a Certificate of Achievement and 3.0 Continuing Education Units*. While the BASIC course is keyed to Heathkit computers, it is also equally applicable to any computer system using BASIC. Available after Oct. 20th, 1977.

EC-1100, Shpg. wt. 6 lbs. 29.95

*Continuing Education Units (CEU's) are nationally recognized means of acknowledging participation in non-credit adult education.

COMING SOON!

8080 Programming: Teaches you the machine and assembly language used with 8080-based computers. Shows you how to use the editor, assembler and debug software to create efficient programs. Ideal for the H8 and other 8080A based machines. Coming soon.

LSI-11 Programming: Shows you how to use editor, assembler, linker, debug and executive I/O software to create efficient programs. Applicable to H11 and most other Digital Equipment Corporation PDP-11 series computers. Coming soon.

COMING IN OCTOBER! MICROPROCESSOR SELF-INSTRUCTIONAL COURSE

Applications Software—Coming Soon!

These complete software programs will make your H8 and H11 computers even more interesting and useful. Watch for them in future catalogs!

Blackjack. Interactive program allows four players to play blackjack on the computer. The computer performs all the functions of the dealer and keeps track of player's progress, wins and losses. Requires 16K of RAM in the H8 and 8K in the H11.

Biorhythm. Computes standard biorhythm information and plots sinusoidal curves of your physical, emotional and intellectual characteristics over a given period of time. Requires 16K of RAM in the H8 and 8K of RAM in the H11.

Startrek. Probably the most popular computer game around. Lets you guide, control and command the Starship Enterprise in its travels through the galaxy. A truly challenging, sophisticated and entertaining computer game. Runs on the H8 or H11 with 8K or RAM or more.

Game Set #1. Lets you play 8 popular computer games including Craps, Orbit, Tic-Tac-Toe, Nim, Hexapawn, Hangman, Hmrabi, and Derby. 8K RAM or more is required on both the H8 and the H11.

Game Set #2. Contains eight more popular games including bagles, slot machine, gomoko, yachtze, apollo, gunner, wumpus and cube.

COMPLETE COMPUTER LIBRARY

- Microcomputer Dictionary and Guide (Matrix).** Comprehensive source of definitions and basic information on computers and related topics. A super reference source. **EDP-218** 17.95
- Introduction to Microcomputers Vol. I (Osborne).** Excellent introduction to concepts. **EDP-224** 7.50
- Introduction to Microcomputers Vol. II (Osborne).** Complete descriptions of all popular microprocessors, 8080, 6800, 6502, SC/MP, Z80, F8, 2650, etc. Good reference. **EDP-225** 12.50
- How to Buy and Use Minicomputers and Microcomputers (Sams).** A fundamental text on operation. **EDP-227** 9.95
- TV Typewriter Cookbook (Sams).** Good text explaining I/O terminals, interfacing, etc. **EDP-226** 9.95
- Bugbook III (E&L).** Superior reference source on 8080 interfacing and programming. Includes experiments. **EDP-231** 15.00
- Bugbook IIA (E & L).** Serial I/O concepts and terminal interfacing. **EDP-232** 5.00
- 8080 Programming for Logic Design (Osborne).** Programming and Using the 3080 microprocessor. **EDP-229** 7.50
- 8080 Software Gourmet Guide and Cookbook (Scelbi).** Excellent source for 8080 programs and subroutines. **EDP-228** 9.95
- Practical Microcomputer Programming: 8080 (Northern Technology).** Machine/Assembly programming. **EDP-235** 21.95
- 6800 Programming for Logic Design (Osborne).** Programming and using the 6800 microprocessor. **EDP-230** 7.50
- 6800 Software Gourmet Guide and Cookbook (Scelbi).** Excellent source of commonly used 6800 programs. **EDP-233** 9.95
- 6800 Microprocessor Applications Manual (Motorola).** Comprehensive review of typical 6800 applications. **EDP-244** 25.00
- M6800 Program Reference Manual (Motorola).** Programming principles and examples for the 6800. **EDP-245** 3.00
- Minicomputer Systems: Organization and Programming (Prentice-Hall).** Emphasis on the PDP-11. **EDP-238** 17.95
- PDP-11 Programming (Algonquin).** A programmed instruction text teaching operation and programming. **EDP-239** 5.00
- The Minicomputer in the Laboratory (Wiley).** Operation, programming and applications of PDP-11 computers. **EDP-246** 19.50
- Assembly Level Programming (Lexington).** Good basic book on assembly language programming. **EDP-236** 14.95
- 101 BASIC Computer Games (DEC).** A classic. Have fun with your computer. **EDP-237** 7.50
- BASIC Software Library, Vol. I.** Complete lists of BASIC applications, bookkeeping games, pictures (graphics). **EDP-240** 24.95
- BASIC Software Library, Vol. II.** Math, engineering, plotting and statistical programs in BASIC. **EDP-241** 24.95
- BASIC Software Library, Vol. III.** Advanced business applications programs in BASIC. **EDP-242** 39.95
- BASIC Software Library, Vol. IV.** Games and business applications programs in BASIC. **EDP-243** 9.95
- BASIC Software Library, Vol. V.** Games, graphics, and useful math programs in BASIC. **EDP-251** 9.95

See page 52 for book ordering information

Amateur Radio Novice Course

What better way to learn about Amateur Radio than from the experts at Heath? This effective, programmed learning course is **GUARANTEED** to help you get your Novice ticket! In fact, we're so confident it's effective that if you fail to pass your FCC exam after completing this course — we'll **REFUND** your money for the course material!



Amateur Radio Novice Self Instruction Course

\$24⁹⁵

Course includes text, two audio cassettes, operating aids

- Study at your own pace
- "Programmed Instruction" makes learning easy and fun!

Now — for CB'ers, electronic hobbyists, anyone interested in operating world-wide two-way Amateur radio equipment — Heath makes it easier than ever! This deluxe course prepares you for the Amateur Radio Novice FCC exam, and provides you with helpful guidelines for setting up and operating your own station once you pass the exam. The course includes a programmed learning text, two audio cassettes to reinforce text material and provide Code practice, helpful aids for operating your station. See page 100 for complete details.

Course ER-3701, Shpg. wt. 7 lbs. 24.95

ECP-3800 Cassette Recorder/Player. See page 100 for details.

Shpg. wt. 6 lbs. 49.95

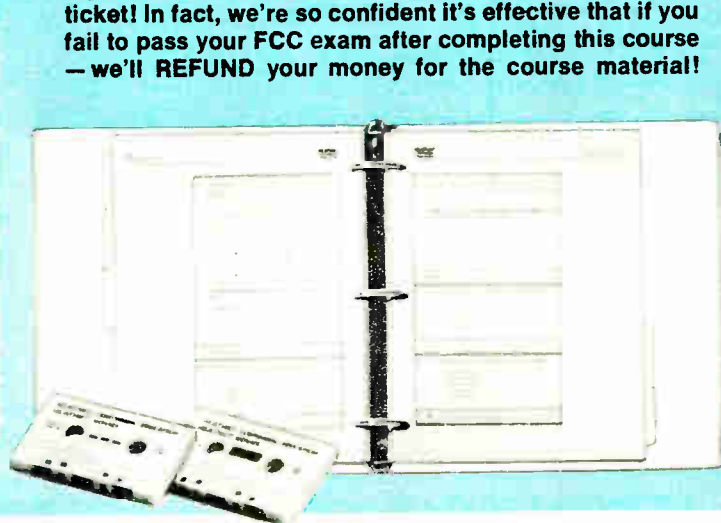
SAVE \$4⁹⁵

when you buy our Course and Code Practice Oscillator together!

The ideal combination — study the course and get "hands-on" Code Practice

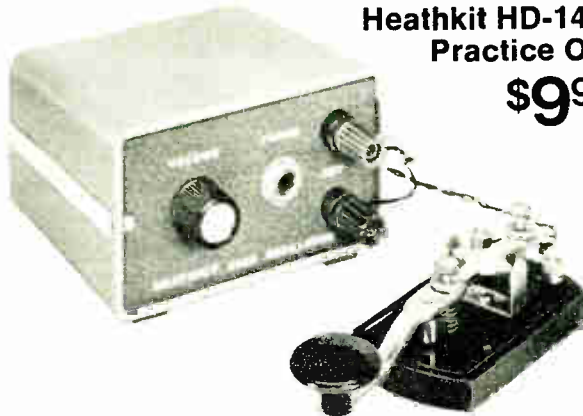
Here's the outfit that will have you operating fast and easy. The HD-1416, described at right, is a fine little unit you'll appreciate even after you have your license; and our course is the fast, easy way to get your license.

ERS-3701 Shpg. wt. 8 lbs. 29.95



Heathkit HD-1416 Code Practice Oscillator

\$9⁹⁵



Fun to build and use — and recommended for ER-3701 Amateur radio course at left! Most components mount on a single circuit board for easy assembly. The unit operates from a single inexpensive 9-volt transistor battery (not supplied) and includes telegraph key and phone jack. Has built-in speaker, volume and adjustable internal tone control.

Kit HD-1416, Shpg. wt. 2 lbs. 9.95

HD-1416 SPECIFICATIONS: Mode of Operation: Speaker or headphones. Tone Frequency: 200-800 Hz adjustable. Battery Required: 9-volt transistor battery equivalent NEDA #1604 (not supplied). Headphones: 8-2000 ohms. Dimensions: 2 5/8" H x 4 1/8" W x 4 3/8" D.

Popular Code Courses (not illustrated)

Ameco Junior Code Course. LP record with 10 lessons from start to 8 words per minute. The course prepares you for Novice and Technician Code examinations with an FCC-type code exam, a code instruction booklet, and charts for recording accuracy.
HDP-232, Shpg. wt. 2 lbs. 3.95

Ameco Senior Code Course. Contains everything above, plus twelve additional lessons to bring your code speed to 18 WPM. Prepares you for Amateur Novice, Technician, General and Conditional Code exams, as well as Commercial Second Class Telegraph Code exams.
HDP-332, Shpg. wt. 2 lbs. 7.50

Ameco Junior Cassette Code Course. As above, cassette instead of LP.
HDP-432, Shpg. wt. 1 lb. 4.95

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

"By the Word" Code Course. A fast, simple and effective way to learn Code! Three LP records teach speed and comprehension using the famous "by the word" method.
HDP-32, Shpg. wt. 2 lbs. 9.95

Same course as above, but on two cassettes instead of LP records.
HDP-132, Shpg. wt. 1 lb. 9.95



BONUS GIFT CERTIFICATE

Get 10% off (up to \$10.00) on any Heathkit Amateur Radio equipment. Simply attach copy of license and proof of ERS-3701 purchase within 90 days of licensing.

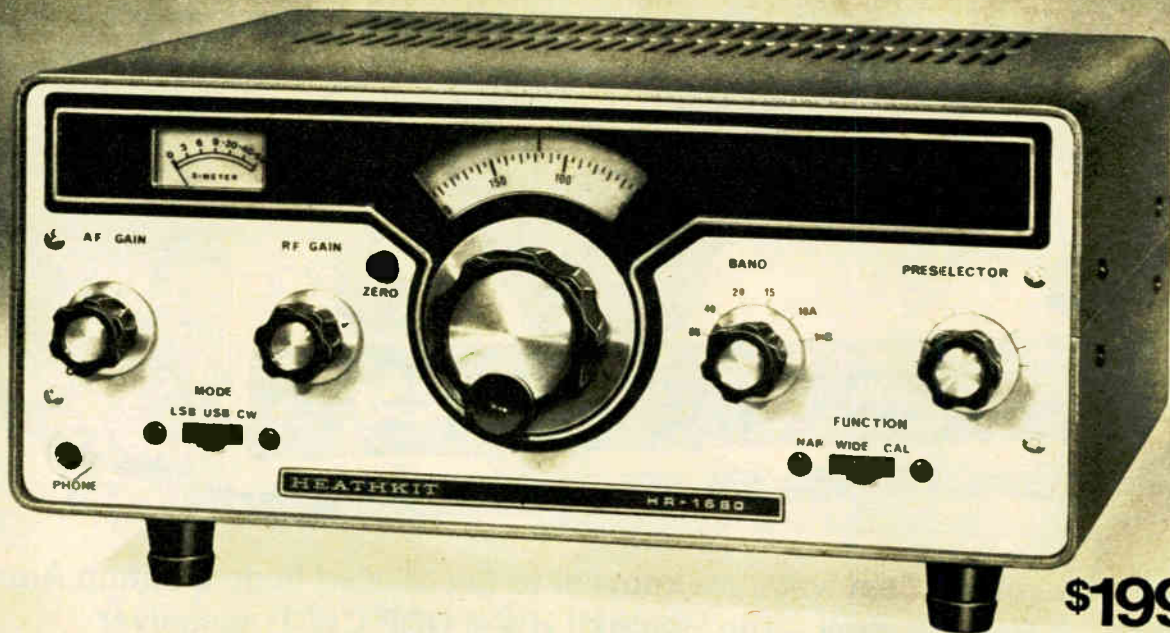
only **\$29⁹⁵**
\$34.90 if purchased separately

"TUNE IN THE WORLD WITH HAM RADIO"

Designed to prepare you for your Novice License. Includes a tape cassette with code speeds of up to five words per minute for easy practice, and an informative booklet with details on setting up a station, equipment, exams, etc. Produced by the ARRL, the official Amateur Radio organization.

HDP-1142, Shpg. wt. 2 lbs. 7.00





HR-1680 High-performance solid-state SSB/CW Receiver

HR-1680 SPECIFICATIONS: Frequency Coverage (MHz): 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5, 28.5-29.0. Sensitivity: Less than 0.5 μ V for 10 dB S+N/N for SSB operation. IF Selectivity: 2.1 kHz minimum at 6 dB down, 7 kHz maximum at 60 dB down. Overall Audio Response: Wide; 2100 Hz minimum at 6 dB down, 7 kHz maximum at 60 dB down. Narrow; 250 Hz minimum at 6 dB down, 2.5 kHz maximum at 60 dB down (center frequency approx. 750 Hz). Overall Gain: Less than 1.5 μ V input for 0.25 watts audio output. Audio Output Power: 1.2 watts into a 4-ohm load at less than 10% THD. AGC Characteristic: Blocking level, 3 volts. Dynamic range, 120 dB. Time Constant, attack time less than 1 mS. Release time switch selectable at 100 μ S (CW) or 1 second (SSB). Intermodulation Distortion: -60 dB. Image Rejection: 50 dB or better. IF Rejection: 60 dB or better. Internally Generated Spurious Signals: Below 1 μ V equivalent antenna input except at 3.74, 21.2, 28.6 and 28.9 MHz. Frequency Stability: Less than 100 Hz per hour drift after 30 minutes warmup. Less than 100 Hz drift for 10% change in line voltage. Tuning Rate: Approx. 15 kHz per turn. Dial Accuracy: Within 2 kHz after calibration at nearest 100 kHz marker. Muting: Shorted external ground at mute socket. Sidetone Input Level: 10 mV or greater (300 mV maximum). Dial Backlash: 50 Hz or less. IF Frequencies: First IF, 8.395-8.895 MHz; Second IF 3.395 MHz. Antenna Input Impedance: 50 ohms unbalanced. Temperature Range: -10°C to +50°C. Meter Calibration: 0 to S-9 + 60 dB. Power Requirement: 120 or 240 volts AC (60/50 Hz) 27 watts maximum or 11.5 VDC to 15 VDC at 0.75 amperes maximum. Dimensions: 12 $\frac{3}{4}$ " W x 6 $\frac{3}{4}$ " H x 12" D. Net Weight: 9 $\frac{1}{2}$ lbs.

- *Easy kit assembly, easy NO-INSTRUMENT ALIGNMENT*
- *Built-in AC power supply, or external battery operation*
- *Excellent sensitivity lets you work weak signals*
- *Stable operation for drift-free SSB and CW reception*
- *Extra-large spinner for really easy tuning*
- *Headphone jack for working stations in private*

Listen to world-wide SSB and CW with the HR-1680. This high-performance, low-cost Amateur radio receiver covers 500 kHz segments of the 80, 40, 20 and 15-meter Amateur bands plus two 500 kHz segments for the lower 1 MHz of 10 meters.

The superhet dual-conversion receiver features a double-tuned RF stage to provide maximum signal on each band. AGC controlled IF and RF stages permit signals of varying strengths to be received without fading or blasting. A four pole crystal filter provides excellent SSB reception and a two-stage active audio filter provides a very sharp bandpass for excellent CW operations. The use of solid-state components throughout eliminate heat buildup and drift, and contributes to the HR-1680's outstanding frequency stability.

Has a front panel "S" meter to indicate relative signal strength, AF and RF gain controls, and preselector. The extra-large, easy-tune spinner and easy-to-read dial calibrated in 5 kHz increments make "right on" station selection fast and easy. Even uses the same dial readout for all four bands — simply flip the bandswitch to change bands. Has mode and function selectors, front panel headphone jack for low-impedance headphones, diode bandswitching, built-in 100 kHz crystal calibrator. The mode switch selects LSB, USB and CW with fast or slow AGC automatically engaged.

Kit construction is easy. The HR-1680 can be aligned completely without external equipment. Its built-in AC power supply makes it useful in any base station operation.

Kit HR-1680, Shpg. wt. 14 lbs. **199.95**

Matching Station Speaker Styled to match the HR-1680, with response tailored to SSB. 4 ohm impedance for use with most other gear too. Includes cable and plug.

Kit HS-1661, Shpg. wt. 5 lbs. **19.95**



Heathkit HP-13B Mobile Power Supply

Supplies all the necessary operating voltages for mobile use of SSB transceivers — high, low and fixed bias voltages, also switches filament

voltage for equipment with which it is used. Features relay control of all primary power, individual circuit breaker protection.

Kit HP-13B, Shpg. wt. 7 lbs. **84.95**

HP-13B SPECIFICATIONS: Input voltage: 12 to 16 VDC (neg. ground only). Input current: 25 amp. max. full load. High voltage output: 800 VDC, no load; 750 volts DC @ 250 mA. AC ripple: less than 1% @ 250 mA. Low voltage output: (high tap) 310 VDC, no load; 200 VDC @ 150 mA. (low tap) 265 VDC, no load; 250 VDC @ 150 mA. AC ripple: Less than 0.05% 150 mA. Fixed Bias: -130 VDC @ 20 mA. Dimensions: 7 $\frac{1}{4}$ " W x 7 $\frac{1}{4}$ " L x 2 $\frac{3}{4}$ " D. All voltages referenced at 13 VDC.



Here's one of the best ways we know of to get started in an exciting Amateur Radio Hobby — the Heathkit HW-8 QRP CW Transceiver

HW-8 SPECIFICATIONS

TRANSMITTER:

DC Power Input: 3.5 watts (80 M); 3.0 watts (40 M); 3.0 watts (20 M); 2.5 watts (15 M).

Frequency Control: built-in VFO.

Frequency Stability: Less than 150 Hz/hour drift after 60 minute warm-up.

Output Impedance: 50Ω, unbalanced.

Spurious & Harmonic Levels: -35 dB or better.

Offset Frequency: approx. -750 Hz, fixed on all bands.

RECEIVER:

Sensitivity: 0.2 μV for readable signal; 1 μV or less for 10 dB S+N/N.

Selectivity: wide, -750 Hz @ -6 dB narrow, -375 Hz @ -6 dB.

Audio Output Impedance: 1000Ω, nominal.

GENERAL:

Frequency Coverage: 3.5-3.75 (80 M); 7-7.25 (40 M); 14-14.25 (20 M); 21-21.25 MHz (15 M).

Frequency Stability: less than 100 Hz/hour drift after 30 min. warmup.

Power Requirement: 12-16 VDC, 90 mA, receive; 430 mA, transmit.

Dimensions: 9¼" x 8½" x 4¼".

Net Weight: 4 lbs.

\$129⁹⁵

- Improved receiver section
- Better frequency coverage
- Front panel Relative Power Meter

We've made the world's most popular low-power CW transceiver even better! To the Heathkit HW-7 — we have added more bands, more features and a super new receiver section that's the best in its class. The famous HW-7 QRP Transceiver helped thousands of hams work the world on a couple of watts — and on a budget. Now, in the same value conscious tradition, Heath announces the HW-8.

Pushbuttons instantly select any of the four bands — 3.5-3.75; 7-7.25; 14-14.25 and 21-21.25 MHz. Crystal heterodyne circuitry allows easy frequency tuning with a *single* dial scale for all four bands, excellent stability and fixed CW offset. Other features include adjustable sidetone volume, relative power

meter, diode band switching and break-in keying with adjustable T/R delay, and RF gain control.

The direct-conversion receiver boasts dramatically improved resistance to overload and reduced microphonics and hum thanks to a new RF amplifier stage and a two-position active audio filter. Its improved selectivity gives the HW-8 the finest receiver section in its price class. You get solid copy from all over with readable signals from as little as 0.2 μV; 1 μV or less produces 10 dB S+N/N!

The HW-8 can be operated from its optional AC power supply or 12 VDC — great for vacationing or emergencies. Has built-in headphone jack, adjustable AF gain, preselector and tune controls.

Now's the time to get into the fun and challenge of low-power CW operation. Order your HW-8 today.

Kit HW-8, Shpg. 6 lbs. 129.95

Kit HWA-7-1, AC Power Supply, Shpg. wt. 4 lbs. 14.95

Quality base and mobile 2-Meter Antennas

Improve your 2-meter performance with one of these quality antennas

1 Standard gain fixed. Omnidirectional. 3.75 dB gain, 1.1:1 SWR, 135-175 MHz, 100 watts. 52 ohm feed with PL-259. Mounts to 1¼" masts. Less coax. Preassembled.

HWA-202-11, 2 lbs. 17.95

2 Standard gain mobile. ⅝" wavelength rear deck whip. 3.4 dB gain, 1.1:1 SWR. 100 watts, 47" radiator. 17" coax, connectors.

HWA-202-3, 2 lbs. 19.95

3 Super gain mobile. Phased ¼ and ⅝ wave radiators. 5.2 dB gain. 200 watts; 6 MHz bandwidth; 1.1:1 SWR. Height 85". 17' RG-58U coax, connectors.

HWA-202-9, 3 lbs. 37.95

4 Super gain fixed. 6 dB gain. 140-150 MHz. 6 MHz bandwidth. 1.2:1 SWR. 1000 watts. SO-239 connector. 117" long. 4 radiators; 21" alum. rod. For 1¼" mast. Less coax.

HWA-202-10, 7 lbs. 57.95



\$169⁹⁵

Optional Auto-Patch Encoder Shown Installed



SAVE \$10!

\$39⁹⁵

HW-2021 Handheld 2-Meter Transceiver

1 Watt out, 5 receive and 5 transmit channels plus repeater offset

Compare features, compare specs and you'll be convinced — the HW-2021 is the best handheld 2-meter rig around. A single crystal controls both transmit and receive. The simplex/offset switch selects —600 kHz or simplex crystals (included) to give you two transmit frequencies for each crystal you buy. Or, substitute your own crystals for any two offset frequencies desired. We include a 146.94 MHz crystal with the HW-2021 to get you on the air in a hurry. Transmitter output is one watt minimum with 0.005% or better stability. FM circuitry and a separate microphone contribute to better audio. The optional auto-patch encoder (order below) lets you access telephone lines through repeaters with auto-patch inputs. Not recommended for beginning kit builders due to its compactness. Requires small 25-watt soldering iron such as Weller W-PS for construction, and VOM or VTVM for alignment. Includes rechargeable batteries and charger. Order additional crystals below.

Kit HW-2021, Shpg. wt. 4 lbs. **169.95**
 HWA-2021-2, Carrying Case and Strap, Shpg. wt. 1 lb. **12.95**
 HWA-2021-4, Crystal Certificates each **6.95**
 Kit HWA-2021-3, Auto-Patch Encoder, 1 lb. **29.95**

HW-2021 SPECIFICATIONS: RECEIVER — Sensitivity: 0.5 μ V for 12 dB SINAD; 0.75 μ V for 20 dB quieting. Squelch Threshold: .3 μ V or less. Audio Output: .5 watts at less than 10% THD. Image Rejection: Greater than -45 dB. IF Frequency: 10.7 MHz. Modulation Acceptance: \pm 7 kHz minimum. TRANSMITTER — Power Output: 1 watt minimum. Oscillator Frequency: Approximately 15 MHz. Multiple Factor: x9. Modulation: Frequency (with limiting). GENERAL — Speaker Impedance: 8 Ω . Operating Frequency Range: 143.9 to 148.3 MHz (unit will meet specifications \pm 1 MHz from alignment frequency within this range). Operating Temperature Range: +10° to +120° F (-120° to +47° C). Operating Voltage: 12 VDC nominal. Size (overall): 9¼" x 1½" x 3¼". Weight (including batteries): 2 lbs.



2-Meter Amplifier boosts the power of your handheld

Delivers up to 10 watts for a 1½ watt input, 8 watts for a 1 watt input — ideal for use with the HW-2021 above. Features fully automatic operation, solid-state transmit/receive switching, tuned input and output

for maximum efficiency and reduced spurious emissions. *Withstands infinite VSWR load without failure.* Includes dummy load and RF detector. Easy 1 to 2 hour assembly. VTVM needed for tuneup. Operates from 12-16 VDC.

Kit HA-201, Shpg. wt. 2 lbs. **27.95**

Heathkit MICODER™ Combination Microphone/Auto Patch Encoder

- Electret condenser microphone
- Compatible auto patch encoder
- Self-powered — use with any high-impedance mike input

Replace your old microphone with the Heathkit Micoder — a quality electret condenser microphone and a reliable auto patch encoder in a single, compact hand-held unit. The microphone section features excellent audio characteristics with 300-3000 Hz response for clean voice transmission. The auto patch encoder generates highly accurate and stable tones for making phone calls through repeaters equipped for auto patch input. The Micoder is completely self-contained and operates on its own 9-volt battery (not supplied). With 6 ft. coiled microphone cable, hanger clip. Alignment requires a frequency counter or decoding at repeater station.

Kit HD-1982, Shpg. wt. 2 lbs. **Was \$49.95 — NOW 39.95**

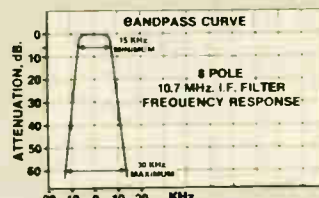
HD-1982 SPECIFICATIONS: Operating Voltage: 9.0 VDC. Current Consumption: 12 mA. Battery Life: Approx. 6 months. Microphone Type: electret condenser. Output Level: 30 mV rms maximum. Frequency Response: 300-3000 Hz. Output Impedance: 10k min. Encoder Frequency Tolerance: \pm 1.5%. Distortion: less than 5% (harmonic plus 1M). Dimensions: 3¼" H x 2½" W x 1¼" D. Weight: 9 oz. (including battery).

The HW-2036 sets a value standard for synthesized 2-meter transceivers!

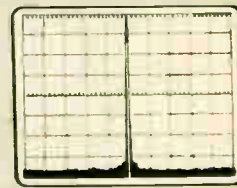
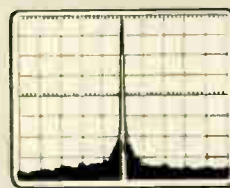
\$269⁹⁵ with standard microphone



Shown with optional Micoder™ installed



An 8-pole IF crystal filter greatly reduces adjacent channel interference.



Actual spectrum analyzer photos of the HW-2036 transmitter output operating at 147 MHz. Spurs within 20 MHz of carrier are down a full 70 dB!

HW-2036 2-meter Transceiver with Frequency Synthesis and Built-in tone encoder

The HW-2036 offers true digital frequency synthesis for real operating versatility. No extra crystals are needed, there are no channel limitations. Advanced digital technology uses a voltage-controlled oscillator (VCO) and a 10 MHz crystal time base. You control the frequency of the VCO with the front panel lever switches for fast, easy and precise frequency selection.

The front-panel lever switches select any frequency in any 2 MHz segment of the 143.5 to 148.5 MHz operating range. You select the last four digits, three with the lever switches which display the frequency directly, and the last with a 0/5 kHz miniature toggle switch. These lever switches are easier to use than conventional thumbwheels and the 5 kHz steps mean that ALL 2-meter frequencies in the band are available to you. And if you inadvertently dial up an out-of-band frequency, the transmitter will not key. Has LED status lights to warn that frequency synthesizer is not locked and indicate whether channel is in use.

The built-in continuous tone encoder, with three tones selectable on the front panel, lets you access most repeaters with the HW-2036. If you order the HW-2036 with Heathkit Micoder, you'll even be able to make telephone calls through repeaters equipped with auto-patch input. Has built-in simplex, + and - 600 kHz offsets, and an Aux. position that lets you add your own crystal for any other offset frequency you may want.

The HW-2036 puts out a minimum 10 watts. For even more output, you can use the HA-202 2-meter amplifier (next page). Even operating continuously into an infinite VSWR will not damage the HW-2036. The transmitter output is extremely clean, with spurious output better than 70 dB below carrier (see spectrum analyzer photos above). True FM circuitry means you transmit and receive with outstanding audio quality, too.

Receiver sensitivity is an excellent 0.5 μ V for 12 dB Sinad. An 8-pole IF crystal filter provides an ideally shaped receiver bandpass for outstanding adjacent channel rejection, and the HW-2036's excellent selectivity makes it ideal for use in crowded signal areas.

Has a Schmitt-Trigger squelch with a threshold of 0.3 μ V or less, diode-protected dual-gate MOS FET's in the front end, IC IF and dual-conversion receiver. A big, built-in 2x6" speaker provides excellent audio quality and there's a jack for an external speaker.

The HW-2036 is extremely compact for easy mounting in car or boat, and its convenient gimbal-mount (supplied) lets you remove it easily for storage or security. You can also use it as a fixed station transceiver with the HWA-2036-3 AC power supply. Kit building is easy too, with just five printed circuit boards and a wiring harness. A built-in signal source lets you align the HW-2036's receiver section for maximum sensitivity using just the front panel meter (no signal generator is required). Alignment requires a VTVM. You can order the HW-2036 with a standard PTT mike, or, for even greater convenience, add \$30 and get our reg. \$39.95 Micoder mike/auto patch encoder.

Kit HW-2036-1, HW-2036 Transceiver with reg. \$39.95 Heathkit Micoder microphone/auto patch encoder. Shpg. wt. 12 lbs. **299.95**

Kit HW-2036-2, HW-2036 Transceiver with standard push-to-talk microphone. Shpg. wt. 12 lbs. **269.95**

HW-2036 SPECIFICATIONS: Receiver: Sensitivity: 0.5 μ V for 12 dB SINAD (or 15 dB of Quieting). Squelch Threshold: 0.3 μ V or less. Audio Output: 1.5 watts at 10% T.H.D. typically 2 watts. (5 kHz deviation). Image Rejection: -45 dB or greater. Spurious Rejection: -50 dB or greater. IF Rejection: -80 dB or greater. Internally Generated Spurious: Below 1 μ V equivalent. Bandwidth: 6 dB at 15 kHz min. and 60 dB at 30 kHz max. Modulation Acceptance: 7.5 kHz, min. Transmitter: Power Output: 10 watts min. at 25°C and 13.8 VDC, into a 50 Ω load. Harmonic & Spurious Output: -70 dB within 20 MHz of carrier; -50 dB elsewhere, -40 dB harmonics. Modulation: FM, 0 to 7.5 kHz, adjustable. Duty Cycle: 100% with infinite VSWR. Tone Encoder: 3 tones, 70 to 200 Hz, approx. \pm 700 Hz deviation. Transmitter Offset: 0 (simplex), -600 kHz, +600 kHz with crystals supplied. Provision for one additional offset crystal. General: Frequency Coverage: Any 2 MHz segment from 143.5 to 148.5 MHz. (Both receiver and transmitter must be aligned for the same 2 MHz segment.) Frequency Increments: 5 kHz. Frequency Stability: \pm .0015%. Operating Temperature Range: 15° to 125° F. (-10° to 50° C). Operating Voltage Range: 12.6 to 16 VDC (13.8 VDC nominal). Current Consumption: RX: 700 mA max. squelched. TX: 2.6 A max. at 13.8 volts. Dimensions: 2 3/4" high x 8 3/4" wide x 9 7/8" deep. Weight: 6.25 lbs.



Order your HW-2036 with the Heathkit HD-1984 Micoder II combination microphone, auto patch encoder and make telephone calls through repeaters equipped with auto patch input. See page 15 for full description.



40W 2-meter amplifier for HW-2036 and HW-202

Delivers solid 40W minimum for 10 watts in. Draws just 7A max. from your car battery. Has antenna changeover relay and sensing circuitry for completely automatic T/R switching, tuned input/output circuits provide low spurious radiation and allow coverage of any 1.5 MHz portion of the band. Covers any 1.5 MHz portion of the 143-149 MHz band. Final alignment requires VTVM, wattmeter or SWR bridge. Mounts just about anywhere.

Kit HA-202, Shpg. wt. 4 lbs. 59.95

HA-202 SPECIFICATIONS: Power Output: 20W @ 5W in. 30W @ 7.5W in. 40W @ 10W in. 50W @ 15W in. Impedance: 50 ohms nom. Power Requirement: 12-16 VDC, 7 A max. Dimensions: 3" H x 4 1/4" W x 5 1/2" D.



AC Power Supply for HW-2036 and HW-202

The 2036-3 supplies the necessary voltage and current to power your HW-2036 or HW-202 2-meter transceivers from a standard AC outlet for base station operation. Delivers 13.8 VDC (adjustable internally from approx. 10 to 15 VDC) at 2.7 amps with better than 1.0% regulation. Has 120/240 VAC wiring options, fused overload protection.

Kit HWA-2036-3, Shpg. wt. 7 lbs. . . 32.95

HWA-2036-3 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (Adjustable internally from approx. 10 to 15 VDC). Output Current: 2.7 amps, intermittent, 20 minutes max. (1.8 amps continuous). Regulation: better than 1% from no load to full load. Ripple: better than 0.1% at 2.7 amps. Transistor, IC and Diode Complement: one 2N3055 Pass Transistor, one MPSU05 Driver Transistor, four IN4002 silicon diodes, one IN2071 silicon diode, one UA78GMT3C IC voltage regulator. Power Requirements: 110 to 130 VAC or 220 to 260 VAC, 60/50 Hz @ 80 watts full load. Dimensions: 3" H x 7 1/4" W x 10" D (including switch and feet). Net Weight: 5 lbs.

The industry standard!



\$149⁹⁵

Optional Tone
Burst Encoder
shown installed

Heathkit HW-202 — proven performance and outstanding value

Our HW-202 2-meter transceiver has become an industry standard with a reputation for excellent audio quality. Just compare features and specifications.

Operates on any 2 MHz segment of the 143.9 to 148.3 MHz range with independent selection of 6 transmit and 6 receive channels. And all 12 crystals can be netted for optimum performance. The transmitter delivers a solid 10 watts minimum and will operate into an infinite VSWR without failure. Standard narrow band deviation adjustable up to 7.5 kHz with instant limiting.

And the receiver is hot: 0.5 μ V signal provides 15 dB of quieting . . . squelch threshold is 0.3 μ V or less. Audio output to the built-in speaker is typically 2 watts at less than 3% harmonic distortion. Diode-protected dual gate MOS-FETS in the front end . . . IC IF that limits at less than 10 μ V . . . dual conversion . . . monolithic 4-pole 10.7 MHz crystal filter . . . built-in

hash filter/voltage regulator to keep ignition noise out and maintain constant input voltage despite changing car system demand. Kit includes a set of crystals for 146.94 MHz to aid in tune-up and get you on the air quickly . . . heavy-duty alligator clips for use in a temporary installation . . . antenna coax jack . . . gimbal mounting bracket and a quick-release mobile mount. And check out the full line of accessories.

Kit HW-202, Shpg. wt. 11 lbs. 149.95

HW-202 SPECIFICATIONS: RECEIVER — Sensitivity: 12 dB SINAD* (or 15 dB of quieting) at 0.5 μ V or less. Squelch threshold: 0.3 μ V or less. Audio output: 3 W at less than 10% total harmonic distortion (THD). Operating frequency stability: Better than \pm .0015%. Image rejection: Greater than 45 dB. Spurious rejection: Greater than 60 dB. IF rejection: Greater than 80 dB. First IF frequency: 10.7 MHz \pm 2 kHz. Second IF frequency: 455 kHz (adjustable). Receiver bandwidth: 22 kHz nominal. De-emphasis: -6 dB per octave from 300 to 3000 Hz nominal. Modulation acceptance: 7.5 kHz minimum. TRANSMITTER — Power output: 10 watts minimum. Spurious output: Below -45 dB from carrier. Stability: Better than \pm .0015%. Oscillator frequency: 6 MHz, approximately. Multiplier factor: X24. Modulation: Phase, adjustable 0-7.5 kHz, with instantaneous limiting. Duty cycle: 100%. High VSWR shutdown: None. GENERAL — Speaker impedance: 4 ohms. Operating frequency range: 143.9 to 148.3 MHz (will meet specifications \pm 1 MHz of alignment frequency within this range). Current consumption: Receiver (squelched): Less than 200 mA. Transmitter: Less than 2.2 amperes. Operating temperature range: -12° to 122°F (-25° to +50°C). Operating voltage range: 12.6 to 16.0 VDC (13.8 VDC nominal). Dimensions: 2.75" H x 7.2" W x 9.875" D, excluding mount.

*SINAD = Signal + noise + distortion
Noise + distortion



Optional Tone Burst Encoder

Accesses most closed repeaters for repeater association members, to give your HW-202 more range and versatility. The four tone select buttons can be pre-set between 1800 Hz and 2500 Hz with bursts adjustable from 0.25 second to continuous. Frequency stability is \pm 1% from -30 to +50°C. Placing all buttons in "out" position removes encoder from circuit. Single circuit board which mounts behind the HW-202's removable bezel.

Kit HWA-202-2, Shpg. wt. 1 lb. 26.95

HW-202 Crystal Certificates

We send certificates to you postpaid. You mail the certificate to the manufacturer and receive the crystals postpaid by return mail.

HWA-202-6, one Transmit Crystal Certificate, postpaid 5.95

HWA-202-7, one Receive Crystal Certificate, postpaid 5.95

Digital Transceiver

\$669⁹⁵

Matching Speaker

\$34⁹⁵



New Heathkit SB-104A Amateur Transceiver... now with improved sensitivity and reduced assembly time

Totally broadbanded, completely solid-state. Operates USB, LSB or CW — you can go from CW on the low end of 80 to USB on the high end of 10 in seconds — maintaining 0.5 μ V receiver sensitivity and 100 watts TRANSMITTER OUTPUT! Just choose the band, select mode and go; no more preselector, loading or tuning controls. True digital readout with 6 electronic digits. Digital circuitry covers all three frequencies: VFO, HFO and BFO — you don't even need a calibrator.

Transmitter delivers 100 watts output; or QRP'ers can flick the switch for instant 1-watt output. The four final transistors are protected against high SWR and thermal runaway. Puts out a clear, strong signal with low harmonic and spurious radiation, third-order distortion down 30 dB or better. Has 15 MHz WWV position on the bandswitch, tune button for loading linears, PTT mike jack, pushbutton 400 Hz or 2.1 kHz IF bandwidth selection for CW mode, mobile noise blanking (with SBA-104-1 installed), ALC/relative power/S-meter, switchable VOX with gain and delay, and more. Alignment requires only a dummy load, mike and VTVM. Operates from 12V auto electrical system. For fixed station, hook up the HP-1144 Power Supply.

- Kit SB-104A, Shpg. wt. 29 lbs. **669.95**
- Kit SBA-104-1, Noise blanker, Shpg. wt. 1 lb. **26.95**
- Kit SBA-104-2, Mobile mount, Shpg. wt. 6 lbs. **36.95**
- Kit SBA-104-3, 400 Hz CW crystal filter, Shpg. wt. 1 lb. **39.95**
- Station Speaker. With connector plug, cable. 7 $\frac{1}{8}$ " H x 10 $\frac{1}{8}$ " W x 14" D.
- Kit SB-604, Shpg. wt. 8 lbs. **34.95**

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 $\pm 10\%$ 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. 1M Distortion: -65 dB min.; -57 dB typ. with noise blanker. Image Rejection: -60 dB min. Dimensions: 5 $\frac{3}{4}$ " H x 14 $\frac{1}{2}$ " W x 13 $\frac{3}{8}$ " D.



SB-614 Station Monitor

Monitors transmitted SSB, CW, & AM signals up to 1 kW from 80-6 meters. Shows non-linearity, insufficient or excessive drive, poor carrier or sideband suppression, regenera-

tion, parasitics and key clicks. Manual includes 40 CRT displays and explanations. Solid-state circuit, easy-to-build with a circuit board and wiring harness to simplify assembly.

Kit SB-614, Shpg. wt. 17 lbs. **159.95**

SB-614 SPECIFICATIONS: RF SAMPLING SECTION: Power Limits: Exciter input (50 - 75 ohm) 10 to 300 watts; Antenna input (50 - 75 ohm) 10 to 1000 watts. Insertion Loss: Negligible. VERTICAL AMPLIFIER: Input Impedance: 1 Megohm shunted by 75 pf. Sensitivity: 60 mV rms/ $\frac{1}{4}$ " vertical deflection. Attenuator: 2-position; x1, 2 volts rms max. Input; x10, 20 volts rms max. input. HORIZONTAL AMPLIFIER: Input Impedance: 1 Megohm shunted by 50 pf. Sensitivity: 50 mV rms/ $\frac{1}{4}$ " horizontal deflection. Power Requirement: 110-130 or 220-260 VAC, 60/50 Hz. DIMENSIONS: 7 $\frac{1}{4}$ " H x 10 $\frac{1}{4}$ " W x 15 $\frac{1}{4}$ " D. Net Weight: 12 lbs.



SB-634 Five-function Console

Adds real operating versatility to your station! Provides five of the necessary station functions every amateur needs. 24-hour digital clock; ten-minute ID timer; RF wattmeter

Matching Speaker
\$19⁹⁵

SSB Transceiver
\$489⁹⁵



Heathkit HW-104 SSB 5-Band Transceiver — broadband design at a great low price

Instant QSY! Choose the band, frequency and mode (USB, LSB or CW) and it stays tuned — without preselector, load or tuning controls. Delivers a clean signal at 100 watts, or in the 1-watt low-power position. At 100 watts, third order distortion is down 30 dB, carrier and unwanted sideband suppression down 55 dB. Reception is super clear, thanks to the broadband design that minimizes cross-modulation and intermodulation. Sensitivity is less than 1 μ V. Has a 4-pole crystal filter, CW sidetone, and VOX provision. For convenience, there's a 15 MHz WWV receive position on bandswitch and "pull-to-calibrate" position on the RF control.

The smooth action dial covers 3.5 MHz to 29.0 MHz with 15 kHz per knob revolution. The VFO is the same basic circuitry as the SB-104, with less than 100 Hz/30 min. drift after warmup. Want the top end of 10 meters? Just add the HWA-104-1 accessory.

Assembly is clean and precise. All you need for alignment are a dummy load, microphone and VTVM. And you can add the matching SB-614 Station Monitor and SB-634 Console to your HW-104 rig, too. Requires 13.8 VDC power; for fixed station use, order HP-1144 supply.

Kit HW-104, Shpg. wt. 29 lbs. 489.95

Kit HP-1144, AC power supply, Shpg. wt. 27 lbs. 89.95

Kit HS-1661, Matching speaker (shown above), Shpg. wt. 5 lbs. 19.95

Kit HWA-104-1, 10-meter accessory (coverage to 29.7 MHz), Shpg. wt. 1 lb. 16.95

SBA-104-1, Noise blanker, Shpg. wt. 1 lb. 26.95

SBA-104-2, Mobile mount, Shpg. wt. 6 lbs. 36.95

SBA-104-3, 400 Hz CW crystal filter, Shpg. wt. 1 lb. 39.95

HW-104 SPECIFICATIONS: Frequency Coverage: 3.5 MHz through 29.0 MHz — (to 29.7 MHz with optional 10M accessory). Dial Accuracy: Within 2 kHz after calibration at nearest 100 kHz marker. All other specifications same as SB-104A.

Fixed Station Power Supply

120 or 240 VAC operated supply provides 13.8 VDC required by SB-104A Transceiver. Full-wave bridge circuit has triple Darlington regulation. Mounts inside SB-604 speaker cabinet.

Kit HP-1144, Shpg. wt. 27 lbs. 89.95

HP-1144 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (adjustable from approximately 11 to 16 VDC). Maximum Output Current: 20 amperes, intermittent. 8 amps continuous. Power Requirement: 110 to 130 VAC @ 6A or 220 to 260 VAC @ 3A, 50/60 Hz maximum. Dimensions: 5½" H x 9¼" W x 10¼" D. Net Weight: 23 lbs.

with 200 or 2000 watt full scale ranges; SWR bridge with sensitivity control; phone patch that can be used manually or with VOX control.

Kit SB-634, Shpg. wt. 13 lbs. 179.95

SB-634 SPECIFICATIONS: CLOCK — Display: Six digits. Time Base: 24 hours. TIMER — Display: Three full digits. Time Interval: 10 minutes with automatic reset. Manual reset at any portion of 10-minute period. Signal: Visual only or both visual and aural. RF POWER/SWR METER — Frequency Range: 1.8 to 30 MHz. Wattmeter Accuracy: $\pm 10\%$ of full-scale reading. Power Handling Capability: 2000 watts (maximum). SWR Sensitivity: Less than 10 watts. Impedance: 50 ohm nominal. Connectors: UHF type SO-239. Power Requirement: 120/240 VAC, 60/50 Hz, 15 watts. DIMENSIONS: 7¼" H x 10¼" W x 15¼" D. Net Weight: 10 lbs.



SB-644 Remote VFO

Designed exclusively for use with the SB-104. Provides split transmit/receive capability without a separate transmitter and receiver. Multi-mode capability allows transceive oper-

ation on either the "644" or the "104." Use either of the two crystal positions in the "644" for fixed-frequency control. "644" tuning scale gets you into the right frequency area, exact frequency readout takes place in the "104." Requires no modifications to "104."

Kit SB-644, Shpg. wt. 10 lbs. 119.95

SB-644 SPECIFICATIONS: Frequency Coverage: 5.0–5.5 MHz allowing 80, 40, 20, 15, 10 meter operation in the SB-104. Frequency Stability: Less than 100 Hz drift per hour after thirty minute warmup. Modes of Operation: Remote VFO Main VFO; Receive Remote/Transmit Main; Receive Main/Transmit Remote; Crystal frequencies (2) (crystals not supplied). Power Requirement: 11V and 13.6V at 500 mA supplied by SB-104. Dimensions: 7¼" H x 10¼" W x 15¼" D. Net Weight: 6½ lbs.



Heathkit HW-101 Deluxe 5-Band Transceiver

\$339⁹⁵ *Its price/performance ratio makes the HW-101 an exceptional value in amateur radio*

The HW-101 is a 5-band SSB/CW transceiver with the features you NEED for operating ease, convenience and versatility. Provides 180 watts input PEP, 170 watts CW. Features 0.35 μV sensitivity, a high stability FET VFO; both PTT (push-to-talk) and VOX (voice-operated transmit) operation. A crystal-controlled heterodyne oscillator assures accurate, stable operation. Triple action level control prevents overdriving the finals.

A built-in crystal calibrator lets you accurately calibrate the HW-101 at 100 kHz intervals. Smooth dial drive with 36-1 ratio and an extra-large tuning knob provide back-lash free tuning. The front panel meter shows signal strength on receive, ALC voltage on transmit, and also reads relative power output or final amplifier cathode current.

Kit assembly is easy. Special "Switch Boards" with built-in wafer switches help eliminate intricate switch wiring to greatly simplify assembly. Buy and build the HW-101 — join the thousands of Hams who've found you can't beat it.

Kit HW-101, Shpg. wt. 22 lbs. 339.95
SBA-301-2, 400 Hz CW crystal filter, Shpg. wt. 1 lb. 29.95

HW-101 SPECIFICATIONS: RECEIVER: Sensitivity: $<0.35 \mu\text{V}$ for 10 dB S+N/N for SSB operation. SSB selectivity: 2.1 kHz min. @ 6 dB down; 7 kHz max. @ 60 dB down; (3.395 MHz filter). CW selectivity: (optional SBA-301-2 CW crystal filter); 400 Hz min. @ 6 dB down; 2.0 kHz max. @ 60 dB down. Input: Low impedance for unbalanced coaxial input. Output impedance: 8 ohm speaker, and high impedance headphone. Power output: 2 watts with $<10\%$ distortion. Spurious response: Image and IF rejection >50 dB. TRANSMITTER: DC power input: SSB 180 watt PEP (normal voice, continuous duty cycle). CW 170 watts (50% duty cycle). RF power output: 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 ohm non-reactive load). Output impedance: 50 ohm to 75 ohm with $<2:1$ SWR. Oscillator feed-through or mixer products: 45 dB below rated output. Harmonic radiation: 40 dB below rated output. Transmit-receive operation: SSB: PTT or VOX. CW: Provided by operating VOX from a keyed tone, using grid-block keying. CW sidetone: Internally switched to speaker or headphone in CW mode. Approx. 1000 Hz tone. Microphone Input: High impedance with a rating of -45 to -55 dB. Carrier suppression: 45 dB down from single-tone output. Unwanted sideband suppression: 45 dB down from single-tone output at 1000 Hz reference. Third order distortion: 30 dB from two-tone output. RF compression (TALC*): >10 dB at .1 mA final grid current. GENERAL: Frequency coverage: 80-10 M amateur bands. Frequency stability: <100 hertz per hour drift after 45 minutes warmup from normal ambient conditions. <100 Hz for $\pm 10\%$ line voltage variations. Modes of operation: Selectable upper or lower sideband (suppressed carrier) and CW. Dial calibration: 5 kHz. Calibration: 100 kHz crystal. Audio frequency response: 350 to 2450 Hz. Power requirements: 700 to 850 volts at 250 mA with 1% maximum ripple; 300 volts at 150 mA with .05% maximum ripple; -115 volts at 10 mA with .5% maximum ripple; 12 volts AC/DC at 4.76 amps. (see fixed & mobile power supplies below). Cabinet dimensions: 6 $\frac{1}{2}$ " H x 14 $\frac{1}{4}$ " W x 13 $\frac{3}{4}$ " D.

*Triple Action Level Control.



Deluxe Heathkit HP-23B Fixed Station AC Power Supply

\$57⁹⁵

Provides fixed station operation for the HW-101 above, also can be used with other Heathkit SSB Transceiver, many others as well

Provides the operating voltages needed for fixed station transceiver use — high voltage, two low voltages, fixed bias, 12.6 volt filament. The improved HP-23B now features a higher voltage rating on B+ filter capacitors; improved filtering on bias voltage; fixed bias voltage, and heavier filament wires in the power cable. Now the popular Heathkit power supply is better than ever.

Kit HP-23B, Shpg. wt. 18 lbs. 57.95

HP-23B SPECIFICATIONS: Power requirements: 120/240 VAC, 60/50 Hz, 350 watts maximum. High voltage output: 820 VDC no load; 700 VDC @ 250 mA $\pm 10\%$. AC ripple. Less than 1% @ 250 mA. Duty cycle: 150 mA continuous to 300 mA @ 50%. Low voltage output: (High tap) 350 VDC, no load; 300 VDC @ 150 mA $\pm 10\%$, (Low tap) 275 VDC, no load, 250 VDC @ 100 mA; $\pm 10\%$. Less than .05% AC ripple @ 150 mA, continuous duty to 175 mA. Fixed bias: -130 VDC $\pm 10\%$, no load; -100 VDC @ 20 mA. Filament voltage: 12.6 VDC @ 5.5 amps. Dimensions: 9" L x 4 $\frac{1}{4}$ " W x 6 $\frac{3}{4}$ " H.

Heathkit SB-220 2 kW Linear Amplifier

\$489⁹⁵

- High-efficiency pre-tuned broadband pi-input
- Zener-diode regulated power supply
- Front-panel current and voltage meters

The one that's making Amateur Radio history because it offers more features and performance for the price! Uses a pair of conservatively-rated Eimac 3-500Z's to deliver up to 2000 watts PEP SSB input. It can be loaded to a full 1 kW on both CW and RTTY. A broadband pre-tuned pi-input delivers maximum efficiency with low distortion over the complete 80-10 meter bands. And it requires just 100 watts drive!

Tune-up couldn't be easier! Just set the band-switch, set the CW-tune/SSB rocker switch to CW-tune position, adjust tune and load controls for maximum relative power. Push the switch back to SSB and you're "on" with up to a full 2 kW PEP input! And you've got up to a full 1000 watts input on CW or RTTY.

The power supply can be wired for 120 or 240 volts. Zener diode regulated operating bias reduces idling current for cooler running and extended tube life. There's built-in circuit breaker protection and a large, quiet-running fan. Other features include ALC to prevent overdriving, front-panel switch-selected monitoring of grid current, relative power and high voltage. The tubes are "instant heating" types, and transmission may begin as soon as the Amplifier is switched on (after tune-up).

The SB-220 is a full legal-limit Amplifier that can take its place on your operating table and give you years of trouble-free pleasure. And kit assembly is easy and enjoyable, too.

Kit SB-220, Shpg. wt. 64 lbs. 489.95



SB-220 SPECIFICATIONS: Band coverage: 80, 40, 20, 15 and 10 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: 8 1/4" H x 14 1/2" W x 14 1/2" D.



\$429⁹⁵

SB-230 1 kW Conduction-Cooled Linear

Uses a husky Eimac 8873 triode in proven, stable, grounded grid circuitry to deliver up to 1200 watts PEP SSB, 1000 watts CW input from less than 100 watts drive. It's also rated at 400 watts input for slow-scan TV and RTTY. Bandswitching is done with a single knob ... Load and Tune controls are clearly marked. A temperature monitored heat sink shuts down the unit if temperature goes too high. Built-in delay circuit allows sufficient tube warmup. An Exciter light indicates the linear is running straight through, without amplification. The On-Off switch includes a circuit breaker for the primary side of the power transformer and the cathode of the tube is fused.

Kit SB-230, Shpg. wt. 40 lbs. 429.95

SB-230 SPECIFICATIONS: Band Coverage: 80, 40, 20, 15 and 10 meter. Duty Cycle: SSB: continuous voice modulation; CW: continuous (max. key-down time 30 seconds); RTTY/SSTV: 50% (max. transmit time 10 minutes at 400 watts). Driving Power Required: less than 100 W. Third Order Distortion: -30 dB or better. Output Impedance: 50 ohms at 2:1 SWR max. Input Impedance: 52 ohms at 1.5:1 SWR max. Zero Signal Plate Current: 25 mA. Power Requirement: 120 VAC, 50/60 Hz, 14 A max. or 240 VAC, 50/60 Hz, 7 A max. Dimensions: 14 3/4" W x 16" D x 7" H. Net Weight: 33 1/2 lbs.



\$349⁹⁵

Heathkit SB-200 Amp has a 1 kW kick

Delivers a full 1200 W PEP SSB input, 1 kW on CW. Requires only 100 watts drive, so it's ideal for use with most any popular transmitter or transceiver. Features include: Solid-state power supply with circuit breaker protection, metering for SWR, grid current, plate current, relative power, plate voltage. Pretuned cathode input circuit for maximum efficiency and low distortion. For extra operating convenience, the antenna relay automatically switches the antenna to the exciter input when the SB-200 is "off".

Kit SB-200, Shpg. wt. 45 lbs. 349.95

SB-200 SPECIFICATIONS: Band coverage: 80, 40, 20, 15 & 10 meters. Maximum power input: 1200 W P.E.P. SSB, 1000 W CW. Driving power required: 100 W. 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 W P.E.P. Output impedance: 50-75 ohm unbalanced; variable pi-output circuit. SWR: not to exceed 2:1. Input Impedance: 52 ohm unbalanced; broadband pretuned input circuit requires no tuning. 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 requirements: 120 VAC @ 16 A (max.), 240 VAC @ 8 A (max.). Cabinet size: 6 3/4" H x 14 1/2" W x 13 3/4" D.



New HD-1426 Field Strength Meter helps you analyze antenna radiation patterns

\$10⁹⁵

- Built-in and external antennas
- Front panel sensitivity control
- Allows precise transmitter adjustment

A must for ham, citizens band and marine radio enthusiasts. This compact, reliable unit may be used in a mobile or fixed location to measure relative field strength of any 1.8 MHz to 250 MHz signal received from a transmitter. Makes transmitter and antenna (beams, dipoles, verticals, etc.) adjustments quicker and more precise; lets you know transmitter is actually operating (especially ideal for marine uses.) For transmitter outputs from 1 to 1000 watts. A front panel mounted sensitivity control may be used to adjust the on-scale meter reading.

The HD-1426 is extremely compact and is self-powered so it is suitable for portable as well as fixed station operation. The circuit board is well laid out and provides easy assembly. Heath's excellent instruction manual makes the HD-1426 a perfect as well as useful starter kit. Rubber feet are supplied for fixed station installation and handy double-sided foam tape is provided for mounting on or under your car's dash. Supplied with whip antenna.

Kit HD-1426, Shpg. wt. 2 lbs. 10.95

HD-1426 SPECIFICATIONS: Frequency Range: 1.8 MHz to 250 MHz. Meter Accuracy: $\pm 10\%$ of full-scale reading. Meter Sensitivity: 150 μ A, full scale. Dimensions: 2 $\frac{3}{8}$ " H x 4 $\frac{1}{8}$ " W x 4 $\frac{3}{8}$ " D.



Improve your CW sending with this solid-state Electronic Code Keyer

\$49⁹⁵

- Selectable 10-35 or 10-60 wpm
- Adjustable paddle travel and tension
- DC or AC operation

Sending code's easy with the HD-1410 whether you're operating fixed 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 per minute or 10 to 60 words per minute. Operates on 120 VAC or 12 VDC. Adjustable sidetone 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 let you use it with most any rigs without blocking other knobs and controls.

Kit HD-1410, Shpg. wt. 4 lbs. 49.95

HD-1410 SPECIFICATIONS: Keying Output, Positive Line to Ground: max. voltage open circuit or spikes — 300 volts. Max. current — 200 mA. Keying Output, Negative Line to Ground: max. voltage open circuit or spikes — 200 volts. Max. current — 10 mA. Audio: internal speaker or jack for optional hi-Z (at least 500 ohms) headphones. Sidetone: adjustable from 500 to 1000 Hz. Internal Controls: sidetone frequency, paddle tension, paddle travel. Rear Panel Connections: AC power cord, 12-volt power input, keyer out, headphones, receiver audio in, ext. key. Power Requirement: 120/240 VAC ($\pm 10\%$), 60/50 Hz, 3.5 watts or 10-14.5 VDC, negative ground, 150 mA. Dimensions: approx. 3" H x 5" W x 7 $\frac{1}{2}$ " D. Net Weight: 3 lbs.

NEW HDP-1228 Portable Twin Speaker

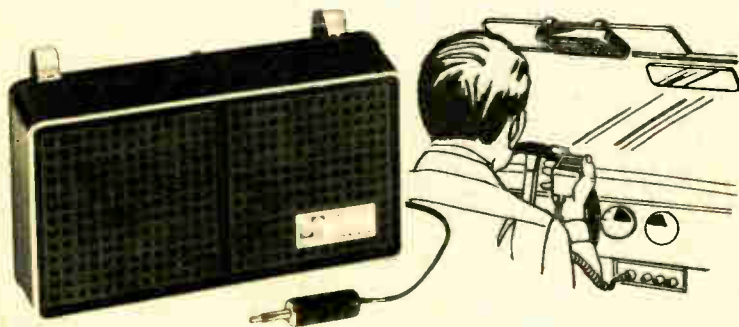
\$9⁹⁵

- Increased volume and clarity
- Makes your ham or CB gear easier to hear

The standard speaker found in many radios often lacks the volume and clarity that's so important for good reception. Many times high ambient noise levels make hearing difficult. The HDP-1228 is designed specifically to overcome these problems. Its twin speaker design comes through loud and clear. It can be mounted just about anywhere although it is designed primarily to clip to the sunvisor of an automobile, directing the sound right at you for greatly clarified reception.

The HDP-1228 plugs directly into the external speaker jack of most transceivers, tape players, etc. It can be quickly unplugged and removed from the vehicle for theft protection. Constructed of tough lightweight plastic the HDP-1228 is a worthwhile addition to your vehicle's communications setup. Fully assembled.

HDP-1228, Shpg. wt. 1 lb. 9.95



HDP-1228 SPECIFICATIONS: Dimensions: 5 $\frac{3}{4}$ " x 3 $\frac{3}{4}$ " x 1 $\frac{1}{4}$ ". Weight: 7 ounces. Cord: 8' with standard "mini-plug." Impedance: 16 ohms. Max. Power Handling: 1.0 W.

Add more versatility to transceivers and separates with these accessories...

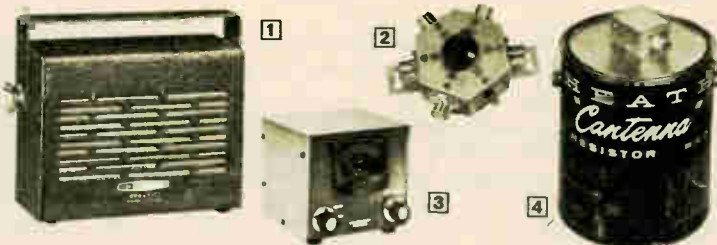
Heathkit solid-state Dip Meter delivers more performance at big savings

Another Heath value triumph—a better dip meter at lower cost. The Colpitts oscillator covers 1.6 to 250 MHz in fundamentals with a MOS-FET paraphase amplifier and hot-carrier diodes for more sensitivity and a better dip. It uses a Q-multiplier for greater detector sensitivity and a responsive 150 μ A meter movement for positive resonance indications. It includes a phone jack for modulation monitoring. It's smaller and lighter than others, too. Completely portable. 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. 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. Build it in one evening. Nearly everything mounts on two circuit boards. And when you finish, you'll have the best dip meter around—for a lot less money.

Kit HD-1250, less battery, Shpg. wt. 3 lbs. 59.95



Here's low-cost operating convenience



1 Heathkit Mobile Speaker for improved audio

8 ohm speaker in rugged steel cabinet. Gimbal mount for fast and easy installation included. 6 $\frac{3}{4}$ " W x 4 $\frac{3}{4}$ " H x 2 $\frac{1}{2}$ " D.

Kit HS-24, Shpg. wt. 4 lbs. 14.95

2 Heathkit Coax Switch for multiple antennas

Switches RF source to any one of several antennas or loads; unused outputs grounded. Use two to switch up to four different transmitters, receivers, etc. 1.1:1 max. SWR to 250 MHz. 2 kW PEP max. power rating.

Kit HD-1234, Shpg. wt. 1 lb. 10.95

3 Low-priced Heathkit VHF Wattmeter

Reads 1-25 and 10-250 W FS. Built-in SWR bridge, adjustable sensitivity.

Kit HM-2102, Shpg. wt. 4 lbs. 37.95

HM-2102 SPECIFICATIONS: Frequency Range: 50 MHz to 160 MHz. Wattmeter Accuracy: $\pm 10\%$ of full-scale. Power Capability: To 250 W. SWR Sensitivity: Less than 10 W. Impedance: 50 ohms nominal. Connectors: UHF type SO-239. Dimensions: 5 $\frac{1}{4}$ " W, 5 $\frac{1}{8}$ " H and 6 $\frac{1}{2}$ " D. *Using a 50 Ω noninductive load.

4 "Canenna" dummy load helps check your rig

1 kW max. input; 1.5-300 MHz w/SWR 1.5:1 or less. Oil not incl.

Kit HN-31, Shpg. wt. 3 lbs. 14.95

Useful Books for your Ham library

U.S. Callbook. EDP-126	14.95
DX Callbook. EDP-127	13.95
Amateur Tests and Measurements. EDP-119	5.50
91 Dipole and Long-Wire Antennas—data for 73 different antennas. EDP-180, 4.95	
73 Vertical, Beam and Triangle Antennas. EDP-181	5.50
ARRL Antenna Handbook. EDP-182	4.00
Radio Handbook. Offers comprehensive coverage of radio theory and operation. EDP-117	19.50

See page 52 for book-ordering information.

Our most popular station accessories Acclaimed by Hams the world over!



5 Heathkit Wattmeter/SWR Bridge

SWR bridge with adjustable sensitivity. Remote detector permits placement of meter in any location. Cable supplied.

Kit HM-102, Shpg. wt. 3 lbs. 37.95

HM-102 SPECIFICATIONS: Frequency Range: 1.8 to 30 MHz. Wattmeter Accuracy: $\pm 10\%$ of full-scale reading. Power Capability: 10 to 2000 watts. Impedance: 50 ohm nominal. Connectors: UHF type SO-239. Dimensions: 5 $\frac{1}{8}$ " H x 2 $\frac{1}{4}$ " W x 6 $\frac{1}{2}$ " D.

6 Heathkit hybrid Phone Patch

Individual Rcvr-line and line-Xmtr gain controls; VU meter. 30 dB isolation. Matches 3-16 ohm speakers & hi-Z or 600 ohm inputs. VOX or PTT operation. 2 $\frac{3}{4}$ " H x 9 $\frac{1}{4}$ " W x 3 $\frac{3}{8}$ " D.

Kit HD-15, Shpg. wt. 3 lbs. 36.95

7 Fully assembled Heathkit Desk Mike

Hi-Z dynamic; grip-to-talk. For convenient VOX or PTT operation with base station transceivers. With cables.

HDP-121, Shpg. wt. 4 lbs. 39.95

8 Fully assembled Heathkit Mobile PTT Mike

Rugged, hi-Z ceramic mike ideal for mobile work. With cable, less connector. GH-12A, Shpg. wt. 1 lb. 11.95

Heathkit Pack-17™ R/C—Uncompromised

Every Heathkit R/C product is the result of quality design and engineering by people who care about R/C. We were the first to use ceramic filters to help eliminate drift; the first to put 8-channels in a single, versatile and reliable unit; the first to give you the convenience of instant plug-in frequency change. Compare Heathkit R/C with top-of-the-line assembled models — you'll see why Heathkit R/C is your smartest buy!

HEATHKIT PACK-17™ R/C gives you the performance and reliability every RC'er wants — PLUS build it yourself kit value! The transmitters, receivers and servos have the quality and reliability you NEED for serious R/C competition; the positive-action control sticks are smooth and responsive; and the easy-to-handle transmitters are compact and comfortable. Heathkit R/C is easy and fun to build too — with a thorough and complete instruction manual that even shows you how to solder. Buy and build Heathkit R/C gear — it's the winning way to fly!

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

- ① **5-Channel Dual-Stick Transmitter & 1 module.** 2-stick control of 4 channels, plus 1 aux. channel.
Kit **GDA-505-D**, Shpg. wt. 6 lbs. **129.95**
- ② **5-Channel Single-Stick Transmitter & 1 module.** 1-hand control of 3 channels, throttle control with trim & 1 aux. channel.
Kit **GDA-505-S**, Shpg. wt. 5 lbs. **139.95**
- ③ **8-Channel Dual-Stick Transmitter & 1 module.** Same as GDA-505-D, plus landing gear switch & 2 additional channels.
Kit **GDA-1205-D**, Shpg. wt. 6 lbs. **139.95**
- ④ **8-Channel Single-Stick Transmitter & 1 module.** Same as GDA-505-S, plus landing gear switch & 2 additional channels.
Kit **GDA-1205-S**, Shpg. wt. 6 lbs. **159.95**
- Receiver & 1 module (less batteries).
Kit **GDA-1205-2**, Shpg. wt. 1 lb. **59.95**
- Receiver battery pack.
Kit **GDA-1205-3**, Shpg. wt. 1 lb. **9.95**

3-channel Pack-17™

Has the convenience and versatility of plug-in frequency change and it's the ONLY 3-channel system we know of that INCLUDES rechargeable batteries and an external charger so you fly with full power and uncompromised performance. Has 2-axis stick assembly, easy to handle transmitter with convenient strap for one-hand operation. An optional conversion pack lets you go 4 channels by adding another channel to the stick. All three stick channels have trim control, the 4th channel is controlled by a thumb tab. Compatible with all Heathkit servos; ideal for use as trainer transmitter with GDA-1205 and GDA-505 systems. Specify frequency when ordering (see specs below).

- Kit **GDA-1405-1**, 3-ch. transmitter with 1 Module. 5 lbs. **84.95**
- Kit **GDA-1405-3**, 4-ch. conversion. 1 lb. **12.95**
- Kit **GDA-1205-2**, receiver with 1 Frequency Module. 1 lb. **59.95**
- Kit **GDA-1205-3**, receiver battery pack. 1 lb. **9.95**

GDA-1205 AND GDA-505 SERIES SPECIFICATIONS:
TRANS. — RF Frequency: crystal controlled, all bands.
Frequency stability: within ±.005% on 27 MHz; within ±.002% on 53 MHz, 72 MHz. **Temp. Range:** 0 to 160°F.
RF Output Circuit: pi network. **RF Input Power:** at least 500 mW. **Modulation:** on-off carrier keying. **Approx. Current Drain:** 100 mA on all bands. **Controls:** GDA-1205, 8 channels (4 with trim), on/off, trainer button; GDA-505, 5 channels (4 with trim), on/off switch, trainer button. **Power Supply:** Internal 9.6V 500 mA Ni-Cad. battery. Rechargeable simultaneously with receiver battery at 35 to 40 mA from 120 volt power line.

Dimensions: 7" H x 7" W x 2" D. **Net Weight:** 2½ lbs., with battery.

GDA-1205-2 SPECIFICATIONS: RECEIVER — Local Oscillator Operating Frequency: crystal-controlled, all bands. **Temperature Range:** 0 to +160°F. **Sensitivity:** 5 µV or better. **Selectivity:** 6 dB down at ±4 kHz; 30 dB down at ±9 kHz. **Current Drain:** 10 mA. **Intermediate Frequency:** 453 kHz. **Power Supply:** 4.8 V battery pack (GDA-1205-3). **Controls:** On/off switch. **Dimensions:** ¾" H x 1¼" W x 1¼" D. **Net Weight:** 2 ozs.

GDA-1405-1 SPECIFICATIONS: TRANSMITTER — RF Carrier Frequency: One frequency, crystal-controlled



Special-design plug-in frequency modules let you fly while the others are grounded! Instantly switch to any of 17 frequencies — and each module is perfectly matched so you get maximum RF output without alignment problems!

Additional Frequency Modules

When ordering specify frequency desired (see list below).

Transmit Module, Shpg. wt. 1 lb. **17.95**

Receive Module, Shpg. wt. 1 lb. **11.95**

FREQUENCIES AVAILABLE (MHz): 26.995, 27.045, 27.095, 27.145, 27.195, 53.1, 53.2, 53.3, 53.4, 53.5, 72.08, 72.24, 72.16, 72.32, 72.40, 72.96, 75.650 MHz. (When ordering, specify transmit or receive.)

SPECIAL 5-MODULE OFFER — SAVE \$20!

5 Transmit and 5 Receive Modules Only **\$129⁵⁰**
of your choice — specify frequencies Shpg. wt. 6 lbs.

⑤ **A FUN-FLY plane** designed for intermediate and advanced flyers. The high strength plastics used in construction make the Delthon lighter than comparably-sized balsa planes, but much more rugged. Has 46½" wingspan, 33½" body. Kit includes tank, wheels, all hardware. Does not need additional covering materials or paint. Ideal for use with all Heathkit R/C systems. With detailed manual.

Kit **RP-1028**, Shpg. wt. 6 lbs. **79.95**

⑥ **Thumb® Tach peaks performance.** Measures model engine rpm without physical connection to engine. Two ranges — 0-5000 and 0-25,000. Perfect for needle valve adjustment, selection of glow plugs, gears and props.

Kit **GD-69**, Shpg. wt. 1 lb. **24.95**



\$14⁹⁵

R/C Battery Monitor. Expanded-scale voltmeter checks capacity (under load) of batteries. Has meter, connector for all Heathkit battery packs, alligator clips for Nicads. Pocket case.

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

Complete 3-channel Systems

Ideal for beginners, or as second systems for experienced flyers.

System with miniature servos
Includes 3-channel transmitter and one frequency module, receiver and one frequency module, receiver battery pack, and two miniature servos.

If purchased separately, **204.75**

GDS-1405-1, 25 lbs. **179.95**

When ordering, specify module frequencies. Systems include batteries.

System with subminiature servos
Includes 3-channel transmitter and one frequency module, receiver and one frequency module, receiver battery pack, and two sub-miniature servos.

If purchased separately, **204.75**

GDS-1405-2, 25 lbs. **179.95**

on 27 MHz, 53 MHz or 72 MHz bands. **Operating Temperature:** 0°-160°F. **Controls:** 3 channels (two with trim); ON-OFF switch. **Optional fourth channel.** **Power Supply:** Internal 9.6V, 500 mA hours, nickel-cadmium battery. Rechargeable simultaneously with receiver battery at 35-40 mA from external charger. **Frequencies Available:** 27 MHz (11 meters) — 26.995, 26.045, 27.095, 27.145 & 27.195. 53 MHz (6 meters) — 53.100, 53.200, 53.300, 53.400, 53.500. 72 MHz (4 meters) for R/C planes only — 72.080, 72.240, 72.400, 75.6°0. (All Models — 72.160, 72.320, 72.960. **Dimensions:** 9½" H x 3¼" W x 2¼" D.

Performance and Value

Save up to \$74.60 on complete 5 and 8-channel systems

5-Channel dual stick

Includes transmitter and one frequency module, receiver and one frequency module, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, up to 299.65.

GDS-505-D, Shpg. wt. 27 lbs. 249.95

5-Channel single stick

Includes transmitter and one frequency module, receiver and one frequency module, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, up to 309.65.

GDS-505-S, Shpg. wt. 27 lbs. 249.95

8-Channel dual stick

Includes transmitter and two frequency modules, receiver and two frequency modules, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, up to 339.55.

GDS-1205-D, Shpg. wt. 30 lbs. 284.95

8-Channel single stick

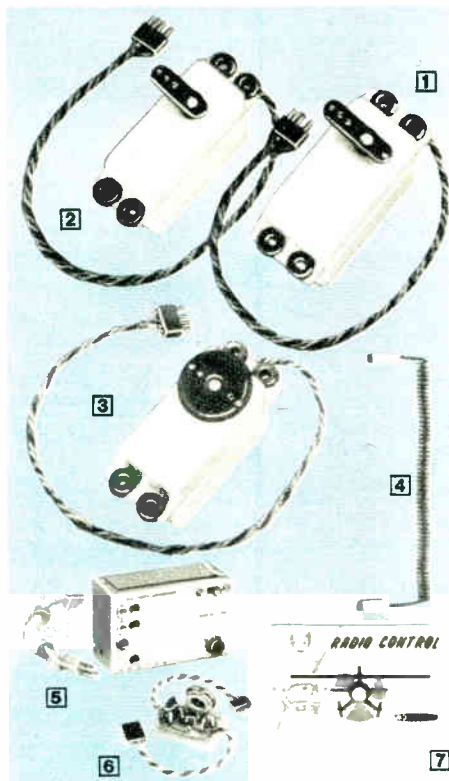
Includes transmitter and two frequency modules, receiver and two frequency modules, receiver battery pack, and four servos (choose miniature, subminiature or both). If purchased separately, up to 359.55.

GDS-1205-S, Shpg. wt. 30 lbs. 284.95

When ordering, specify module frequencies and type(s) of servos. All systems include batteries.



Servos and Accessories for Heathkit R/C



1 Miniature Servo. For use with all Heathkit R/C systems.

Kit GDA-1205-4, Shpg. wt. 1 lb. 24.95

GDA-1205-4 SPECIFICATIONS: Input Signal: Pulse 1-2 msec. wide, 4 V P-P. Thrusts: 4 lbs. min. at rotor. Travel Time: 0.5 sec. Rotary Output Travel: 90° rotation. Temperature Range: 0°-160°F. Power Requirements: Battery — 4.8 VDC. Idle current — 15 mA maximum. Stall current — 450 mA; no load current, 80 mA. Gear Train Backlash: Less than .002". Mechanical Output: 1 rotary arm, 1 rotary wheel. Position Accuracy: 1.0%. Dimensions: 1 1/4" H x 3/8" W x 2 3/4" L (length includes mounting ears; height includes outputs). Net Weight: 1.75 ozs.

2 Sub-Miniature Servo. For use with all Heathkit R/C systems.

Kit GDA-1205-5, Shpg. wt. 1 lb. 24.95

GDA-1205-5 SPECIFICATIONS: Power Requirements: Battery — 4.8 VDC. Idle current, 15 mA maximum. Stall current, 450 mA nominal; no load current, 80 mA. Mechanical Output: 1 rotary arm, 1 rotary wheel. Position Accuracy: 1.0%. Dimensions: 1 1/4" H x 3/4" W x 2 3/4" L (length includes mounting ears, height includes the outputs.) Net Weight: 1.25 ozs. Other specifications same as GDA-1205-4 above.

3 High Torque Servo. For use with all Heathkit R/C transmitters and receivers. Features high power (torque) and fast transition (rotational speed). You can wire it to operate 90° or 180°. Heavy-duty gearing.

Kit GDA-1205-8, Shpg. wt. 1 lb. 24.95

GDA-1205-8 SPECIFICATIONS: Input Signal: Pulse 1-2 msec wide, 4 V p-p. Torque: 6 lbs. at outer hole. Travel Time: 0.4 sec. Rotary output travel: 90° or 180° rotation. Temperature range: 0-160° F. Power Requirements: Battery, 4.8 V. Idle current, 20 mA maximum. Stall current, 1000 mA. No load current, 150 mA. Mechanical output: 1 rotary arm, 1 rotary wheel. Position Accuracy: 1%. Dimensions: 1 1/4" H x 3/4" W x 2 3/4" L (length includes mounting ears, height includes outputs). Net Weight: 1.75 oz.

4 Trainer link accessory. Six-foot coiled cord connects two GDA-1205 or 505 Transmitters for in-flight instruction — one unit is "master" with override, the other is "slave." GDA-1205-6, Shpg. wt. 1 lb. 10.95

5 Servo Centering Standard. Calibrates all Heath Servos with variable pots to 1.4 millisecond pulse width standard. Eliminates recentering when changing control units. Included in all Pack-17 transmitters!

Kit GD-1189, Shpg. wt. 1 lb. 9.95

6 Servo Simulator. Takes the place of both transmitter and receiver for making adjustments on all Heathkit servos, and a wide variety of others. Charges receiver and glo-plug batteries when plugged into 120 VAC. Kit GD-1053, Shpg. wt. 2 lbs. 24.95

7 Radio Control Handbook. Detailed information on the use and maintenance of Heathkit R/C gear. Get the most from Heath R/C gear, others too. GDA-1205-7 1.00

See page 52 for book ordering information
See page 45 for other informative R/C books.

Add realism and excitement to your model railroad

Heathkit Transistorized Power Supply/Throttle

\$79.95 Get top performance from every engine in your line

The Heathkit RP-1065 makes an HO or N-gauge layout dramatically more realistic! Just operate the slide throttle control to make your engines gradually build up speed just like a real train or, at slow speeds, maintain realistic acceleration and braking. Braking is independent of the throttle and controlled by a five-position knob.

The RP-1065's load compensation circuitry prevents stalling out when climbing grades, even lets you precisely simulate a real train, slowing as it climbs, then accelerating as it goes down. Helps overcome side rod and gear train binding, tight spots in wheel bearings, even tight sections of track. Easily powers two HO or N-gauge engines — has built-in short protection with an indicator light and a time delay to prevent false triggering.

The RP-1065 goes together in just a couple of evenings, even if it's your first kit. There's just one circuit board to wire, and a plug-in IC simplifies assembly. Operates on 120 VAC. 4 3/4" x 9 1/2" x 8 1/2".

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



Special offer!

Order RP-1065 and RPA-1065-1 together, for only

\$99.95

If bought separately, \$102.90

Walk-Around Controller for RP-1065

Provides remote operation of Throttle, Brake position switch and Engine direction switch, from approx. 20-ft. away from RP-1065.

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

10-ft. Extension Cable. For operation to approx. 30-ft.

RPA-1065-2, Shpg. wt. 2 lbs. 7.95



Beginner kits that are fun and practical

1 Electronic Darkroom Timer. Has two switch-selected ranges — up to 99 seconds in 1 second steps or up to 9.9 seconds in 0.1 second steps. A time/focus switch turns the safelight off when focusing and printing. 2% accuracy. 3 1/4" H x 6 5/8" W x 6 1/2" D.

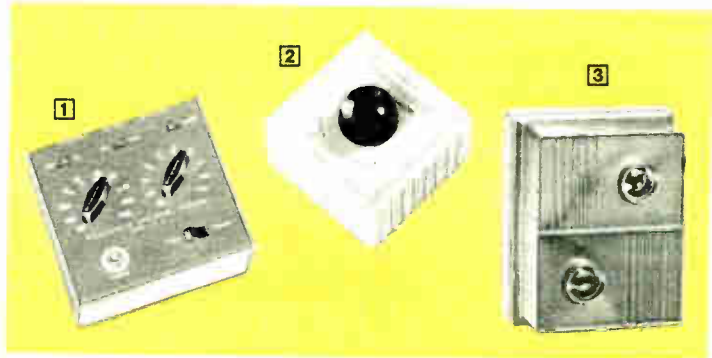
Kit PT-15, Shpg. wt. 4 lbs. 36.95

2 Tabletop Lamp Dimmer. Smoothly adjusts the brightness of table or floor lamps up to 300 watts. For 120 VAC. 3 1/4" H x 3 1/4" W x 3 1/4" D.

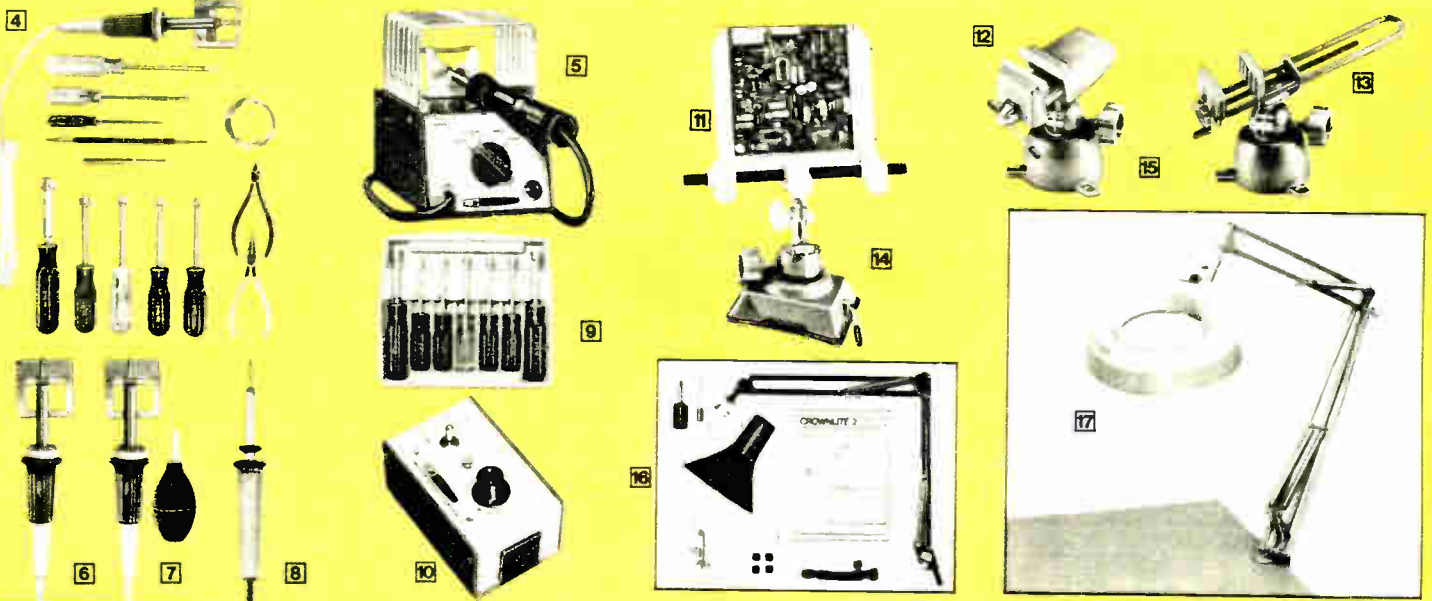
Kit GD-1018, Shpg. wt. 2 lbs. 7.95

3 Eye Spy® Photobeam Relay. Photo-cell controlled relay activated whenever the light beam is broken. Any warning devices or lamps plugged into photocell are then activated. Works up to 25 ft. Electronics, 5 3/8" H x 4 3/8" W x 5 1/4" D. Mirror assembly, 5" H x 4" W x 2 3/4" D.

Kit GD-1021, Shpg. wt. 3 lbs. 14.95



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



4 Kitbuilders' Tool Set. Includes wire stripper/diagonal side cutter; small long-nose pliers; three screwdrivers (3/2", 1/2", 3/8"); Weller WP-25 soldering iron; five nut drivers (3/8", 1/4", 3/8", 3/8", 1/2"); nut starter; soldering aid; and solder.

Model GH-25, Shpg. wt. 3 lbs. 29.95

5 3-Heat Soldering Iron Kit. Handy stand with metal cage keeps iron safe and secure. 3 heat ranges. With six foot power cord. 120 VAC.

Kit GH-17A, Shpg. wt. 5 lbs. 24.95

6 Heath-approved Weller 25-Watt Pencil Soldering Iron. 1/8" chisel tip develops 860° heat fast. U.L. and C.S.A. Approved.

Model GDP-207, Shpg. wt. 1 lb. 7.95

7 Heath Solder/de-Solder Set. Weller 25-watt pencil soldering iron that develops 860°. Includes de-solder squeeze bulb.

GDP-1009, Shpg. wt. 1 lb. 9.95

8 Soldering Iron For Close Work. Wall 25-watt pencil soldering iron for work on high-density boards where space is limited. 3-wire cord. For 120 VAC. Disposable. Ideal for computers, R/C gear, etc.

GDP-1231, Shpg. wt. 1 lb. 6.95

9 HeathKit Nut Driver Set. 3/8", 1/4", 3/8", 3/8", 1/2", 3/8" and 1/2" sizes.

Model GDP-204, Shpg. wt. 2 lbs. 11.95

10 Motor Speed Control. Saves power, blades, bits, saws, etc. Ideal for use with any universal motor with nameplate rating of 15 amps or less. (Not for use with Dremel tools).

Kit GD-973A, Shpg. wt. 2 lbs. 19.95

11 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 16.95

12 Vertical Jaw Vise Head— For most standard hobby applications. Nylon jaws open to 2 1/4" and provide a firm grip, without marring the object to be worked on.

GDP-1253 9.95

13 Wide Opening Vertical Vise Head— Holds bulkier items — model parts, chassis, etc. — firm and secure in any position. Jaws open to 6 1/2". Neoprene pads are reversible and replaceable.

GDP-1255 9.95

14 Vacuum Base — Attaches securely to any smooth, non-porous 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 3/4". Base dimensions 5" x 4 1/4".

GDP-1252 16.95

15 Standard Height Base — Designed for permanent installation and normal applications. Three mounting lugs let you attach it securely to the work surface. As with above base, choose desired vise head from three syles listed above.

GDP-1251 11.95

16 Extension Lamp Kit. The extension arm comes already assembled. All you do is attach the socket, shade and cord. Has 34" reach and 360° sweep; vented shade, and movable base clamp. Less bulb.

Kit GDP-202, Shpg. wt. 4 lbs. 16.95

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

Model GDP-200, Shpg. wt. 7 lbs. 39.95



Action-packed Heathkit Automatic Scanning Monitors

GR-1132 3-Band VHF/UHF Monitor

Monitor fire calls, police, ambulances, Amateur 2-meter FM, marine emergency vehicles, gov't weather stations, more. It automatically scans each channel, stopping on any signal, then resumes scan after broadcast. Priority feature — checks priority channel every 4 seconds. 4-pole crystal filter (for even better selectivity in crowded signal areas, order the optional 8-pole filter, right); channel lockout buttons; extra-large lighted channel indicators. Telescoping antennas for each band, provision for external antenna. Built-in speaker, volume and squelch controls. AC and 12 VDC power supplies. Order crystal certificates at right.

Kit GR-1132, Shpg. wt. 9 lbs. **139.95**

GR-1132 SPECIFICATIONS: Scanning Range: LO-VHF, any 10 MHz segment of 30-50 MHz frequency range. Hi-VHF, any 8 MHz segment of 146-174 MHz frequency range. UHF, any 8 MHz segment of 450-500 MHz frequency range. Sensitivity: Lo and Hi VHF: 0.5 μ V or less for 12 dB SINAD. UHF: 0.7 μ V or less for 12 dB SINAD. Adjacent Channel Rejection: (30 kHz channel spacing) — 40 dB typ. (-55 dB typ. with optional 8-pole filter). Scan Rate: approx. 16 channels per second. Scan Delay: approx. 1/2 second. Priority Channel Check: approx. 4 seconds. Antenna Impedance: 50 ohms. Audio Output: AC operation, 1 watt; DC operation, 2 watts; less than 10% distortion. Power Requirement: 120 VAC, 60 Hz. 12 watts or 13.8 VDC, 300 mA squelched; 500 mA at full output. Dimensions: 3 $\frac{3}{8}$ " H x 8 $\frac{1}{2}$ " D x 11 $\frac{1}{8}$ " W. Net Weight: 5 lbs.



4-Band Shortwave — just right for the beginner

Tunes foreign broadcasts from all over the globe — amateur and CB radio bands — local and marine weather reports — ships at sea — plus standard AM. Features wide slide-rule tuning dial with logging scale; signal-strength tuning meter; built-in AM rod antenna plus connection for SWL antenna. Kit SW-717, Shpg. wt. 10 lbs. **74.95**

SW-717 SPECIFICATIONS: Frequency coverage: 550 kHz - 1500 kHz, 1.5 — 4 MHz, 4 — 10 MHz, 10 — 30 MHz. Meter: indicates relative signal strength. Headphone Jack: Accepts low impedance headphone or external speaker. Loudspeaker: Built-in. Power Requirement: 120/240 VAC, 60/50 Hz, 8 W. Dimensions: 5 $\frac{1}{2}$ " H x 14 $\frac{1}{2}$ " W x 8" D.

GR-1131 Hi-Band VHF Scanning Monitor

If the emergency services in your area use the high-VHF band, this is the low-cost way to listen in! Monitor fire calls, police, ambulances, Amateur 2-meter FM, marine emergency vehicles, government weather stations and more. Other features same as GR-1132.

Kit GR-1131, Shpg. wt. 9 lbs. **89.95**

GR-1131 SPECIFICATIONS: Scanning Range: any 8 MHz segment of the 146-174 frequency range. Sensitivity: 0.5 μ V or less for 12 dB SINAD. Other specifications same as GR-1132 at left. Dimensions: 3 $\frac{3}{8}$ " H x 8 $\frac{1}{2}$ " D x 11 $\frac{1}{8}$ " W. Net Weight: 5 lbs.



Outdoor Scanner Antenna

For VHF and UHF. Really helps improve reception. Covers all bands, VHF and UHF. For masts to 1 $\frac{1}{2}$ " diameter. SO-239 receptacle. GRA-1132-1, Shpg. wt. 2 lbs. **21.95**

See page 45 for useful books to aid your listening.

Accessories for all Scanners on this page

Mobile Mounting Bracket. GRA-1131-1, Shpg. wt. 1 lb. **3.95**

Crystal Certificate. You send to crystal mfr. with specific frequency. Crystal is returned postpaid. Order one for each frequency.

GRA-1100-1 each **4.95**

Optional 8-pole crystal filter. Improves selectivity for use in crowded signal areas.

GRA-1100-2, Shpg. wt. 1 lb. **9.95**

Note: Some states prohibit use of scanners in vehicles. Check with local authorities.

SPECIAL \$10 SAVINGS!

Exciting Portable VHF/FM Monitor

Was ~~\$49.95~~ NOW ONLY **\$39.95**

Covers 152-174 MHz VHF for fascinating local police, fire and emergency service listening! Has telescoping antenna to help pull in stations, rugged case with carrying handle for easy portability. Ideal for first-time builders.

Kit GR-88, Shpg. wt. 5 lbs. Was **\$49.95** — NOW **39.95**



GR-88 SPECIFICATIONS: Tuning Range: 152-174 MHz. Antenna Input: 50-75 ohms. Sensitivity: 2.0 μ V or less for 20 dB quieting. IF Selectivity: \pm 40 kHz @ 6 dB down. Image Rejection: 40 dB or greater. IF Rejection: 80 dB or greater. Speaker: 3" round. Batteries: Six 1.5 V "C" cells, not supplied. Dimensions: 7 $\frac{1}{2}$ " H x 8 $\frac{3}{4}$ " W x 3 $\frac{1}{2}$ " D.



Convenient and versatile AM/FM Digital Electronic Alarm Clock-Radio

\$129⁹⁵

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

Here's everything you need in a quality clock-radio — 24 hour set'n forget alarm, fine sound and style that fits anywhere — kitchen, bedroom, den, office. The GR-1075 all-electronic digital clock reads out the time in conventional 12-hour format with bright orange 7-segment Beckman digits. Displays AM or PM, too. A lighted decimal pulsates to indicate seconds and also shows that the alarm is properly set. Readout features automatic brightness control. The 24-hour alarm cycle can be set to wake you with a gentle pulsating, electronic "beep" (which can be changed in volume by the radio volume control) ... or by the soft music from the FM or AM radio station of your

choice. The 7-minute snooze cycle feature is repeatable for up to an hour. Two 9-volt batteries (not supplied) take over during power interruptions and keep the clock counting, without the display — when power is restored the clock is "on time" and the alarm will go off at the set time. On the front panel are finger-flip switches for on/off; AM/FM selection; radio or electronic alarm; "wake-up" alarm set; "Snooze" cycle; plus volume and AM/FM tuning controls. Black plastic cabinet with brushed aluminum trim strip, and simulated walnut-grain vinyl end panels.

Kit GR-1075, Shpg. wt. 10 lbs. 129.95

GR-1075 SPECIFICATIONS: FM Sensitivity: 5 μ V @ 30 dB quieting. AM Sensitivity: 300 μ V/M @ 20 dB quieting. Speaker: 3" x 5" oval. Power requirement: 120/240 VAC, 50/60 Hz; 17 watts max.; clock, 7 watts. Dimensions: 4 1/4" H x 13 3/4" W x 8 1/2" D.

1 Heathkit AM/FM Portable Radio

Has AFC, AGC and big up-front speaker. Operates on six "D" cells (not included), or standard AC with the optional AC adapter below. Stitched leatherette carrying case with handle. 6 3/4" H x 8 3/4" W x 4" D.

Kit GR-17, Shpg. wt. 5 lbs. 46.95

GRA-43-1, AC Adapter, Shpg. wt. 1 lb. 4.95

2 Solid-State AM/FM Table Radio

Has AFC, built-in AM and FM antennas, rich-sounding 3 x 5" oval speaker. High-impact plastic case, 5 1/4" H x 10" W x 4 7/8" D. 120 VAC.

Kit GR-48, Shpg. wt. 5 lbs. 43.95

3 AM Pocket Portable Radio

A perfect kit for beginners. Handsome white and black plastic case, 4" H x 7 7/8" W x 2" D. Operates on 9-volt battery (not supplied).

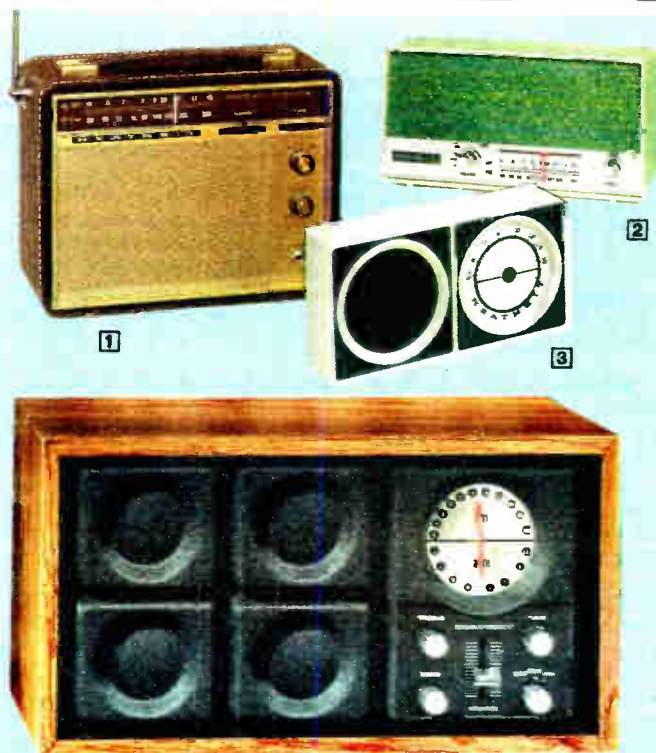
Kit GR-1008, Shpg. wt. 2 lbs. 16.95

Deluxe Heathkit AM/FM Table Radio

An outstanding value, this compact and handsome table radio puts great sound anywhere you want it! Features quality solid-state circuitry, a sensitive AM/FM tuner and a full-range acoustic-suspension speaker. Its low-distortion amplifier (Power Output: 5 watts, minimum RMS, into 8 ohms with less than 1.0% total harmonic distortion from 60 Hz to 15 kHz) gives you a roomful of full-bodied sound. Separate bass and treble controls let you tailor the sound the way you like best. Handsome teak-grained vinyl-covered cabinet with molded front grille. Easy kit assembly, too, even for first-time builders.

Kit GR-1085, Shpg. wt. 12 lbs. 89.95

GR-1085 SPECIFICATIONS: FM: Sensitivity: 5 μ V. Selectivity: 60 dB. GENERAL: Power Requirement: 120/240 VAC, 50/60 Hz, 25 watts. Speaker: 4 1/2", 8 Ohm. Dimensions: 7" H x 13" W x 7 1/4" D.



Our best stereo receiver ever—



AR-1515 Digital AM/FM Stereo Receiver — a new standard in convenience and performance

From its half-inch tall LED frequency readouts to its extraordinarily low distortion, the Heathkit AR-1515 is the finest receiver Heath has ever designed. Unquestionably, it is one of the world's finest audio components.

The AR-1515's digital readout is far more accurate and easy to use than conventional dial-type tuning. Simply tune to the exact frequency you want. Signal-strength and center-channel meters then help you "zero in" on the strongest signal and lowest FM distortion. There's even an oscilloscope output to monitor multipath distortion.

But 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 without periodic realignment.

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, -3dB 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 amplifier section is also unmatched in convenience. All the frequently-used controls — volume, input selector, stereo/mono switch, tuning — are on the front panel. The secondary controls (which clutter the front panels of many receivers) are concealed behind a hinged door — main and remote speaker switches, headphone jack, balance, bass and treble, FM muting and stereo blend, subsonic and high-frequency filters, tone-flat, dubbing inputs and outputs and more. All are convenient when you need them and out of the way when you

don't. Convenient indicator lights in the black-out section of the front panel instantly show the input you've selected and which switches are engaged. In the same functional way, the digits light only when listening to AM or FM and only the necessary tuning meters are illuminated — signal-strength only for AM, signal-strength and center-tune for FM.

The bass and treble controls have been specially designed to act primarily at the frequency extremes, allowing you to compensate for room acoustics and program deficiencies while maintaining smooth midrange response. For even greater versatility, the AR-1515's pre-amp out/amp in jacks allow it to be used with any high-quality audio equalizer, such as the Heathkit AD-1305.

The AR-1515's styling is both elegant and functional. The massive brushed extruded aluminum front panel is accented by an attractive, diecast Heathkit logo and by luxurious solid walnut end-panels.

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. There's even a separate test meter to double-check your work each step of the way. Finally, the illustrated, step-by-step assembly manual makes it easy for even a novice to assemble the AR-1515.

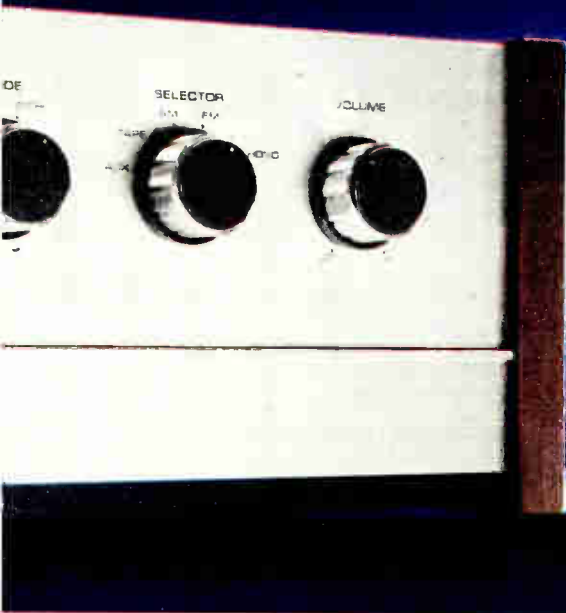
The receiver of the future... today! There's never been a receiver quite like the Heathkit AR-1515. It combines beauty, convenience, superb performance and value. And, in doing so, it redefines the state of the art. If you want the best for your audio system, it's the receiver you should own.

Kit AR-1515, Shpg. wt. 47 lbs. 549.95

Dolby FM Module. Enjoy the reduced noise and increased dynamic range of Dolbyized FM broadcasts. Assembles and installs in one evening.

Kit AD-1504, Shpg. wt. 1 lb. 39.95

Heathkit AR-1515



The AR-1515 has everything you could want in a stereo receiver; precision digital read-out, incredibly low distortion, functionally elegant styling and much more!

It's the only receiver at anywhere near this price that gives you digital frequency readout AND it provides performance equal to the finest separate components.

Over three years ago we gave our engineers a challenge: to design a totally new stereo receiver. A component which would set new standards for the industry.

They succeeded. To the dedicated music-lover, the AR-1515 offers exceptional specifications — massive power combined with vanishingly low distortion, a superlative FM section and an AM section which truly deserves to be called "hi-fi".



A flip-down panel reveals the AR-1515's secondary controls.

Only **\$549⁹⁵**

70 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.08% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

And look at these other impressive specifications!

AMPLIFIER — Frequency Response: +0, -1 dB, 8 Hz to 45 kHz; +0, -3 dB, 4 Hz to 80 kHz. Intermodulation 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 (Monophonic): Frequency Response: ±1 dB, 20-15,000 Hz. Antenna: 75 or 300 ohm. Sensitivity: 1.8 μV*. Selectivity: 100 dB*. Image Rejection: 90 dB*. Capture Ratio: 1.5 dB*. AM Suppression: 65 dB*. Harmonic Distortion: 0.3%. Intermodulation Distortion: 0.1%. Signal to Noise Ratio: 70 dB*. Spurious Rejection: 90 dB*. Mute Thresh-

old: 0.5 μV variable; FM (Stereo/Phonic). Channel 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. 19 and 38 kHz Suppression: 60 dB. SCA Suppression: 60 dB. AM: Sensitivity: 5 μV with 50-ohm direct input. Selectivity: 20 dB at 10 kHz. AM Antenna external static-shielded loop. Image Rejection: 70 dB at 600 kHz. 50 dB at 1400 kHz. GENERAL: Accessory AC Outlets: One switched and one unswitched. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 21½" W x 6¾" H x 15" D. Net Weight: 35.8 lbs. *Rated IHF (Institute of High Fidelity Standards). Dolby is a trademark of Dolby Laboratories.

Choose one of these carefully-matched AR-1515 systems for a lifetime of superb listening!



Save up to **\$132.39**

System Price

\$864³¹



- Heathkit AR-1515 Stereo Receiver
- Two AS-1352 Speakers
- B+I-C 960 Turntable with Base and Choice of Shure M91ED or Empire 2000E/III Cartridge

ARS-125. Shpg. wt. 194 lbs.
Motor Freight 864.31

If purchased separately, up to **\$996⁷⁰**



Save **\$60.99**

System Price

\$1158⁸¹



- Heathkit AR-1515 Stereo Receiver
- Two AS-1373 Speakers
- Dual CS-721 Turntable with Base, Dustcover and Shure V 15 III Cartridge

ARS-134. Shpg. wt. 195 lbs.
Motor Freight 1158.81

If purchased separately, **\$1219⁸⁰**



A new standard in performance and flexibility

The AN-2016 Digital Tuner/Preamplifier is the "heart" of the Modulus system. Its sophisticated circuitry and exceptional versatility put you in complete command of your musical environment. And the AN-2016's matching amplifiers and optional plug-in modules let you "custom design" a system that's right for you. You can easily change or update your system to meet your changing needs. Add Dolby FM, a more powerful amplifier, convert to 4-channel, add SQ or CD-4 "build-in" modules—all at minimum cost and *without* obsoleting the AN-2016!

The tuner section of the AN-2016 is one of the most technologically advanced on the market. Four ½" tall LED digits display the broadcast frequency more accurately than a conventional tuning dial. TWO meters—signal-strength for fine tuning on both AM and FM, and center channel to indicate the point of lowest distortion on FM—give you outstanding tuning precision. And there are "scope" outputs so you can align your antenna for the lowest multipath distortion. Fully adjustable FM muting can be switched on or off from the front panel, and a phase-locked-loop stereo multiplex circuit assures wide stereo separation of 40 dB at 1000Hz. Even the AM section is one of the world's best—with dual-gate MOSFET's, a 9-pole LC filter and a static-shielded loop antenna (a Heath exclusive which provides exceptional freedom from noise and improved dynamic range) for AM reception that's real "hi-fi" quality.

The preamplifier inputs have overload characteristics and freedom from distortion that allow superb sound reproduction from any program source. On high-level inputs, the AN-2016 reaches full output with a signal of 170mV, yet it doesn't overload until 5 volts. The phono amplifier can be driven to full output with as little as 2 mV, but does not overload until the input reaches 60 mV! And total harmonic distortion is a mere 0.05% throughout the entire 20 Hz to 20,000 Hz frequency range.

Each channel's peak-responding meter has a full 40 dB dynamic range to follow the softest and loudest musical passages faithfully—quickly detects distortion-causing clipping or overload. Order yours now. It could be the last hi-fi system you'll ever buy.

Kit AN-2016, Shpg. wt. 39 lbs. 599.95

CD-4 Demodulator Module. Lets you play CD-4 discrete 4-channel records through the AN-2016. Includes calibration record. For use with CD-4 phono cartridge.

Kit AD-1507, Shpg. wt. 2 lbs. 79.95

Dolby FM Module. Provides the reduced noise and increased dynamic range of Dolbyized FM. Assembles, installs in one evening.

Kit AD-1504, Shpg. wt. 1 lb. 39.95

SQ Decoder Module. For 4-channel SQ material. Includes full-logic with variable blend enhancement for outstanding separation from tapes, records and FM.

Kit AM-1503, Shpg. wt. 2 lbs. 49.95

AN-2016 SPECIFICATIONS: PREAMPLIFIER—Frequency Response: -0.5 dB at 10 Hz and 30 kHz **Total Harmonic Distortion:** less than 0.05% at 1.5 V into 20K ohms. **IM Distortion:** less than 0.05%. **Hum & Noise (unweighted):** phono, -75 dB ref. to 10 mV; high-level, -80 dB ref. to 0.25V. **Bass Control:** ±15 dB at 20 Hz nominal. **Treble Control:** ±12 dB at 20 kHz nominal. **Hi Filter:** -3 dB at 7 kHz ±1 kHz. 12 dB/octave. **Lo Filter:** -3 dB at 30 Hz ±2 Hz. 12 dB/octave. **Input Sensitivity (for 1.5 V output):** phono, 2/6 mV (switch selected). **Phono Equalization:** ±0.5 dB of RIAA standard from 20-20,000 Hz. **Output Voltage:** 1.5 RMS. **FM TUNER—(Monophonic—Sensitivity:** 1.7 μV (IHF); 3.5 μV for 50 dB S/N. **Signal-to-Noise Ratio:** 68 dB at 1000 μV **Selectivity:** greater than 100 dB. **Capture Ratio:** 1.3-dB. **Spurious Rejection:** greater than 90 dB. **IF Rejection:** greater than 100 dB. **Image Rejection:** greater than 90 dB. **Total Harmonic Distortion:** 0.3%. **IM**

Distortion: less than 0.1%. **AM Suppression:** 68 dB **Antenna Inputs:** 300Ω balanced; 75Ω unbalanced. — **FM (Stereo) S/N:** 35 dB for 50 dB S/N. **Total Harmonic Distortion:** 1 kHz, 0.35%. **Stereo Separation:** 40 dB at 1 kHz; 20 dB at 15 kHz. **SCA Rejection:** 65 dB. **AM TUNER—Sensitivity:** 6 μV for 20 dB S+N/N. **Selectivity:** more than 60 dB at 20 kHz. **Signal-to-Noise Ratio:** more than 48 dB. **Harmonic Distortion:** less than 1.0% at 400 Hz. **Antenna:** external static-shielded loop. **GENERAL—Power Requirement:** 120/240 VAC, 60/50 Hz. **AC Convenience Outlets:** 2 switched, 2 unswitched (500 watts max.). **Dimensions:** approx. 6½" H x 19" W x 14½" D. **†SQ** is a trademark of CBS, Inc.; "Dolby" is a trademark of Dolby Labs and "CD-4" is a trademark of the Japan Victor Company.

Matching power amplifier . . .

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

A perfect match for the AN-2016 in styling and performance—and you should also consider using it with other quality preamps. Just compare the specs—intermodulation distortion is less than 0.1% at full power and drops to a mere 0.05% at 0.1 watt. Frequency response is exceptionally wide and flat—down just 0.5 dB at 8 Hz and 45,000 Hz. And, with a damping factor of over 60, you can count on the AA-1506 to provide high definition bass response. Features pushbutton main and remote speaker switching, lighted power button.

Kit AA-1506,

Shpg. wt. 25 lbs. 179.95

Modulus Stereo System

- Heathkit AN-2016 Modulus AM/FM Control Center
- Heathkit AA-1506 Stereo Power Amplifier
- Two Heath AS-1373 Speakers
- Dual 1245CS Turntable with base and your choice of Empire 2000E/II or Shure M91ED Stereo Cartridge

ARS-135, 215 lbs. Motor Freight 1234.77

Save up to 134.93. If purchased separately, 1,369.70





**60 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH
LESS THAN 0.25% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.**

Heathkit AR-1500A Stereo FM-AM Receiver gives you top performance for your audio dollar

The AR-1500A delivers the kind of clean, low-distortion power and excellent AM and FM performance others only talk about. Compare our specifications with any other receiver—kit or assembled: 60 watts, minimum RMS, per channel into 8 ohms with less than 0.25% total harmonic distortion from 20–20,000 Hz. Intermodulation distortion is an infinitesimal 0.1% at full power or at one watt. Frequency response extends from 9 Hz to 80,000 Hz, +0, -1 dB. Remember, these are guaranteed *minimum* specifications!

A factory-assembled FET front-end provides high sensitivity and excellent resistance to overload. IHF sensitivity is just 1.8 μ V so you hear more stations and less noise. And fixed LC IF filters help keep stations separate. A phase-locked multiplex demodulator provides over 40 dB of midband FM stereo separation. Signal-strength and center-channel meters make tuning easy and accurate. A front panel control lets you set the FM muting threshold to suit reception conditions in your area.

Pushbuttons instantly select tape, tape monitor, auxiliary, phono, AM, FM stereo stations only, or FM with automatic stereo/mono

switching. Pushbuttons also control main and remote speakers. For private listening, there are two front-panel stereo headphone jacks. Has multipath scope outputs, switchable loudness compensation, a tone flat button, an FM stereo blend button, and individually adjustable level controls for each channel of every input. Preamp outputs and power amp inputs let you add other audio accessories. Beautifully styled too. A blackout dial accents the massive, diecast front panel. And you can custom

mount the receiver or order the optional walnut veneer case. Either way, it's one beautiful receiver at a beautiful, build-it-yourself price. Less case.

Kit AR-1500A, Shpg. wt. 51 lbs. **399.95**
Walnut veneer case.

ARA-1500-1, Shpg. wt. 8 lbs. **24.95**

AR-1500A SPECIFICATIONS: AMPLIFIER—Frequency Response (1 watt level): -1 dB, 9 Hz to 80 kHz; -3 dB, from less than 5 Hz to 120 kHz. **Intermodulation Distortion:** Less than 0.1% at full power; less than 0.1% at 1 watt. **Damping Factor:** Greater than 60. **Input Sensitivity:** Phono, 1.8 millivolts; Tape, Aux., Monitors: 140 millivolts. **Hum & Noise:** Phono (10 millivolt reference), -63 dB. Tape and Aux (0.25 volt reference), 75 dB. **—FM (Monophonic) — Frequency Response:** \pm 1 dB, 20 to 15,000 Hz. **Antenna:** 75 or 300-ohm. **Sensitivity:** 1.8 μ V. **Selectivity:** 90 dB. **Image Rejection:** 100 dB. **IF Rejection:** 100 dB. **Capture Ratio:** 1.5 dB. **AM Suppression:** 50 dB. **Harmonic Distortion:** 0.5% or less. **Intermodulation Distortion:** 0.1% or less. **Hum & Noise:** 60 dB. **Spurious Rejection:** 100 dB. **—FM (Stereo) — Channel Separation:** 40 dB or greater at midfrequencies; 35 dB at 50 Hz; 25 dB at 10 kHz; 20 dB at 15 kHz. **Harmonic Distortion:** 0.5% at 1000 Hz with 100% modulation. **19 kHz and 38 kHz Suppression:** 55 dB or greater. **SCA Suppression:** 55 dB. **—AM—Sensitivity:** 50 μ V with external input, 300 μ V per meter with radiated input. **AM Antenna:** Built-in rod type; connections for external antenna and ground. **Image Rejection:** 70 dB at 600 kHz; 50 dB at 1400 kHz. **IF Rejection:** 70 dB at 1000 kHz. **GENERAL—Accessory AC Outlets:** Two. One switched and one unswitched (240 watts). **Power requirement:** 120 or 240 volts, 60/50 Hz AC. 40 watts idling (zero output) and 350 watts at full output. **Dimensions:** Overall — 18 $\frac{1}{2}$ " W 5 $\frac{1}{2}$ " H x 13 $\frac{3}{4}$ " D.

*Rated IHF (Institute of High Fidelity) Standards.

Budget Pleaser

- Heathkit AR-1500A AM/FM Stereo Receiver and walnut veneer case
- Two AS-1342 Speakers
- B+C 940 Automatic Turntable with base and your choice of Shure M91ED or Empire 2000E/III Cartridge

ARS-122, Shpg. wt. 165 lbs.,
available..... 599.95

System Price

\$599.95

Please Specify Cartridge
When Ordering

**If purchased
separately, up to**

\$791.65

SAVE UP TO

\$191.70



Reference Standard

- Heathkit AR-1500A AM/FM Stereo Receiver and walnut veneer case
- Two AS-1373 Speakers
- Dual 1245-CS Automatic Turntable with Base and Choice of Shure M91ED or Empire 2000E/III Cartridge

ARS-133, Shpg. wt. 202 lbs.,
UPS..... 897.52

System Price

\$897.52

Please Specify Cartridge
When Ordering

**If purchased
separately, up to**

\$1014.70

SAVE UP TO

\$117.18





New Affordable Hi-Fi from Heath

Heathkit AR-1219 AM/FM Stereo Receiver

15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 Hz.

The new AR-1219 is a value that's hard to beat. It has the styling, features and performance of units costing much, much more. Brings you full fidelity AM, FM and stereo FM reception; also has inputs for magnetic phono and tape so you can have a complete and versatile home entertainment setup. Has power enough for solid bass even from inefficient speakers; advanced phase-locked-loop FM stereo circuit for wide stereo separation and minimum distortion: a factory assembled and aligned FM front end which assures 2 μ V sensitivity to really pull in FM stations.

Features include: tape monitor for professional-quality recordings with 3-head tape decks, pushbutton input and mode selection, speaker on-off button, stereo headphone jack, precision flywheel tuning with stereo indicator light. Inputs for a 75 or 300 ohm FM antenna and a built-in swivel-mounted AM antenna help you get the best reception even

- 2 μ V FM Sensitivity pulls in plenty of stations
- Pushbutton function selectors for easy operation
- Easy kit assembly

from weak stations. The extra-wide slide-rule tuning dial assures easy and accurate tuning for both AM and FM.

The AR-1219 is an easy kit to build too, just three PC boards, a wiring harness, and an open chassis layout for easy installation of components. The famous Heathkit manual makes it ideal even for first-time kit builders. Beautiful brushed aluminum front panel and walnut-veneer end panels make it a handsome addition to any decor.

Kit AR-1219, Shpg. wt. 18 lbs. 189.95

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. Hum and Noise: Phono, -60 dB; Tape, -65 dB. FM SECTION — Sensitivity: 2 μ V. Selectivity: 60 dB*. Image Rejection: 50 dB*. Stereo Separation: 40 dB typ., 35 dB minimum. — AM SECTION — Sensitivity: 100 μ V per meter*. Selectivity: 40 dB. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 3 $\frac{3}{8}$ " H x 17" W x 13" D.

*Rated IHF (Institute of High Fidelity) Standards.

8-Track/4-Channel Player with 4 Speakers

These specifications apply to compact systems on pages 34 and 35

4.5 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS AT LESS THAN 1.0% TOTAL HARMONIC DISTORTION FROM 50-15,000 HZ.

AMPLIFIER — Response: 30-15,000 Hz, ± 3 dB. Hum & Noise: -60 dB. FM Sensitivity: 5 μ V. Stereo Separation: 35 dB. **AM** — Sensitivity 300 μ V/m. **TAPE PLAYER** — Response: 50-10,000 Hz, +3, -5 dB. Separation: 30 dB at 1 kHz. **GENERAL** — Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: All units are 4" high and 15" deep; units with 8-track players are 22" wide, others are 17" wide. Cases: walnut-grained, vinyl clad metal and plastic.



Order it with these four good-sounding speakers

ONLY \$99⁹⁵ complete
If bought separately \$125.85
YOU SAVE \$25⁹⁰

Plays discrete 4-channel and stereo 8-track tapes, has SQ* decoder for matrix 4-channel or enhanced stereo.

ATS-1124, AT-1124 w/speakers, 51 lbs. UPS 99.95
Kit AT-1124, Player/Amp Alone, Shpg. wt. 21 lbs. **Was 89.95 Now 49.95**

Save \$49.85

- Heathkit AR-1219 AM/FM Stereo Receiver
 - Two Heathkit AS-1332 Speakers
 - B-I-C 920 Automatic Turntable with Base, Dust Cover and Shure M75ECS Stereo Cartridge
- ARS-129, Shpg. wt. 108 lbs. . . 349.95**



If purchased separately, **\$399.80**

Save up to \$156.75

- Heathkit AR-1219 AM/FM Stereo Receiver
 - Two Heathkit AS-1342 Speakers
 - B-I-C 940 Automatic Turntable with Base and choice of Empire 2000E/III or Shure M91ED Stereo Cartridge
- ARS-130, Shpg. wt. 128 lbs. . . 399.95**



Please specify cartridge when ordering

If purchased separately, **\$556.70**



While they last, you can get truly great stereo sounds at a super-low price! You may never get a chance like this again.

The AR-29 AM/FM stereo receiver is a best-seller that offers you no-compromise performance—and now it's priced even lower for even better value. Has pushbutton function selectors, slide controls, FM muting and stereo blend, tape monitor and main/remote speaker switching. Tuning is as easy and accurate as you could want, with a wide, clearly marked slide-rule tuning dial and two meters; signal strength for both AM and FM, center channel for FM. Special level controls for each channel of all inputs let you switch from phono to tuner to tape without changing volume. The AR-29 provides as much power as you're likely to need for most listening areas with about half the distortion of many competitive models. Intermodulation distortion is extremely low too; less than 0.2% at full power and less than 0.1% at 1 watt. The AR-29's sound is solid, clean and well-defined, which is what hi-fi is all about. Kit assembly is easy and fun—most parts mount on printed circuit boards that simply plug into the unit, and pre-assembled harnesses with individual wires stripped and cut to length further simplify construction. A built-in meter lets you check yourself every step of the way, and aids in servicing. With black metal top, order wood case (illustrated) below.

Kit AR-29, Shpg. wt. 34 lbs. Was 339.95 . . . NOW ONLY 269.95
 Pecan-Stained Veneer Case.
 AE-19, Shpg. wt. 11 lbs. 21.95



Heathkit AR-29 AM/FM Stereo Receiver

**35 WATTS, MINIMUM RMS, PER CHANNEL
 INTO 8 OHMS AT LESS THAN 0.25% TOTAL
 HARMONIC DISTORTION FROM 20-20,000 Hz.**

ONLY \$269⁹⁵ YOU SAVE A BIG \$70⁰⁰

Limited Quantities

Was \$339.95 in 1976
Fall Catalog

AR-29 SPECIFICATIONS: AMPLIFIER—Frequency Response: -1 dB, 7 Hz to 60 kHz. IM Distortion: 0.2% at 35 W, 0.1% at 1 W. Input Sensitivity: Phono: 2.2 mV. Tape, Aux. and Tape Mon., 180 mV. Hum and Noise: Phone (10 mV ref.), -65 dB. Tape & Aux. (0.25 V ref.), -FM Sensitivity: 1.8 μ V*. Selectivity: 70 dB*. Image Rejection: 90 dB*. Capture Ratio: 1.5 dB*. AM Suppression: 50 dB*. Harmonic Distortion: 0.5%*. Spurious Rejection: -90 dB*. Antenna: 75 or 300-ohm. Channel Separation: Typically 45 dB at mid-frequencies. SCA Suppression: 55 dB. — AM SECTION — AM Antenna: Adjustable rod. Connections for external ant., gnd. Sensitivity: External antenna, 20 μ V at 1000 kHz for 20 dB S+N/N. Selectivity: 40 dB at 20 kHz. Image Rejection: 60 dB at 600 kHz*. 45 dB at 1400 kHz*. Power Requirement: 120/240 VAC 60/50 Hz. Dimensions: 5 1/2" H x 16 3/4" W x 14 1/2" D.
 *Rated IHF (Institute of High Fidelity) Standards.



**AM/FM/
8-Track
Receiver with
2 Speakers**

Has a preassembled and aligned 8-track tape player that simply drops into the chassis. Quality AM and FM stereo sections. AS-1140 speakers described right.

ACS-1120, AC-1120
with speakers, 37 lbs. . . 149.96
Kit AC-1120,
Shpg. wt. 23 lbs. 149.95

**NOW
\$149⁹⁶**

If bought
separately,
\$187⁹⁰

SAVE \$37⁹⁴

Budget-priced Music Systems and Components

HIGH-EFFICIENCY SPEAKERS. 4 1/2" foam suspension speakers for use with units on this page, other compact stereo systems. 70-16,000 Hz response. Good-looking walnut-grain vinyl-clad enclosures. 12" H x 7" W x 6" D. 8 ohms impedance.

Kit AS-1140, Shpg. wt. 16 lbs. Pair 37.95

CERAMIC CARTRIDGE CHANGER. 3-speed changer with molded vinyl base, dust cover, 45-rpm adaptor. Ceramic cartridge with diamond stylus. 7 1/4" H x 15 1/4" W x 14 1/4" D.

ACP-1138, Shpg. wt. 14 lbs. 44.95
AD-1037, Automatic 45-rpm
adaptor, Shpg. wt. 1 lb. 1.95





Unique flip-down front panel reveals secondary controls!

AA-1515 high-performance Stereo Amplifier

\$299⁹⁵

70 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.08% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

The low-distortion power you need to drive most any speakers to "live performance" volume levels. Harmonic distortion is an amazing 0.08% over the 20-20,000 Hz range for exceptionally accurate music reproduction. Background noise is a full 65 dB down on phono inputs, 80 dB down on all other inputs. Has dual output meters calibrated in both watts and decibels over a 40 dB range for an accurate visual indication of amplifier output. The meters respond to peaks as short as a record click, making them useful as overload indicators. High and low filters help you get the best sound from old or worn records. Handsome cabinet with brushed aluminum front panel, solid walnut side panels. Easy kit assembly.

Kit AA-1515, Shpg. wt. 40 lbs. **299.95**

AA-1515 SPECIFICATIONS: Frequency Response: -1 dB, 8 Hz to 45 kHz; -3 dB, 4 Hz to 80 kHz. **IM Distortion:** less than 0.08% from 0.25 to 70 watts. **Damping Factor:** greater than 60. **Input Sensitivity:** Phono, 2 mV. Aux., Tuner, Tape Mon., Tape Dub., 150 mV. **Input Overload:** Phono, greater than 100 mV. All other inputs: greater than 10 volts. **Hum and Noise:** Phono, 65 dB. Tape, Tuner and Aux., 80 dB. **Power Requirement:** 120 or 240 volts; 60/50 Hz. **Dimensions:** 17½" W x 6½" H x 14¼" D. **Net Weight:** 27 lbs.

AJ-1515 deluxe AM/FM Stereo Tuner

\$379⁹⁵

The tuner section from our AR-1515 Stereo Receiver featuring digital frequency readout and top performance—one of the finest tuners you can buy

Digital frequency readout displays AM and FM broadcast frequencies far more accurately than tuners with conventional dials; its signal-strength and center-channel tuning meters help you "zero in" on stations for the finest reception. Build in the optional Dolby FM module to get the reduced noise and greater dynamic range of Dolbyized FM broadcasts now in many areas, too. Even the AM section can be called hi-fi. Just look at the specifications and you'll be impressed.

Kit AJ-1515, Shpg. wt. 27 lbs. **379.95**

Kit AD-1504, Optional Dolby FM Module, 1 lb. **39.95**

AJ-1515 SPECIFICATIONS: Frequency Response: ±1 dB, 20-15,000 Hz. **Antenna:** 300 ohm balanced, 75 ohm unbalanced. **Sensitivity:** 1.8 μV. **Selectivity:** Alternate Channel, 100 dB*. **Image Rejection:** 90 dB*. **IF Rejection:** 90 dB*. **Capture Ratio:** 1.5 dB*. **AM Suppression:** 65 dB*. **Harmonic Distortion:** 0.3%. **Intermodulation Distortion:** 0.1%. **Spurious Rejection:** 90 dB*. **Signal-to-Noise Ratio:** 70 dB*. **Stereo Channel Separation:** 40 dB at 1000 Hz, 35 dB at 100 Hz, 25 dB at 10 kHz, 20 dB at 15 kHz. **Stereo Harmonic Distortion:** 0.35%. **19 kHz and 38 kHz Suppression:** 60 dB. **SCA Suppression:** 60 dB. **Mute Threshold:** 0-5 μV (variable). **AM Sensitivity:** 5 μV. **Selectivity:** 20 dB. **Image Rejection:** 70 dB at 600 kHz, 50 dB at 1400 kHz. **IF Rejection:** 40 dB at 600 kHz, 60 dB at 1400 kHz. **Harmonic Distortion:** 3%. **Power Requirement:** 120 or 240 volts, 60/50 Hz, 30 watts. **Dimensions:** 17½" W x 6½" H x 14¼" D. **Net Weight:** 27 lbs.

*Rated IHF (Institute of High Fidelity) Standards

Dolby is a trademark of Dolby Labs.



A kaleidoscope of color for your parties and get-togethers!

\$84⁹⁵

Music becomes bursts of colored light

The TD-1006 Color Organ translates any kind of music into pulsing, whirling starbursts of color. Just connect the TD-1006 to the speaker leads of any sound source (except AM radio). The lights pulsate in time to the music creating spokes of color that seem to swirl. Just 4½" deep—even hang it on the wall. Walnut-grained vinyl-clad case, black-out front panel. 22¾" W x 22¾" H x 4½" D. For 120/240 VAC.

Kit TD-1006, Shpg. wt. 34 lbs. **84.95**



Shown in optional case

AJ-1510A Digital FM Stereo Tuner

The most precise and accurate tuning system available today—digital readout and digital frequency synthesis. Convenient three-way tuning. Auto-Sweep count down from the top of the FM band; program it to stop only at stereo stations, or use the A, B and C buttons to select any of three stations programmed with computer-type punch cards.

Kit AJ-1510A, Shpg. wt. 25 lbs. **499.95**

Pecan Veneer Case, AJA-1510-1, Shpg. wt. 8 lbs. **26.95**

AJ-1510 SPECIFICATIONS: **Antenna:** 75 or 300 ohm. **Sensitivity:** Less than 1.8 μV. **Selectivity (alternate channel):** Greater than 95 dB. **Capture ratio:** Less than 1.5 dB. **Harmonic distortion:** Less than 0.3%. **IF rejection:** Greater than 95 dB. **Spurious rejection:** Greater than 90 dB. **STEREOPHONIC—Channel separation:** 1,000 Hz, 40 dB; 80 Hz, 25 dB; 10 kHz, 25 dB; 15 kHz, 20 dB. **Harmonic distortion:** 0.35%. **AUDIO OUTPUT—Audio output level: (fixed):** 1.2 V rms nominal (100% mod.). **GENERAL—Power Requirement:** 120/240 VAC, 60/50 Hz, 50 W.



1219 Series "Separates"—great sound at low cost!

AA-1219 Stereo Amplifier

\$109⁹⁵

15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

The AA-1219 has a host of "top of the line" features for operating convenience and versatility. Input level controls match the amplifier to your phono cartridge's output; tape monitor lets you listen as you record (with 3-head decks), positive pushbutton input selection, front panel stereo headphone jack, bass and treble controls, and much more. The kit building is fun and easy, too. Case with stained walnut-veneer end panels.

Kit AA-1219, Shpg. wt. 15 lbs. **109.95**

AA-1219 SPECIFICATIONS: Frequency Response: ± 1 dB, 7 Hz to 100 kHz **IM Distortion:** less than 0.5% at full power; less than 0.2% at 1 watt. **Hum and Noise:** -65 db. **Power:** 120/240 VAC, 60/50 Hz. **Dimensions:** 3 $\frac{3}{4}$ " H x 12 $\frac{3}{4}$ " W x 12" D.

AJ-1219 AM/FM Stereo Tuner

\$109⁹⁵

Delivers crisp, clear AM and FM reception even on distant stations—offers excellent FM stereo separation with minimum distortion

The new AJ-1219 has everything you'd expect to find in a tuner costing far more. The pre-assembled and aligned FM front end provides 2 μ V sensitivity with extremely low cross modulation and virtually 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, the AJ-1219 is the stereo tuner for you.

Kit AJ-1219, Shpg. wt. 12 lbs. **109.95**

AJ-1219 SPECIFICATIONS: **FM Sensitivity:** 2 μ V. **Selectivity:** 60 dB. **Capture Ratio:** 2 dB. **AM Suppression:** 50 dB. **Stereo Channel Separation:** 40 dB typ., 35 dB min. **Power Requirement:** 120/240 VAC, 60/50 Hz. **Dimensions:** 3 $\frac{3}{4}$ " H x 13" W x 11" D.



AA-2015 deluxe 4-Channel Amplifier

35 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.25% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ

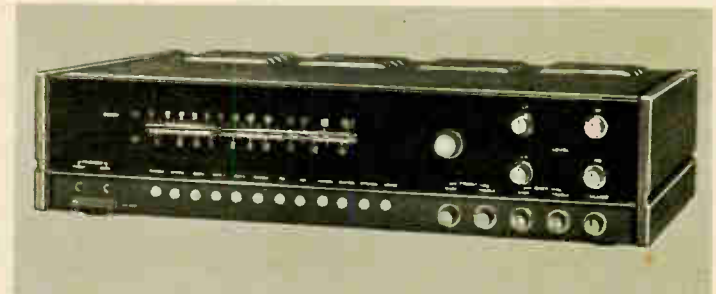
The same distinctive styling and features of the AA-1515 in a discrete 4-channel amplifier version

Kit AA-2015, Shpg. wt. 40 lbs. **299.95**

Kit AD-1507, Optional CD-4 Module. Shpg. wt. 2 lbs. **79.95**

Kit AM-1503, Optional SQ Module. Shpg. wt. 2 lb. **49.95**

AA-2015 SPECIFICATIONS: **Frequency Response:** (at 1 watt): 0 dB to -1 dB, 7 Hz to 40 kHz. **Intermodulation Distortion:** Less than 0.2% from 250 mW to 35 watts. **Damping Factor:** greater than 50. **Input Sensitivity:** Phono, 2 mV. High level, 200 mV. **Input Overload:** phono, 95 mV. High level, 5 volts. **Hum and Noise (input shorted):** Phono, -65 dB. High level, -75 dB. **Power Requirement:** 120/240 VAC, 60/50 Hz. **Dimensions:** 18" W x 6 $\frac{1}{4}$ " H x 14 $\frac{3}{4}$ " D. **Net Weight:** 31 lbs. SQ is a trademark of CBS, Inc. CD-4 is a Trademark of Japan Victor Company.



Heathkit AR-2020 4-Channel AM/FM Receiver

15 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.5% TOTAL HARMONIC DISTORTION FROM 20-20,000 HZ.

Dramatic 4-channel sound at a sensational low price. Plenty of power, excellent performance. Built-in matrix decoder for all 4-channel encoded sources.

Kit AR-2020, Shpg. wt. 32 lbs. **149.95**

AR-2020 SPECIFICATIONS: **AMPLIFIER—Frequency Response:** ± 1 dB, 7 Hz to 50 kHz. **Input Sensitivity:** Phono, 2.2 mV. Tape, 200 mV. **Hum and Noise:** Phono, -60 dB. Tape, -70 dB. **FM SECTION:** **Selectivity:** 60 dB*. **Image Rejection:** 50 dB*. **Power Requirement:** 120/240 VAC, 60/50 Hz. **Dimensions:** 5" H x 20" W x 14" D.

*Rated IHF (Institute of High Fidelity) Standards.

AA-18 Low-cost Solid-State Mono Amplifier



3.25 WATTS, MINIMUM RMS, INTO 8 OHMS WITH LESS THAN 1.5% TOTAL HARMONIC DISTORTION FROM 40-20,000 HZ. Has input for phono with ceramic cartridge, mono AM or FM tuner, or tape recorder. 2 $\frac{1}{2}$ " H x 7 11/16" W x 5 9/16" D. 120/240 VAC, 60/50 Hz.

Kit AA-18, Shpg. wt. 4 lbs. **24.95**

AA-2005A deluxe Stereo/4-Channel Amplifier



Similar to above. Features built-in matrix decoder optimized for SQ; inputs for phono, tuner, discrete 4-channel tape and aux. and outputs for a discrete 4-channel tape recorder.

Kit AA-2005A, Shpg. wt 28 lbs. **99.95**

LAST CALL!



Heathkit AA-1640 Stereo Power "Superamp"

\$449⁹⁵

less
meters

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

- Automatic circuitry assures complete speaker protection
- Use with any quality preamp like the AP-1615 or AN-2016
- Massive heat sinking for adequate dissipation without noisy fans

In sheer power and exceptionally low distortion, the Heathkit AA-1640 is an extraordinary amplifier. Hum and noise are an inaudible 100 dB below full output. A 10-second delay protects your speakers from turn-on thumps and instantly disconnects them when you turn the power off. This delay circuit also disconnects the speakers if it detects DC or extremely low-frequency AC at the outputs. Automatic thermal shutdown helps prevent damage from overheating. Finally, speaker fuses are located in the primary feedback loop—an exclusive design which maintains a high damping factor for excellent bass definition.

AP-1615 Stereo Preamp/Control Center

*Perfect for use with AA-1640 or any
high-quality stereo power amplifier*

The Heathkit AP-1615 offers the kind of specifications and features normally found on preamps costing much more. Harmonic and IM distortion are insignificant, less than 0.05%. And extremely wide dynamic range, 100 dB for all inputs, means that even the loudest and most complex musical passages come through with minimum distortion. If you need tone controls, the optional AD-1305 (right) offers far more versatility and precise tone adjustment than ordinary bass and treble controls. A relay instantly mutes the output when power is turned on or off to prevent "thumps." A sub-sonic filter eliminates the noise from turntable rumble or record warp. Has high-frequency filter, two phono inputs, aux. and tuner inputs, tape monitor, mono switch, headphone jack and front panel dubbing inputs and outputs. Case with solid walnut end panels.

Kit AP-1615, Shpg. wt. 12 lbs. 129.95

The optional peak-responding meters continuously monitor the output, accurately showing how much power is reaching your speakers. The backlighted scales are calibrated from -30 to +3dB and from 0.2 to 200 watts into 8 ohms. They respond to peaks as short as a record click, making them useful as overload indicators. The meters can be installed when the amplifier is built, or later. However, if you buy the meters at the same time you buy the amplifier, you'll save \$19.95.

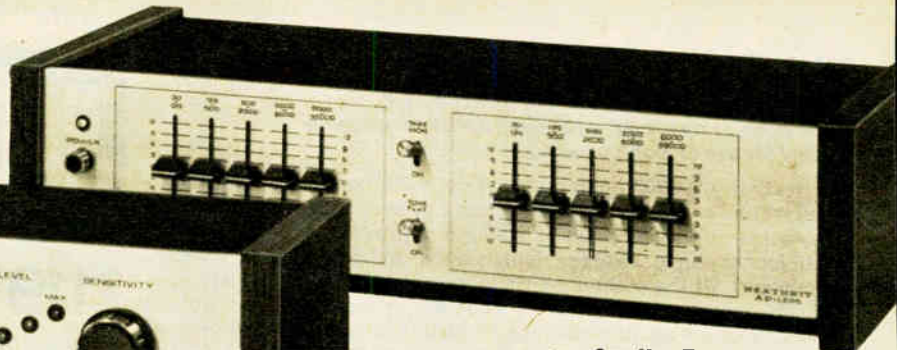
Kit AA-1640, less meters,
Shpg. wt. 72 lbs. UPS 449.95
Kit AAA-1640-1, Output meters only,
Shpg. wt. 3 lbs. 69.95
Kit AAS-1640, Amp and meters together.
Shpg. wt. 83 lbs., UPS 499.95

OTHER AA-1640 SPECIFICATIONS Frequency Response: -1 dB, 7 Hz to 50 kHz; -3 dB, 5 Hz to 100 kHz. Intermodulation Distortion: less than 0.1% from .25 to 200 watts. Damping Factor: greater than 50. Hum and Noise: Less than 400 μ V or 100 dB below full output. Channel Separation: 50 dB, min. Input Impedance: 50k ohms. Input Sensitivity: 1.5 V. Net Weight: 58 lbs. Dimensions: 19"Wx7¼"Hx 18"D. Power Requirement: 120 VAC, 60 Hz only.



AP-1615 SPECIFICATIONS: Input Sensitivity: Phono, 2 mV. Hi-Level (Tuner, Tape, Aux., Tape Mon and Tape Dub): 180 mV. Input Overload: Phono, over 100 mV, Hi-Level, over 10 V. Hum and Noise: Phono, -65 dB (2 mV input); Hi-Level -85 dB (180 mV input). Frequency Response: Phono, \pm 0.5 dB, 30 Hz to 15 kHz. Hi-Level, \pm 2 dB, 20 to 20 kHz. Rated Output: 1.5 V at rated sensitivity. Tape Output: 180 mV. Harmonic and IM Distortion: Less than 0.05% from 20 Hz to 20 kHz at 1.5 V output. Channel Separation: 50 dB at 1 kHz. Filters: Low, -3 dB at 15 Hz, -12 dB octave/slope. High, -3 dB at 7 kHz, -12 dB octave/slope. Power Requirement: 120/240 VAC, 60/50 Hz, 25 watts. Dimensions: 4 9/16" H x 17½" W x 8¼" D.

Active Audio Processor
NEW \$199⁹⁵



Audio Equalizer
\$119⁹⁵

AD-1304 Active Audio Processor

- Provides increased dynamic range and reduced noise from virtually ANY program source

Here's a necessary addition to ANY quality hi-fi system! Because of the inherent noise and compression on all program sources, even the finest quality component systems can benefit substantially from this Audio Processor. The AD-1304 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 quieter backgrounds while maintaining full frequency response and ultra-low distortion, even at "live performance" volume levels.

The AD-1304 connects between the tape output and tape monitor jacks on your receiver, preamplifier or integrated amplifier. Any program source (phono, tuner, tape, etc.) is then processed through the unit. It provides 7 dB of dynamic range expansion, restoring dynamic range lost in the recording and broadcasting process; and up to 10 dB of noise reduction to virtually eliminate hiss and surface noise.

A front panel switch turns on a 7 kHz, linear phase, 12 dB per octave rolloff high frequency filter. This filter helps reduce noise in unusually noisy material such as AM broadcasts, 78-rpm recordings, TV and 8-track tapes. While the processor can significantly reduce background noise to enhance listening, it does not change excessively noisy sources into high-fidelity material.

Front panel LED's indicate both relative dynamic noise reduction and dynamic range expansion. Tape monitor facilities are built into the AD-1304 you do not sacrifice your tape monitor function. The AD-1304's single-ended design makes it compatible with any program source since it does not require a preprocessed source.

The AD-1304 styling complements the Heathkit AD-1305, Audio Equalizer, the AD-1307 Audio Control Center, and the AP-1615 Stereo Preamplifier. Kitbuilding is easy and fast, with printed circuit boards and a color-coded wiring harness to simplify assembly.

Kit AD-1304, Shpg. wt. 11 lbs. 199.95

AD-1304 SPECIFICATIONS: Rated Input: 200 mV. Input Impedance: 100K ohms. Gain: Expander off, 0 dB (unity) ± 0.5 dB. Expander on, -3 dB to +4 dB. Frequency Response: +0, -0.2 dB from 20 Hz to 20 kHz. High Filter: 7 kHz, 12 dB octave rolloff. Noise Reduction: 10 dB typical between 4 kHz and 15 kHz. Hum and Noise: -70 dB, 20 Hz to 20 kHz. Channel Separation: 50 dB at 1 kHz. Output Impedance: 500 ohms. Input Overload: 5 volts. Total Harmonic Distortion: 0.1% from 20 Hz to 20 kHz. Power Requirements: 120/240 VAC, 50/60 Hz, 15 watts. Dimensions: 17½" W x 4½" H x 8½" D. Net Weight: 10 lbs.

AD-1305 5-band, 2-channel Audio Equalizer

- "Engineer" your favorite music the way YOU want to hear it

The AD-1305 is an audio equalizer offering complete tone control versatility with five slide controls for each stereo channel, each control handling its own portion of the frequency spectrum. It is designed for use with the AP-1615 at left, or any receiver or amplifier having a preamp output and power amp input, or tape monitor.

Each control provides a 12 dB per octave slope, for precise corrections in each portion of the frequency spectrum, without overlapping. Highlight instruments, create special sound effects, "engineer" your music the way YOU want to hear it! A center detent allows exact "0" dB setting bypassing each band; a tone flat switch bypasses the equalizer entirely, returning the system to flat response.

Adjusts response to allow precise corrections for room acoustics, differences in cartridges and speakers, even deficiencies in program sources. Can also be used with tape recorders to filter old or scratchy records or broadcasts before recording; and with PA and musical instrument amplifiers for anti-feedback control or special effects.

The active bandpass filters in the AD-1305 use large, fully-shielded coils, ensuring extremely low distortion even at full boost and cut. Excellent overload characteristics too. Rated output is 1.5 V, overload does not occur until output is at least 5 volts. The complementary symmetry output circuit permits the AD-1305 to be used with virtually any preamp and amplifier. Harmonic distortion is a mere 0.05% from 20 Hz to 20 kHz; hum and noise are a full 90 dB below rated output (1.5 volts).

The AD-1305's own tape monitor lets it be used in a receiver's tape monitor circuit without losing monitor capability. Has tape monitor, tone flat and power-on switches, switched and unswitched AC outlets. Its brushed aluminum front panel, black metal top and solid walnut end panels make it a handsome addition to any system, and ideal for use with the AP-1615, AA-1640, and AD-1304.

The AD-1305 is a fun-to-build kit too, even for first-time builders. Parts mount on three circuit boards, and there's minimal point-to-point wiring, so assembly is fast and easy.

Kit AD-1305, Shpg. wt. 11 lbs. 119.95

AD-1305 SPECIFICATIONS: Input Impedance: 100k ohms. Output Impedance: 100 ohms. Rated Output: 1.5 V rms. Overload: 5 V rms. Signal-to-Noise Ratio: 90 dB below 1.5 V. Total Harmonic Distortion: 0.05% from 20 Hz to 20 kHz at 1.5 volt output. IM Distortion: 0.05% at 1.5 volts. Frequency Control Range: (separate controls for each channel), 30-125 Hz, 125-500 Hz, 500-2000 Hz, 2000 Hz to 8 kHz, 8 kHz-32 kHz. Overall Gain (flat): Zero db (unity gain). Slope of Filters: 12 dB per octave. Power Requirement: 120/240 VAC, 60/50 Hz. Dimensions: 4 7/32" H x 17½" W x 8" D.

AD-1307 versatile Audio Control Center

- Dual meters accurately monitor power output
- Provides complete AC power and speaker switching
- Ideal for use in high-power audio-systems

The Heathkit AD-1307 is an outstanding audio control center that is useful for any component stereo system and especially recommended for systems using high-power amplifiers. It provides accurate power output monitoring for exact system balance, and complete AC switching facilities for the most sophisticated component setups. Lets you hook up one stereo amplifier to two sets of speakers, two stereo amplifiers (or a 4-channel amplifier) to four speakers. Uses the same output meters as the AA-1640. Julian Hirsch of "Stereo Review" described those meters as "by far the most useful we have ever seen on an audio amplifier...they are the ONLY ones that have any practical utility for the listener..." The meters are peak-responding with a log scale calibrated in both decibels and watts. Because they can respond to output peaks as short as a record click, they are extremely accurate and useful as overload indicators. A front panel monitor switch allows you to monitor the outputs of up to two amplifiers, you can even use a four-channel amplifier to "A-B" speaker systems. Four switched and four unswitched outlets (for a total of 1500 watts), a main power switch and a line cord capable of carrying up to 13



\$119⁹⁵

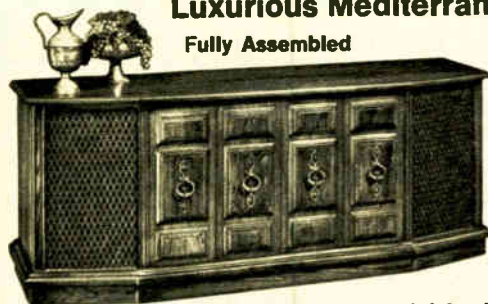
amps provide power switching for all the components in your system. There's a front panel headphone jack for conventional phones, and a barrier-type terminal strip on the rear panel for convenient connection of electrostatic headphones. The AD-1307 is an easy kit to build too, you can assemble it in just a couple of evenings.

Kit AD-1307, Shpg. wt. 11 lbs. **119.95**

AD-1307 SPECIFICATIONS: Meter Scale Calibration: -30 dB to +3 dB, 0.2 to 200 watts. (0 dB = 200 watts into 8 ohms.) Meter Circuit Type: Peak Responding. Meter Circuit Response Time: Less than 50 μ sec. Meter Circuit Fall Time: Greater than 0.5 sec. Power Requirement: 120 VAC, 50/60 Hz, 10 watts, 240 VAC, 50/60 Hz, 10 watts. Dimensions: 4 $\frac{1}{4}$ " H x 17 $\frac{1}{2}$ " W x 8 $\frac{1}{2}$ " D. Weight: 8 lbs. (3.6 kg.)

Luxurious Mediterranean equipment cabinet

Fully Assembled



\$279⁹⁵

- Solid Oak Trim for a rich, luxurious appearance

- Handsome Pecan Finish adds beauty to any decor

Ducted port speaker enclosures with precut 12" openings. Overall cabinet: 26 $\frac{1}{2}$ " H x 66" W x 19 $\frac{1}{4}$ " D. Shelf compartment: 35 $\frac{1}{8}$ " W x 17 $\frac{1}{2}$ " D overall, shelf 15" D. Adjustable shelf height: 5 $\frac{1}{2}$ ", 6 $\frac{1}{2}$ ", 7 $\frac{1}{2}$ ", 8 $\frac{1}{2}$ ". Lower compartment: 35 $\frac{1}{8}$ " W x 17 $\frac{1}{2}$ " D x 12 $\frac{1}{4}$ " H min. (shelf at 8 $\frac{1}{2}$ "). Speaker cabinet volume: 2.3 cu. ft. Changer Base: 5 $\frac{1}{2}$ " H x 18" W x 14" D. Shpg. wt. 193 lbs.

AE-101, Motor Freight **279.95**

AEA-101-3, slide-shelf accessory, 8 lbs. **24.95**

Stereo/4-Channel Audio-Scope

Measure phasing and channel separation on stereo and 4-channel systems; signal-strength, FM center tune, multipath distortion on tuners and receivers with multipath



scope outputs. Has built-in audio oscillator for frequency response checks. With black metal cabinet, optional case below.

Kit AD-1013, Shpg. wt. 21 lbs. **249.95**

Walnut veneer case. ARA-1500-1, Shpg. wt. 8 lbs. **24.95**

AD-1013 SPECIFICATIONS FRONT PANEL - Scope Input: Vertical Sensitivity: 25 millivolts P-P/cm. Input Impedance: 100 k Ω . Frequency Response: 5 Hz to 200 kHz \pm 3 dB. Oscillator Output: 20 Hz to 20 kHz. Voltage Level: 2 mV to 3 volts (rms) (variable). Output Impedance: (front panel jack). Approximately 600 Ω . Calibrator Voltage: 1.0 volt P-P \pm 5%. Total Harmonic Distortion: 1% or less. REAR PANEL - Oscillator Output Impedance: 6000 Ω . Multipath Input (Scope Horizontal and Scope Vertical) Sensitivity: 25 mV P-P/cm. Input Impedance: 100 k Ω . Left Front, Right Front, Left Back and Right Back Inputs: Sensitivity: 25 mV P-P/cm. Input Impedance: 100 k Ω . Frequency Response: 5 Hz to 200 kHz, \pm 3 dB. 4-Channel Input: Sensitivity: 1 volt P-P/cm. Input Impedance: 5000 Ω . GENERAL - Triggered Sweep Generator: Range: 10 Hz to 100 kHz. Power Requirement: 120 or 240 volts AC, 60/50 Hz, 15 watts. Dimensions (overall): 5 $\frac{1}{2}$ " H x 18 $\frac{1}{2}$ " W x 13 $\frac{1}{2}$ " D.

Stereo Mike Mixer - a hi-fi mixing console unmatched in versatility and value

The wide response (40-20,000 Hz, \pm 1 dB) and low distortion (0.5%) of the solid-state TM-1626 will give you clean, life-like mixing capability. Each of the two outputs has its own master level control and meter and they can be switched for use in stereo or mono. The six inputs include two high-level auxiliary inputs for disc or tape sources, and four mike inputs which are switchable to high impedance or balanced or unbalanced low impedance, for use with any type of microphone. The fourth microphone input has a "pan" control to adjust its apparent location from left to right or anywhere in between. All six inputs can be individually switched to left, off, or right channel. Access to "Mix-Bus" permits paralleling added mixers for extra inputs and outputs. A pair of backlit meters with two switch-selected ranges plus a pair of LED's with adjustable threshold show instantaneous peaks faster than any meter. Handsome in black with walnut stained veneer end panels. Build this quality mixer into your recording system now.

Kit TM-1626, Shpg. wt. 12 lbs. **129.95**



\$129⁹⁵

TM-1626 SPECIFICATIONS: Frequency Response: 40-20,000 Hz, \pm 1 dB. Distortion: 0.5% maximum. Hum: -80 dB at minimum volume. Hum & Noise: -50 dB from 20-20,000 Hz, all controls set at maximum. Input Sensitivity for 1.0 Volt Output: Mike (low-Z), 1 mV; Mike (high-Z), 14 mV; Aux., 150 mV. Input Overload: Mike 60 mV (low-Z), 900 mV (high-Z). Auxiliary, 3.0 V. Mixer Bus, 200 mV. Input Impedance: Mike 1100 ohms (low-Z), 170k ohms (high-Z). Auxiliary: 100k ohms. Mixer Bus: 3000 ohms. Output Impedance: 150 ohms. Power Requirement: 120/240 VAC, 60/50 Hz, 15 watts maximum. Dimensions: 5 $\frac{1}{4}$ " H x 16" W x 9 $\frac{1}{4}$ " D.



NEW Aiwa Stereo Cassette Deck with automatic front loading and Dolby® Noise Reduction System

\$349⁹⁵ *Unique auto loading and memory rewind system*

The latest in front loading cassette designs. The Aiwa AD-6500 is unmatched in high quality performance and convenience. A separate transport motor automatically loads the cassette into place, so there's no danger of damaging the loading mechanism by pushing the cassette in too far. Light finger pressure is all it takes. Once in position, the cassette tilts forward for easy monitoring. Two lamps illuminate the cassette while it is in operation. Two big VU meters tell you monitor recording levels. LED peak indicators respond to instantaneous signals and help you adjust your recordings for the widest dynamic range with the lowest possible distortion. Separate 3-position bias and equalizer switches allow for optimum recording with conventional, CrO₂ or FeCr tapes. For precision playback of specific tape passages, the memory rewind system is hard to surpass. No more rewinding and overshooting.

And the AD-6500 has the specifications to impress even the most demanding audiophile; frequency response is 30-17,000 Hz, wow and flutter is only 0.07% (WRMS) and the signal to noise ratio is 62 dB with the built-in Dolby operating on an FeCr tape. Step up to one of the finest cassette decks ever. Fully assembled.

ATP-1236, Shpg. wt. 27 lbs. **349.95**

AD-6500 SPECIFICATIONS: Frequency response: 30~14,000 Hz (LH tape) 30~17,000 Hz (CrO₂ tape) 30~17,000 Hz (FeCr tape). Head: Ferrite guard head. Fast forward time, 95 sec.; rewind time, 90 sec. (C-60 tape). Motor: FG servo motor. Input sensitivity/impedance: LINE: 50 mV/100K ohms. DIN: 0.1 mV/K ohm/3 K ohms. MIC: 0.25 mV/200~10 K ohms. Output level/impedance: LINE: 0.775 V/50 K ohms (OVU). DIN: 0.775 V/50 K ohms (OVU). HEADPHONE: 1 mW/8 ohms. Tape speed: 4.8 cm/sec. (1-7/8 ips). Wow and flutter: 0.07% (WRMS). S/N ratio: 62 dB (Dolby-on FeCr tape). Semiconductor: 1 IC, 2 FET's, 36 transistors, 30 diodes, 4 LEDs. Power consumption: 10W. Power source: 110~120 V/220~240 V (Selectable with voltage selector) 50/60 Hz. Track system: 4-track, 2-channel. Recording system: AC bias. Erasing system: AC erasure. Dimensions: 17 3/4" W x 6 3/4" H x 11 1/4" D. Weight: 18.7 lbs.

®Dolby is a trademark of Dolby Laboratories Inc.



NEW Aiwa Stereo Cassette Deck with Dolby® Noise Reduction System and streamlined "slant-front" panel

\$219⁹⁵ *Super modern, easy-access design complements any stereo hi-fi system*

The Aiwa AD-1250 is one of the most advanced stereo cassette decks available today. The inclined panel makes operation of controls and tape insertion a breeze. Features include an oil-damped cassette ejection system for smooth, noiseless ejection, large VU meters and LED peak indicator for precision recording levels on all types of material and, of course, Dolby noise reduction for greatly reduced tape hiss and background noise. Piano-type keys give a light but positive action. A mechanical pause key is separate from other keys for quick identification and operation. Separate 3-position bias and equalizer switches allow for optimum recording with conventional, CrO or FeCr tapes.

The performance of the AD-1250 is excellent too; frequency response is a full 30-16,000 Hz with standard tape, wow and flutter are less than 0.09% (WRMS) and signal to noise ratio is 60 dB (dolby-on with FeCr tape). The tape head is constructed of long-lasting ultra-hard permalloy famous for its frequency response characteristics and resistance to distortion. Add the AD-1250 to your hi-fi system today. It's an outstanding value and a superb performer at a sensational low price! Fully assembled.

ATP-1233, Shpg. wt. 17 lbs. **219.95**

AD-1250 SPECIFICATIONS: Frequency response: 30~14,000 Hz (LH tape) 30~16,000 Hz (CrO₂ tape) 30~16,000 Hz (FeCr tape). Head: Ultra-hard permalloy head. Fast forward and rewind time: 85 sec. (C-60 tape). Motor: DC servo motor. Input sensitivity/impedance: LINE: 50 mV/50K ohms. DIN: 0.1 mV/K ohm/3 K ohms. MIC: 0.3 mV/200~10 K ohms. Output level/impedance: LINE: 0.775 V/50 K ohms (OVU). DIN: 0.775 V/50 K ohms (OVU). HEADPHONE: 1 mW/8 ohms. Tape speed: 4.8 cm/sec. (1-7/8 ips). Wow and flutter: 0.09% (WRMS). S/N ratio: 60 dB (Dolby-on FeCr tape). Semiconductor: 2 ICs, 19 transistors, 12 diodes, 3 LEDs. Power consumption: 10W. Power source: 110~120 V/220~240 V (Selectable with voltage selector) 50/60 Hz. Track system: 4-track 2-channel. Recording system: AC bias. Erasing system: AC erasure. Dimensions: 15 3/4" W x 5 3/4" H x 10 3/4" D. Weight: 10.2 lbs.

®Dolby is a trademark of Dolby Laboratories Inc.

Your Personal Engraved Name Plate — A Special offer for Customers Who Order From This Catalog!



\$150 for one **\$130** each for 2 or more

Your personal name plate in jewel-like, silver-satin finish — etched, hand-engraved and adhesive backed. Easily worth \$2.95 — a real value with your order!

Handsome hand-engraved name-plates in virtually indestructible silver-satin, brushed jeweler's finish on durable Metal Graphics™ Aluminum, self-adhesive backing. Remember, your name plate order must accompany a regular kit order from this catalog.

PLEASE PRINT YOUR NAME PLAINLY IN CAPITAL LETTERS USING THE MAXIMUM 14 CHARACTER (INCLUDING SPACES) BOXES PROVIDED BELOW.

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Please ship _____ GDP-1225 Name Plates as shown below at \$1.50 for one, \$1.30 each for two or more (including postage and handling). Name Plates are shipped 1st class mail under separate cover. My total remittance of \$_____ is included with the regular Heathkit order form (p. 53) attached.

Name _____

Address _____

City _____

State _____ Zip Code _____

CUT OUT ENTIRE FORM ON DOTTED LINE AND ATTACH TO YOUR KIT ORDER



Heathkit 2-way bookshelf speaker system

Budget-priced speaker system gives you BIG audio performance from a compact enclosure

\$59⁹⁵
each

An excellent choice for low to medium priced music systems. Has an 8" woofer with a hefty 1 lb. ceramic magnet, 1 3/4" phenolic ring tweeter. The flat response characteristics of the AS-1332 provide clean, natural and well-balanced sound over its entire frequency range. Frequency response extends from 40-20,000 Hz and is a flat 3 dB from 50-18,000 Hz — the kind of performance you'd expect only in a far more expensive speaker. Can be driven by as little as 9 watts, but handles up to 50 watts. 3400 Hz crossover for smooth, even frequency distribution. Has individual fuses for woofer and tweeter; tweeter level control; factory-assembled walnut grain vinyl covered enclosure, three dimensional formed grille cloth. 19 1/2" H x 10 1/2" W x 8" D. 8 ohms impedance.

Kit AS-1332, Shpg. wt. 29 lbs. each 59.95

AS-1332 SPECIFICATIONS: Frequency Range (-10 dB): 40 Hz to 20 kHz. Frequency Response: ±3 dB, 50 Hz to 18 kHz. Impedance: 8 ohms nominal. Recommended Amplifier Power: 9 watts min. to 50 watts (fused for larger amplifiers). Crossover Frequency: 3400 Hz (12 dB/octave). Dimensions: 19" H x 10 1/2" W x 8" D (without grille). Weight: 15 lbs.

Heathkit 2-way "mid-priced" bookshelf speaker system

High efficiency and wide-response for good sound even from lower power amplifiers and receivers

\$79⁹⁵
each

Provides a louder sound level than the AS-1332 with the same amount of amplifier power. Uses an 8" woofer and a 2x6" horn-type tweeter for smooth, wide-range sound with excellent high-frequency dispersion.

Frequency response extends from 40-16,000 Hz and is a flat ±3 dB from 60-14,000 Hz. The crossover is at 2500 Hz (12 dB per octave) to minimize distortion and ensure smooth overall response. The woofer and tweeter are front mounted and the cabinet rails are kept low to minimize diffraction and dispersion problems. The horn tweeter can be mounted so you get the best high-frequency dispersion no matter whether you place the system horizontally or vertically — a Heath exclusive! A continuous tweeter level control lets you adjust the high-frequency response to suit your listening area. Each driver is individually fused for protection. Impedance is 8 ohms. With factory assembled walnut-finish vinyl-covered enclosure, handsome 3-dimensional grille cloth. 12" W x 22 1/4" H x 10 1/2" D. Easy 2-4 hour kit assembly — build a pair for great stereo sound!

Kit AS-1342, Shpg. wt. 32 lbs. each 79.95

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: 4 watts min. to 50 watts (fused for larger amplifiers). Crossover Frequency: 2500 Hz (12 dB/octave). Dimensions: 22 1/4" H x 12" W x 10 1/2" D. Weight: 20 lbs.



Heathkit deluxe 2-way bookshelf speaker system

Handsome walnut-veneer cabinet with deluxe foam grille

\$99⁹⁵
each

One of the best sounding speakers in its price range, with the "punch" you need for good sound levels from low and medium-power amplifiers. Has a wider frequency range and better response than our other two-way shelf systems. The special-design 10" woofer provides solid bass response and has enhanced midrange so the AS-1352 has the kind of smooth effortless sound you'd expect from an expensive three-way system. The 1 3/4" tweeter has phenolic ring suspension for superior dispersion. Frequency response extends from 30-20,000 Hz and is a flat 3 dB from 45-18,000 Hz for excellent overall performance. Has a flat/ -3 dB high frequency switch, separately fused woofer and tweeter. Handsome factory assembled walnut-veneer cabinet with acoustical foam grille. 24" H x 13 1/2" W x 11" D. 8 ohms impedance.

Kit AS-1352, 55 lbs. mailable each 99.95

AS-1352 SPECIFICATIONS: Frequency Range (-10 dB): 30 Hz to 20 kHz. Frequency Response: -3 dB, 45 Hz to 18 kHz. Impedance: 8 ohms nominal. Recommended Amplifier Power: 6 watts min. to 100 watts (fused for larger amplifiers). Crossover Frequency: 2800 Hz (12 dB/octave). Dimensions: 24" H x 13 1/2" W x 11" D. Weight: 38 lbs.

Our lowest-priced three-way floor/shelf speaker system

Offers full-range 3-way performance at the price of many two-way systems

\$119⁹⁵
each



The AS-1363 is a full-range 3-way speaker system designed for use in moderately priced stereo systems or as rear-channel speakers in quadraphonic systems. It uses a 10" woofer, a 4 1/2" midrange speaker and a 1" dome tweeter for extremely smooth and clean overall response, with excellent high-frequency dispersion. The woofer-to-midrange crossover frequency is 750 Hz (6 dB/octave) to insure a smooth-sounding midrange; while the midrange to tweeter crossover is 4000 Hz (12 dB/octave) to prevent the excessive cone excursions that cause distortion and breakup. Two-position midrange and tweeter switches let you adjust the AS-1363's sound to suit any listening room. Each driver is individually fused for protection. Impedance is 8 ohms. The factory-assembled cabinet features a handsome pecan-veneered Mediterranean finish and hardwood trim, with a decorative gold/black patterned grille cloth. 24 3/4" H x 14 1/4" W x 11 1/2" D.

Kit AS-1363, Shpg. wt. 55 lbs. UPS each 119.95

AS-1363 SPECIFICATIONS: Frequency Range (-10 dB): 30 Hz to 20 kHz. Frequency Response: ±3 dB, 45 Hz to 18 kHz. Impedance: 8 ohms, 6 ohms minimum. Recommended Amplifier Power: 5 watts min. to 130 watts (fused for larger amplifiers). Crossover Frequencies: 750 Hz (6 dB/octave) and 4000 Hz (12 dB/octave). Controls: two-position switches for midrange and tweeter. Enclosure: Pecan-veneered 3/4" particle board, sealed, 1.45 cu. ft., filled with sound absorbent material. Dimensions: 24 3/4" H x 14 1/4" W x 11 1/2" D. Weight: 40 lbs.

Versatile two-way column speaker system

Features **FLAT ENERGY RESPONSE** for superb sound throughout your listening room

\$129⁹⁵
each



Our best-selling three-way speaker system

Rivals the performance of speakers costing much more — innovative design and superb sound

\$149⁹⁵
each



Our finest three-way speaker system

Offers the bass power and dynamic range you **NEED** for "live performance" sound levels with any music

\$269⁹⁵
each



One of the finest column speakers you can buy, at a surprisingly low kit form price! Has two 1" dome tweeters and two 6½" full-range drivers mounted in separate woofer-tweeter arrays on adjacent sides of the cabinet to maintain well-balanced sound. The woofers are located well above the floor, so bass response is solid and well-defined. There is no mid-bass boom or resonance, so mid-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 — and their amazing 270° dispersion pattern maintains a well-balanced stereo image regardless of speaker placement. Has a nominal 4 ohms impedance, so most amplifiers will deliver up to TWICE their rated 8 ohm power. Separately fused woofers and tweeters, flat/-3 dB level control. Light walnut-vinyl finish on all four sides, simulated black slate top and acoustically transparent foam grille.

Kit AS-1344, Shpg. wt. 57 lbs. UPS each 129.95

AS-1344 SPECIFICATIONS: Frequency Range (-10 dB): 35 Hz to 22 kHz. Frequency Response: ±3 dB, 55 Hz to 20 kHz. Impedance: 4 ohms minimum. Recommended Amplifier Power: 6 watts min. to 100 watts (fused for larger amplifiers). Crossovers: 4000 Hz mechanical (on woofer) and 12 dB/octave electrical on tweeter. Fuses: 1½-amp Slow-Blow for woofers, 1 amp regular for tweeter. Control: 2 position tweeter level, flat and -3 dB. Dimensions: 40" H x 11" W x 11" D. Weight: 45 lbs.

A truly outstanding floor/shelf speaker system, for use with even the finest components. The 10" woofer provides solid, well-defined bass. The 4½" midrange is isolated in its own polyester-damped subenclosure to prevent distortion caused by woofer vibrations and reflections. The 1" dome tweeter provides excellent power handling and definition, and features horizontal dispersion of a full 120° even at 12,000 Hz. All three drivers are flush mounted, and there are no "rails" around the cabinet to limit treble dispersion. For best stereo imaging, you can position the tweeter directly above the midrange whether you position the system vertically or horizontally — a Heath exclusive! 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. 26" H x 14½" W x 11½" D. 8 ohms impedance.

Kit AS-1373, Shpg. wt. 68 lbs. UPS each 149.95

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: 11 watts min. to 200 watts. (fused for larger amplifiers). Crossover frequencies: 500 Hz (12 dB/octave) and 3000 Hz (12 dB/octave). Fuses: Woofer, 1½ 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 11½" D, without 1¼" grille. Weight: 47 lbs.

Here's TRUE sonic excellence at a sensational low price! Combines a massive 15" slot-loaded woofer, two 4½" midrange speakers and three 1" tweeters in a precision-designed cabinet. Has dynamic range from below 30 Hz to above 20 kHz. The woofer is mounted in the rear of the cabinet to improve low-frequency response. The two midrange drivers radiate directly forward for excellent presence and realism. The three tweeters face forward, angle right and angle left for high-frequency response with outstanding dispersion. The AS-1348 produces very high sound levels without distortion at ALL audible frequencies. Has individual fuses for woofer, midranges and tweeters, six-position attenuation controls. Fully assembled, sealed acoustic-suspension enclosure with walnut and oak veneer finish, acoustically transparent grille cloth. 38" H x 24" W x 15" D. 8 ohms impedance.

Kit AS-1348, Shpg. wt. 102 lbs. Motor Freight 269.95

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. Fuses: Woofer, 1½-amp Slow-Blow; midrange, ¾-amp Slow-Blow; tweeter, 1-amp regular Blow. Dimensions: 38" H x 24" W x 15" D. Weight: 100 lbs.

Our lowest-priced bookshelf speaker system

\$26⁹⁵
each

True acoustic-suspension design for clean, well-balanced sound

An excellent performer at a low kit-form price! Has a high-compliance 4½" speaker for usable frequency response from 70 Hz to 16 kHz, ultra-compact assembled walnut-veneer enclosure. For use with amplifiers providing 2.5 to 20 watts. 8 ohms. Measures only 12" H x 7" W x 6" D.

Kit AS-106, Shpg. wt. 9 lbs. each 26.95



SAVE AN EXTRA 5%

when you order a complete home hi-fi system from Heath Here's another way Heath helps you get more good sound for your money. Simply select 1) a receiver and a pair of speakers or 2) an amplifier, a pair of speakers and program source (tuner, turntable or tape deck). Add the costs of the individual components, then deduct 5%. The same 5% discount applies to any audio accessories you order with your system — remote or rear-channel speakers, cabinets, tape deck, turntable, audio scope or headphones. NO LIMIT — order as many accessories as you like and still get the 5% discount! Discount does not apply to featured systems, or SALE-PRICED systems on pages 34-35.



B-I-C 920 belt drive turntable

\$89⁹⁵

With Base, Dust Cover and Cartridge

Belt-drive, 24-pole motor, tubular tonearm, anti-skate and tracking force adjustments, lots more. Plays a single record up to six times, or

six records in a stack. 33 $\frac{1}{3}$ or 45-rpm operation. CD-4 capability. Includes base, dust cover and Shure M75ECS stereo cartridge.

ACP-1211, Shpg. wt. 15 lbs. Assembled 89.95



B-I-C 960 belt drive turntable

\$159⁹⁵

With Base and Cartridge

The same ultra-reliable design as the B-I-C 980 minus the electronic speed control, adjustable pitch and strobe. 33 $\frac{1}{3}$ and 45 rpm. Includes base and your choice of Empire 2000E/111 or Shure M91ED cartridge (specify). 15 $\frac{1}{8}$ " W x 12 $\frac{1}{16}$ " D x 4 $\frac{1}{16}$ " above board, 1 $\frac{1}{8}$ " below. If purchased separately, up to \$246.85.

ACP-1166, Shpg. wt. 11 lbs. Assembled 159.95



Dual CS-721 direct-drive automatic

\$369⁹⁵

With Base and Cartridge

One of the finest turntables available. Fully automatic single-play, electronic direct-drive motor, twin gimbal tonearm mounting, adjustable tonearm height, calibrated anti-skate, more. 33 $\frac{1}{3}$ and 45-rpm operation. CD-4 capability. With Shure V-15 Type III cartridge, base and dust cover.

ACP-1217, Shpg. wt. 25 lbs. Assembled 369.95

ACCESSORIES FOR B-I-C TURNTABLES, EXCEPT 920

ADP-1163, Solid oiled walnut base, Shpg. wt. 3 lbs. 16.95

ADP-1184, Hinged dustcover, Shpg. wt. 4 lbs. 9.95

ADP-1165, 45-rpm spindle, Shpg. wt. 1 lb. 3.95

NOTE: When ordering turntable, please specify cartridge and base model numbers on order blank.

Stereo Cartridges

Shure V-15 Type III. Famous for its excellent tracking and smooth, uncolored sound. For tonearms capable of tracking at $\frac{3}{4}$ to 1 $\frac{1}{4}$ grams. See specifications at right.

AD-1059, Shpg. wt. 1 lb. 85.00
With turntable purchase 45.00

Audio-Technica AT-14Sa. Specially shaped and polished Shibata stylus for unparallelled quadrasonic CD-4 and stereo response. Lasts twice as long as ellipticals! Specs at right.

ADP-1139, Shpg. wt. 1 lb. 85.00
With turntable purchase 45.00



B-I-C 940 belt drive turntable

\$119⁹⁵

With Base and Cartridge

A true B-I-C automatic turntable — with belt drive, low speed 24-pole synchronous motor, up to six-record continuous play. Has viscous-

damped cueing, 12" platter, 33 $\frac{1}{3}$ and 45 rpm speeds, and CD-4 capability. Includes base and your choice of Empire 2000E/111 or Shure M91ED cartridge (specify). If purchased separately, up to \$206.85.

ACP-1161, Shpg. wt. 11 lbs. Assembled 119.95



B-I-C 980 with electronic speed control

\$199⁹⁵

With Base and Cartridge

B-I-C's finest! Unique "programming panel" permits automatic play of a single disc once or up to six times, or plays a six-record

If purchased separately, up to \$286.85.

stack. Has 24-pole motor, pitch control, strobe, 33 $\frac{1}{3}$ and 45 rpm with base and your choice of cartridge: Empire 2000E/III or Shure M91ED (specify). For premium performance, add \$45 for Shure V-15 Type III or \$45 for Audio-Technica AT-14Sa cartridge.

ACP-1167, Shpg. wt. 13 lbs. Assembled 199.95



Dual 1245 deluxe automatic

\$219⁹⁵

With Base, Dust Cover and Cartridge

Quality automatic has famous Dual features: full-size 12" platter,

6% pitch control and lighted strobe, continuous repeat switch, adjustable height cue control. Factory-assembled, includes Base, Dust Cover and Empire 2000E/III or Shure M91ED cartridge (specify).

ACP-1237, Shpg. wt. 18 lbs. Assembled 219.95



Sennheiser HD-424 Headphones with patented Open-Air design. Super lightweight — a mere 6.5 ounces. 15-20,000 Hz response, less than 1.0% total harmonic distortion. 2000 ohms. 10-ft. coil cord, $\frac{1}{4}$ " phone plug.

AHP-1193, Shpg. wt. 2 lbs. Assembled 64.95

Model	Response (Hz)	Output	Separation	Stylus	Tracking	Price Alone	With Turntable
ADP-1082, Wt. 1 lb. Shure M91ED	20-20,000	5.0 mV	25 dB	Ellipt. 0.2 x 0.7	$\frac{3}{4}$ to $1\frac{1}{2}$ gr.	59.95	FREE
ADP-1147, Wt. 1 lb. Empire 2000E/111	20-20,000	4.5 mV	28 dB	Ellipt. 0.2 x 0.7	$\frac{1}{2}$ to $1\frac{1}{2}$ gr.	69.95	FREE
AD-1059, Wt. 1 lb. Shure V-15 Type III	10-25,000	3.5 mV	28 dB	Ellipt. 0.2 x 0.7	$\frac{3}{4}$ to $1\frac{1}{4}$ gr.	85.00	45.00
ADP-1139, Wt. 1 lb. Audio-Tech. AT-14Sa	5-45,000	2.7 mV	27 dB	Shibata	$\frac{3}{4}$ to $1\frac{1}{4}$ gr.	85.00	45.00



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Guide to using op-amps and other
electronic devices. EDP-202 9.95
- Electronic Data Handbook.
EDP-171 5.95
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EDP-199 6.50
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EDP-178 3.95
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EDP-176 30.00
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EDP-177 18.95
- Radio Operator's License Question
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listing of informative computer
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Heath test gear; a very wise choice!



Heath test equipment is among the best you can buy anywhere at any price. From our economy, solid-state IM-17 TVOM to our top of the line IO-4510 oscilloscope the quality remains constant. Care in engineering and top quality materials mean that the test equipment you purchase from Heath will perform up to the highest standards for years to come. Thousands of amateur and professional technicians across the country can attest to Heath reliability. And we know that specifications play no small part in your buying decision, so the specifications we quote for our test instruments are as accurate and as detailed as possible.

And Heath test instruments are more than just a purchase; they are an investment in your future. If you make a career in electronics your

Heathkit IM-17 — everybody's TVOM — an easy-to-build and practical starter kit

The perfect buy for homeowners, hams, servicemen, hobbyists, modelers, everyone. This battery-powered voltmeter has hundreds of uses around the house — use to check appliance operation, house wiring, even automobile electrical circuits.

Its rugged, portable case with storage compartment for probes makes it ideal for fast, in-the-field checks too. All solid-state circuit with FET input for less circuit loading, provides better accuracy than ordinary VOM's. Has zero and ohms-adjust controls, DC polarity switch, three test leads, jack for accessory probe. Easy 3-5 hour assembly makes it an ideal beginner's kit. Less batteries. NOTE: The IM-17 is recommended for use with the Heathkit Continuing Education Series — See pages 100-103.

Kit IM-17, Shpg. wt. 4 lbs. 32.95

IM-17 SPECIFICATIONS: DC VOLTMETER — Four ranges: 0-1, 10, 100, 1000 V full scales. Input resistance: 11 meg. on all ranges. Accuracy: $\pm 3\%$ of full scale. AC VOLTMETER — Four ranges: 0-1, 10, 100, 1000V full scale. Input resistance: 1 meg. on all ranges. Accuracy: $\pm 5\%$ of full scale. Frequency response: ± 1 dB, 10 Hz to 1 MHz. OHMMETER — Four ranges: RX1, RX100, RX10k, RX1M. Meter: $4\frac{1}{2}''$, 200- μ A, 100-degree movement. Transistor-Diode Complement: 1 FET, 4 silicon transistors, 1 silicon diode. Batteries (not supplied): One 1.5 V "C" cell (NEDA #14); one 8.4 V mercury cell (NEDA #1611). Dimensions: $5\frac{3}{8}''$ H x $9\frac{3}{8}''$ W x $9''$ D.

kit building experience can become an invaluable aid. Not only will you be adding the reliability of a Heath instrument to your bench but each project provides an excellent opportunity to better define and expand your knowledge of electronics.

You can count on a Heath instrument for unparalleled performance under the toughest conditions. Another advantage that only a Heathkit instrument can give you is self-serviceability. What could be more economical than performing your own troubleshooting and repair should the need ever arise? It's easy with a Heathkit product. Our simple easy to follow instruction manuals make service a breeze even if you have little knowledge of electronics.

We think that Heathkit test instruments make good sense from both a practical and economical standpoint. When you purchase a Heath instrument you purchase years of engineering expertise in the field of test equipment design. If you want equipment that's designed to last, order your first piece of test gear from Heath and you'll agree; Heath is truly the best there is.

Heath self-instruction courses — an ideal route to electronics education

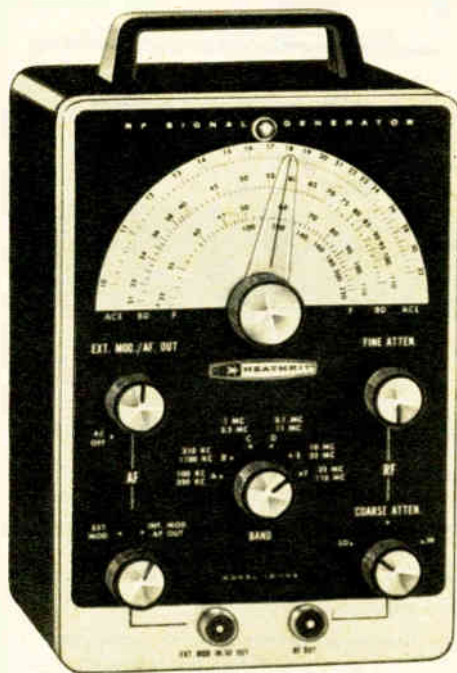
Just about anything in electronics you'd like to know more about is covered by one of Heath's acclaimed self-instructional courses. It's the really convenient low-cost way to learn electronics. Study at your own rate starting with DC Electronics, progress to AC Electronics, Semiconductor Devices and advance to Digital Techniques and Electronic Circuits.

Each course is complete with step-by-step "programmed" instructions, audio records (or optional tapes), self-evaluation quizzes and interesting experiments. Each course is attractively bound so that important learning materials won't be lost. Once completed, each course makes an excellent addition to your electronics library. You'll enjoy and benefit from these courses if you're a beginner or an expert just brushing up. Read about the courses on pages 100 through 103.

\$32⁹⁵



Heathkit instruments make servicing easy



Heathkit General Purpose RF Generator

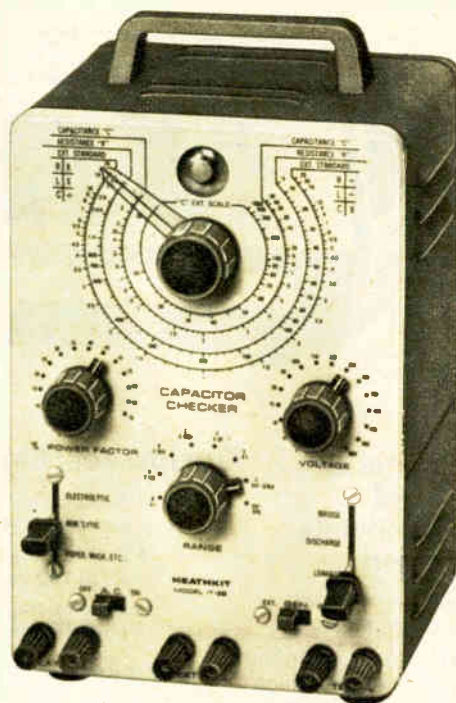
\$49⁹⁵ *Provides modulated or unmodulated RF. Ideal for radio-TV service.*

The Heathkit IG-102 is an accurate, stable source of modulated or unmodulated RF signals for use in AM, FM, TV, LW and SW broadcast bands. It covers 100 kHz to 110 MHz in 6 bands (110-220 MHz on harmonics) with 2% tuning accuracy. Has a large, easy-to-read calibrated dial, fine and coarse attenuation controls, external modulation input. Internal signal modulation is 400 Hz and a 400 Hz audio output is provided for audio tests.

To insure greater accuracy of the RF frequencies, the bandswitch and coil assembly has been assembled and adjusted to precision standards at the factory. The completed Signal Generator can be calibrated easily and quickly without the need of expensive calibration equipment.

Kit IG-102, Shpg. wt. 6 lbs. 49.95

IG-102 SPECIFICATIONS: RF OUTPUT SIGNAL: Frequency Range; 100 kHz to 110 MHz in six bands (bands A through F). 110 MHz to 220 MHz (additional band of calibrated harmonics). Frequency Accuracy; $\pm 2\%$. Output Impedance; 50 ohms. Internal Modulation; 400 Hz (30% modulation). External Modulation; 3 volt signal input for 30% modulation. AF OUTPUT SIGNAL: Frequency; 400 Hz. Output Voltage; 10 volts (open circuit). GENERAL: Tube Complement; 12AT7 RF oscillator. 6AN8 amplifier and modulator. Power Requirements: 105 to 125 volts AC, 50/60 Hz, 15 watts. Cabinet Dimensions; 6½" W x 9½" H x 5" D. Net Weight; 4½ lbs.



Heathkit Direct-reading Capacitor Checker

\$57⁹⁵ *Ideal for general-purpose servicing and testing of capacitors.*

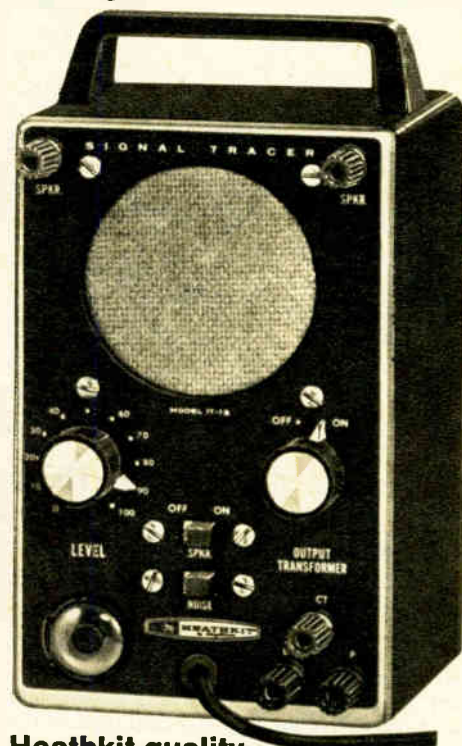
Do fast, accurate analyses without bothersome calculations — just read and interpret directly from front-panel scales.

Measures capacitance from 10 pF to 1000 μ F in 5 ranges, resistance from 5 ohms to 50 megohms in 4 ranges and also has 16 leakage testing voltages from 3 to 600 volts. Low bridge voltage makes it ideal for testing miniature electrolytics. Precision resistors and capacitors in the bridge circuit provide a high degree of accuracy and stability. Has terminals for external standard L, C or R measurements, calibrated power factor control, "eye" tube null and leakage indicator.

Front panel terminals are provided for component under test (TEST), an external audio generator (EXT. GEN.) and an external standard (EXT. STD.). Can be wired for 120/240 VAC operation.

Kit IT-28, Shpg. wt. 7 lbs. 57.95

IT-28 SPECIFICATIONS: Test Circuit: AC bridge, powered by internal 60 Hz supply or partial external audio generator with 10 V output. Upper Frequency Limit: 10 Hz. Capacitance Ranges; 10 pF to 0.005 μ F, 0.001 μ F to 0.5 μ F, 0.1 μ F to 50 μ F, 20 μ F to 1000 μ F. External standard (comparison bridge; maximum ratio 25:1). Inductance Check: External standard only. Power Requirement: 120/240 VAC 60/50 Hz, 30 W. Dimensions: 9½" H x 6¾" W x 5" D.



Heathkit quality visual-aural Signal Tracer

\$32⁹⁵ *Versatile, easy-to-use instrument for efficient audio and TV service.*

The instrument you NEED for fast, effective stage by stage trouble-shooting and service in AM, FM and TV circuits, both tube type and solid-state. Helps you trace RF, IF and audio signals; locate noisy or intermittent components easily and quickly. Has 3½-inch speaker, bright eye-tube indicator.

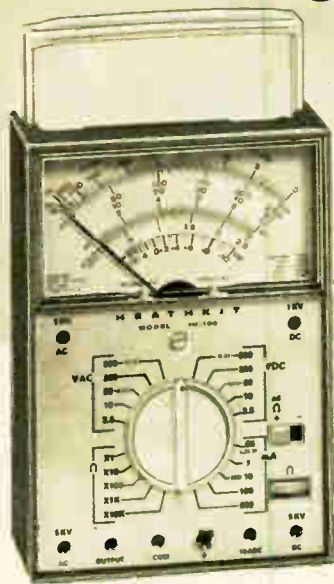
Universal front panel binding posts accept banana plugs, alligator clips, spade lugs or ordinary hookup wire for fast, easy connections. Also doubles as test amp and speaker. Switchable audio/RF probe included. Can be wired for 120/240 VAC operation. 7½" H x 4½" W x 4" D.

The Heathkit Visual-Aural Signal Tracer is a compact, service-designed instrument incorporating the features that meet the everyday needs of the service technician. Kit assembly is quick and easy too. A good low cost addition to your test bench.

Kit IT-12, Shpg. wt. 6 lbs. 32.95

IT-12 SPECIFICATIONS: Power Supply; Transformer operated. Power Requirements; 117 volts AC, 50-60 Hz, 25 watts. Tube Complement; V1-12AX7 high gain dual triode, input cascade amplifier. V2 — 12CA5 beam power output tube. V3 — 1629 electron beam visual indicator. Speaker; 3½" permanent magnet. Probe and Test Leads; 4' input lead for RF and audio w/switch in probe body. Two 3' panel test leads with alligator clips. Dimensions; 4½" W x 7½" H x 4" D. Weight; 4 lbs.

High-performance Heathkit VOM's



- Taut-band meter with diode and fuse protected movement
- Excellent for field work—accurate enough for engineering

\$69⁹⁵

Heathkit general-purpose VOM ideal for hobbyists or servicemen

Here's one of the many reasons why Heathkit VOM's are first on the list of professional technicians everywhere. The IM-105 is a high-accuracy VOM that's really designed to take it—rugged enough for bench and field work—and accurate enough for engineering, design and R&D work. It's the one to have if you're a hobbyist experimenter or service tech! It's an easy, enjoyable one-evening kit too—just build up two modular circuit boards and you have it. This highly versatile IM-105 gives you a low-friction, taut-band meter with diode & fuse protected movement. Fuse in-line with the input connector is removable from front for extra convenience. Less batteries.

Kit IM-105, Shpg. wt. 3 lbs. **69.95**
 Assembled SM-660, (less 5 KV ranges), Shpg. wt. 3 lbs. **94.00**

IM-105 SPECIFICATIONS: DC VOLTAGE RANGES: -0.25, 2.5, 10, 50, 250, 500, 1000 & 5000 V full scale. Accuracy: $\pm 3\%$ of full scale. Input resistance: 20,000 ohms/V full scale. AC VOLTAGE RANGES: -2.5, 10, 50, 250, 500 V, 1 kV & 5 kV full scale. Accuracy: $\pm 4\%$ of full scale. Input resistance: 5000 ohms/V. Input capacity: Less than 20 pF. Frequency response: 2.5, 10, and 50 V ranges. $\pm 5\%$, 10 Hz to 100 kHz; 250, 500 V ranges: $\pm 5\%$, 10 Hz. DC CURRENT RANGES: -0.05, 1.0, 10, 100, 500 mA & 10 A full scale. Accuracy: $\pm 3\%$ of full scale. Voltage drop: Approximately 0.25 V at full scale. RESISTANCE RANGES: -x1 (20 center scale), x10, x100, x1k, x10k. Accuracy: ± 3 degrees of ac. Source voltage: x1 through x1k ranges: 1.5 V x 10k range. 15 V. DECIBEL RANGES: (0 dB=1 mW in 600 ohms). -10 to +56 dB. Dimensions: 7" H x 5" W x 2 1/4" D.

Heathkit Instrument Test Probes

30 kV High Voltage Probes...
IMA-100-10 Probe multiplies DC ranges of any 10-megohm meter by 100. 1000 megohm input measures voltages as low as 1V in high-impedance circuits. Banana plug connector.

Kit IMA-100-10, Shpg. wt. 1 lb. **10.95**
IMA-100-11 Probe provides X100 measurement for meters with 11-megohm input impedance. (Incl. probe resistance). Phone plug, ground clip.
 Kit IMA-100-11, Shpg. wt. 1 lb. **10.95**
Assembled SMA-100-11, Shpg. wt. 1 lb. **13.95**
IMA-1000-1 Probe provides X1000 attenuation for meters with 1-megohm input impedance. Banana plug connector.
 Kit IMA-1000-1, Shpg. wt. 1 lb. **10.95**



\$67⁹⁵

Our low cost high performance Digital Multimeter

- Solid-state design uses IC circuitry for a clear non blanking 2 1/2-digit display with auto decimal positioning
- Full-function capability includes AC voltage measurement up to 700 volts
- Ease of operation makes it a pleasure to use for both beginners and advanced technicians

Here's a low-cost, high performance DMM that hams, hobbyists and service techs have been waiting for. Its full-function capability even includes AC voltage measurements up to 700 volts. Has four overlapping AC & DC voltage & current ranges and five resistance ranges. And it's hard to find better accuracy at a price this low: 1% on DC volts, 1 1/2% on AC volts and AC/DC current, and 1 1/2% on resistance. Lighted front-panel indicators show overrange, + and - DC voltages and current at a glance.

A solid-state design uses IC circuitry for a clear non-blanking 2 1/2-digit display with automatic decimal positioning. Its ease of operation makes it a pleasure to use for both beginners and advanced technicians. The easy assembly makes it a great project for student electronics labs. And the exclusive Heath built-in calibration standards are all that's needed for initial and periodic adjustments.

Features overload protection on all ranges, 120 or 240 VAC operation, isolated floating ground, attractive heavy-duty case to withstand rugged use, universal banana jack inputs for easy testing of all types of electronic equipment.

Kit IM-1210, Shpg. wt. 5 lbs. **67.95**
 Factory assembled and calibrated version of above.
SM-1210, Shpg. wt. 5 lbs. **90.00**

IM-1210 SPECIFICATIONS: Functions: DC volts, DC current, AC volts, AC current, Ohms. 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 (50 Hz to 10 kHz). Ohms: 0-200, 2K, 20K, 200 K, 2M ohms. Overrange: 25% on all functions, within maximum input limits. Maximum Input: 3 amperes into AC or DC mA, and Ohms (fuse protected). 700 VAC rms into Volts (except 2V range: 250 VAC rms). 1000 VDC into Volts (except 2V range: 350 VDC). "- input may be floated 1000 VDC (700 VAC) above earth ground. Resolution (Low Range): Volts: 10 mV. Current: 10 μ A. Ohms: 1 ohm. Display: 2 1/2-digit, 7-segment, planar, LED (light emitting diode) with overrange and negative-input indicators. Accuracy (Full Scale, ± 1 Digit): DC volts: $\pm 1\%$. DC current: $\pm 1.5\%$. AC volts: $\pm 1.5\%$. AC current: $\pm 2\%$. Ohms: $\pm 1.5\%$. Input Impedance: 1 megohm on all voltage ranges. 2.1-volt drop maximum on current ranges (except 2.5-volt drop on 2,000 mA range). Sample Rate: Line frequency. Display Settling Time: Less than 1.0 seconds on DC volts and DC current, and less than 3.0 seconds on AC volts, AC current, and ohms; to within 5 counts. Power Requirements: 100-135 VAC, 200-270 VAC 50/60 Hz, 8 watts. Fuse Requirements: Input: 3AG, 3-ampere. Line: 3AG, 1/4-ampere slow-blow. (1/2-ampere slow-blow for 240 VAC.) Dimensions (overall): 3.00" H x 8.69" W x 10.54" D. (7.62 cm high, 22.07 cm wide, 26.77 cm deep.) Weight: 3.3 pounds (1.5 kg). NOTE: Specifications are based on 30-minute warmup.

Digital Multimeters for Accuracy and convenience



Heathkit IM-2202 Portable Digital Multimeter

\$179⁹⁵

Great low price for a digital meter with these professional features and superb specifications

Features 26 ranges—measures AC and DC volts, DC current and resistance. Has 100% overrange capability, separate voltage and current inputs for circuit protection. 2-volt full scale measurement on 1k, 10k and 1 meg ranges allow forward biased junction testing of semiconductor devices. Has 3½-digit display with leading zero suppression, automatic polarity indication and decimal placement. Assembly is not difficult, but previous kitbuilding experience is recommended. Operates on four rechargeable nickel-cadmium batteries (included), 110 or 220 VAC, or temporarily on four "C" cells.

Kit IM-2202, Shpg. wt. 8 lbs. **179.95**

IM-2202 SPECIFICATIONS: DC VOLTAGE — Range/Input Impedance: 100.0 mV/50 MΩ, 1.000 V/500 MΩ, 10.00 V/10 MΩ, 100.0 V/10 MΩ, 1000 V/10 MΩ. Overload Capability: 300 V on 100 mV & 1V ranges; 1000 V on 10 V & 1000 ranges. Accuracy: Built-in references, ±0.5%, ±1 digit. Laboratory standards, ±0.2%, ±1 digit. AC VOLTAGE — Range/Input Impedance: 100.0 mV/10 MΩ-120 pF, 1.000 V/10 MΩ-120 pF, 10.00 V/10 MΩ-60 pF, 100.0 V/10 MΩ-60 pF, 750 V/10 MΩ-60 pF. Overload Capability: 250 V on 100 mV & 1 V ranges; 750 V on 10 V, 100 V & 750 V ranges. Accuracy: Built-in references... ±1.0%, ±3 digits; 40 Hz to 1 kHz (except 40 Hz to 10 kHz on 100 m and ranges). Laboratory standards... ±0.5%, ±3 digits; 40 Hz to 2 kHz on 750 range). 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: Built-in references... ±0.5%, ±1 digit (except ±1%, ±1 digit on 1000 mA range). Laboratory standards... ±0.2% ±1 digit (except ±0.5%, ±1 digit on 1000 mA range). Overload Protection: Input coupled through 3.0 Ampere fuse to shunt diodes for overloads above approximate 1.2 Volts. 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: Built-in references... ±1.0%, ±3 digits (except ±1.5%, ±3 digits on 1000 mA range); 40 Hz to 10 kHz. Laboratory references... ±0.5%, ±3 digits (except ±1.0%, ±3 digits on 1000 mA range); 40 Hz to 10 kHz. Overload Protection: Input coupled through 3.0 Ampere fuse to shunt diodes for overloads above approximate 1.2 Volts. 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: Built-in references... ±2%. ±1 digit. Open-circuit Voltage: 12 VDC. Overload Protection: Positive input over-voltage protection by blocking diode to 400 volts; negative input over-voltage through 0.03 A fuse and shunt diode. GENERAL — Overrange Capability: 100% on all ranges except 1000 VDC & 750 VAC. Display: 1999 maximum; seven segment planar; 0.55" high digits. Display Rate: Approximately 5 per second, non-blinking. Normal Mode Rejection: 35 dB (line operation); extended on battery operation. Common Mode Rejection: 80 dB (line operation); extended on battery operation. Power Line Isolation: May be operated 1500 V above power line ground (during line operation). Operating Temperature Range: 10°C to 40°C. Power Requirement: 110 to 130 VAC, or 220 to 260 VAC (internal selectable); 60/50 Hz; 5 watts typical during charge. Size (overall including handle folded to rear): 3" H x 8¼" W x 8" D).

NOTE: Accuracy specifications of the IM-2202 depend on use of built-in references or laboratory standard references for calibration.



Our finest 3½-digit Multimeter has the features you NEED for fast, easy and profitable service

\$249⁹⁵

One of the finest digital multimeters available anywhere — put it on your bench for professional service

Our best digital multimeter. Displays voltage, current and resistance measurements on a large, bright tube display. Five voltage and five current ranges are used for both ac and dc. The full-scale voltage ranges are 200 millivolts to 1000 volts (500 volts maximum for ac) and the current ranges are from 200 microamperes to 2 amperes. The six resistance ranges are from 200 ohms to 20 megohms. Has automatic polarity indication and decimal positioning and over-range indication, lots more! The convenience, versatility and accuracy of this modern unit make it the perfect instrument for the laboratory, the service shop, or the ham shack.

Kit IM-102, Shpg. wt. 9 lbs. **249.95**

IM-102 SPECIFICATIONS: DC VOLTMETER — 5 Ranges: 200 mV, 2V, 20V, 200V, 1000V. Input Impedance: Approx. 100 megohm on 200 mV, approx. 1000 megohm on 2 V, 10 megohm on all other ranges. Accuracy: ±2% ±1 digit with furnished DC calibrator, ±0.1% ±1 digit with lab calibration. Normal Mode Rejection: 35 dB minimum @ 60 Hz. Common Mode Rejection: 80 dB minimum with 1k unbalance @ 60 Hz. OHMMETER — 6 Ranges: 200 ohms with 1 mA test current, 2k with 100μA, 20k with 10μA, 200k with 10μA, 2M with 1μA, 20M with 100 nA. Accuracy: With DC calibrator, ±0.5% ±1 digit on 200, 2k, 20k, 200k ranges; ±1.5% ±1 digit on 2M and 20M ranges. With lab calibration, ±0.5% ±1 digit on 200 ohm range; ±0.25% ±1 digit on 2k, 20k, 200k; ±1% ±1 digit on 2M and 20M. AC VOLTMETER (Average responding, rms calibrated) — 5 Ranges: 20 mV, 2V, 20V, 200V, 1000V. Input Impedance: 1 megohm @ 150 pF. Accuracy: With DC calibrator, ±0.75% ±1 digit for 40Hz-10kHz, ±1% ±1 digit for 10kHz-20kHz on 200 mV and 2V ranges; ±0.75% ±1 digit for 40Hz-5kHz, ±1.5% ±1 digit for 5kHz-10kHz on 20V and 200V ranges; ±1.5% ±1 digit for 40Hz-1.5kHz on 1000V range. DC AMMETER — 5 Ranges: 200μA, 2mA, 20mA, 200mA, 2A. Voltage Drop: 0.2V (nominal). Accuracy: With DC calibrator, ±0.5% ±1 digit for 2A, ±3% ±1 digit on all other ranges. With lab calibration, ±0.25% ±1 digit for 2mA and 20mA; ±0.3% ±1 digit for 200 mA; ±0.5% ±1 digit for 2A. AC AMMETER (40Hz-10kHz) — 5 Ranges: 200μA, 2mA, 20mA, 2A. Voltage Drop: 0.2 V (nominal). Accuracy: With DC calibrator, ±1.5% ±1 digit on 2A, ±1% on all other ranges. With lab calibration, ±0.75% ±1 digit on 200μA, ±0.7% ±1 digit on 2mA and 20mA; ±0.8% ±1 digit on 200mA; ±1 digit on 2A. GENERAL — Display: Maximum count, 1999. Overrange Indication: Automatic beyond 1999. Polarity Indication: Automatic "+" or "—" Display Rate: Approx. 5 per second, non-blinking. Power Requirement: 120 or 240 VAC, 60/50 Hz, 8 W nominal. Power Line Isolation: May be operated 500 volts above power line ground (during line operation). Operating Temperature: 10°C-40°C. Size: 3" H x 7" W x 7.9" D.

NOTE: Accuracy specifications of the IM-102 depend on use of built-in references or laboratory standard references for calibration.

Heathkit VTVM's—real precision and performance



Heathkit IM-5228 Service Bench VTVM gives you "Pro" features at a low kit-form price

\$49⁹⁵
Kit

A bench-type version of the IM-5218 with PLUS features that make it ideal for service and repair

The one to have for day-in, day-out service and testing! The big 6" meter is really easy to read; separate 1.5 and 5 VAC scales make low voltage readings easy and accurate too. All calibration controls are

conveniently adjustable from the front panel, so there's no need to remove the cabinet. Has the same outstanding features and performance specifications of the IM-5218 — 7 AC, DC and ohms ranges, 1% precision divider resistors, extended frequency response. All measurements are made with a single probe, and the ground test lead has an alligator clip for added convenience. Can be wired to operate from 120 or 240 VAC. Easy kit assembly, or order the unit factory assembled and tested. Either way, you'll get more instrument for your dollar. Converts easily to solid-state with IMA-18-1, below.

Kit IM-5228, Shpg. wt. 6 lbs. **49.95**
Assembled SM-5228, Shpg. wt. 7 lbs. **100.00**

IM/SM-5228 SPECIFICATIONS: DC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 V full scale; up to 30,000 V with accessory probe. Input Resistance: 11 megohm (1 megohm in probe) on all ranges: 1100 megohms with accessory probe. Circuit: Balanced bridge (push-pull) using twin triode. Accuracy: $\pm 3\%$ of full scale. AC VOLTMETER — Ranges: 0-1.5, 5, 15, 50, 150, 500, 1500 rms scales. Frequency Response (5 V range): ± 1 dB 25 Hz to 1 MHz (800 ohm source, referred to 60 Hz). Accuracy: 5% of full scale. Input Resistance & Capacitance: 1 megohm shunted by 40 pF measured at input terminals (200 pF at probe tip). OHMMETER — Ranges: Scale with 10 ohm center, X1, X10, X100, X1000, X10k, X1 meg. Measures 0.1 ohm to 1000 megohms with internal battery. Meter: 6" 200 μ A movement, polystyrene case. Battery: 1½ V, "C" cell (not supplied). Power requirement: 120/240 VAC, 60/50 Hz, 10 W. Dimensions: 5" H x 12½" W x 4¾" D.

Convert your IM-5228, 5218, 18 or 28 to instant-on solid-state operation with the IMA-18.1. Two solid-state devices plug directly into tube sockets. Provides instant-on service. Helps eliminate pointer-drift corrections.

IMA-18-1, Shpg. wt. 1 lb. **17.95**



Heathkit IM-5218 — our most popular, lowest-cost VTVM

\$39⁹⁵
Kit

The basic tester EVERYONE can use — make voltage and resistance tests on audio, TV, appliances, instruments, any tube or solid-state electronic equipment

Features a single test probe that makes all measurements; seven practical AC, DC volts and ohms ranges; a precision 4½" color-coded 200 μ A meter; and a convenient size for portability. 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. Easy kit assembly or you can order the unit factory assembled and tested. Can be wired for 120 or 240 VAC operation. Converts easily to solid-state with IMA-18-1 above.

Kit IM-5218, Shpg. wt. 5 lbs. **39.95**

Assembled SM-5218, Shpg. wt. 5 lbs. . . **80.00**

IM/SM-5218 SPECIFICATIONS: Meter Scales: DC & AC (rms): 0-1.5, 15, 50, 150, 500, 1500 V full scale. AC peak-to-peak: 0.4, 14, 40, 140, 1400, 4000 V full scale. Resistance: 10 ohm center scale x1, x10, x100, x1000, x10k, x100k, x1 meg. Measures 1 ohm to 100 megohms. Meter: 4½" 200 μ A movement. Input resistance: 11 megohms (1 megohm in probe) on all DC ranges; 1 megohm shunted by 35 pF on all AC ranges. Circuit: Balanced bridge (push-pull) using twin triode. Accuracy: DC $\pm 3\%$, AC $\pm 5\%$ of full scale. Frequency response: ± 1 dB, 25 Hz to 1 MHz (600 ohm source). Battery requirements: 1.5 V, size "C" cell (not supplied.) Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 7¾" H x 4½" W x 4¼" D.

There are 49 Heathkit Electronic Centers coast to coast (Units of Schlumberger Products Corporation)

Check the white pages of your telephone directory for address and phone no.

ARIZONA
Phoenix
CALIFORNIA
Anaheim
El Cerrito
Los Angeles
Pomona
Redwood City
San Diego (La Mesa)
Sacramento
Woodland Hills

DISTRIBUTORS IN ALASKA:
Yukon Radio Supply
Anchorage, Fairbanks, Valdez

COLORADO
Denver
CONNECTICUT
Hartford (Avon)
FLORIDA
Miami (Hialeah)
Tampa
GEORGIA
Atlanta

ILLINOIS
Chicago
Downers Grove
INDIANA
Indianapolis
KANSAS
Kansas City (Mission)
KENTUCKY
Louisville
LOUISIANA
New Orleans (Kenner)
MARYLAND
Baltimore
Rockville

MASSACHUSETTS
Boston (Peabody)
Boston (Wellesley)
MICHIGAN
Detroit
East Detroit
St. Joseph
(Heathkit Factory Store and Customer Center)
MINNESOTA
Minneapolis (Hopkins)
MISSOURI
St. Louis (Bridgeton)

NEBRASKA
Omaha
NEW JERSEY
Fair Lawn
Ocean
NEW YORK
Buffalo (Amherst)
Jericho, Long Island
Rochester
No. White Plains
OHIO
Cincinnati
(Woodlawn)
Cleveland

Columbus
Toledo
PENNSYLVANIA
Philadelphia
Frazer
(Chester Co.)
Pittsburgh
RHODE ISLAND
Providence
(Warwick)
TEXAS
Dallas
Houston

VIRGINIA
Norfolk
(Virginia Beach)
WASHINGTON
Seattle
WISCONSIN
Milwaukee

Opening this Fall:
Alexandria,
Virginia
San Jose,
California

Round out your bench with Heathkit Instruments

Heathkit IO-4101 Vectorscope/Color Generator

\$149⁹⁵ *Combines a vectorscope and color bar generator for fast, easy and thorough color TV servicing*

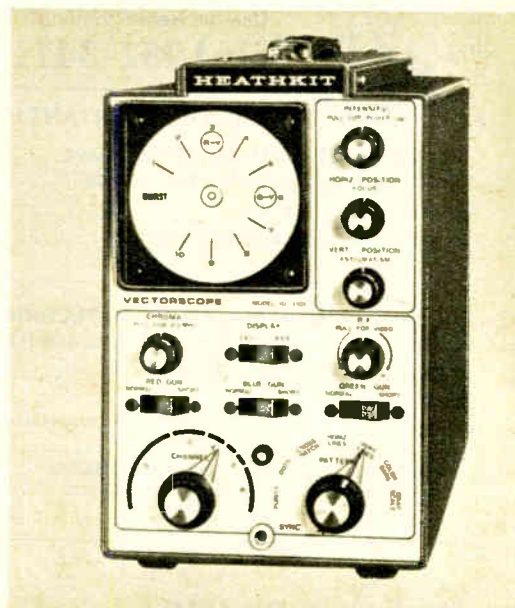
Two instruments in one — at a low kit form price! The vectorscope displays ten color bars to accurately represent the chroma signal being fed to the CRT guns. Indicates missing or weak colors, proper adjustment of the burst phase transformer, 3.58 MHz oscillator, reactance coil, bandpass transformer, color demodulation angle. A grid-cathode switch displays all vector patterns the same way, regardless of how CRT is driven. The color bar/pattern generator provides 12 patterns plus a raster for purity adjustments in either the familiar 9x9 display or the exclusive Heath 3x3 format. Features tuning for channels two through six, RF output variable to 50,000 μ V, plus or minus going video signals, front panel sync output,

4.5 MHz crystal controlled sound carrier, lead-piercing grid jacks and front panel gun shorting switches.

Kit IO-4101, Shpg. wt. 13 lbs. 149.95

IO-4101 SPECIFICATIONS: PATTERNS — Purity: Produces a snow-free raster. Dots*: 9x9 (110 small dots.) 3x3 (9 dots.) Crosshatch*: 9x9 (11 vertical and 10 horizontal lines.) 3x3 (3 vertical and 3 horizontal lines.) Horizontal lines*: 9x9 (10 horizontal lines.) 3x3 (3 horizontal lines.) Vertical lines*: 9x9 (11 vertical lines.) 3x3 (3 vertical lines.) Color bars*: 9x9 (ten standard color bars.) A visual fingerprint (voltage pattern) of all ten color bars in the form of a petal pattern is displayed for color circuit servicing. Gray scale: Provides a wide bar crosshatch pattern with six shades of brightness. **OUTPUT SIGNALS** — Video: Greater than ± 1 volt p-p composite signal for composite signal injection beyond the video detector. Sync: Greater than 3.5 volts p-p. Power requirement: 105-125 or 210-250 VAC, 60/50 Hz, 20 Watts. Dimensions: 9 $\frac{1}{4}$ " H x 6 $\frac{3}{4}$ " W x 14 $\frac{1}{2}$ " D.

*The number of dots, lines, and bars indicated for a 9x9 display is the number displayed if the receiver under test has no overscan.



Heathkit IT-3117 low-cost, easy-to-use Tube Checker

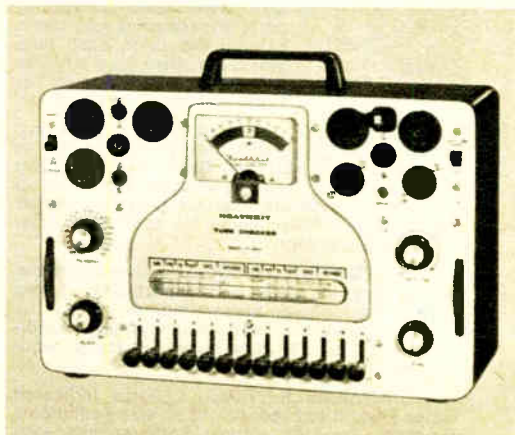
\$99⁹⁵ *A BASIC service instrument for anyone working on tube-type TV, hi-fi or radio equipment*

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. Easy-to-operate thumbwheel roll chart makes locating tube types fast and easy. Positive-action toggle switches for easy test setups.

Kit IT-3117, Shpg. wt. 12 lbs. 99.95

Updated Tube Chart Subscription Service for all Heathkit Tube Checkers includes new data book plus two supplements per year for only \$6.85. Write: Heath Tube Data Service, P.O. Box 377, Hewlett, Long Island, New York 11557.

IT-3117 SPECIFICATIONS: Sockets: 4-pin, 5-pin, 7-pin miniature, octal, local, 10-pin miniature, 9-pin novar, 9-pin miniature, 12-pin compactron, 5-pin nuvistor, 7-pin nuvistor. Meter: 1 mA BAD-?-GOOD scale, illuminated. Line Voltage Adjustment: Step type. Roll Chart Mechanism: Constant tension, free-rolling, thumbwheel operation, illuminated. Filament Voltage: 0.63, 1.4, 2, 2.35, 2.5, 3.15, 4.2, 4.7, 5, 6.3, 7.5, 9.45, 12.6, 19.6, 25, 32, 50, 70, 110 VAC. Element Test Voltages: 30, 100, 250 VAC. Power Requirement: 120 VAC, 50/60 Hz. Dimensions: 8 $\frac{1}{2}$ " H x 13" W x 5 $\frac{1}{2}$ " D.



Order your Heath/Schlumberger Assembled Instruments Catalog today!



FREE!

Complete descriptions, specifications and prices for many high performance instruments: frequency counters, oscilloscopes, power supplies, function generators, TV and audio service equipment, multimeters, chart recorders, more.

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Heath/Schlumberger Instruments, Dept. 524-320, Benton Harbor, Mich. 49022

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Zip _____

HEATH

Schlumberger**HEATH COMPANY**A Schlumberger Company
Benton Harbor MI 49022

PLEASE DO NOT WRITE IN THIS SPACE

ORDER FORM

Agreement

817-100**1 BILLING ADDRESS** (Print or write plainly — always use same name)

Name _____

Street Address _____

City _____ State _____ Zip _____

2 SHIPPING ADDRESS (If different from above)

Name _____

Street Address _____

City _____ State _____ Zip _____

3 ADDRESS CHANGED SINCE LAST ORDER?
Please indicate old address.

Name _____

Street Address _____

City _____ State _____ Zip _____

4 TYPE OF ORDER (check one) **Cash:** Check or money order only. **C.O.D.:** For orders of \$10 or more only. 20% deposit required. **Revolving Charge:** (Maximum Acct. Balance, \$1500)
See reverse side for details New Account Add-on to existing Acc't No. _____Signature _____
(necessary to send merchandise)**5 METHOD OF SHIPPING****Mailable Items.** We ship UPS for fastest delivery.Include Zone from Zone Chart

Indicate other Preference _____

Motor Freight Items. Shipped transportation charges collect. If a single item is Motor Freight, all items will be shipped Motor Freight.**6** If merchandise is ordered from another catalog, please indicate catalog no. _____**7** Please give phone number.

(Area)				(Number)			

WHEN ORDERING, BE SURE TO REMOVE ENTIRE ORDER FORM PAGE.

QUAN.	MODEL NO.	KIT DESCRIPTION	SHPG. WT.	SHPG. CHARGES*	UNIT PRICE	UNIT TOTAL PRICE

* For mailable items only. See rate chart

HOW TO ORDER KIT MANUALS: See how easy kitbuilding really is — choose the product you want, then order the manual first. **Be sure to send manual orders on a separate sheet of paper.** Manuals are \$3 each plus 50¢ each shipping and handling, except color TV's, organs, H9, H10, SB-104A, HW-104, AN-2016, AR-1515, AA-1640, AJ-1510A, AR-1500A, TO-1102, EE and ET series, which are \$7 each. Individual H8 and H11 manuals are unavailable. Simply write Heath Company, Manual Dept., Benton Harbor, Michigan 49022.

MONEY-BACK MANUAL OFFER: We'll deduct the price of the manual when you buy the kit. Simply include manual invoice with your order.

IMPORTANT ORDERING INFORMATION

1. Please use separate sheet to order parts, manuals or for any correspondence.
2. All prices are net FOB Benton Harbor, Michigan and apply to the U.S., APO and FPO areas only.
3. Prices and specifications are subject to change without notice.

Total for shpg. charges

TOTAL**C.O.D. ORDERS**

For orders of \$10 or more only. 20% deposit required.

less allowance, if any

TOTAL AMOUNT OF ORDER

Less 20% Deposit

Net Amount C.O.D.

Merchandise TOTAL

Add 4% sales tax for all Michigan deliveries

REVOLVING CHARGE ORDERS**TOTAL AMOUNT OF ORDER**

LESS: Down Payment

TOTAL AMOUNT less Down Payment (Maximum Account Balance \$1500)

Shpg. Charges from above

Plus amount due from previous order: Invoice # _____

TOTAL AMOUNT OF ORDER

TO: HEATH COMPANY, BENTON HARBOR, MICHIGAN 49022: REVOLVING CHARGE SECURITY AGREEMENT

I hereby purchase the total amount of merchandise listed on the reverse side plus shipping charges and tax, if any, less down payment, if any, plus the **FINANCE CHARGE** which, in lieu of being added to this contract in total as of the date hereof will be added monthly on the previous month's ending balance of my account before deducting payments and credits or adding purchases made during the current billing period. **FINANCE CHARGE** will be assessed on the balance according to the following schedule or in accordance with the laws of the State of my residence which ever is the lesser.

Account Balance Amount: ALL BALANCES. Periodic Percentage Rate: 1½%

ANNUAL PERCENTAGE RATE: 18%

The minimum **FINANCE CHARGE** assessed will be 50¢ on any small balances. If within 30 days from my billing date I pay the full outstanding balance shown on my statement, no **FINANCE CHARGE** on such balance, will be charged on any subsequent statement. The highest level of my balance reflected by the payment chart will govern my monthly payment, beginning 30 days from the cycle closing date shown on the statement, until such time as the total unpaid balance of each purchase is fully paid (minimum \$10). Regular or Extended Terms are the two plans available for my use. To use the extended plan, the balance of my account must be at least \$500.00. The amount of my monthly installment is determined from charts below.

REGULAR REVOLVING CHARGE

Charge up to:	\$150	200	250	300	350	400	450
Pay Monthly:	\$10	15	20	25	30	35	40

EXTENDED REVOLVING CHARGE (Maximum Account Balance, \$1500)

Charge up to:	\$500	600	700	800	900	1000	1100	1200	1300	1400	1500
Pay Monthly:	\$25	30	35	40	45	50	55	60	65	70	75

I hereby grant to the above named creditor a security interest in all goods purchased until the purchase price and **FINANCE CHARGE** have been paid in full. I will not sell, transfer possession of, remove or encumber the property without your written consent. Upon default on the terms of this agreement, you may declare my existing outstanding balance due and payable and you may repossess the property. If legal proceedings are commenced, I will be required to pay reasonable attorney's fees in such an amount as may be allowed by the court. My installments shall be applied as follows. In case of items purchased on different dates, the first purchase shall be deemed first paid for. In case of items purchased on the same date, the lowest price shall be deemed first paid for. In case of items purchased on the same date, the lowest price shall be deemed first paid for. You are authorized to investigate my credit record and report to proper persons and bureaus my performance on this agreement.

NOTICE TO BUYER: 1. Do not sign this agreement before you read it or if it contains blank spaces. You are entitled to a copy of the agreement you sign. 2. The other side of this page is part of this contract. Notice: See accompanying statement for important information regarding your rights to dispute billing errors.

4. NOTICE: ANY HOLDER OF THIS CONSUMER CREDIT CONTRACT IS SUBJECT TO ALL CLAIMS AND DEFENSES WHICH THE DEBTOR COULD ASSERT AGAINST THE SELLER OF GOODS OR SERVICES OBTAINED PURSUANT HERETO OR WITH THE PROCEEDS HEREOF. RECOVERY HEREUNDER BY THE DEBTOR SHALL NOT EXCEED AMOUNTS PAID BY THE DEBTOR HEREUNDER.

TYPE OF ACCOUNT <input type="checkbox"/> INDIVIDUAL <input type="checkbox"/> JOINT	Sign here _____ Date _____	Check Revolving Charge Plan Desired <input type="checkbox"/> Regular <input type="checkbox"/> Extended
	(Customer's Signature)	
	Sign here _____ Date _____	
	(Spouse's Signature) If Joint Account	

FILL IN IF YOU ARE A NEW ACCOUNT, OR IF YOUR PREVIOUS ACCOUNT HAS BEEN PAID UP FOR 12 MONTHS OR MORE.

CREDIT APPLICATION TO: HEATH COMPANY, BENTON HARBOR, MICHIGAN 49022 Former Account No. _____

The Federal Equal Credit Opportunity Act prohibits creditors from discriminating against credit applications on the basis of sex or marital status. The Federal agency which administers compliance with this law concerning this company is Federal Trade Commission, Washington, D.C. 20580.

IMPORTANT: Please fill in completely. Omissions and errors cause delays **SIGN REVOLVING AGREEMENT**

ACCOUNT To Be In The Name Of			AGE	No. of Dependent Children
First	Initial	Last		
Present Residence: Address — Street			Area Code + Phone Number	
City			State	Zip
<input type="checkbox"/> OWN <input type="checkbox"/> RENT <input type="checkbox"/> BOARD <input type="checkbox"/> MARRIED Monthly Rent or Mortgage Payments \$ _____			TYPE OF ACCOUNT <input type="checkbox"/> UNMARRIED <input type="checkbox"/> SEPARATED <input type="checkbox"/> INDIVIDUAL <input type="checkbox"/> JOINT	
Former Address If Less Than 3 Yrs. At Present Address			How Long _____ YRS _____ MO	
Street			City	
			State	
			Zip	
			Social Security Number	
			How Long _____ YRS _____ MO	

COMPLETE FOR PERSON REQUESTING ACCOUNT:

Employer's Name (Give Firm's Full Name)	How Long _____ YRS _____ MO	Position	Salary (Monthly) \$ _____	Business Phone
Employer's Address	(Child support, alimony and separate maintenance optional.) Other Income — Source(s)			Amount (Monthly) \$ _____
Former Employer — Name-Address	Position	How Long _____ YRS _____ MO	Salary (Monthly) \$ _____	
Bank — Branch Address	City	State	Zip	<input type="checkbox"/> Check <input type="checkbox"/> Loan <input type="checkbox"/> Savings

CREDIT REFERENCE: (Give Merchants, Firms, or Finance Companies with whom you do or have done business)

Firm Name	Address — Street, City, State	Account No.	Balance

Name Nearest Relative Not At Your Present Address	Relationship	Relative's Address
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COMPLETE FOR SPOUSE IF JOINT ACCOUNT REQUESTED:

Spouse's Full Name (First, Initial, Last)	Age	Social Security Number
Employer's Name (Give Firm's Name)	Employer's Address	Business Phone
How Long _____ YRS _____ MO	Position	Salary (Monthly) \$ _____
Bank — Branch	<input type="checkbox"/> Check <input type="checkbox"/> Savings <input type="checkbox"/> Loan	

WHEN ORDERING, BE SURE TO REMOVE ENTIRE PAGE.

THE PRESIDENT'S CORNER



Dear Friends,

With this issue of the catalog we introduce our new line of computer products. Computers are not for everyone. They represent a fairly large investment, and some expertise in programming is required to use them properly. And a lot of the claims made about their ability to perform a variety of useful household functions have yet to be realized. There are usually more practical ways of accomplishing the same thing without a computer. But the potential is there.

Those persons familiar with computers understand that you don't buy one, turn it on and expect it to perform. Computers must be programmed for your particular requirement. Software must be available or you must learn how to program — not a quick or easy task.

Computers can be thought of as learning machines. Build our kits and you can learn how computers work. Take our self instructional course and we will take you step-by-step through the process of programming if you wish to learn more about software. The best way to learn about computers is to get your hands on one and use it.

We designed our computers to provide the maximum flexibility so that almost any applications can be handled. We have made the commitment to support our computers with additional software and accessories in the fu-

ATTENTION ENGINEERS. Our growth has resulted in engineer openings in the following areas: HF Single Sideband, RF Signal Generator Design, Mechanical Packaging and Automotive Test Equipment. If you seek a new challenge and possess a BS or MS in Engineering, send us your resume and salary requirement in confidence. We are an Equal Opportunity Employer M/F.

Copies of the Heathkit warranty or warranties for any other consumer product in this catalog costing more than \$15 may be obtained free of charge by writing the Manager of Marketing Services, Heath Company, Benton Harbor, Michigan 49022.

ture. We also offer complete systems so that everything you need — computers, software, peripherals — is compatible. To make the construction faster and easier, the CPU circuit boards and the main circuit board for the video terminal are factory assembled and tested. We also provide you with all the software to get you started and the means of obtaining additional software. And self instructional courses in programming are available if you need them.

Computers are fun, a real enjoyment to build and to operate. They are challenging and educational. Personal computing is a great new hobby and one which will return real value. The use of computers is spreading into all areas of business and industry. If you haven't already encountered them on your job, you can certainly expect to. You can be sure there's a computer in your future. Maybe the time to learn about them is now. See pages 2-11.

Sincerely,
David W. Nurse
President

**FOR FASTEST SERVICE,
USE THE HEATHKIT 24-HOUR HOTLINE:
call (616) 982-3411 anytime day or night**

PLEASE NOTE: If you are receiving more than one catalog, please send us the mailing labels from your duplicate copies. This will help us keep our mailing lists up to date and eliminate unwanted catalogs.

ATTENTION: GD-1380 TV Game Owners

The GDA-1380-1 Target Accessory is now available. Add two exciting games to your present GD-1380.

GDA-1380-1, Shpg. wt. 2 lbs. 19.95

The following notice is required by the Fair Credit Billing Act:

IN CASE OF ERRORS OR INQUIRIES ABOUT YOUR BILL

The Federal Truth in Lending Act requires prompt correction of billing mistakes.

1. If you want to preserve your rights under the Act, here's what to do if you think your bill is wrong or if you need more information about an item on your bill:

a. Do not write on the bill. On a separate sheet of paper write (you may telephone your inquiry but *doing so will not preserve your rights under this law*) the following:

i. Your name and account number (if any).

ii. A description of the error and an explanation (to the extent you can explain) why you believe it is an error.

If you only need more information, explain the item you are not sure about and, if you wish, ask for evidence of the charge such as a copy of the charge slip. Do not send in your copy of a sales slip or other document unless you have a duplicate copy for your records.

iii. The dollar amount of the suspected error.

iv. Any other information (such as your address) which you think will help the creditor to identify you or the reason for your complaint or inquiry.

b. Send your billing error notice to the address on your bill which is listed after the words: "Send Inquiries to,"

Mail it as soon as you can, but in any case, early enough to reach the creditor within 60 days after the bill was mailed to you. If you have authorized your bank to automatically pay from your checking or savings account any credit card bills from that bank, you can stop or reverse payment on any amount you think is wrong by mailing your notice so the creditor receives it within 16 days after the bill was sent to you. However, you do not have to meet this 16-day deadline to get the creditor to investigate your billing error claim.

2. The creditor must acknowledge all letters pointing out possible errors within 30 days of receipt, unless the creditor is able to correct your bill during that 30 days. Within 90 days after receiving your letter, the creditor must either correct the error or explain why the creditor believes the bill was correct. Once the creditor has explained the bill, the creditor has no further obligation to you even though you still believe there is an error, except as provided in paragraph 5 below.

3. After the creditor has been notified, neither the creditor nor an attorney nor a collection agency may send you collection letters or take other collection action with respect

to the amount in dispute; but periodic statements may be sent to you, and the disputed amount can be applied against your credit limit. You cannot be threatened with damage to your credit rating or sued for the amount in question, nor can the disputed amount be reported to a credit bureau or to other creditors as delinquent until the creditor has answered your inquiry. However, you remain obligated to pay the parts of your bill not in dispute.

4. If it is determined that the creditor has made a mistake on your bill, you will not have to pay any **FINANCE CHARGES** on any disputed amount. If it turns out that the creditor has not made an error, you may have to pay **FINANCE CHARGES** on the amount in dispute, and you will have to make up any missed minimum or required payments on the disputed amount. Unless you have agreed that your bill was correct, the creditor must send you a written notification of what you owe; and if it is determined that the creditor did make a mistake in billing the disputed amount, you must be given the time to pay which you normally are given to pay undisputed amounts before any more **FINANCE CHARGES** or late payment charges on the disputed amount can be charged to you.

5. If the creditor's explanation does not satisfy you and you notify the creditor *in writing* within 70 days after you receive his explanation that you still refuse to pay the disputed amount, the creditor may report you to credit bureaus and other creditors and may pursue regular collection procedures, but the creditor must also report that you think you do not owe the money, and the creditor must let you know to whom such reports were made. Once the matter has been settled between you and the creditor, the creditor must notify those to whom the creditor reported you as delinquent of the subsequent resolution.

6. If the creditor does not follow these rules, the creditor is not allowed to collect the first \$50 of the disputed amount and **FINANCE CHARGES**, even if the bill turns out to be correct.

7. If you have a problem with property or services purchased with a credit card, you may have the right not to pay the remaining amount due on them, if you first try in good faith to return them or give the merchant a chance to correct the problem. There are two limitations on this right:

a. You must have bought them in your home state or if not within your home state within 100 miles of your current mailing address; and

b. The purchase price must have been more than \$50.

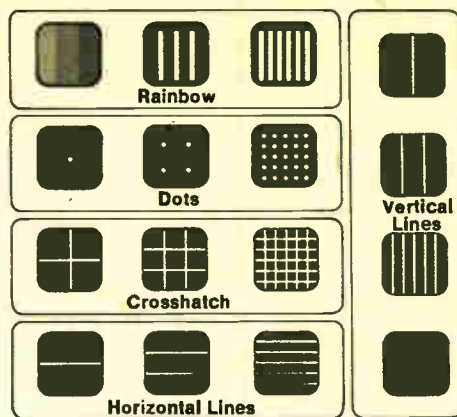
However, these limitations do not apply if the merchant is owned or operated by the creditor, or if the creditor mailed you the advertisement for the property or services.

"Shirt-Pocket" size portable color Alignment Generator

Has the versatility you NEED for complete color TV alignment and convergence — plus a special battery saver circuit for added efficiency

The IG-5240 offers outstanding performance, with crystal-controlled carrier and color oscillator for real precision, accuracy and stability. It's a versatile, low-cost service tool for hobbyist and technician alike. 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" to conserve battery power. The unit uses two inexpensive 9-volt transistor batteries (NEDA #1604 or equivalent), which provide a minimum of 8 hours continuous operation. Less batteries.

Kit IG-5240, Shpg. wt. 2 lbs. 64.95
 Factory assembled version of above.
 SG-5240, Shpg. wt. 1 lb. 85.00



IG/SG-5240 SPECIFICATIONS: Chroma Carrier: 3563.795 kHz $\pm 0.005\%$ crystal-controlled. Master Timer: 377.616 kHz $\pm 0.005\%$ crystal-controlled. RF Carrier: Channel 4, 67.250 MHz $\pm 0.005\%$ crystal-controlled. RF Output Level: 5000 μ V min. into 300 ohms. Video Modulation: 50% (approx.) On-Time Interval: 5 minutes min. OFF pushbutton can override time out. Power Requirement: Two 9-volt transistor batteries; with 180 mA capacity (NEDA #1604). Dimensions: 5.4" L x 2.75" W x 1.15" D.

\$64⁹⁵
Kit



Heathkit Post-Marker/Sweep Generator for easy, accurate, television alignment

\$169⁹⁵

Fifteen crystal-controlled markers are provided to make video and audio alignment a breeze

The Heathkit IG-5257, TV Post-Marker/Sweep Generator offers the precision and stability that are necessary for exacting black and white or color television and FM receiver alignment. It's ideal for the bench of the service professional or home user and solid state design means reliable year after year performance.

The post marker generator provides markers that are sharp, well defined and will not alter or distort the response characteristics of circuits being aligned. Fifteen precise crystal controlled oscillators provide markers which greatly simplify alignment procedures. Four are for color bandpass adjustment, one is provided for FM receiver IF alignment and eight markers, from 39.75 to 47.25 MHz, make

television IF alignment fast and easy. In addition, video and audio carrier markers are provided for television channels 4 and 10.

Because any of the IG-5257's fifteen markers are selectable, as many as six markers may be simultaneously presented on an IF curve. Due to this unique multi-marker display, optimum bandpass shaping is easily attained.

The sweep generator circuits of the IG-5257 provide three linear ranges which cover the frequencies necessary for television and FM IF scope displays. Another feature of the IG-5257 is its diode modulator which combines outputs of both the post-marker and sweep generator to permit amplitude modulation of the video carrier by a low frequency sweep signal. This method of alignment, called Video Sweep Modulation (VSM), permits observation of the overall color bandpass response, including the effect of the video detector load circuitry.

Other features of the IG-5257 include a 400 Hz modulation tone which is extremely useful in checking out the alignment and adjustment of FM receivers and two variable voltage bias supplies which are capable of providing both positive and negative bias voltages. A multi step attenuator pad assures proper circuit impedance matching and avoids stage overload during alignment. Easy straightforward construction simplifies kit assembly and the rugged reliability of the Heath IG-5257 will make it a valued addition to your test instrumentation. Includes four coax cables, four test leads and a de-modulation probe.

Kit IG-5257, Shpg. wt. 16 lbs. 169.95

IG-5257 SPECIFICATIONS: Marker frequency: 100 kHz. Marker frequencies, crystal-controlled: 3.08, 3.58, 4.08, and 4.50 MHz $\pm 0.1\%$. 10.7, 39.75, 41.25, 42.17, 42.50, 42.75, 45.00, 45.75, 47.25, 67.25 and 193.25 MHz $\pm 0.005\%$. Modulation frequency: 400 Hz. Input Impedance: External Marker/Sweep, and Attenuator — 75 ohms. Trace in — 220 k ohms. Output Impedance: Marker Output, Sweep Output, and Attenuator — 75 ohms. Scope Vert. — 1 k ohms. Bias voltage: Two individually adjustable supplies: Positive or negative polarity. Sweep frequency ranges: LO Band — 2.5 to 5.5 MHz ± 1 dB. IF Band — 38 to 49 MHz ± 1 dB. RF band — 64 to 72 MHz ± 1 dB. Attenuator: Total of 70 dB in seven steps. Power requirement: 120 V, 60 Hz AC at 4.5 watts.

Heathkit IT-5230 CRT Tester/Rejuvenator brings old and worn TV Picture Tubes back to LIFE!

\$89⁹⁵

- Tests *IN-LINE GUN* Color CRT's
- Individual meters for each color gun
- Clean and rejuvenate modes for each gun
- Heater/Cathode short indicator

The IT-5230 is a deluxe CRT rejuvenator/tester that is priced well within reach of any service shop. With it you can 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. To insure correct CRT restoration, a separate cleaning process is applied after rejuvenation to assure proper tube operation.

The IT-5230 is designed for portability and a transformer power supply assures reliable operation even at the low line voltages likely to be encountered in the field. A self-contained storage tray offers plenty of room for test cables and small tools.

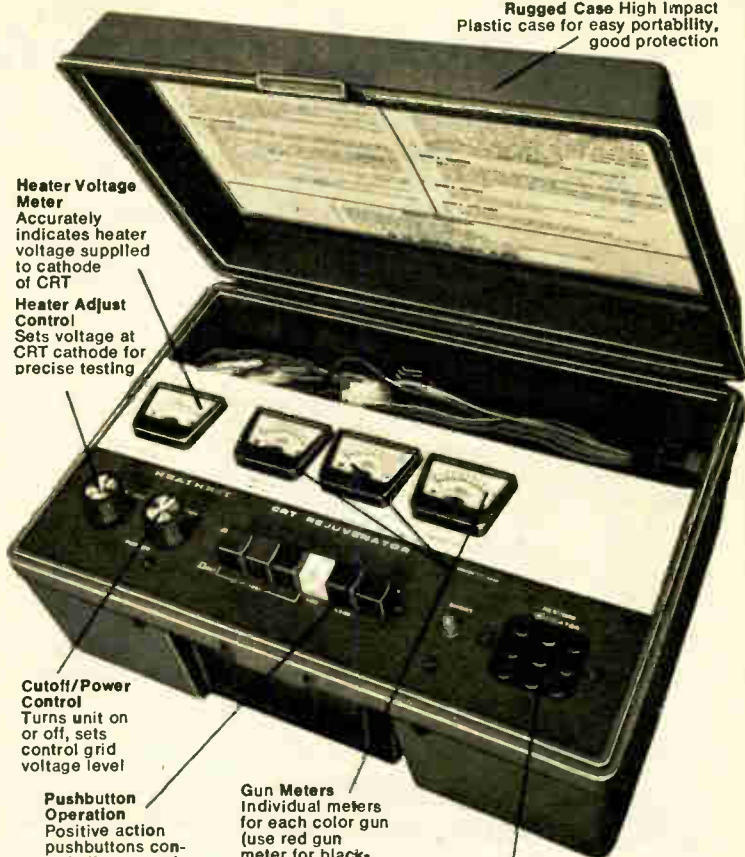
Kit IT-5230, Shpg. wt. 9 lbs. **89.95**

Factory assembled version of above.

ST-5230, Shpg. wt. 9 lbs. **140.00**

IT-5230 SPECIFICATIONS: Sockets Supplied: 14-pin for 90° color tubes; 13-pin for in-line color tubes; 8-pin for black-and-white tubes; 7-pin for black-and-white tubes. Heater Supply Voltage: Variable from 2 volts to 12 volts at 1 ampere. Test Cables Supplied: 4' heavy duty. Power Requirement: 105-135 VAC, 60/50 Hz (50 watts maximum at 60 Hz). Dimensions: 5.12" high x 10" deep x 13.5" wide.

Rugged Case High Impact Plastic case for easy portability, good protection



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

Positive action pushbuttons control all tests and processes for really easy operation

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

Solid state color bar and dot pattern Generator for fast, easy TV servicing

\$89⁹⁵

- Logic circuitry insures sharp stable alignment patterns
- Solid state crystal controlled time base

The Heathkit IG-5228 is THE choice for the television service professional who desires uncompromising quality in a color bar and dot generator. At the heart of the IG-5228 system is a highly stable crystal controlled Pierce oscillator which operates at a frequency of 190.08 kHz. Output from this standard is coupled to a divide chain and at various points signals are "picked" off and applied to logic circuits consisting of AND, NAND, NOR, and OR gates. The product of the divide and logic circuitry yields 12 highly stable and precise alignment patterns.

Dots, cross hatch, horizontal and vertical lines, color bars, and gray scale patterns are all front panel selectable and may be generated in either 3 X 3 or 9 X 9 displays. For added stability the IG-5228's horizontal and vertical sync circuits are crystal controlled. These circuits provide pulses which accomplish blanking and insure all alignment patterns are firmly "locked" on screen.

For added convenience sync signals and two 500 W AC receptacles are also available on the front panel. A big plus of the IG-5228 is its selectable, channel 2 through 6 RF output. This carrier may be utilized in either modulated or nonmodulated modes and is a real bonus in analysis of overall receiver performance. Patterns are available for servicing both black and white or color television receivers. The IG-5228 is a perfect addition to the bench of all television technicians and Heath engineering insures year after year reliability.

Kit IG-5228, Shpg. wt. 8 lbs. **89.95**



IG-5228 SPECIFICATIONS: Output signals: Video — Greater than ± 1 V peak-to-peak composite signal. RF — Variable to 50,000 μ V output, channels 2 through 6. Sync — Greater than 3.5 V peak-to-peak signal. Control Grids (3) — Individual red, blue, and green control grid signals for viewing chroma signal demodulator phase adjustments. Power supply: full wave zener diode regulated. Input — 120/240 VAC, 60/50 Hz. Output — 3.6 VDC, 500 mA, zener diode regulated. Dimensions: 5 1/2" H x 13 1/2" W x 8" D.

Heathkit 40 kV High-Voltage Probe Meter



Makes TV tube voltage measurements fast and convenient. Measures DC voltages up to 40 kV with $\pm 3\%$ 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. 1 1/2" H x 1 7/8" W x 15" D.

Kit IM-5210, Shpg. wt. 1 lb. **17.95**

Power your bench with Heathkit Supplies

Tri-Output Experimenter's Power Supply

\$79⁹⁵

Three floating outputs can be connected in any combination for a wide variety of output voltage and current capability

The IP-2718 offers both the functions and operational flexibility that make it an indispensable addition to the bench of the designer and experimenter. Features include a fixed 5VDC supply and two continuously variable 0-20 VDC supplies, each one completely isolated from the other.

The fixed 5 VDC source is ideal for digital experimentation and design and with a rating of 1.5 A there's enough current to handle any of today's many and varied logic devices. For greater versatility, the outputs of both 20 VDC supplies may be "strapped" in any combination to provide positive and negative voltages. These voltages may be applied with either a fixed reference or they may be allowed to "float" without reference level. There's also clutch-coupled tracking control to allow the two 20 VDC supplies to "track" each other at any specified voltage difference. This feature is ideal for analog circuits requiring both positive and negative voltages.

All three outputs are short-circuit proof and each is capable of automatic current limiting. As an extra feature, both 20 VDC supplies can be connected in parallel for higher through-the-load current operation. The front panel has a large, easy to read meter and its switchable functions allow the user to monitor both voltage and



Heathkit IP-5220 Variable Isolated AC Supply

\$109⁹⁵

- Variable 0-140 VAC output
- 1 A & 3 A ammeter ranges for easy low-current readings
- Simultaneous metering of voltage and current output

This variable AC source provides complete isolation between the AC power line and any electrical equipment that is plugged into its front

1-15 VDC Regulated Supply

Perfect for servicing, testing or designing transistor radios, portable tape recorders and other low-voltage solid-state devices. Continuously adjustable 1-15 VDC at 500 mA output, 500 mV line and load regulation and fully adjustable current limiting. AC or DC programming capability lets you control output voltage from another source.

Kit IP-2728, Shpg. wt. 5 lbs. \$24.95



IP-2728 SPECIFICATIONS: Ripple and Noise: Less than 5 mV. Current Output: 500 mA maximum continuous load. Current Limiting: Adjustable from 10 mA to over 500 mA. Transient Response: 25 microseconds. Output Impedance: 0.5 ohm or less to 100 kHz. Power Requirement: 120/240 VAC, 60/50 Hz, 15 W at full load. Dimensions: 4 3/8" H x 5 1/2" W x 5 3/4" D. Programming: AC or DC, 5000 ohm input resistance.



current outputs from each of the three supplies. An outstanding value and excellent addition to any bench.

Kit IP-2718, Shpg. wt. 12 lbs. \$79.95
Assembled SP-2718, Shpg. wt. 12 lbs. \$140.00

IP-2718 SPECIFICATIONS: Outputs: 5 volts DC $\pm 5\%$ at 1.5 A. Two 0-20 VDC at 0.5A, continuously adjustable. 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 VAC or 200-270 VAC, 60/50 Hz, 100 watts full load. Dimensions: 4 1/2" H x 10 3/4" W x 9" D.

panel variable output socket. The variable 0-140 volt output is useful anywhere a slow run-up of line voltage is needed. A full 360 volt-amperes of AC power is available at the front panel variable output socket. More than enough to operate equipment with large power requirements. And the IP-5220 is capable of supplying its full-rated output continuously. The IP-5220's ability to start from zero voltage is helpful when trying to locate circuit faults caused by high or low line voltage — or testing equipment with unknown power requirements. You simply monitor the output on the large voltmeter and ammeter as output voltage is increased. When excessive current is observed, power can be quickly and easily removed before components are damaged. Switch-selected 1A and 3A ranges are fused individually on the front panel. Fused variable output socket protects the IP-5220 and the circuit under test.

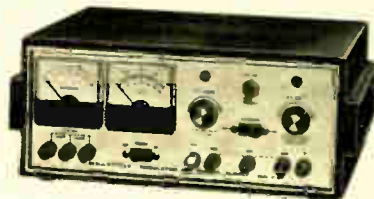
Kit IP-5220, Shpg. wt. 28 lbs. \$109.95

IP-5220 SPECIFICATIONS: Input Voltage: 120 V @ 60 HZ for specified output. Output Voltage: 0-140 V @ 60 Hz. Voltmeter Range: 0-150 VAC. Ammeter Ranges: 0-1 & 0-3 A, AC. Output Current: 3 A max. 10 A (direct line connection). Output Power: 360 Volt-Amperes maximum. Dimensions: 5.5" H x 15" W x 10.5" D.

0-400 VDC General-Purpose Power Supply

This versatile supply provides 0-400 VDC at 0-100 mA continuous (125 intermittent) with excellent line and load regulation. Has front panel voltage and current meters and built-in circuit protection. Binding posts are insulated from chassis.

Kit IP-2717, Wt. 19 lbs. . . . \$99.95
Assembled SP-2717 \$160.00



IP-2717 SPECIFICATIONS: Additional Outputs: 0 to -100 VDC at 1 mA variable bias voltage, 6.3 VAC at 4 amps., 12.6 VAC at 2 amps. (25 VA max. AC load), filament voltage. Regulation: Output variation less than 1% from no load to full load. Ripple: Less than 10 millivolts rms. Output Impedance: Less than 10 ohms, DC to 1 MHz. Meters: Voltmeter 0-400 V or 0-150 V; Milliammeter 0-150 mA. Power Requirement: 120/240 VAC, 60/50 Hz, 150 W max. Dimensions: 5 1/8" H x 13 1/4" W x 11" D.

Dependable DC Supplies from Heath

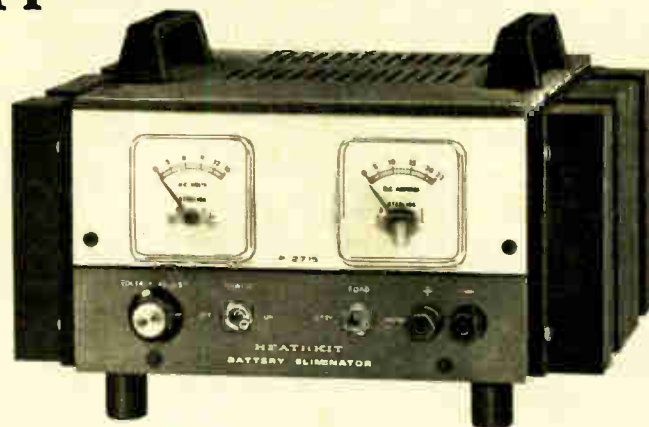
Heavy-Duty Power Supply/Battery Eliminator

\$134⁹⁵

*Provides variable 9-15 volt output
capable of 12 amps continuous,
20 amps intermittent*

The Heathkit IP-2715 heavy duty power supply provides you with a clean, accurate voltage source necessary for the reliable service of Ham, Marine, and CB communications gear. In fact, the IP-2715 is ideal for any high current DC voltage application. Features include two easy to read front panel meters which permit the user to 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 removes voltage from the output binding posts. Output accuracy is assured by a zener reference diode which automatically regulates to maintain fixed output even under varying load conditions. Large double heat sinks, 4 output transistors and extra-large transformer insure accurate low ripple operation. An excellent addition to your bench.

Kit IP-2715, Shpg. wt. 31 lbs. **134.95**



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 Requirements: 110-130 VAC, 7A or 220-260 VAC, 3.5 A, 60/50 Hz. Dimensions: 5 1/4" H x 11" W x 11" D.



Precise, reliable 2700 series power supplies

All feature remote programming and voltage sensing; simplified front panel operation. Digital readout types have two decade auto-ranging for high resolution.

Kit IP-2710, 30V @ 3A analog, Shpg. wt. 34 lbs. **149.95**

Assembled SP-2710, 30V analog, Shpg. wt. 34 lbs. **220.00**

Kit IP-2711, 30V @ 3A digital, Shpg. wt. 36 lbs. **199.95**

Assembled SP-2711, 30V digital, Shpg. wt. 36 lbs. **300.00**

Kit IP-2730, 7.5V @ 10A analog, Shpg. wt. 36 lbs. **79.95**

Assembled SP-2730, 7.5V analog, Shpg. wt. 34 lbs. **100.00**

IP/SP-2700 SERIES SPECIFICATIONS: Max. Rated Output: IP/SP-2710 & 2711: 30V, 3A; IP-2730 7.5V, 10A. Load Regulation: Voltage: $\pm 0.05\%$ +1 mV, Current: $\pm 0.10\%$ +3.5 mA. Line Regulation: Voltage: $\pm 0.05\%$ +1 mV, Current: $\pm 0.10\%$ +1 mA. Ripple & Noise: Voltage: 1 mV RMS; 0.03% of rated output, peak-to-peak. Voltage/Current Readout (Switchable): Analog: 3 1/2", 100 μ , meter. Digital: 3 1/2-digit (1999), two-decade, auto-ranging, digital meter. Readout Accuracy: Voltage: Analog $\pm 3\%$ of rated output; Digital $\pm 0.5\%$ of reading ± 1 count using lab standards, $\pm 1.0\%$ of reading ± 1 count using built-in calibrator. Current: Analog $\pm 3\%$ of rated output; Digital $\pm 1.0\%$ of reading ± 4 count using lab standards, $\pm 1.5\%$ of reading ± 4 count using built-in calibrator. Readout Response Time: (Digital): 2 seconds to within 5 counts. Stability at Output Terminals: Voltage: $\pm (0.01\% + 1 \text{ mV})/\text{hr}$. Current: $\pm (0.05\% + 1 \text{ mA})/\text{hr}$. Stability as Displayed (Digital): Voltage: $\pm (0.1\% + 1 \text{ mV} + 1/2 \text{ count})/\text{hr}$. Current: $\pm (0.01\% + 1 \text{ mA} + 1/2 \text{ count})/\text{hr}$. Operating Modes: Constant voltage, constant current, auto-series, auto parallel. Power Requirements: 120/240 \pm 10/20 VAC; 60/50 Hz, 2.0/1.0 Amps max. Overall Dimensions: 5.5" H x 15" W x 13.5" D. (NOTE: Specs measured in accordance with NEMA standards (PYI-1972) after 30-minute warmup period.)

Laboratory Breadboard

\$79⁹⁵

• Perfect for
prototyping-
experimenting



The ET-3300 makes basic circuit designing a breeze. Solderless sockets and a built-in power supply makes hook-up and teardown quick and easy. It can even be used to test electronic components. You'll find dozens of other uses for it. A great kit for the electronics experimenter.

Kit ET-3300, Shpg. wt. 5 lbs. **79.95**

Assembled ETW-3300, Shpg. wt. 6 lbs. **120.00**

ET-3300 SPECIFICATIONS: OUTPUTS: +5 VDC @ 1.5 amps; +12 VDC @ 100 mA; -12 VDC @ 100 mA. REGULATION: Load: Less than 2% variation from no load to full load on all supplies. CURRENT LIMITING: Fixed current limiting of each supply at rated current provides short-circuit protection. POWER REQUIREMENT: 120/240 VAC 60/50 Hz 30 watts at full load. SIZE: 3 1/2" H x 12" W x 12" D.

Low-cost Strip Chart Recorder

Has 1 mV or 10 mV full-scale input (selected during assembly); twelve chart speeds from 5 sec./in. to 200 min./in. Power, servo and chart switches, coarse and fine zero controls, high impedance, floating input. Zener regulated reference voltage supply. Less than 1% error, full scale. For 120/240 VAC, 60/50 Hz. 6" H x 15" W x 9 1/2" D.



Kit IR-18M, Shpg. wt. 15 lbs. **189.95**

3 rolls chart paper (140 ft./roll)

IRA-18-1, Shpg. wt. 5 lbs. **10.95**

120 ft. roll chart paper. (For slow speeds.)

SU-445-17, 2 lbs. **4.75**



Deluxe AC Voltmeter for fast, easy audio service

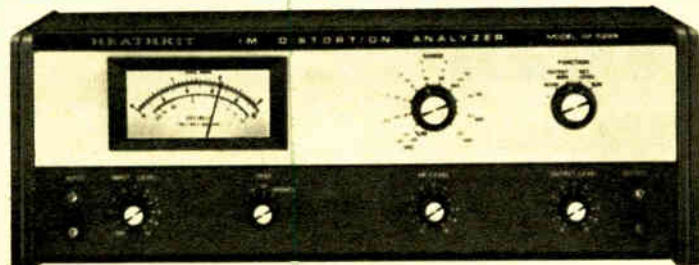
- Linear scales for both volts and dB make readings easy and accurate
- High sensitivity 0-1 mV full-scale range for low-voltage measurements
- Wide dynamic range for less switching

The excellent frequency response and sensitivity of the IM-5238 allow measurement of amplifier and tuner outputs, power supply ripple, noise and much more. AC volts are measured in 12 ranges from 0-1 mV to 0-300 VAC. dB measurements can be made from -70 to +40 dBm in 12 ranges. The meter is calibrated to read standard dBm with up to 30 dB linearity, has pushbutton function switches, range selector and dB offset control.

\$89⁹⁵
Kit

- Kit IM-5238, Shpg. wt. 8 lbs. **89.95**
Factory assembled and calibrated version of above.
SM-5238, Shpg. wt. 8 lbs. **130.00**

IM/SM-5238 SPECIFICATIONS: Voltage Range (full scale): 1 millivolt to 300 volts AC, 12 ranges. Decibel Range: -70 dB to +40 dB, 12 ranges in 10 dB steps with variable offset. Input: 10 megohms, 30 pF, negative input grounded to chassis. Frequency Response: Voltage Range, 10 Hz to 1 MHz, ± 2 dB. 10 Hz to 500 kHz ± 1 dB, dB range, 10 Hz to 250 kHz ± 1 dB. Outputs: DC (proportional to input volts), 1 volt full scale. DC (proportional to log of input volts), 3 volts full scale. AC (amplified output), 1 volt peak, full scale. Scales: 0-10 volts; 0-3.16 volts; -20 to +10 dB. Accuracy: Voltage Ranges, 4% of full scale at 1 kHz plus accuracy of calibration standard. dB ranges, ± 0.5 dB at 1 kHz plus accuracy of calibration standard. Temperature Range: +10° C to +40° C. Power Requirement: 100-135 VAC, 200-270 VAC, 50/60 Hz, 20 watts. Dimensions: 5 1/2" W x 6 3/4" H x 10 1/2" D. Net Weight: 5.5 lbs.



Heathkit IM-5258 Total Harmonic Distortion Analyzer

\$219⁹⁵
Kit

- Measures THD as low as 0.03%
- Perfect for optimum adjustment of hi-fi amplifiers and receivers

The Heathkit IM-5258 is a professional-grade total harmonic distortion (THD) analyzer. Its outstanding sensitivity and bandwidth permit measurement of THD levels as low as 0.03%, over a frequency range of 5 Hz to 100 kHz. The IM-5258 also functions as an AC voltmeter with 12 switch-selected ranges from 1 mV to 300 V full scale. Also has dB scale.

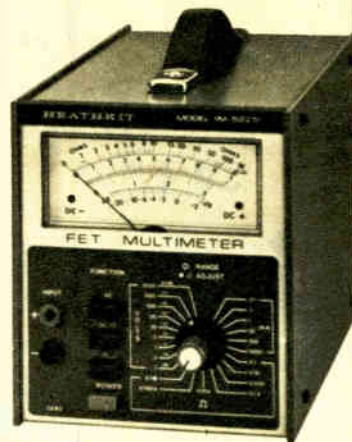
- Kit IM-5258, Shpg. wt. 17 lbs. **219.95**
Factory assembled version of above.
SM-5258, Shpg. wt. 16 lbs. **330.00**

IM/SM-5258 SPECIFICATIONS: Frequency Range: 5 Hz to 100 kHz in 5 ranges, 5-10 Hz, 10-100 Hz, 100-1000 Hz, 1-10 kHz and 10-100 kHz. Distortion Range: reads from 0.3% to 100% full scale in 6 ranges with a 1-3-10 sequence. Residual Distortion: 0.03% or less. Input Impedance: 1 megohm/70 pF maximum. Required Input Level: 316 mV for distortion measurements. Voltmeter: 1 mV to 300 V in 12 ranges with a 1-3-10 sequence. Accuracy: 5% of full scale. Output: 100 mV for full scale meter deflection. Power Requirement: 100-135 VAC or 200-270 VAC switch selected, 60/50 Hz, 12 watts. Dimensions: 5 1/2" H x 15" W x 11 1/2" D.

New Pro-quality FET Multimeter

- Auto-polarity function for extra convenience
- LED display indicates voltage polarity
- High-Low volts/ohms functions for in, out-of circuit semiconductor checks
- Extended range for high accuracy

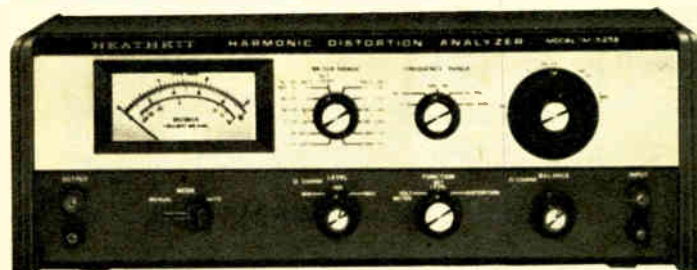
The IM-5225 is an FET multimeter capable of AC and DC voltage and current measurements in ranges from 0.1 to 1000 volts and 0.01 to 1000 mA. Seven ranges allow resistance measurements from 10 ohm to 10 megohm mid-scale. High and low voltage/ohms functions allow both in and out of circuit checks of semiconductor devices and resistance measurements. Features like continuous rotation range and 4-position pushbutton switches allow ease of operation and top dollar value. Add professional quality to your bench today!



\$119⁹⁵
Kit

- Kit IM-5225, Shpg. wt. 8 lbs. **119.95**
Factory assembled and calibrated version of above.
Kit SM-5225, Shpg. wt. 8 lbs. **160.00**

IM/SM-5225 SPECIFICATIONS: DC Volts: nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 full-scale. AC Volts: nine ranges 0-0.1, 0.3, 1, 3, 10, 30, 100, 300, and 1000 volts full-scale. DC Current: six ranges 0-0.1, 0.1, 1, 10, 100, 1000 milliamperes full-scale. AC Current: six ranges 0-0.1, 0.1, 1, 10, 100, 1000 milliamperes full-scale. Ohms: seven ranges X1, X10, X100, X10k, X100k, X1M.



Heathkit IM-5248 Intermodulation Distortion Analyzer

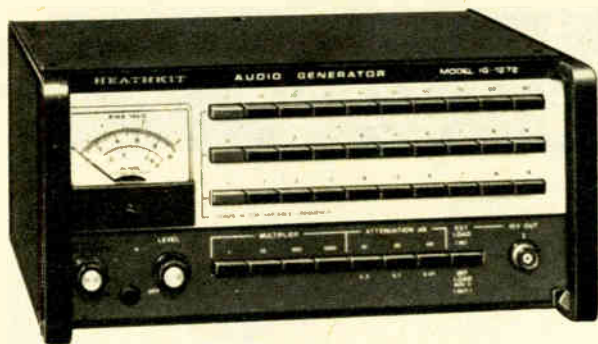
\$169⁹⁵
Kit

- Measures distortion as low as 0.01%
- Built-in 60 Hz and 7000 Hz oscillators
- External oscillator inputs

This intermodulation distortion analyzer is designed for professional-quality audio servicing and testing. Features built-in AC voltmeter, excellent sensitivity and dB measurement capability.

- Kit IM-5248, Shpg. wt. 14 lbs. **169.95**
Factory assembled version of above.
SM-5248, Shpg. wt. 15 lbs. **250.00**

IM/SM-5248 SPECIFICATIONS: IM METER: Ranges: 0.1 to 100% in a 1-3-10 sequence. Readable to 0.01% plus residual. Residual: Less than 0.01% with internal generators. Accuracy: 5% full scale. Input Impedance: 1 megohm. HF Sensitivity: 100 mV minimum. Oscillator Frequencies: 60 Hz (line syncable), and 7000 Hz. Generator Amplitude: Adjustable, 100 mV to 3 volts rms (50 mV to 1.5 volts into 600 ohms), with 60 Hz and 7000 Hz at a 4:1 ratio. Impedance and Bandwidths of External Oscillator Outputs: LF -51k ohms, 10 to 500 Hz. HF -18k ohms to 25k ohms; 2 kHz to 100 kHz. Impedance of Oscillator Outputs: 1000 ohms. Connectors: 5-way binding posts. AC VOLT-METER: 10 mV to 300 volts in a 1-3-10 sequence. Input Impedance: 1 megohm. Accuracy: 5% full scale. Frequency Response: 5 Hz to 1 MHz, 3 dB. Power Requirement: 100-135 VAC or 200-270 VAC switch selected, 60/50 Hz, 12 watts. Dimensions: 5 1/2" H x 15" W x 11 1/2" D.



Heathkit IG-1272 Low-Distortion Audio Frequency Oscillator

\$129⁹⁵
Kit

- Super-low distortion
- Flat output across entire range
- Frequency from 5 Hz to 100 kHz

The Heathkit IG-1272 provides a low-distortion sine wave output over a frequency range from less than 5 Hz to 100 kHz. It's perfect for the testing requirements of the serious audiophile, audio service shop or the audio designer. Pushbuttons select the first three significant digits of the desired frequency and also control the frequency multiplier and output attenuator. The IG-1272 can also be operated in a continuously-variable frequency mode. A level meter on the front panel allows accurate monitoring of the output. A BNC output connector helps keep noise level approximately 70 dB below signal output level. A buffered sync signal, for use with an oscilloscope or frequency counter, is available at the rear panel BNC. Includes cable, BNC, and clip leads.

Kit IG-1272, Shpg. wt. 11 lbs. 129.95

Factory assembled version of above.

SG-1272, Shpg. wt. 10 lbs. 190.00

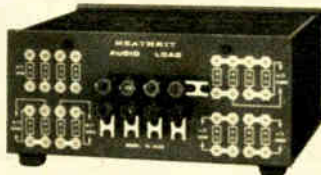
IG/SG-1272 SPECIFICATIONS: Output Voltage: 0.003 to 10 volts RMS. Output Load: 600 ohms. Hum and Noise: 0.01% or less. Frequency Range: 5 Hz to 100 kHz. Output Flatness (referenced to meter) Pushbutton Mode: Within ± 1.1 dB from 5 to 20 Hz; within ± 2 dB from 20 Hz to 100 kHz. Output Flatness (referenced to meter) Variable Mode: Within ± 2.5 dB from 10 Hz to 100 kHz. Frequency Accuracy: Pushbuttons: $\pm 4\%$, ± 1 Hz, typical $\pm 1.5\%$. Variable: Depends on accuracy of counter being used. Distortion: 10 to 40 Hz; 0.1% or less. 40 Hz to 20 kHz; 0.04% or less. 20 kHz to 100 kHz; Rises to 0.1% at 100 kHz. Attenuation: Pushbutton combination selected, 10 to 70 dB. Attenuation Accuracy: $\pm 0.2\%$ dB. Selector Accuracy: ± 1 Hz $\pm 4\%$. Power Requirement: 120 VAC or 240 VAC, 50 or 60 Hz. 10 watts maximum. Dimensions: 5 1/2" H x 11" W x 12 3/4" D. Weight: 9.5 lbs.

Heathkit Audio Load

The ID-5252 is a must for audio service technicians, manufacturers, and the serious audiophile. It provides the correct loading required for audio amplifiers under test in accordance with manufacturers published specifications and the Institute of High Fidelity Manufacturers (IHFM). Eliminates "special order" load resistors for each amplifier you want to test. Provides audio loads of 2, 4, 8, 16 or 32 ohms. Jacks are provided for connecting a voltmeter, oscilloscope or other test instrument at the load in use. Includes test leads.

Kit ID-5252, Shpg. wt. 6 lbs. 44.95

ID-5252 SPECIFICATIONS: Available loads (all resistors 1% tolerance): four 8-ohm, 60 W; two 16-ohm, 120 W; one 32-ohm, 240 W; one 2-ohm, 240 W; one 8-ohm, 240 W. Reactance: Less than 10% at 100 kHz. Leads: four 3-ft. #12 gauge leads, spade lugs, four jumper links. Dimensions: 4" H x 9" W x 9" D.



Sine-square wave Audio Generator with frequency range to 100 kHz

\$84⁹⁵
Kit

- Sine wave output available from 1 Hz to 100 kHz with low distortion
- 5 Hz to 100 kHz square wave output with fast risetime ideal for audio response testing
- Outputs available simultaneously or independently

A highly versatile, low cost addition to any bench. The IG-5218 is 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.

Sine wave output, for amplifier gain and distortion measurement, is generated by a "differential amplifier" pair in conjunction with a frequency selective "notch filter". The product of this circuitry yields a clean output with a frequency range of 1 Hz to 100 kHz. Distortion levels are less than 0.1% from 10 Hz to 20 kHz. Eight switch-selected output ranges from 0.003 to 10 V are provided when operating into a high impedance (10 k ohm min.) external load. Six ranges from 0.003 to 1 V are available when operating into the internal 600 ohm load or external load. A meter monitors the sine wave output, and is conveniently calibrated in both volts and dB. Square wave output is available from 5 Hz to 100 kHz with peak-to-peak output levels of 0.1 and 10 V into a load of 2000 ohms or greater. Risettime is 50 nanoseconds, making the IG-5218 ideal for checking audio amplifier response or use as a trigger for digital circuitry testing.

Frequency is quickly and accurately selected using front panel switches for 0-100, 0-10, and x1, 10, 100 and 1000 multipliers. A separate vernier control is provided for the 0-1 range.

Other features include output available simultaneously or independently at 5-way banana jacks...switchable internal or external load...dual primary transformer for 120 or 240 VAC operation...built-in carrying handles for easy portability. Easy kit assembly, or you can order the unit factory tested and calibrated. Either way, you'll have a truly useful and versatile instrument for all your audio testing and service needs.

Kit IG-5218, Shpg. wt. 10 lbs. 84.95

Assembled SG-5218, wired version of the IG-5218 in black & white styling, Shpg. wt. 10 lbs. 150.00

IG/SG-5218 SPECIFICATIONS: 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 +2 dB on meter and -50 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 indications: Two voltage and one dB scale on meter. Output impedance: 10 V range: 0-1000 ohm, 3 V range: 800-1000 ohm; 1 V range and lower; 600 ohm. Meter accuracy: $\pm 10\%$ of full scale with proper load termination. 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.

Counter Buying Tips

Frequency counters are bought based on specifications and features. Here are some tips on what the important specs are, and how to interpret them.

Frequency Range. This spec would seem to speak for itself, i.e., how high does the instrument count? Be sure that the advertised frequency range is no higher than that which is guaranteed by the logic manufacturer. All Heath counters are specified in this manner.

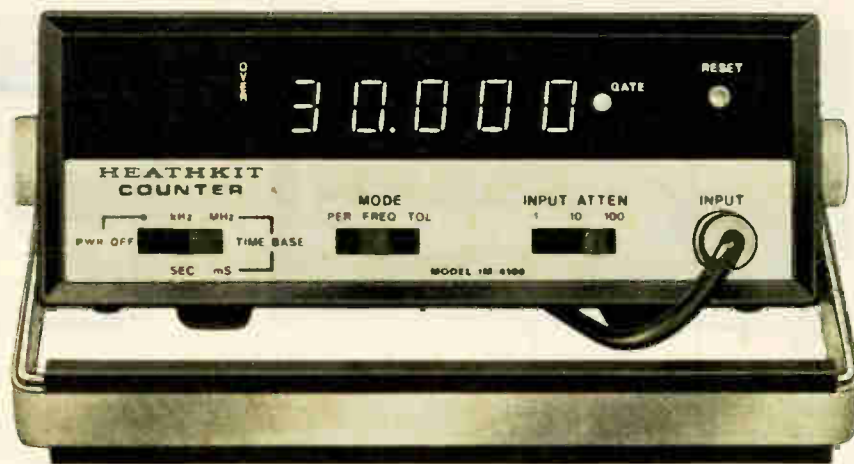
Sensitivity. Heath experience has determined that an input sensitivity of 15-25 mV is the best for most applications. Very low sensitivities (100 mV or higher) are often useless and high sensitivities (1 mV) can give false readings on noisy signals.

Input Impedance. Since the input impedance is both resistive and capacitive, you need to know both values. At high frequencies (above 110 MHz), the capacitive loading becomes the most important factor. At 500 MHz, 1 megohm shunted by 25 pF is actually a 12 ohm load. This is a VSWR of greater than 4, with a 50-ohm cable. At these frequencies, well-designed counters use as a close to a resistive 50 ohm input as practical to maintain a good VSWR. Heath counters GUARANTEE a VSWR of 1.5 to 1 up to 250 MHz, and less than 2.0 at 1 GHz.

Accuracy. This spec is given as time base accuracy ± 1 digit. Time base accuracy must include both aging rate and temperature stability to be meaningful. Some manufacturers hide errors of 25 ppm or more by omitting one or both of these factors. All Heath counters are specified with both aging rate and temperature stability to insure a true accuracy specification.

Resolution is determined by the number of digits and gate time. It is easy to be misled by simply considering the number of digits. Well-designed counters, like Heath's, always provide the proper number of digits and the proper gate times for resolution consistent with accuracy as defined above.

These considerations plus numerous other features, service and parts availability make Heath counters one of your best instruments buys!



Our Lowest-Priced Counter

Heathkit IM-4100 — Counts frequency to 30 MHz, period to 99.999 seconds, events to 99,999

\$129⁹⁵ Gives you the performance you *NEED* for precision measurements with outstanding resolution and sensitivity

The Heathkit IM-4100 is an almost unbelievable counter value. It's a full five-digit frequency counter which also functions in period and totalize modes. It provides built-in input attenuation and 12-volt operation all in one compact package. The latest digital design and a stable 10 MHz crystal oscillator assure accuracy and precision on all measurements. Its excellent resolution makes it ideal for a variety of signal alignment applications.

As a frequency counter, the IM-4100 is guaranteed to 30 MHz with 1 Hz resolution. Sensitivity is 15 mV from 50 Hz to 30 MHz, 50 mV below 50 Hz.

In the period mode, it measures intervals up to 99.999 seconds. Using the millisecond time base, it resolves to 1 μ sec! This mode can be used for low frequency measurements with high accuracy. Just position the TIME BASE switch to mS and the MODE switch to PER. Then solve the equation $f = 1/\text{period}$, using the displayed value.

The totalize mode will add up (totalize) event pulses up to a count of 99,999. Pushing the RESET button starts the count at zero. An inhibit signal can stop the totalize

mode at any time, without loss of the displayed count.

The front panel attenuator switch allows the amplitude of input signals to be divided by 1, 10 or 100. The pushbutton RESET switch quickly resets the display to zero in any mode. Front panel display includes over-range indicator and a gate lamp.

A rear panel switch easily selects internal or external time base. The rear panel connector can be used as an input for an external time base signal, frequency ratio measurements, or as an output to check the internal 10 MHz time base, or to provide a convenient frequency standard of 1 MHz for bench use. The IM-4100 operates on 120/240 VAC, or 12-volt DC. DC power is applied through a rear panel connector (mating connector supplied).

The IM-4100 is an easy kit to build, with an open chassis layout, with circuit board construction to simplify assembly. Or you can order it factory assembled and tested.

Kit IM-4100, Shpg. wt. 6 lbs. **129.95**
Factory assembled and tested version of above.

SM-4100, Shpg. wt. 6 lbs. **190.00**

IM-4100 SPECIFICATIONS

FUNCTIONS — Frequency: 5 Hz to 30 MHz minimum. Period: 1 μ sec resolution to 99.999 sec. Totalize: 1-99,999 events. Sensitivity: 15 mV rms (50 mV, 5 Hz to 50 Hz). Period Pulse Width: 25 nsec minimum. Low Frequency Signal Risettime: 1 msec for signals less than 10 Hz. Input Impedance: 1 megohm shunted by less than 35 pF. Protection: 240 volts rms at 60 Hz. Attenuator: X1, X10, X100 fixed compensation. **TIME BASE** — Frequency: 10 MHz. Setability: ± 1 ppm. Temperature stability: ± 10 ppm, maximum 0° to 40° C ambient. Aging rate, 10 ppm per year. **OSCILLATOR**

CONNECTION — External Input Frequency: DC to 20 MHz. External Input Sensitivity: TTL or 2.5 V rms from 50-ohm source. Internal Output: TTL signal at 1 MHz. **GENERAL** — Gate Interval: kHz-1 sec, MHz-1 msec. Manual Gate: DC control in events mode using external OSC input connector. Display Time: 200 msec plus gate interval. Power Requirement: 105-130 or 210-250 VAC (switch-selected). 60/50 Hz, (at 25 watts); or 9-14 VDC at 1.25 amperes. Dimensions: 2 $\frac{3}{4}$ " H x 7 $\frac{1}{4}$ " W x 10 $\frac{1}{2}$ " D (less handle).



High-Performance Frequency Counters

- Frequency, Events, Period and Period Averaging
- Bright Red LED 8-Digit Readout
- Optional 12-Volt and Battery Operation
- Overrange and Gate Lamp Indicators

These frequency counters offer excellent flexibility, accuracy and resolution, PLUS features you simply won't find on others in this price range.

A switchable attenuator on the 110 MHz input divides the input signal x1, x10 or x100 to facilitate accurate measurements of large amplitude signals. The time base switch selects the gate time and the resolution of the display. The 4120 and 4130 time bases are controlled by a high quality TCXO (temperature-compensated crystal oscillator) with a temperature stability of ± 1 ppm and an aging rate of < 5 ppm/yr for excellent stability. (The 4110's crystal oscillator has stability of ± 10 ppm and an aging rate of < 10 ppm/yr.)

Separate 50-ohm inputs are used for frequency ranges above 110 MHz to maintain low VSWR, while inputs below 110 MHz are

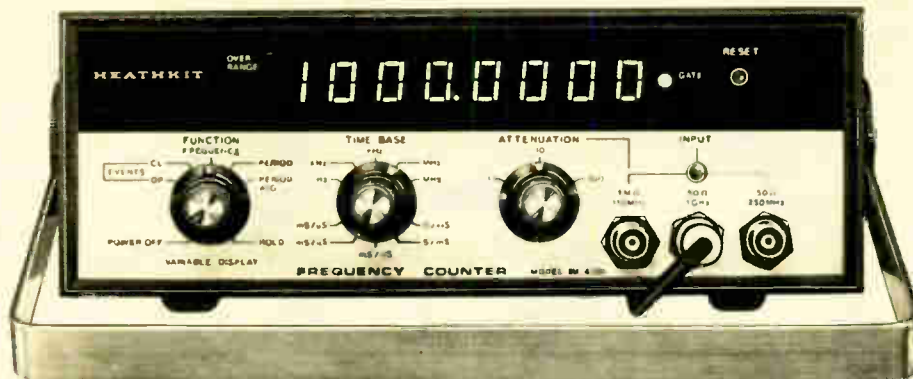
12-volt Converter for 4110, 4120 and 4130 Frequency Counters

Mounts inside counter cabinet, permits 12-volt mobile operation of 4110, 4120 and 4130. Can also be fitted with 12 rechargeable NiCad batteries (not included, order below).

Kit IMA-4130-1, Shpg. wt. 3 lbs. **59.95**
Assembled version of above.

SMA-4130-1, Shpg. wt. 3 lbs. **90.00**
Set of 12 NiCad batteries.

SMA-4130-2, Shpg. wt. 4 lbs. **89.95**



IM-4130 — 110 MHz, 250 MHz and 1 GHz inputs

1 meg shunted by less than 25 pF. There's a rear panel oscillator input/output jack for an external time base, frequency ratio measurements, or it can be used as a signal source for breadboarding, calibrating or marker applications.

These counters include additional functions — events, period and period averaging. In events OP, the counting circuit increments for each input pulse with the resulting counts displayed. Events CL stops the events count and displays the accumulated total.

In the period mode, the readout displays a single period of the signal.

In the period averaging mode, the counter displays the time of a single period based on a 1000-period average. This results in a more accurate and higher resolution measurement.

A 12-position handle rotates a full 360° for easy storage and mounting. Easy kit assembly and NO-INSTRUMENT calibration. Counters operate on 120/240 VAC (switch-selected), 12 VDC with IMA-4-130-1 accessory at left, or portable battery operation with IMA-4130-1 and SMA-4130-2 batteries.

IM-4110 5 Hz to 110 MHz Counter

Applications include CB, low-band AM and FM, AM and FM broadcast bands, musical instruments, video tape systems, crystals, etc. Has single 110 MHz input.

Kit IM-4110, Shpg. wt. 12 lbs. **189.95**

Assembled and tested version of above.

SM-4110, Shpg. wt. 10 lbs. **275.00**

IM-4120 5 Hz to 250 MHz Counter

For above applications, plus marine and aircraft radios, 2-meter and 220 FM, general lab and research work, more. Has 5 Hz to 110 MHz and 5 MHz to 250 MHz inputs.

Kit IM-4120, Shpg. wt. 12 lbs. **329.95**

Assembled and tested version of above.

SM-4120, Shpg. wt. 11 lbs. **500.00**

IM-4130 5 Hz to 1 GHz Counter

For virtually every counting application including 450 FM, Military uses and land mobile. Has three separate inputs—5 Hz to 110 MHz, 5 MHz to 250 MHz and 100 MHz to 1 GHz.

Kit IM-4130, Shpg. wt. 12 lbs. **529.95**

Assembled and tested version of above.

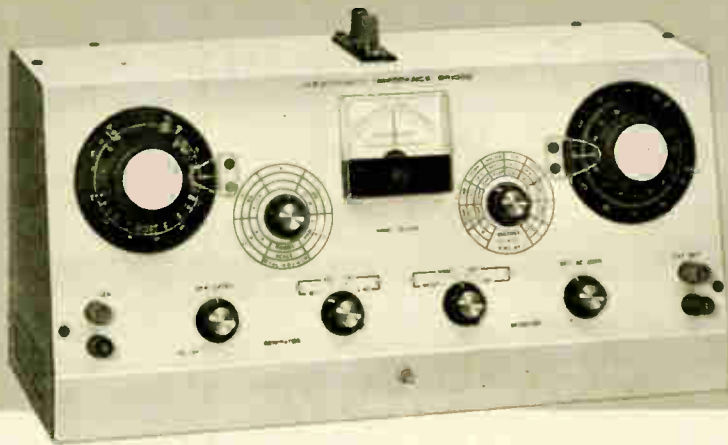
SM-4130, Shpg. wt. 10 lbs. **765.00**

	IM-4110	IM-4120	IM-4130
Frequency Range	5 Hz to 110 MHz	5 Hz to 250 MHz	5 Hz to 1 GHz
Inputs	5 Hz to 110 MHz	5 Hz to 110 MHz, 5 MHz to 250 MHz	5 Hz to 110 MHz, 5 MHz to 250 MHz, 100 MHz to 1 GHz
Input Sensitivity	15 mV RMS from 50 to 110 MHz (25 mV, 5 Hz to 50 Hz)	20 mV RMS (250 MHz input) 110 MHz, same as 4110	25 mV RMS (1 GHz input) 110 MHz, same as 4110 250 MHz, same as 4120
Input Impedance	1 meg shunted by <25 pF	50 ohms, VSWR less than 1.5:1	50 ohms, VSWR, less than 2:1
Protection	250 V (DC + peak AC) to 100 kHz	5 Vrms	5 Vrms
Time Base Freq.	10 MHz	4 MHz TCXO	4 MHz TCXO
Aging Rate	<10 ppm/yr	<5 ppm/yr	<5 ppm/yr
Temp. Stability (0 to 40°C ambient)	± 10 ppm	± 1 ppm	± 1 ppm

OTHER IM-4110, 4120 AND 4130 SPECIFICATIONS — FUNCTIONS: Events: 1 to 99,999,999. Period Resolution, 0.1 μ s. Period Average, 1000 periods. Period Pulse Width, 100 nsec min. Low Frequency Signal Risetime, 1 msec to signals less than 10 Hz. Attenuation, (110 MHz input) x1, x10, x100 fixed compensation. TIME BASE: Setability, ± 0.1 ppm. OSCILLATOR

CONNECTION: External Input Frequency, 1 MHz. External Input Sensitivity, TTL or 2.5 Vrms for 50-ohm source. External Input Protection, -5 V peak to $+10$ V peak. Internal Output, >1.5 V p-p into 50 ohms at 1 MHz TCXO Warmup, 10 minutes. GATE INTERVAL: Frequency, 1 mS to 10 S (4 mS to 40 S on 1 GHz input). Period, determined by period of input frequency.

Period Average, 1000 periods of input frequency. Display Time, 200 ms to 20 S including a count hold position. Power Requirements: 105-130 VAC or 210-260 VAC (switch-selected), 50-60 Hz at 35 watts; or 9-14 VDC at 2.5 A max. with IMA-4130-1 accessory. Dimensions: 10 $\frac{1}{4}$ " W x 13 $\frac{1}{4}$ " D x 4" H (less handle). Net Weight: 8 lbs.



High-accuracy Impedance Bridge ideal for design and experimentation

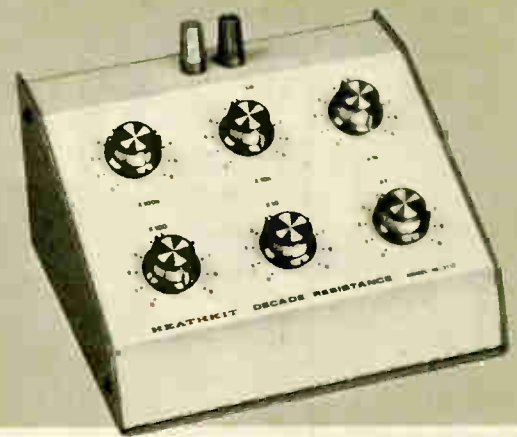
\$124⁹⁵

- *Accurately measures resistance, capacitance and inductance*
- *Has sensitive, easy to read meter*

Has four separate bridge circuits for accurate measurement of resistance, capacitance, low and high inductance, dissipation factor of capacitors and storage factor of inductors. Has sensitive direct reading 100-0-100 microammeter and easy-access front panel binding posts for quick and convenient test setup. Ideal for the experimenter and designer or any electronics professional. Easy to follow manual makes construction a simple matter. A great value. Requires headphones or scope for alignment.

Kit **IB-3128**, Shpg. wt. 11 lbs. **124.95**

IB-3128 SPECIFICATIONS: DC Measurements: Built-in power supply. Binding posts for external supply. Meter: 100-0-100 microampere meter. AC Measurements: Built-in 1000 Hz generator. Terminals on panel for external generator. Detector: Vacuum tube detector and amplifier, using built-in meter. Terminals for external detector. Resistance: 0.1 ohm to 10 megohm. Capacitance: 100 pF to 100 μ F. Inductance: 0.1 mH to 100 H. Dissipation Factor: (D) 0.002 to 1. Storage Factor: (Q) 0.1 to 1000. Accuracy: 1/2 % decade resistors used. Power Supply: Transformer and silicon rectifier. Power Requirements: 105-125 V. or 210-250 V., 60/50 Hz, 10 watts. Dimensions: 8" H x 17" W x 6" D.



Precision laboratory-type decade resistance box for easy value substitution

\$39⁹⁵

- *Provides accurate resistance values*
- *Simple operation*
- *Easy kit assembly*

The Heathkit IN-3117 Decade Resistance Box is an accurate laboratory-type instrument for use whenever precision resistors are required for an electrical measurement or circuit design.

The extensive range of available resistance values makes the IN-3117 invaluable as a variable multiplier or shunt, a variable substitution resistor, or as a leg for AC and DC bridges. Use in conjunction with the IN-3147 below for solving complex resistance and capacitance networks where large ranges of values are necessary. Covers 1 ohm to 999,999 ohms in 1-ohm steps.

Resistors are 1-watt, 0.5% tolerance. Features rugged case and binding posts for easy test set up. Whether you're a designer or experimenter the IN-3117 is a must for your bench.

Kit **IN-3117**, Shpg. wt. 3 lbs. **39.95**

IN-3117 SPECIFICATIONS: Range: 1 ohm to 999,999 ohms in 1-ohm steps. Resistors: precision, 0.5% accuracy, rating 1 watt. Minimum DC resistance: 0.025 ohm at terminals with all switches set at zero. Maximum current for each range: X1, 1000 ma. X10, 300 ma. X100, 100 ma. X1K, 30 ma. X10K, 10 ma. X100K, 3 ma. Dimensions: 5" H x 7 1/2" W x 6 3/4" D.

Capacitor Substitution Box

Helps you determine proper capacitance values without time-consuming calculations. Excellent for design or analysis of simple and complex RC and RCL networks. Provides switch selection of any of 18 EIA standard capacitors from 100 pF to 0.22 μ F.

The special rotary switch incorporates make-before-break contacts that provide smooth changes in capacitance without "opening" or "shorting" the circuit under test. All capacitors are rated at 600 V except 3 lowest and 2 highest values are 500 & 400 V respectively. Accuracy is $\pm 5\%$ for values from 0.0001 μ f through 0.00047 μ f; and $\pm 10\%$ for 0.01 through 0.22 μ f. The IN-3147 makes an excellent addition to the bench of the experimenter and designer. Easy kit construction, and excellent accuracy make it a great value. 3" H x 3" W x 6" D.

Kit **IN-3147**, Shpg. wt. 2 lbs. **11.95**

Resistor Substitution Box

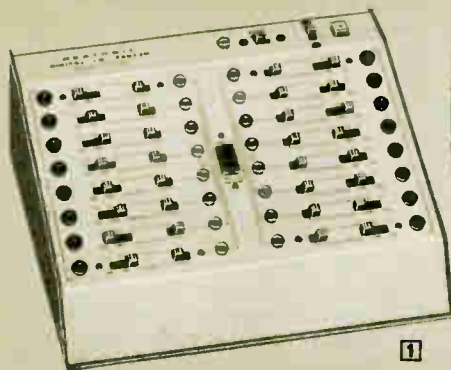
Gives you a rapid and flexible means of determining resistance values required in new electronic circuit design. Also lets you substitute resistance values directly in existing circuits during operation to determine the resistance value that will provide maximum circuit performance. Provides switch selection of any one of 36 EIA standard 10% 1-watt resistors from 15 ohms to 10 meg.

The "shorting type" switches with make-before-break action permit smooth selection of the resistance values without opening or shorting the circuit.

The IN-3137 is ideal for radio, television, and audio work — anywhere that unknown values of resistance need to be determined. It's an invaluable addition to your service bench and a practical, easy to build kit, too. 5 3/8" H x 3 1/8" W x 3" D.

Kit **IN-3137**, Shpg. wt. 2 lbs. **11.95**

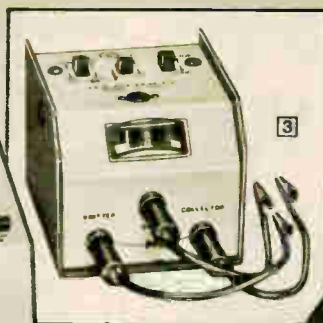




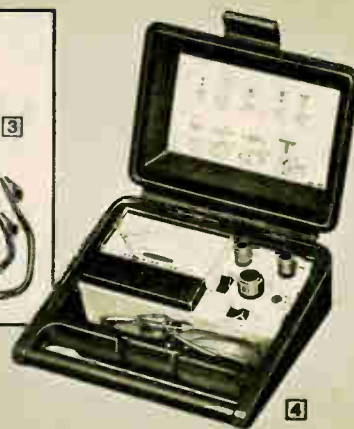
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1 Heathkit deluxe Digital IC Tester

A "must" for anyone working with digital IC's. Lets you determine functions of IC's, check operation against your own data sheets. Features a special high-quality "zero-force" insertion socket — the same as used in expensive production-line testers — lets you make thousands of insertions and extractions without worrying about bent pins. Exclusive "bounce-free," computer-type mercury stepping switch allows safe and easy "exercising" of multi-function IC's such as flip-flops. Has input-output jacks for each pin; neon indicators. Exceptionally easy to operate — 14- or 16-pin IC's can be installed in any position, switches and banana jacks allow each IC pin to be used as input or output. Ideal for use with the Heathkit Digital Techniques Program (page 94).

Kit IT-7400, Shpg. wt. 6 lbs. 74.95

IT-7400 SPECIFICATIONS: Pull-up Resistors: externally connected, with patch terminals. Patch Terminals: one at each pin. Selector Switches: two at each terminal, one for +5V, step, or off; the other for gas discharge or ground. Gas Discharge: allows direct driving of neon indicator lamp for high voltage decoder driver. Power Supply: 5 VDC regulated, $\pm 5\%$, 300 mA and 3.6 VDC, switch selected. Power Requirement: 100-135/200-270 VAC, 60/50 Hz, switch selected. Dimensions: 4 $\frac{1}{2}$ " H x 11 $\frac{3}{8}$ " W x 9 $\frac{1}{4}$ " D.

2 High-accuracy FET/Transistor Tester

For quick, accurate tests of conventional (bipolar) 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. Other test functions listed below.

Kit IT-3120, Shpg. wt. 5 lbs. 54.95

IT-3120 SPECIFICATIONS: Out-of-Circuit Accuracy: $\pm 5\%$ for DC beta and leakage. In-Circuit Accuracy:

Indicates good or bad transistor, FET, diode, SCR or triac. Diode Test: Tests for forward conduction and blocking. Unijunction Transistor Test: Measures h_{FE} , h_{FE} and emitter current. Power Requirements: Two 1 $\frac{1}{2}$ V cells, (alkaline for best performance, not supplied). Dimensions: 5" H x 9 $\frac{3}{8}$ " W x 8 $\frac{1}{4}$ " D.

3 Transistor/Diode Checker

Check high and low power transistors (NPN & PNP) for shorts, leakage, opens and current gain, diodes for forward and reverse current, continuity. Uses two 1.5 V "C" cells, not supplied. 3 $\frac{1}{8}$ " H x 3 $\frac{1}{8}$ " W x 3 $\frac{3}{4}$ " D.

Kit IT-27, Shpg. wt. 2 lbs. 11.95

4 Deluxe Transistor Tester

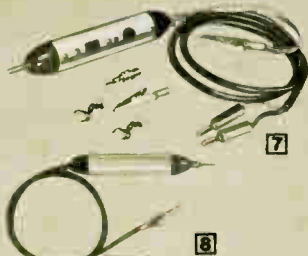
For reliable in- or out-of-circuit tests. Reads DC Beta (gain) on two ranges, 2-100 and 20-1000. Measures out-of-circuit leakage. Identifies NPN or PNP's. Low power — will not damage transistor or diode incorrectly connected. Not for high power or switching transistors.

Kit IT-18, Shpg. wt. 4 lbs. 32.95



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Probes and Accessories for Heathkit test instruments

5 50-Ohm Termination for frequency counters and scopes. DC to 1 GHz; power rating, 1 watt. VSWR; 250 MHz, 1.2:1, 600 MHz, 2:1.

Assembled SU-511-50; Shpg. wt. 1 lb. 15.00

6 RF Fuse in UHF BNC-to-BNC connector. Prevents burnout. DC to 500 MHz range; 50 ohms; 12:1 VSWR (max.); insertion loss 1.80 dB max. at 500 MHz. With spare fuses.

Assembled SU-512-50, Shpg. wt. 1 lb. 45.00

7 Low capacitance scope probe provides direct or X10 attenuated operation; options for 3.3 or 1 megohm input resistance. Banana plug/BNC wiring option.

Kit PK-1, Shpg. wt. 1 lb. 7.95

8 RF probe for RF measurements from 1000 Hz to over 100 MHz; 11 meg input; 1000 VDC max. at tip; 90 V rms max.

Kit PK-3, Shpg. wt. 1 lb. 5.95

Assembled PKW-3, Shpg. wt. 1 lb. 7.95

9 Scope demodulator probe for distortion checks, RF & IF display. 30 V rms max., 500 VDC max. Banana plug/BNC wiring option.

Kit 337-C, Shpg. wt. 1 lb. 5.00

10 NEW! Combination X1, X10 Scope Probe. Has 2-position multiplier for X1 and X10 at probe tip. DC to 15 MHz (X1) and DC to 80 MHz (X10) bandwidths. X10 risetime, 4.0 nS. Compensation range of 15-50 pF.

Assembled PKW-105, Shpg. wt. 1 lb. 24.95

PKA-101-1 Accessory Pack. Includes three assembled tips, two 6-inch ground leads and one 12-inch ground lead for the PKW-101/104 only.

PKA-101-1, Shpg. wt. 1 lb. 9.95

Accessory cables ... for inter-connecting scopes, counters, etc. All cable is RG-58/U, 50 ohm impedance. Shpg. wt. (each), 1 lb.

Assembled SU-501-1, 1 ft., BNC/BNC 7.50

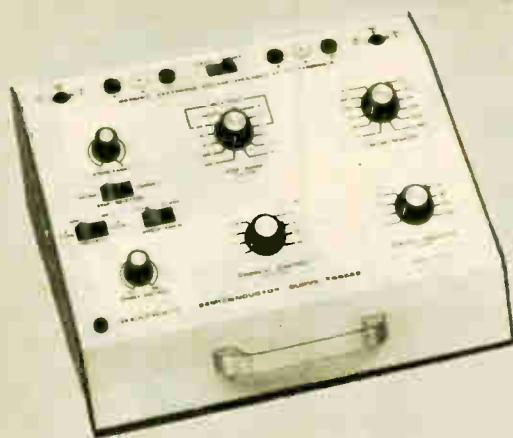
Assembled SU-501-3, 3 ft., BNC/BNC 7.50

Assembled SU-501-6, 6 ft., BNC/BNC 7.50

Assembled SU-502-3, 3 ft., BNC/UHF 7.50

Assembled SU-503-3, 3 ft., BNC/Banana ... 7.50

65

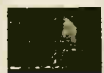


Check semiconductor parameters with your scope and this IT-3121 Curve Tracer

- Test bipolar transistors, diodes, SCR's, FET's, etc.
- Ideal for selecting specific devices for circuit design

Take the guesswork out of semiconductor testing with the Heathkit IT-3121 Curve Tracer. An invaluable tool for the designer, technician or the serious electronic hobbyist. Just connect the IT-3121 to any oscilloscope with horizontal sensitivity of 0.5 V/div. and vertical sensitivity of 1 V/div. and get an accurate display of operating parameters for virtually any discrete semiconductor. Devices such as bipolar transistors, diodes, SCRs, triacs, FETs, etc. can be inspected or tested for specific applications. Plug-in cables are supplied for fast, easy scope hookup. A calibration switch permits fast and accurate scope calibration. You can display fundamental parameters such as gain (beta), leakage, breakdown voltage, saturation, forward conduction voltage, output admittance, linearity, capacitance effects, temperature effects and others (see insets for typical displays). The extensive manual included in each kit tells how to interpret each display.

Kit IT-3121, Shpg. wt. 10 lbs. 99.95



Unijunction Transistor



"Thermal Runaway"

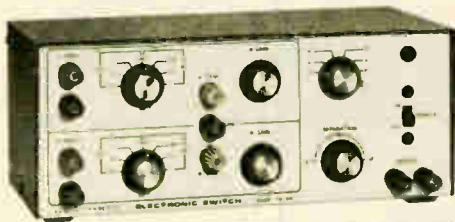


Field Effect Transistor



Transistor Breakdown

IT-3121 SPECIFICATIONS: Sweep Voltage Ranges: 0-40 volts at 1 ampere max. 0-200 volts at 200 mA max. Sweep Voltage Sampling: 0.1, 0.2, 0.5, 1, 2, 5, 10, 20 and 50 V/div. $\pm 3\%$. Sweep Current Sampling: 0.5, 1, 2, 5, 10, 50, 100 and 200 mA/div. $\pm 5\%$. Step Currents: 0.002, 0.005, 0.01, 0.02, 0.1, 0.2, 2, 5, and 10 mA/step. $\pm 3\%$, ± 250 mA offset current max. Step Voltages: 0.05, 0.1, 0.2, 0.5, and 1 volt/step. $+3\%$, $\pm 5\%$ mA maximum offset voltage. Oscilloscope Requirements: Bandwidth to 20 kHz or greater. (DC-coupled oscilloscope is recommended). Power Requirement: 110 to 130 or 220 to 260 VAC. Dimensions: 4 1/2" H x 11 1/4" W x 10" D.



Add dual trace function to your oscilloscope

Gives any single beam scope with external trigger input dual-trace versatility. Simultaneous display of two separate input signals.

Kit ID-4101, Shpg. wt. 5 lbs. 42.95

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. Power requirement: 120/240 V, 60/50 Hz, 6 W. Dimensions: 4 1/4" H x 10 1/2" W x 5 1/4" D.

Low-priced scope calibrator

Crystal controlled time base for scope calibration. Generates a square wave output in ranges from 1 kHz to 1 MHz. Output is at TTL levels and the 1 kHz output is adjustable from 0 to 4.7 V/pk.

Kit IOA-4510-1, Shpg. wt. 1 lb. 14.95
66



Deluxe scope calibrator

The IG-4505 is a practical oscilloscope calibrator at a sensible price. It provides all the waveforms necessary for complete and accurate oscilloscope calibration. Good for scopes with up to 35 MHz bandwidths. An excellent value for the bench.

Kit IG-4505, Shpg. wt. 4 lbs. 44.95

IG-4505 SPECIFICATIONS: TIME CALIBRATION: Range: 0.5 sec. to 1 μ s square wave accurate to within .01%. Amplitude: ≈ 200 mV peak. Output: 50 ohms terminated cable. VOLTAGE CALIBRATION: Ranges: 1 mV to 100 V peak square wave. Accuracy: To within 2% with 1M Ω load referenced to 1 V position. Rise Time: ≤ 2 μ s. Frequency: DC, 2 Hz to 10 kHz. Power Requirement: 120-240 Volts AC, 60/50 Hz, 12 watts.

Tips on oscilloscopes — features to look for

We at Heath realize that the purchase of an oscilloscope can amount to a large investment and as with all investments full value may only be realized by careful examination and understanding of the various specifications and parameters that will tailor that investment to your needs. With that in mind, we offer these helpful explanations for oscilloscope evaluation. Oscilloscope applications are wide ranging and encompass a multitude of measurement techniques. Waveform analysis, AC and DC voltage measurement, frequency calculations, phase relation analyses, frequency ratio calculations and many other types of measurements all become possible with the correct oscilloscope. Here are some important features and what they mean.

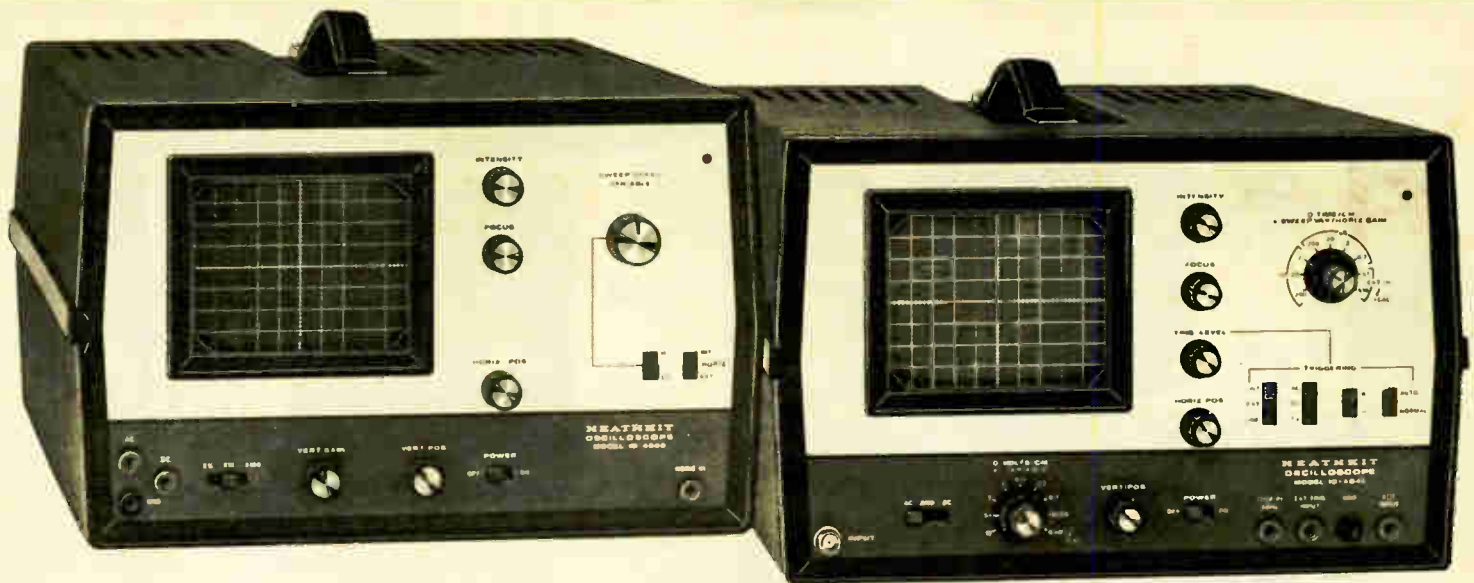
Bandwidth: Indicates the frequency range over which the oscilloscope will faithfully display the input waveform. The -3 dB bandwidth must be related to the rise time specification by $T_R = 0.35/f_{MHz}$ for proper pulse response. The 5 MHz oscilloscopes ($T_r = 70$ ns) find their most important applications in audio and television servicing. The 15 MHz oscilloscopes, ($T_r = 24$ ns) are excellent service and experimenter oscilloscopes especially useful for analysis of logic circuits. Oscilloscopes with 35 MHz bandwidth ($T_r = 10$ ns) are designed for critical pulse analysis applications and for observing high frequency waveforms.

Horizontal Time Base: The time base setting selects the time for one complete sweep across the CRT face. Faster time bases require shorter times. Triggering starts the sweep at the same point on the waveform every time.

Vertical Sensitivity: tells you how small a signal can be seen on the oscilloscope. The vertical attenuator allows you to desensitize the oscilloscope to view higher amplitude waveforms.

Vertical Modes: Single trace oscilloscopes offer only one vertical input, so only one signal may be displayed at a given time. Dual trace operation allows simultaneous observation of two signal sources and is required for checking phase relationships as well as making other timing comparisons.

These functions, along with features such as trigger modes, vertical delay lines, vertical and horizontal calibration determine the quality of an oscilloscope. Heath offers a full line of top-quality oscilloscopes at prices that give you more value and performance for your equipment dollar. Read about them on the next three pages.



Heath has the VALUES in Oscilloscopes

\$119⁹⁵

The lowest priced auto-triggering oscilloscope anywhere! DC-5 MHz, 100 mV sensitivity

Now you can have the most universal of all test instruments on your bench — the oscilloscope. The 4560's ability to display many types of voltage waveforms permits study of complex signals, such as those found in audio devices, television receivers, transmitters and other electronic equipment. It's ideal for service techs and hobbyists.

Operation couldn't be easier. In addition to the power switch, there are only nine switches and controls, for correct operation — even the first time. The large 8 x 10 cm screen makes for easy waveform measurements.

Auto-triggering provides automatic, positive locking of the displayed waveform. A stable display is assured for any frequency up to the full 5 MHz bandwidth. The uncalibrated sweep speed control provides continuous adjustment from 20 ms/cm to 0.2 μ s/cm.

The DC to 5 MHz vertical bandwidth is more than adequate for general design and service work. Maximum vertical sensitivity is 100 mV with a front panel switch for X1, X10 and X100 attenuation, AC or DC. Vertical input impedance is 1 megohm for low circuit loading. Up to 400 VDC can be applied directly without circuit damage, making it a great scope for student use. For phase and frequency measurements, an external horizontal input can be applied directly through the front panel input jack. It has 0.25 V/cm sensitivity with DC to 100 kHz bandwidth. Display stability is excellent because the low voltage supplies for the amplifiers and sweep circuit are zener regulated. The primary circuit of the power transformer is fused for protection from overload.

Easy assembly and operation, reliable, accurate performance, and low price make the IO-4560 the best instrument buy in years.

Kit IO-4560, Shpg. wt. 19 lbs. 119.95

IO-4560 SPECIFICATIONS: VERTICAL CHANNEL: Input Impedance: 1 megohm. Sensitivity: 100 mV/cm. Maximum Input Voltage: 400 volts DC. Frequency Response: DC to 5 MHz \pm 3 dB. Attenuator: X1, X10, X100, AC or DC. HORIZONTAL CHANNEL: Input Impedance: 100 k Ω . Sensitivity: 0.25 volt/cm (uncalibrated). Frequency Response: DC to 100 kHz. TIME BASE: Sweep: 20 ms to 0.2 μ s/cm (uncalibrated). Trigger Mode: Automatic. GENERAL: CRT: 5DEP31F, 8 x 10 cm viewing area. Blue-green, medium persistence phosphor. 5" round, flat-face tube. Graticule: 8 x 10 cm. Power Requirements: 110-130 or 220-260 VAC. 60/50 Hz 35 watts. Dimensions: 8" H x 13" W x 17" D.

\$179⁹⁵

DC to 5 MHz Oscilloscope with complete triggering controls including TV coupling

The Heathkit IO-4541 is a triggered scope with controls and features that are not found in other scopes in this price range. A stable triggering circuit is used for solid waveform displays (not the recurrent type sweep generator normally used in other scopes). Trigger controls include selection of normal or automatic modes, switch controlled AC or DC coupling and front panel input of external triggering signals. All front panel trigger controls are clearly labeled for "no mistake" operation. A special TV position on the trigger selector control allows for low frequencies to pass while rejecting the high frequencies, so the 4541 will easily trigger on the vertical component of a complex TV signal.

Any one of seven calibrated time bases, from 200 ms/cm to 0.2 μ s/cm can be selected by the time/CM switch. A variable control provides for settings between steps. The horizontal amplifier will accept external inputs from DC to 100 kHz.

Vertical input sensitivity of 20 mV/cm and nine calibrated vertical attenuator positions, up to 10 V/cm, will accommodate a broad range of input signals. A variable gain control gives precise control between settings.

Both vertical amplifier and horizontal sweep circuit power supplies are regulated to provide stable voltages to all circuits under varying line voltage conditions. Partial mu-metal shielding helps eliminate display error. Accurate measurements are easily made from the bright 8 x 10 cm screen.

Kit IO-4541, Shpg. wt. 23 lbs. 179.95

Factory assembled and calibrated version of above.

SO-4541, Shpg. 19 lbs. 295.00

IO-4541 SPECIFICATIONS: VERTICAL: Bandwidth: DC to 5 MHz \pm 3 dB. Attenuator: 1, 2, 5 sequence, calibrated and variable. Rise Time: 70 ns. Overshoot: 5% at 1 kHz. Impedance: 1 M Ω /38 pF. Sensitivity: 20 mV/cm. SWEEP: Type: Triggered. Range: 200 ms to 0.2 μ s/cm, 7 steps plus variable. Trigger Source: Int/Ext/Line. Trigger Modes: AC/DC/TV; +/- Slope; Auto/Norm. HORIZONTAL: Sensitivity: .25 V/cm. Bandwidth: DC to 100 kHz. Impedance: 1 M Ω /50 pF. Ext. Horiz. Input: X1 and X10 attenuator. GENERAL: CRT: 5DEP31F, 8 x 10 cm, green, medium-persistence phosphor, 5" round, flat-face tube. Accelerating Potential: Approx. 1.5 kV. Graticule: Painted, 8 x 10 cm. Power Requirements: 110-130 VAC or 220-260 VAC, 50/60 Hz, 35 watts. Dimensions: 8" H x 13" W x 17" D.



New Professional quality 10 MHz single trace scope offers outstanding features at a low price

\$299⁹⁵

- Brighter trace for easier-to-see displays
- TV trigger position
- Fully regulated power supplies

Heath puts together engineering and solid state technology to come up with an unparalleled price/performance value, the IO-4555. This scope offers the features and performance that both the professional and hobbyist can appreciate and its 10 MHz bandwidth makes the IO-4555 ideal for applications in audio, digital and television servicing. Features include X-Y capability with matched X-Y attenuation, extra-bright trace, 11 step vertical and 19 position horizontal attenuators. Vertical sensitivity may be varied in calibrated, 1-2-5 sequence from 10 mV to 20 V/cm or continuously varied, between steps, to approximately 60 volts per centimeter. Horizontal time bases may be selected in calibrated 1-2-5 sequence from 0.2 sec/cm to 0.2 μ s/cm and the X5 magnifier makes it a simple matter to observe enlarged portions of displayed waveforms. AC, DC, and TV trigger modes make application of the IO-4555 to any test configuration a simple matter. Kit construction is straightforward, with circuit boards and wiring harnesses to simplify assembly, and Heath's performance engineered solid state circuitry insures years of trouble free performance. Put the IO-4555 on your bench today. It's one of the most versatile and practical instruments you can own, an investment that will really pay off in time and trouble saved.

Kit IO-4555, Shpg. wt. 29 lbs. **299.95**

IO-4555 SPECIFICATIONS: VERTICAL Sensitivity: 10 mV/cm to 20 V/cm. Attenuator: 11 steps in 1-2-5 sequence. Variable attenuator: Continuous between steps to approximately 60 V/cm. Accuracy: Within 3% (10°C to 40°C). Vertical Response: DC Coupling: DC to 10 MHz (-3 dB) at 6 cm. AC Coupling: 2 Hz to 10 MHz (-3 dB) at 6 cm. Rise Time: 35 ns. Overshoot: less than 5%. Vertical Input: Impedance: 1M Ω shunted by 38 pF. Maximum Input: 400 volts peak combined AC and DC. Connector: BNC. HORIZONTAL: Ramp: 0.2 sec/cm to 0.2 μ s/cm. Positions: 19 steps in 1-2-5 sequence. Variable time base: Continuous between ranges to approximately 0.6 sec/cm. Accuracy: Within 3% (20°C to 30°C), 5% (10°C to 40°C). Magnifier: X5 (adds additional 2% to sweep accuracy). Trigger: Automatic: Adjustable over 10 divisions. Normal: Adjustable over 10 divisions. Mode: AC, DC, TV. Y Channel: same as vertical. X Channel: same as vertical, except response is limited to 1 MHz. Phase Shift: less than 8° at 1 MHz. Power Requirement: 105 to 130 VAC/210 to 260 VAC switch selected, 70 watts at 120 VAC (240 VAC). 6.9" H x 12.8" W x 19.3" L (without handle). Calibration requires a precise source of square waves such as IOA-4510-1 or IG-4505 on page 66.

Lab-quality deluxe dual-trace oscilloscope features brighter trace and faster writing speed

\$379⁹⁵

- Mu-metal shield eliminates error caused by electromagnetic interference
- Fully-regulated high voltage supply

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 μ -metal shielding helps prevent interference. 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 on page 66.

Kit IO-4550, Shpg. wt. 27 lbs. **379.95**

Factory assembled and calibrated version of above.

SO-4550, Shpg. wt. 25 lbs. **525.00**

IO/SO-4550 SPECIFICATIONS: VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. Attenuator: 11 steps in 1-2-5 sequence; Variable: Continuous between steps to approximately 60 V/cm. Accuracy: Within 3%. Vertical Response: DC Coupling: DC to 10 MHz. AC Coupling: 2 Hz to 10 MHz. Rise Time: 35 ns. Overshoot: Less than 5%. VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm. Attenuator: Vertical Input: Impedance: 1 M Ω shunted by 38 pF. Maximum Input: 400 V. HORIZONTAL: Time Base: Ramp: 0.2 s/cm to 200 ns/cm. Positions: 19 steps in 1-2-5 sequence. Variable: Continuous between ranges to 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 k Ω (approx.). Frequency Response: DC to 1 MHz. Connector: BNC. TRIGGER: Internal: Automatic: Adjustable over 10 divisions. Normal: Adjustable over 10 divisions. Slope Selection: + or -. External: Automatic: Adjustable over 0.8 V. Normal: Adjustable over 0.8 V. Slope Selection: + or -. Impedance: 1 M Ω shunted by 40 pF. Connector: BNC. X-Y: Y Channel: Same as Vertical; X Channel: Same as vertical except response is limited to 1 MHz. Phase Shift: Less than 8° @ 100 kHz. Power: Voltage Range: 100-135 VAC/200-270 VAC switch selected, 70 watts at 120 VAC (240 VAC). 6.9" H x 12.9" W x 19.3" L (without handle).

**Dual-Trace, DC-15 MHz — the one you NEED
for professional service, circuit-design and engineering —
available fully assembled, or in money-saving kit form**



Easy kit assembly and service — major circuitry is contained on 5 PC boards



TV Servicing — excellent for stage by stage troubleshooting



Lab Work — circuit design, testing components, checking assembly

Our finest oscilloscope does it ALL!

Heathkit IO-4510 Dual-Trace Oscilloscope

\$579⁹⁵
Kit

- DC-15 MHz bandwidth with post-deflection accelerated CRT for high brightness
- Excellent 1 mV/cm input sensitivity
- 45 MHz typical triggering bandwidth

- Time base sweep to 0.1 μ s/cm; x5 sweep magnifier
- Y₁ and Y₂ trigger selection • X-Y capability

Professional scope performance at a low price — plus DC-15 MHz bandwidth, 1 mV/cm vertical sensitivity, time base to 0.1 μ s/cm and complete dual trace capability. Vertical input sensitivity of 1 mV/cm is provided over the entire bandwidth. With the 4510 and a X10 probe you can read waveforms to 10 mV, 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. And there's 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. Choice of normal or automatic sweep uses any one of 20 time bases from 0.2 sec/cm to 0.1 μ sec/cm. Any sweep speed can be magnified five times. An externally generated horizontal signal can also be selected. Internal delay lines display of at least 20 nanoseconds of the pre-triggered waveform, insuring complete waveform display — mandatory for logic analysis.

The fully regulated power supplies provide stable voltages. An adjustable AC line switch is used to match the regulated power supplies to any common line voltage from 100 VAC to 280 VAC.

IO-4510 calibration requires precise source of square waves such as IOA-4510-1 or IG-4505 on page 66.

Kit IO-4510, Shpg. wt. 36 lbs. **579.95**
SO-4510, factory assembled & calibrated version of IO-4510, Shpg. wt. 28 lbs. **750.00**

IO/SO-4510 SPECIFICATIONS — VERTICAL: Deflection Factor: Sensitivity: 1 mV/cm to 5 V/cm. Attenuator: 12 steps in 1-2-5 sequence. 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. Connector: BNC. Vertical Modes: Single: Y₁ or Y₂, selected by vertical position controls. Dual: Chopped (200 kHz) or alternate automatically selected by Time Base switch. **HORIZONTAL:** Time Base: Ramp: 0.2 n/cm to 0.1 μ sec/cm. Positions: 20 steps in 1-2-5 sequence. 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.). Polarity: Negative input causes right hand deflection. Frequency Response: DC to 1 MHz (-3 dB). Connector: BNC. **TRIGGER:** Internal: Automatic: Zero crossing \pm 0.5 volts. Normal: Adjustable over 8 divisions Slope Selection: + or -. External: Automatic: Zero crossing \pm 0.2 volts. Normal: Adjustable over \pm 5 volts. Slope Selection: + or -. Impedance: 1 megohm shunted by approx. 30 pF. Connector: BNC. **X-Y:** Y Channel: Same as Vertical. X Channel: Same as Vertical, except response limited to 1 MHz and no delay line. Phase Shift: Less than 3° @ 100 kHz. **GENERAL:** CRT: Type: 6 x 10 cm spiral PDA. Acceleration Potential: 4 kV regulated. Phosphor: P31. 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. Internal Supplies: Fully regulated. 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.

IG-1275 Deluxe Lin/Log Sweep Function Generator

\$319⁹⁵

- Sine, square and triangle outputs
- CW, burst, linear and log sweeps
- Variable symmetry, variable offset, VCG input

The IG-1275 is a reliable lab-grade function generator that provides sine, square and triangle waveforms PLUS swept-function waveforms for convenient frequency response tests. Also has pen lift and chart control signals for use with Heath chart recorders and others. Six operational modes; Continuous output (CW); gated CW; a burst mode that completes a variable integral number of output cycles; linear and log sweeps for a 1000:1 sweep range. Stop and start frequencies are set independently; sweep modes can also be triggered externally providing one sweep for each trigger, and stops for an integral number of cycles. Other features include: A 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. 16 lbs. **319.95**

Factory assembled and tested version of above:

SG-1275, Shpg. wt. 16 lbs. **475.00**

IG/SG-1275 SPECIFICATIONS: Output: 50-ohm source — short circuit protected. ± 10 volts open circuit. ± 5 volts into 50-ohm load. Output Flatness: ± 0.1 dB to 300 kHz. ± 0.5 dB to 3 MHz. Output Waveforms: Sine — Triangle — Square. Symmetry continuously variable 5% through 95% to 300 kHz. Frequency: 0.003 Hz through 3 MHz in 6 range steps on primary decade. Sine Distortion: Less than 1%, $\times 10^4$. Less than 0.5%, $\times 10^3$, 10^2 . Less than 0.75%, $\times 10^1$. Harmonics 30 dB down $\times 10^4$. Triangle Linearity: No deviation greater than 1% to 300 kHz*. Square-Wave Rise and Fall: Less than 60 nS. Dial Accuracy: $\pm 3\%$ of full scale. Attenuator: 0 to -50 dB in 10 dB steps. Variable control 0 to -20 dB. DC Offset: Signal plus offset, limited to ± 10 volts open circuit or ± 5 volts into 50-ohm load. Time Symmetry: Within 1% of full period through 300 kHz*. Sweep Generator: 6 ranges, 10 μ s through 100 sec. Each range may be extended by 100 with the variable control. Sweep Output: Supplies 0 to 4.5-volt linear ramp at sweep generator rate from a 1000-ohm source. Sweep Gate Output Connector: Supplies high TTL level for duration of sweep or burst. Analog Out-

IG-1273 Lin/Log Function Generator

- Offers top performance at a budget price

Has the same fine features and specifications of the IG-1275 above, but does not offer swept-function capability.

Kit IG-1273, Shpg. wt. 12 lbs. . . . **229.95**

Factory assembled and tested version of above:

Kit SG-1273, Shpg. wt. 14 lbs. **375.00**

put Connector: Supplies 0 to 6 volts DC for 3 decade span. Less than 100-ohm source. Sync Output Connector: Supplies 1.5-volt (minimum) peak-to-peak signal from a 50-ohm source. Voltage Control Input Connector (VCO): 0 to ± 5 volts signal for a 3-decade span. 8 k Ω input impedance. External Trigger Input Connector: \pm (250 mV to 4 volts) with 10 k Ω . Triggers on positive slope. Operating Temperature: 0° to 40° C ambient. Power Requirements: 100 to 135 volts, 50–60 Hz, 20 watts maximum. Switch selectable for normal or low line. (200 to 270 volts, 50–60 Hz, switch selectable.) Fuse Requirements: $\frac{3}{4}$ -ampere, slow-blow, 120/240 VAC operation. Dimensions: 15" wide, 11 $\frac{1}{2}$ " deep, 5 $\frac{3}{4}$ " high. 38.1 cm wide, 30.2 cm deep, 13.7 cm high.)

*Applicable only on top decade of each frequency range.

*NOTE: All specifications except those for swept functions also apply to IG/SG-1273 above.

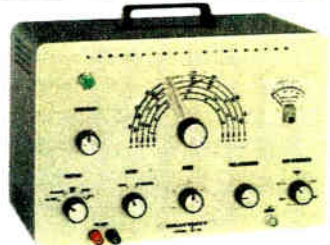
The IG-1275 and IG-1273 require a triggered sweep oscilloscope for calibration.



1



2



3

1 Stereo Generator — Provides audio or composite stereo signal for multiplex adapter adjustments... RF carrier modulated by these signals for tuner & receiver adjustments... phase test function for subcarrier transformer adjustment... a variable level crystal-controlled 19 kHz pilot signal for checking receiver lock-in ranges... plus built-in sweep and marker signals for RF & IF alignment. With test leads.

Kit IG-5237, Shpg. wt. 11 lbs. **99.95**

IG-5237 SPECIFICATIONS: RF Signal frequency: 100 MHz adjustable by approx. ± 2 MHz. Pilot modulating frequency: 10 kHz ± 2 Hz. FM modulation: Left channel (stereo), right channel (stereo), Phase Test (left plus right channel in phase). Monophonic FM. Deviation: Adjustable to 75 kHz. Sweep rate: (used for RF and IF alignment) 60 Hz. Power requirement: 120/240 VAC, 50/60 Hz, 35 W. Dimensions: 5 $\frac{1}{2}$ " H x 13 $\frac{1}{2}$ " W x 9" D.

2 Function Generator — Generates highly accurate sine, square or triangle waveforms. 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 for each step for a total of 70 dB. A triggered oscil-

loscope is needed for calibration.

Kit IG-1271, Shpg. wt. 7 lbs. **99.95**

Assembled SG-1271, wired version of the IG-1271 in same attractive blue & white styling (not shown), Shpg. wt. 7 lbs. **150.00**

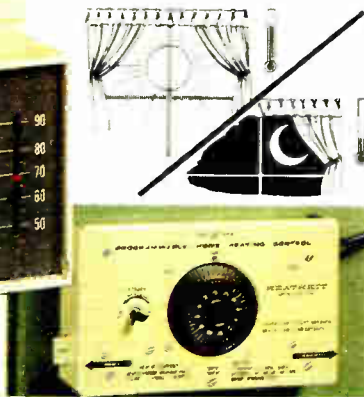
IG-1271 SPECIFICATIONS: Frequency accuracy: $\pm 3\%$ of full scale on dial. Functions: Triangle waveform: Nonlinearity, 5% maximum. Symmetry within 10% of 50% duty cycle. Square waveform: 100 nanosecond maximum rise or fall time. Sine waveform: Harmonic distortion: 3% max., 5 Hz to 100 kHz. Power requirement: 105-130 volts or 210-260 volts. rms, 60/50 Hz. 15 watts max. Dimensions: 3" H x 7 $\frac{1}{4}$ " W x 8 $\frac{3}{4}$ " D (with handle removed). Net weight: 4.2 lbs.

3 Precision RF Generator — The IG-42 provides 100 kHz to 30 MHz signals with $\pm 3\%$ adjustable frequency calibration. RF output voltage adjusts from 5 to 100,000 μ V in five attenuated steps, with 10:1 variable attenuation. Output can be modulated from 0-50% with 5% accuracy. 120/240 VAC, 60/50 Hz. 8 $\frac{1}{2}$ " H x 13" W x 7" D.

Kit IG-42, Shpg. wt. 15 lbs. **109.95**



Attractive, compact thermostat uses your present 2-conductor wiring.



Control unit installs easily on any single-stage gas, oil or electric furnace.

Control your home heat for BIG fuel savings!

Remember last winter's fuel bills? This Programmable Home Heating Control can help!

\$37⁹⁵

- Two programmable setbacks in a 24-hour period
- Econ-Norm override switch for normal operation
- Provides substantial fuel savings of 5-10%

The GD-1776 helps you conserve energy and save on fuel bills by automatically reducing room temperature during one or two pre-programmed periods. It reduces room temperature from as little as 1°F to more than 10°F for periods of ½ hour minimum to 23½ hours maximum. Heat is returned to its normal level automatically. An ECON-NORMAL switch overrides the timer and returns your furnace to normal operation.

The GD-1776 installs quickly and easily on any type of single-stage furnace. The replacement thermostat utilizes your existing 2-conductor wire. No extra thermostat wiring is needed. Certain combination heating/cooling systems may require the aid of a professional heating/air conditioning service if the installation presents unusual circumstances. Some local codes may require "hard-wiring" of the primary (120 VAC) power source by a licensed electrician. Not intended for use with 2-stage systems.

Kit GD-1776, Shpg. wt. 5 lbs. 37.95

GD-1776 SPECIFICATIONS: Temperature Setback Range: 1 to 10°F. Number of Setback Periods: 2. Setback Duration: ½ hour, minimum, 23½ hours, maximum. Timer Dial: 24 hours. Controls: Timing, Setback. Power Requirement: 120 volts, 60 Hz, 10 watts. Furnace Control Current Rating: 1A @ 24 VAC maximum. Dimensions: Thermostat: 3¼" H x 4½" W x 1¾" D. Control Unit: 4¾" H x 8" W x 2½" D.

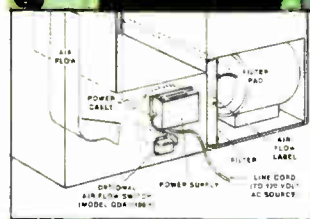
Ultra-convenient, efficient Ultra-sonic Cleaner

\$69⁹⁵

For those almost impossible cleaning chores. The Heathkit GD-1150 makes fast work of deep-cleaning watch parts, most jewelry, dentures,

any delicate items that could be harmed by scrubbing or abrasives. Simply fill the stainless steel tank with any safe detergent or solvent for the item to be cleaned. Place the object or objects in the tank, set the timer and that's it! You'll be amazed how quickly and easily your possessions come clean. Tank measures 6" L x 4" W x 2¾" D. Overall, 11" L x 5¾" W x 3¾" H. For 120 VAC.

Kit GD-1150, Shpg. wt. 4 lbs. 69.95



Electronic Air Cleaner for your home Furnace

\$179⁹⁵ *Installs on standard furnaces or air conditioners directly in place of present filter — usually without cutting or altering ductwork*

Removes most dust, dirt, pollen and other allergenic contaminants so your whole family can breathe fresh, clean air. Helps remove smoke and reduce odors too. NOTE: Kits below differ in size of filter panel. Check your furnace's filter size/capacity before ordering. For two-zone homes, two filters may be used with a single power supply. CFM, cubic ft. per min.

Kit GD-1196-1, 20" x 25" x 2", 1000 CFM. Shpg. wt. 24 lbs. 179.95

Kit GD-1196-2, 20" x 20" x 2", 800 CFM. Shpg. wt. 24 lbs. 179.95

Kit GD-1196-3, 16" x 25" x 2", 800 CFM. Shpg. wt. 24 lbs. 179.95

Kit GD-1196-4, 16" x 20" x 2", 640 CFM. Shpg. wt. 24 lbs. 179.95

Extra Filters. Use order nos. above, with GDA prefix i.e., GDA-1196-1, 20" x 25" x 2" Filter only. Av. Shpg. wt. 10 lbs. each 99.95

Accessory Air Flow Switch. Required when GD-1196 is used with 240 VAC furnaces and air conditioning systems.

Kit GDA-1196-5, Shpg. wt. 2 lbs. 24.95

GD-1196 SPECIFICATIONS: Air Cleaning Efficiency: 70% nominal. Generated Ozone Concentration: 0.02 PPM maximum. Static Pressure Drop: 0.15 in. w.g. (clean filter). Power Supply Dimensions: 12" W x 8" H x 4" D. Power Requirement: 110-130 VAC, 60 Hz, 25 watts max. Note: In some cases, a licensed electrician may have to make the electrical connections. Check with local building inspectors. Filter panels are 2" thick, so some adjustment in your present holding brackets may be required.

Room-size Electronic Air Cleaner

\$149⁹⁵

The Heathkit GD-1003 cleans the air of 99% of airborne pollen and 95% of other contaminants . . . regardless of size or concentration. The GD-1003 easily cleans the air in a 400 sq. ft. room, and it can be carried from room

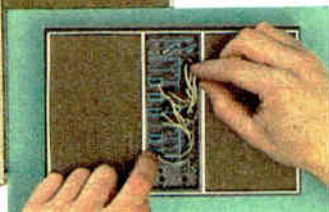
to room. Plugs into any 120 VAC electrical outlet. The two-speed fan is life-time lubricated for trouble-free operation. Everything's accessible for easy cleaning, too. A built-in safety interlock switch offers positive shock-hazard protection while cleaning, and against the inquisitive fingers of small children. Cabinet measures 15" H x 13½" W x 17¾" D.

Kit GD-1003, Shpg. wt. 55 lbs. 149.95

\$44⁹⁵



**Changes tunes
fast 'n easy**



1

1 Unique Programmable Doorbell

A FUN to build and use kit that will brighten your home all year 'round! A one-octave C through C "keyboard" lets you program any tune up to 16 notes — celebrate the season, a birthday, an anniversary, a special party — whatever you like. Change notes by simply rearranging the leads. And installation is easy too — just wire between existing bell transformer and TD-1089. The TD-1089 is loud enough to be heard throughout most homes, but you can add extra speakers to spread the sound throughout the house. Easy assembly too, ideal for first-time builders.

Kit TD-1089, Shpg. wt. 3 lbs. **44.95**

TD-1089 SPECIFICATIONS: Power Requirement: 16 volts AC, 50/60 Hz, from standard doorbell transformer (not supplied) with 10 VA Rating. Tone Characteristics: De-caying, mellow. Speaker Size: 3" x 5" oval — 16 Ohm. Extra speakers can be added for a total of not less than 16 Ohms. Programming Matrix: 13 notes x 16 beats — same note up to 9 beats. Dimensions: 5 3/4" H x 8 3/4" W x 2 3/4" D. Net Weight: Approx. 1 1/2 lbs. Power Drain: Idle, 6 watts, Maximum 12 watts.

2 Freezer Alarm could save you money

It signals if the freezer door is left open; and it signals if freezer temperature reaches 20°F even though the door is closed. The dual-alarm system uses both an audible "beep" and a flashing light. The alarm shuts off automatically when freezer temperature returns to about 10°F. Sensors install easily in any freezer; alarm box mounts anywhere with 20-ft. cable supplied.

Kit GD-1183, Shpg. wt. 2 lbs. **14.95**

3 Mount-anywhere "touch-control" Light Switch with half-brightness position

Gives you on-off switch control wherever you need it, without the bother and expense of extra outlets, wall boxes and rewiring. Simply plug your lamp (up to 150 watts incandescent only) into the control unit, plug the unit into an AC outlet. The remote touch-plate mounts anywhere and connects to the unit by an easily concealed wire. Then simply touch the plate briefly for half-bright, longer for full "on", and touch again for "off". Control unit 1 1/4" x 2 3/8" x 3 1/2". For 105-135 VAC, 60 Hz.

Kit TD-1187, Shpg. wt. 1 lb. **12.95**

4 Heathkit Telephone Amplifiers can make your telephone system more useful

Low As **\$49⁹⁵**

- Talk and listen to calls "hands-free"
- Great for conference and family calls
- Includes connectors for easy installation

In performance, features and value, these two quality telephone amplifiers equal the finest you can rent or buy. To answer the phone, simply press the power button; to hang up press it again. Voice-activated circuitry instantly and silently switches the amplifier from talk to listen. A slide control adjusts the volume; a listen button lets everyone in the room hear both sides of a conversation, or lets you monitor the line while talking privately. The built-in microphone lets you talk from up to 10 feet away. To return the phone to normal operation, just turn the amplifier off. The GD-1112 requires an external phone to place calls, the GD-1162's built-in dial and ringer makes it a completely self-contained telephone. Both units operate on standard 9-volt battery (not supplied), or optional GRA-43-1 AC converter, order below. For easy installation, the GD-1112 includes a 1/4" phone plug and 4-pin telephone plug; the GD-1162 has a 4-pin phone plug and, for business phones, a 15-pin dataphone connector. Both come with 6', 4-conductor cable. Each unit, 2 1/2" H x 8 1/2" W x 5 3/4" D. Good-looking cabinet may be used on desk or wall-mounted.

Kit GD-1112, Amplifier, Shpg. wt. 3 lbs. **49.95**

Kit GD-1162, Amplifier with Dialer, Shpg. wt. 4 lbs. **69.95**

Kit GRA-43-1, AC Converter, Shpg. wt. 1 lb. **4.95**

NOTE: Customer-owned equipment connected to telephone lines may be subject to local tariff.

2



3



Use it as an extension phone!



4

Heathkit electronic digital "Super-Clock"

An electronic digital floor clock with full 3¼" high numerals
in a modern, functional etagere cabinet

\$139⁹⁵

- **Automatic dimming circuit adjusts to room light for a charming and pleasant glow**
- **Hour and minute read-out can be seen from anywhere in the room**
- **Optional electronic Westminster Chimes build in easy for an authentic, rich "Big Ben" sound**

Add elegance with a "space-age" touch anywhere in your home! The GC-1195 "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. Easy time setting is accomplished by readily accessible, easy-to-use fast and slow time advance switches located on the bottom of the clock chassis. For even more charm and "Old World" distinction, add our electronic clock chimes accessory (described below).

Kit GC-1195, Shpg. wt. 72 lbs. Mailable **139.95**

GC-1195 SPECIFICATIONS: Display: 3¼" diffused incandescent readout. 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: 14" W x 9½" D x 60½" H. Net Weight: 48½ lbs.



Westminster Chimes Accessory

\$69⁹⁵ Authentic "Big Ben" chimes sound

Builds into the GC-1195 or GC-1197 to provide rich, electronically synthesized "Big Ben" chimes: 4 notes on the ¼-hour, 8 notes on the ½-hour; 12 notes on the ¾ hour and the full 16-note passage and hour announcement on the hour. And you can even turn on a reassuring electronic "tick-tock". Has volume and pitch adjustment, sound-decay control, "tick-tock" volume control, built-in speaker.

Kit GCA-1195-1, Shpg. wt. 3 lbs. **69.95**



Digital Electronic Shelf "Super Clock"

\$89⁹⁵ Has the same great features as our Digital Floor Clock in a handsome Shelf Clock 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. Specifications same as GC-1195 above, except dimensions are 6½" H x 12½" W x 6¼" D.

Kit GC-1197, Shpg. wt. 18 lbs. **89.95**

1 Digital Electronic Clock/Thermometer

We've combined two of our most popular kits — our digital alarm clock and our indoor/outdoor temperature thermometer, AND included a practical temperature alarm. The time and alternating indoor and outdoor temperatures (or any two temperatures you wish) are displayed in bright, orange digits. It's ideal for home or office. Has a full-feature electronic alarm clock with a 10-minute "snooze" alarm for "catnaps" up to an hour and an instant-reset alarm bar (just touch it to reset alarm for the same time tomorrow!). Exclusive temperature alarm sounds whenever the temperature goes above or below any temperature you preset — great for monitoring greenhouses, orchards, refrigerated areas, etc.

Has easy-to-use time advance and alarm set switches, adjustable display brightness, PM time indicators; + and -, indoor and outdoor temperature lights. The factory-assembled temperature sensors come with 75' (outdoor) and 10' (indoor) cables so you can custom mount the sensors just about anywhere! Has a sleek, low-profile cabinet with simulated wood-grain top and trim. The ID-1490 is an easy-to-build kit, too — just 3 circuit boards, and a wiring harness simplifies assembly. Use it for awhile and you'll wonder how you ever got along without it!

Kit ID-1490, Shpg. wt. 7 lbs. Was \$124.95 Now 99.95



1

- Exclusive temperature alarm sounds if temperature goes above or below a preset temperature
- Snooze alarm lets you take 10-minute "catnaps"

ID-1490 SPECIFICATIONS: CLOCK. Format: 12 or 24 hour. Accuracy: Determined by accuracy of power line frequency. No accumulative error. THERMOMETER: 2½-digit with + and - signs, and indoor-outdoor indicators. Format: Switch-selected °C (Celsius) or °F (Fahrenheit) read out. Temperature Range: -40° to +70° C. -40° to +158° F. Accuracy: (Outdoor) ±1° from -40° to +70° C. ±2° from -40° to +158° F. (Indoor) ±1° C from 0° to 50° C. ±2° F from -30° to 120° F. Power Requirement: 105-135 VAC, 60 Hz. Dimensions: 11¼" W x 6¾" D x 2¾" H.

2 "Budget" Digital Electronic Alarm Clock

Shows the hours, minutes and seconds in bright ½" high digits that can be seen easily most anywhere in the room. It wakes you with a gentle electronic "beep" and lets you take catnaps of approximately seven minutes each for up to an hour. The special power interruption indicator shows all "eights" if there is a significant power interruption. The "eights" remain until the clock has been reset, assuring correct time all the time. The GC-1094 can be wired for 12 or 24-hour readout, and it has a 24-hour alarm, so even if you reset the alarm in the morning, you'll be awakened the next day. Handsome wood-grain cabinet measures only 2¼" H x 7" W x 4¾" D. Kit assembly is really easy, too — making it a great project for first-time builders. Most parts mount on just two circuit boards, and a wiring harness simplifies assembly. For 120/240 VAC, 60/50 Hz.

Kit GC-1094, Shpg. wt. 4 lbs. 49.95

3 Deluxe Digital Electronic Alarm Clock

Same as GC-1092D below, but includes a full-feature 24-hour alarm instead of the calendar. Wakes you to a gentle electronic "beep". Take 7-minute "catnaps" for up to an hour by simply touching the snooze alarm. Select 12 or 24-hour (military) time format; an AM indicator lets you set the alarm for AM or PM. Easy to build, too. Same case style and dimensions as below. Less batteries.

Kit GC-1092A, Shpg. wt. 5 lbs. 69.95

4 Deluxe Digital Electronic Calendar Clock

Keeps you right on schedule with an easy-to-read ½" high digital display of the time in hours, minutes and seconds — and the date in four digits for month and day. Displays time continuously, or the date 2 seconds out of every ten, and you can call the date display any time by simply touching the case-top control. A standby battery supply takes over in case of power interruption. Also has automatic control of display brightness — brightly in brightly lit areas, dim in dimmer areas, with a switch for a continuous bright display. 12 or 24-hour clock format, too. Has a built-in charging circuit for rechargeable nickel-cadmium batteries, or you can wire it for standard batteries. Handsome low-profile case with rich brown tone finish, or you can place it in its pedestal base (included!) which swivels and tilts for easy viewing from any angle. The GC-1092D is an easy kit to assemble, and it's one of the easiest ways ever to stay on time and up to date! 8¾" W x 4¾" D x 2½" H (4" H with pedestal.) For 120 VAC, 60 Hz. Less batteries.

Kit GC-1092D, Shpg. wt. 5 lbs. 69.95

74



3



4



The remote transmitter assembly for the ID-1290 and ID-1590 clamps easily to any TV antenna mast.

\$89⁹⁵

Stay "on top" of conditions with this five-function weather station

The Heathkit ID-1290 Weather Station monitors indoor and outdoor temperatures, barometric pressure, wind speed and direction — all with electronic accuracy and reliability. It's ideal for home or office, radio-TV stations, airport pilot lounges, anywhere accurate and instant weather information is needed.

The barometer lets you observe changes as small as 0.02 inches of mercury to indicate changing weather conditions. The thermometer is calibrated in two degree increments from -40 to $+120^{\circ}\text{F}$ and a switch selects indoor or outdoor readings. The windspeed indicator has two ranges — 0-30 mph or 0-90 mph, and 8 wind direction lights offer true 16-point resolution for precision readings.

The ID-1290's walnut-grained plastic cabinet can be hung vertically or horizontally; or used as a handsome and distinctive desk set with the stands included. The remote transmitter assembly (windcups, weather vane and outdoor temperature sensor) clamps onto any TV antenna mast and is connected to the plaque with optional 8-wire

cable (below). Easy and enjoyable kit assembly makes the ID-1290 a great project for first-time builders too. Includes comprehensive weather book.

Kit ID-1290, Shpg. wt. 9 lbs. \$9.95

ID-1290 SPECIFICATIONS: Wind Speed: 0-30 mph, ± 2 mph; 0-90 mph, ± 5 mph. Direction: 8-point readout over 360° . Temperature: 0° to $+120^{\circ}\text{F}$, $\pm 2^{\circ}\text{F}$ (typ. IN-DOOR); -40° to $+120^{\circ}\text{F}$, $\pm 2^{\circ}\text{F}$ (typ. OUTDOOR). Barometric Pressure: 29-31 inches of mercury within .05 inches, accurate up to altitudes of 10,000 ft. Operating Temperature: Receiver, -32° to 100°F ; Transmitter, -40° to $+120^{\circ}\text{F}$. Power Requirement: 110-130 VAC, 50/60 Hz, 3.5 watts. Dimensions: Wall mount, $20\frac{1}{2}''$ W x $7''$ H x $2''$ D; Desk $20\frac{1}{2}''$ W x $7''$ H x $6\frac{3}{4}''$ D. Net Weight: 7 lbs.

8-Wire cable for remote transmitters

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

IDA-1290-2, 100 ft. cable, 4 lbs. 13.95

IDA-1290-3, 150 ft. cable, 6 lbs. 18.95

Digital Wind Speed and Direction Indicator

Outstanding accuracy and easy-to-read digital display make this kit a "must" for pilots, boaters — anyone whose activities are affected by the wind. Pick the two readout modes you want from the three available: miles or kilometers per hour, or knots. Switches select mode and front-panel lights show which is in use. Incandescent bulbs mark the 8 principal compass points, providing 16-point resolution. Uses same transmitter assembly and cable as above.

Kit ID-1590, Shpg. wt. 7 lbs. \$9.95

ID-1590 SPECIFICATIONS: Wind Speed: 0-99 in miles per hour, knots or kilometers per hour (choice of two). Response Threshold: 3 mph. Accuracy: ± 1 digit or $\pm 10\%$, whichever is greater. Direction Response Threshold: approx. 2 mph. Operating Temperature: Remote transmitter, -40 to $+120^{\circ}\text{F}$; Receiver, 0 to 150°F . Power Requirement: 120 VAC, 50/60 Hz, 6.5 watts. Dimensions: Receiver, $2\frac{1}{2}''$ H x $7''$ W x $5''$ D; Remote transmitter, 30" bcom.

Digital Indoor/Outdoor Thermometer

Monitor indoor/outdoor (or any two temperatures) with a big, bright, $\frac{1}{2}''$ high digital readout. The readout includes plus and minus signs as well as indoor and outdoor indicator lights. Select Fahrenheit or Celsius and continuous readings of one temperature or alternate readings of both. The 10' indoor and 75' outdoor cables included let you place the temperature sensors just about anywhere for a variety of custom applications — home freezer, hot house, basement, swimming pool, almost any temperature. Black Cyclocac® plastic case with teak-grain vinyl inserts.

Kit ID-1390, Shpg. wt. 4 lbs. \$9.95

ID-1390 SPECIFICATIONS: Temperature Range: Fahrenheit -40 to $+120^{\circ}$; Celsius, -40 to $+50^{\circ}$. Accuracy: Celsius, $\pm 1^{\circ}\text{C}$ from -15° to $+50^{\circ}\text{C}$, $\pm 2^{\circ}\text{C}$ from -30° to -15°C . Fahrenheit, $\pm 1^{\circ}\text{F}$ from $+20^{\circ}$ to $+120^{\circ}\text{F}$, $\pm 2^{\circ}$ from -30° to $+20^{\circ}\text{F}$. Display: 2½-digit planar gas discharge with + and - sign. Power Requirement: 110-130 VAC, 60 Hz, 4 to 6 watts approx. Dimensions: $2\frac{1}{2}''$ H x $7''$ W x $5''$ D.





NEW Klima-Gro® Indoor Greenhouse

\$279⁹⁵

(less base)

A miniature garden plot with electronically controlled climate for your indoor plants

The new Klima-Gro puts a little bit of country in your home or apartment. Grow your own vegetables, herbs and ornamental plants year round in this magnificent indoor greenhouse. Klima-Gro gives your plants the perfect environment for optimum growth. Light and heat are controlled automatically by reliable solid-state electronic circuits. A built-in moisture sensor and meter tells you when to water your plants — no more guessing. A 24-hour timer regulates the internal light. Automotive type safety glass panels slide for easy access. Klima-Gro costs only pennies a day to operate, too. Ruggedly constructed of anodized aluminum, safety glass and ABS plastic. The electronic control panel is fully assembled — only mechanical assembly is required. 51" W x 26" D x 28" H.

Kit GD-2225, Shpg. wt. 98 lbs. (see shipping note below)**279.95**

GDA-2225-1, Optional Base. 55 lbs. (see note below)**69.95**

Note: If you purchase the Klima-Gro and optional base at the same time, shipping and handling for both items is only \$20.00. If you order them separately, shipping and handling is \$20 for each item. So you SAVE \$20 by ordering the Klima-Gro and base together. Shipping is via motor freight from Charlotte, Michigan to a terminal near you in the continental U.S. Include your phone number on order for notification of arrival. Arrangements for home delivery may be made at extra charge. No COD orders accepted.



NEW Automatic Telephone Answering System

Completely automatic—perfect for home or business

The Record-a-Call® VOX 70 has all the features you need in an automatic telephone answering device. Records on a standard-size cassette tape. Voice actuation permits a caller to speak as long as desired without time limits on the recorder. Other features include silent monitor (only the caller's voice is heard), announce only (gives message to caller and hangs up), dictation capability, fast forward, rapid rewind, rapid erase, and more. 120 VAC powered. 9" x 11 7/8" x 3 3/8". Fully assembled. **GDP-1227**, Shpg. wt. 12 lbs.**199.95**



NEW Digital Thermometer

\$49⁹⁵ • Bright 4-digit display
• Wide range of uses

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 (0°C to 100°C) in 1/10th degree increments.

Some typical uses include photo processing, tropical fish tanks, clinical uses, measuring soil temperatures and checking heating and air conditioning. Power is supplied by a standard 9V battery. A flashing decimal point provides a low battery warning. Fully assembled. Less battery.

GD-1226, Shpg. wt. 1 lb.**49.95**

Unique Heathkit programmable digital stopwatch

For features, versatility and accuracy, we don't think you can find a better stopwatch than our GB-1201! Two exclusive Heath PMOS IC counters and quartz crystal accuracy make it ideal for almost any timing job. Reads hours, minutes, tens and hundredths of seconds in a bright red digital readout that's easy to see in most any light. We even include a sunscreen so you can read it in direct daylight! Seven functions time any event; Start/stop elapsed time, sequential timing, total activity time, split time, start/stop activity time, upcount to a preset time, downcount from time.

Includes pre-wired AC adapter/charger, rechargeable batteries, sunscreen, lanyard for wearing the GB-1201 around wrist or neck. Special modification instruction lets you convert the GB-1201 to read hundredths of minutes — perfect for car rallies and time studies.

Kit **GB-1201**, Shpg. wt. 2 lbs.**84.95**

ICA-2009-1, Felt-lined Naugahyde® carrying case, Wt. 1 lb.**3.95**

GB-1201 SPECIFICATIONS: Accuracy: ±0.006%, typically better than 0.003%. Instrument alignment provides higher accuracy. Battery Life: approx. 40 hrs. between charges with displays mostly off; approx. 4 hrs. with displays continuously on. Recharging: approx. 14 hours with power off. Temperature Range: -10° to +120°F. Dimensions: 5 1/8" H x 2 1/4" W x 2" D. Net Weight: approx. 8 oz.



Fidelity Electronics Chess Challenger™

The microprocessor-based computer chess game that's sweeping the country! Lets you play the exciting, fascinating, challenging game of chess on a computerized board that challenges you with its own moves and strategies. If you're a beginning chess player it's the perfect way to learn and practice, if your an advanced player or an expert, it will keep your game "in tune" and sharpen your skills!

Has chess board marked in easy to understand letters and numbers (not standard chess notation), keyboard entry of moves, including castling and en passant! A computer memory provides position verification and the digital display shows the computer's moves. A four digit readout indicates from and to positions and there are indicator lights for "check", when the computer puts you in check, and "I lose", when the computer concedes. The chess challenger is not a pushover, however average players usually beat the computer 25% to 70% of the time.

Includes complete board and keyboard, chess pieces and line cord. For 120 VAC, 60 Hz. The Chess challenger will help you become a better chess player, it's also an instant "partner" so you can play your game whenever you feel like it. Fully assembled and ready to use. Compact enough for easy portability.

GD-1235, Fully assembled. Shpg. wt. 6 lbs. 179.95

Famous Logix Experimenter Kits

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.

JKP-1222, Shpg. wt. 5 lbs. 24.95

2 Basic Electric Lab Kit with over 140 exciting experiments. Build and experiment with telephone systems, electromagnets, motors, burglar alarm, compass, microphone, lots more. Includes 135 experimenter parts plus a detailed instruction manual for hours of fun-filled education. No soldering. Less batteries.

JKP-1223, Shpg. wt. 3 lbs. 14.95

3 Super Electronics 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.

JKP-1224, Shpg. wt. 3 lbs. 16.95

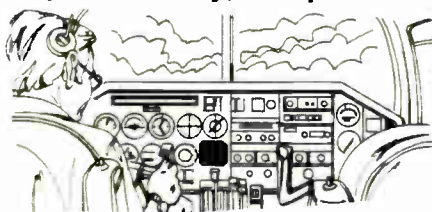


Function selector with LED "moving dot" indicator

Easy-access pencil-tip pushbutton clock controls

4-digit red LED displays with automatic dimming

High-accuracy, low-priced Aircraft Clock/Timer



- Indicates GMT, local time — times to 24 minutes and 24 hours, preset alarm too
- FAA/PMA Approved, Meets DO-160 requirements
- Clock runs even with display "off"

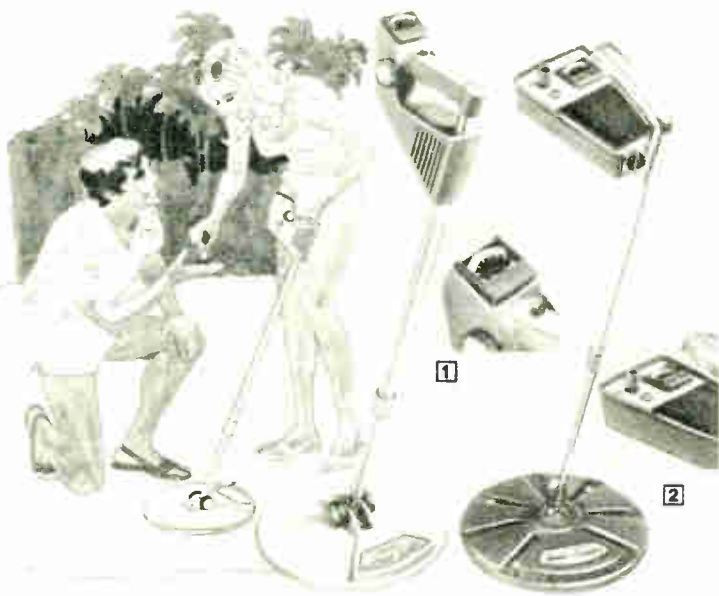
Gives you the accuracy and reliability you NEED for any flight timing, at about HALF THE COST of competitive models! All timing functions are quartz-crystal controlled for exceptional accuracy. The upper 4-digit display shows 24-hour GMT or ZULU time; the lower display shows local time, 24-minute timer (displays minutes and seconds), total trip timer (24 hours max.); or an alarm time that

you have stored in the memory of the trip timer. This alarm time function is for fuel management or check point notification. A function switch selects the time shown on the lower display. Both clocks run continuously; the trip timer runs only when the aircraft's master power switch is on. Displays dim automatically for night flying. Fits standard 3 1/8" instrument panel.

Kit OI-1154, Shpg. wt. 3 lbs. 149.95

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

OI-1154 SPECIFICATIONS: Input Voltage: 14 VDC or 28 VDC. Input Current: 0.5 A max. (bright display). Crystal Oscillator Accuracy: Typical, less than ±1 minute per month. Initial, .004% at 25°C. Drift, ±.003%, -20°C to +65°C. Aging, .002% per year. Dimensions: 3.3" x 3.3" x 6" deep.



1 Heathkit GD-348 — Our best Metal Locator

Heathkit metal locators use a sophisticated "induction balance" system — you don't hear anything until a piece of metal enters the field. Then the tone grows louder as you get closer to the object. Listen through the built-in speaker or optional headphones, or use the front-panel meter to pinpoint your find. The GD-348 has null and wide range sensitivity controls that let you adjust it to find smaller or larger objects, overcome ground effects, etc. The shaft telescopes and the search coil folds flat for easy storage.

Kit GD-348, Locator only, Shpg. wt. 5 lbs. **89.95**
 GDA-48-1, 9-volt battery, Shpg. wt. 1 lb. **3.25**
 GD-396, 600-ohm Superex headphones, Shpg. wt. 2 lbs. **5.95**
 GDA-348-1, carrying case, Shpg. wt. 2 lbs. **11.95**

2 Heathkit GD-48 Standard Metal Locator

Uses an "induction balance" system similar to the GD-348. There are no tone variations to guess at because there is no tone until a metal object enters the field. All solid-state circuitry, telescoping shaft, built-in speaker, headphone jack, meter. A single 9-volt battery (not included) supplies power.

Kit GD-48, Locator only, Shpg. wt. 6 lbs. **59.95**
 GDA-48-1, 9-volt battery, Shpg. wt. 1 lb. **3.25**
 GD-396, 600-ohm Superex headphones, Shpg. wt. 2 lbs. **5.95**

3 Heathkit 2-Station Intercom System

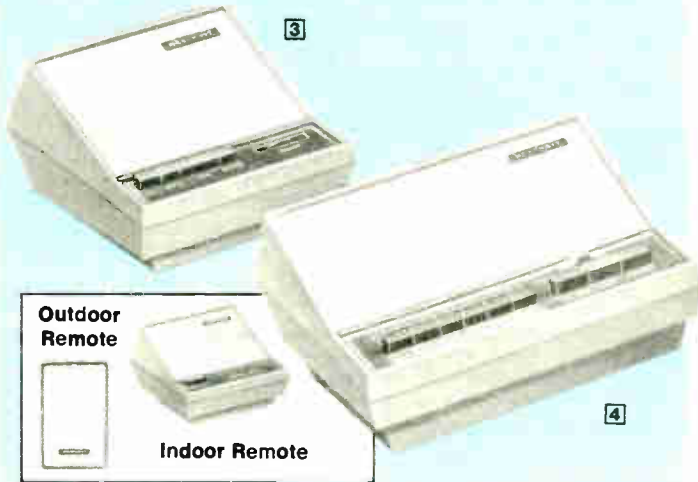
Master station accommodates up to two remotes. Remotes can initiate "private" calls to Master. Master can call either or both remote stations. Low-profile cabinets with plastic feet for surface use, holes for wall mounting. 3 3/4" H x 6" W x 5 3/4" D.

Kit GD-140, one Master, one Remote, Shpg. wt. 4 lbs. **36.95**
 Kit GD-120, one extra Remote, Shpg. wt. 2 lbs. **12.95**
 GDA-110-2, 100' 4-conductor cable, Shpg. wt. 3 lbs. **9.95**

4 Indoor/Outdoor Intercom System

Master functions include "All Call," "Talk," "Dictate"... plus monitoring of up to four Remotes. Indoor Remotes can be rendered private to prevent monitoring. GD-110 and GD-120 are light green and measure respectively 4 1/2" H x 8 1/2" W x 6 3/4" D and 3 3/4" H x 6" W x 5 3/4" D. GD-130 has weatherproof crinkle finish. 5 3/8" H x 3 3/8" W x 2 5/8" D.

Kit GD-110, Master Station, Shpg. wt. 5 lbs. **44.95**
 Kit GD-120, Indoor Remote, Shpg. wt. 2 lbs. **12.95**
 Kit GD-130, Outdoor Remote, Shpg. wt. 2 lbs. **9.95**
 GDA-110-2, 100' 4-conductor cable, Shpg. wt. 3 lbs. **9.95**
 GDA-110-4, 100' 2-conductor outdoor cable, Shpg. wt. 1 lb. **4.95**



SAVE \$5!
 GD-1414 includes certificate for \$5 rebate from manufacturer!

First Alert™ Battery-Powered Early Warning Smoke Detector

\$32.95

- Ionization-type detector gives earlier warning
- Protects your home, family and property

Protect yourself from tragedy! This performance-proven detector is already in millions of homes and it *SHOULD* be in yours. Detects fire in its first stage, when there's still time to protect your family from flames and suffocating smoke. Warns you before smoke or flames, by sounding its self-contained built-in alarm horn. This 85 decibel horn is powerful enough to awaken people sleeping soundly behind closed doors. Has dual-chamber detection for maximum reliability. Operates on its own internal battery (included!) that will last at least a year. If the battery needs replacement, a low-battery trouble signal acti-

vates and will sound an intermittent beep for as long as a month. Battery operation makes installation easy too — just fasten to any ceiling or wall with the mounting screws and anchors that are included. Has automatic reset, built-in test switch to check operation before installation. 100% solid-state circuit. Temperature range: 0° to 112°F. Humidity Range: 20%-95% RH. The First Alert provides excellent area coverage. In most cases, two units will provide effective coverage for an average size home. First Alert may qualify you for an insurance discount — check with your agent. U.L. listed. **GD-1414**, Shpg. wt. 2 lbs. Assembled . . . **32.95**



1 Central Processor



3 Auxiliary Transmitter



2 Ultrasonic Detector



5 Smoke/Fire Detector



4 Emergency Transmitter



6 On-Off Transmitter

Heathkit "Total Security" Wireless Alarm Systems For Home or Business

1 Central Processor Module. The "heart" of the Heathkit wireless security system, the central processor responds to signals from any of the other modules (2 thru 6 described below) to sound the alarm. Has tamper-proof circuit that sounds alarm if AC power fails, penetrating built-in siren and outputs for external speaker and phone dialer. Time delay circuit and automatic reset provide added protection and convenience. With batteries. 4½" H x 10⅞" W x 6" D.

Kit GDA-1158-1, Shpg. wt. 8 lbs. 159.95

2 Ultrasonic Detector Module. Protects an area up to 300 sq. ft. When any object enters the field, sends signal to Central Processor. Each unit plugs directly into AC outlet. Use as many as needed as long as areas covered do not overlap. 10⅞" H x 3¼" W x 3¼" D. (Since the GDA-1158-2 operates in the same frequency range as the Heath TV remote controls, interference between the two is possible).

Kit GDA-1158-2, Shpg. wt. 3 lbs. 74.95

3 Auxiliary Transmitter Module. Lets you add door/window switches, mat pressure switches and other sensors to the system. Switches

Informer® ultrasonic alarm

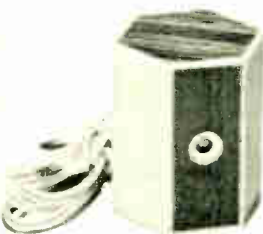


Sits on bookshelf or table, sounds alarm if an intruder enters its field of surveillance. Transmits ultrasonic signal up to 25 feet away for effective room protection. Triggers indoor or outdoor alarms, lamps, buzzers, etc. Has automatic reset, built-in time delay. 2⅜" W x 10⅞" H x 7½" D. For 120/240 VAC.

Kit GD-39, Shpg. wt. 5 lbs. 49.95

GDA-39-1, Indoor buzzer alarm. 1 lb. 9.95

GDA-39-2, Outdoor Bell. Shpg. wt. 5 lbs. 26.95



Low-cost photoelectric Lamp Switch

Turns lights on in the evening, off in the morning, gives your home a "lived in" appearance when you're away. For incandescent lamps up to 150 watts. Simply plug into AC outlet and adjust sensitivity. Great 1-evening get-acquainted kit too.

Kit GD-600, Shpg. wt. 2 lbs. 5.95

must be either all Normally Open or all Normally Closed. Transmits signals to Central Processor. 3¼" H x 7¼" W x 3¼" D.

Kit GDA-1158-6, Shpg. wt. 2 lbs. 39.95

4 Emergency Transmitter Module. Place anywhere you need them for total protection — lets you send a signal to Central Processor by simply pushing the button. Plugs into any AC outlet. 1¼" H x 5" W x 3¼" D.

Kit GDA-1158-4, Shpg. wt. 2 lbs. 29.95

5 Early Warning Smoke/Fire Detector. Use with GD-1158 Central Processor or by itself with its built-in speaker. Solid-state sensor detects gases generated before flames or intense heat begins. A built-in thermal switch also activates the alarm when the temperature exceeds 135° F (57°C). Has sensitivity control, "armed" light, automatic reset. 7¼" W x 3¼" H x 3¼" D.

Kit GDA-1158-5, Shpg. wt. 3 lbs. 74.95

6 On/Off Transmitter Module. Turns off Central Processor with a push of the button. Plugs into any AC outlet. To turn Processor on again, simply release the button. 1¼" H x 5" W x 3¼" D.

Kit GDA-1158-3, Shpg. wt. 2 lbs. 29.95

Outdoor Speaker (Not shown). Weatherproof speaker connects to Central Processor, sounds alarm outdoors so it can be heard through the neighborhood. All-weather design. Includes mounting hardware.

GDA-1158-7, Assembled. Shpg. wt. 3 lbs. 19.95

Automatic Telephone Dialer brings help fast



Perfect for vacation homes, warehouses, any remote location

The alarm to have for unattended areas or when you're away for an evening. Automatically dials a number you preselect — relatives, neighbors, etc., when alarm is triggered. Can be used with intrusion alarms, pressure switches, panic buttons, the GD-1158 security system, etc. Has automatic redial if line is busy, 3-digit location code, separate microphone. Battery-powered to operate if AC power fails. 4¾" H x 11" W x 6" D. With batteries. Check with phone company for installation requirements, if any.

Kit GD-1156, Shpg. wt. 7 lbs. 169.95

Heathkit/Thomas Keyboard Kombo

*The instrument that looks like an organ,
but does a whole lot more — build it for
a lifetime of musical entertainment!*



\$549⁹⁵



**Create the sound of an entire musical combo
by playing simple one-finger chords!**

- Provides solo instruments, rhythm accompaniment and drums
- Wide-selection of built-in tempos for real versatility
- **BIG, FULL** sound from the built-in 12" wide-range speaker

The TO-1102 will make you the "life of the party" as you dazzle your friends and family with exciting and creative musical entertainment all at the touch of a finger.

The TO-1102 accurately reproduces the sounds of these solo instruments: Flute, Clarinet, Trumpet, Violin, Accordion, Guitar, Piano, Banjo, Mandolin, Harpsichord, Vibes and Hawaiian Guitar. As you play the "solos" with these instruments, the TO-1102 automatically accompanies you with a wide assortment of rhythm instruments: piano, guitar, banjo, harpsichord and flute. These rhythms are automatically accompanied by alternately bass pedal notes.

And the drums provide the beat! Variable slide controls for drums tempo and volume let you create your own tempos or you can choose automatic tempos of Waltz, Fox trot, Swing, Rock and Latin.

The Keyboard Kombo has 24 major and minor one-finger chords. Simply press the key with one finger and the chord automatically plays — depressing a foot pedal switch lets you change the chord from major to minor. A special memory-chord circuit keeps the last chord sounding until you play the next, providing a smooth, professional-sounding flow of music. Vibrato and reverb controls let you create special effects for even more musical versatility!

The TO-1102's sound system delivers the music you produce with outstanding sound quality. There's a deluxe all-solid-state amplifier with a heavy-duty wide-range 12" speaker system. And its unique

electronic circuits insure that all instrument and rhythm sounds are accurately reproduced.

Has on-off switch with pilot light, volume control, slide controls for keyboard balance and reverb, a balanced expression control. There's even a headphone jack so you can entertain yourself or practice in complete privacy. The keyboard is clearly marked with each note, so learning to play is easy and fast. Just sit down with it for awhile and you'll find yourself sounding like a "Pro"! We include full instructions with songs to get you started!

Finally, the TO-1102 is as good to look at as it is to play and listen to. The contemporary designed cabinet is fully assembled and has a simulated rosewood finish for a rich, expensive look. The handsome matching bench is included too. The TO-1102 is an easy-to-build kit too, with IC's and plug-in circuit boards to simplify assembly. And it's priced a lot lower than assembled units, so you get big kit-form savings. Treat yourself and your family to musical entertainment at its best — order the TO-1102 today!

Kit TO-1102, Shpg. wt. 189 lbs. Motor Freight 549.95

TO-1102 SPECIFICATIONS: Solo Instruments: Flute, Clarinet, Trumpet, Violin, Accordion, Guitar, Piano, Banjo, Mandolin, Harpsichord, Vibes, Hawaiian Guitar. Accompaniment Instruments (Rhythm): Piano, Guitar, Banjo, Harpsichord and Flute: Drums: Waltz, Fox Trot, Swing, Rock, Latin. Drum Controls: Tempo — Variable Slide; Volume — Variable Slide. Chords: 24 one-finger Chords, Memory Chord. Controls: Vibrato Cancel; Reverberation, variable slide; Keyboard Balance, variable slide. On-off switch with pilot indicator. Balanced Expression control. Headphone Jack. Cabinet: Contemporary Design with Rosewood Finish. Sound System: solid-state amplifier with 12" heavy-duty Speaker. Dimensions: 34 1/4" H x 36" W x 21 1/4" D. Net Weight: 150 lbs.

Heathkit Music Accessories help you perform BETTER!

1 25-watt Guitar Amplifier. An excellent choice for the musician on the move! The rugged one-piece case with carrying handle houses a full control amplifier and a speaker system featuring two heavy-duty 12" woofers. Has two dual-input channels — one for accompaniment, microphone, etc.; the other for special effects. Features double-spring variable reverb and tremolo with variable rate and depth, a line reverse switch to minimize hum. Two footswitches permit hands-free control of reverb and tremolo. ¾" black vinyl-covered wood cabinet, 28" W x 19¾" H x 9" D. For 120/240 VAC, 60/50 Hz.

Kit TA-16, Shpg. wt. 61 lbs. 149.95

2 120-watt Guitar Amplifier. Fine-sounding instrument amplifier at a low build-it-yourself kit price. Has a switchable built-in harmonic modifier for that "fuzzy" sound; a special brightness switch to enhance high frequency presence; separate bass and treble boost controls, dual-spring-type variable reverb and a tremolo that's variable in both rate and depth. A dual footswitch gives you hands-free on-off control of tremolo & reverb. Has three separate channels with two inputs for each channel. Can be used with guitar, bass guitar, electronic combo organ, microphone/phonograph. Rugged ¾" black vinyl-covered wood cabinet, 27⅞" W x 6¾" H x 14½" D. For 120/240 VAC, 60/50 Hz.

Kit TA-17, amplifier only, Shpg. wt. 50 lbs. 199.95

3 Deluxe Instrument Speaker. Matched to TA-17 above, delivers excellent sound from two 12" woofers with 27-oz. magnets and fiberglass voice coils; and a special horn driver for extra brilliance. Stacks with TA-17 for easy, convenient setup. Black ¾" vinyl-covered wood cabinet, 25⅞" W x 38" H x 14½" D. With 20-ft. cable.

Kit TA-17-1, Shpg. wt. 112 lbs., Motor Freight 189.95

4 Electronic Metronome. A front panel control turns the unit on and adjusts tempo from 40 to 210 beats per minute. A rear panel control adjusts the volume. Cherry-finish birch cabinet. Easy 1 evening assembly. Requires two 9-V batteries (not supplied).

Kit TD-17, Shpg. wt. 2 lbs. 17.95

See page 45 for Informative Music Books.

Professional-quality PA Equipment

5 P.A. Control Amplifier. Delivers 100 watts continuous power to two column speakers, has six fully mixable low-impedance inputs; each with bass, treble reverb-on-off and attenuation controls; complete filtering system for good sound. Add as many booster amps and speakers as you need for any audience coverage — even add more control amps for additional inputs. Rugged particle board case, 21½" W x 11¼" H x 7" D. For 120/240 VAC, 60/50 Hz.

Kit TA-1620, Shpg. wt. 54 lbs. Was 449.95 Now Only 399.95

6 Low-Distortion Booster Amplifier. Use with the TA-1620 for even more power. Delivers 100 watts continuous to two column speakers. Matched in style and stackable with the TA-1620.

Kit TA-1625, Shpg. wt. 22 lbs. Was 179.95 Now Only 159.95

7 PA Speaker Column. Has six 8" full-range speakers response tailored for clean voice reproduction; an output jack for TA-1625 booster amp, or to connect two columns in parallel. With 50' cable, storage compartment. 14" W x 62" H x 10¼" D. Shpg. wt. 112 lbs.

Kit TS-1630, Motor Freight Was 199.95 each Now Only 169.95

SAVE on this complete PA system!

SAVE \$349⁹⁰ Original Prices if purchased separately, \$849.85 **NOW \$499⁹⁵**

Control Amplifier and Two Column Speakers.
TAS-1620, Shpg. wt. 277 lbs. Motor Freight 499.95



Our most popular Guitar Amp/Speaker Kit only \$149⁹⁵



Deluxe Guitar Amplifier only \$199⁹⁵



Deluxe Instrument Speaker only \$189⁹⁵



Electronic Metronome makes practice "perfect" only \$17⁹⁵



LOWEST PRICES EVER!
SAVE on both the individual pieces and the complete system!



New Heathkit Garage Door Opener now with improved electronics



Low As
\$159⁹⁵

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

The GD-3309 garage door 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. Drive into the garage, touch the button again, and the garage door closes behind you. Has a powerful 1/3 hp motor that opens even the heaviest residential garage doors (up to 7 1/2' maximum height) with ease; responsive, self-lubricating screw drive. 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 pre-cut and pushbutton connectors are already installed. A separate doorbell-type switch and 20' cable let you operate the unit from inside your house, or anywhere you may choose.

- Kit GD-3309A, Transmitter, Receiver, Mechanism.**
Shpg. wt. 45 lbs. Motor Freight **159.95**
- Kit GD-3309B, Two Transmitters, Receiver, Mechanism.**
Shpg. wt. 46 lbs. Motor Freight **174.95**
- Kit GDA-3309-1, Mechanism only.** Shpg. wt. 44 lbs. Motor Frt. . . **129.95**
- Kit GDA-3209-2, Adaptor for jamb and pivot doors.** 3 lbs. **9.95**
- GDP-3309, 1 Transmitter only.** Shpg. wt. 1 lb. **24.95**
- GDP-3319, 1 Transmitter, 1 Receiver.** (3-wire system) 1 lb. . . . **44.95**
- GDP-3329, 2 Transmitters, 1 Receiver.** (3-wire system) 2 lbs. . . **59.95**
- GDA-3309-3, Power Transformer.** Allows use of new transmitter and receiver with any 2-wire system door openers and model 309 below.
Shpg. wt. 1 lb. **5.95**

GD-3309 SPECIFICATIONS: Overall Size: 120" L x 12" H x 9" W. Motor: 117 VAC 1/3 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: 350 MHz. Useful Temperature Range: -50°F. to +140°F. **UHF Receiver:** Powered by 24 VAC from opener mechanism. Usable on any 3-wire mechanism or 2-wire with addition of GDA-3309-3. RF Frequency: 350 MHz.

Build and install this "economy" chain-drive opener over the weekend



\$129⁹⁵

- **Safety-Reverse Feature—Door instantly reverses and returns to full open if obstructed**
- **Factory-assembled transmitter and receiver**

A powerful quarter-horsepower chain-drive opener at a great kit price! Operates standard 7 1/2' track doors or jamb and pivot doors with GDA-309-2 adaptor, or "California" style doors with GDA-309-3 Speed Reducer Adaptor. Self-locking, automatic reversing, Quick-release pin. Includes "doorbell" button & wire for manual door operation.

82



New factory assembled transmitter and receiver with latest circuitry

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 digitally coded with 250 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. The transmitter and receiver units come fully assembled and ready to use. They are FCC approved and usable with standard NEC 3-wire systems.



Up-Down Limiters

Permanently installed limiters let you adjust amount of door travel so door coasts smoothly to proper position, open or close.

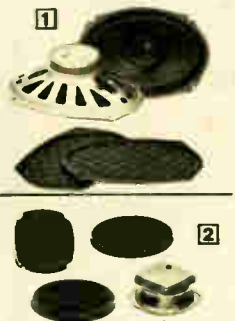
- Kit GD-309A, System with 1 transmitter,** Shpg. wt. 49 lbs. . . . **129.95**
- Kit GD-309-B, System with 2 transmitters,** Shpg. wt. 49 lbs. . . **144.95**
- Kit GDA-309-1, Mechanism only,** Shpg. wt. 42 lbs. **99.95**
- Kit GDA-309-2, Adaptor for jamb & pivot door,** Shpg. wt. 2 lbs. . . **4.95**
- Kit GDA-309-3, Adaptor for vertical-opening 1-pc "California" style doors,** Shpg. wt. 4 lbs. **9.95**

To order additional transmitters & receivers, see listing under GD-3309A and GD-3309-3 Transformer above.

NOTE: This economy opener is mailable—for lower shipping costs!

GD-309A SPECIFICATIONS: Overall Size: 123" L x 10" H x 8 1/2" W. Motor: 120 VAC 1/4 HP. Open and Closing Time: Approx. 9 sec. for 7' door. Control: Wall-mounted, doorbell-type pushbutton switch, or optional devices (transmitter-receiver, key switch, etc.). Safety: Door travel reverses instantly and returns to full open position when obstructed. Overhead Mounting Clearance: 2 1/2" above highest point of door travel. Safety Lamp: 60 watts. Automatically turns on when the door is fully open and stays on until door starts to close. Specifications: Same as GD-3309A above.

Heathkit FM Car Stereo Tuner



Put true hi-fi sound in your car

Offers the kind of performance you'd expect from a home system — less than 1% THD; frequency response ± 1 dB, 30 to 15,000 Hz; 3 μ V sensitivity; 60 dB selectivity; 40 dB nominal separation. Has phase-locked loop demodulator, muting circuit to eliminate noise between stations; AFC; stereo indicator light. Requires power amp. (below).

Kit CR-1000A, Shpg. wt. 7 lbs. \$69.95
Kit CRA-1000-1, Power amp., fits back of tuner, for 12V battery.
 Shpg. wt. 3 lbs. \$29.95

1 CRA-1000-5, 6" x 9" 4-ohm rear deck mount hi-fi speakers (including grilles and 24' speaker lead). Shpg. wt. 7 lbs. (pair) **21.95**

2 CRA-1000-2, 4 1/2", 4-ohm door-mount hi-fi speakers (including grilles, adapter plates for most speaker size openings and 24' speaker lead). Shpg. wt. 7 lbs. (pair) **14.95**



Windshield Wiper Delay

Ideal safety accessory for driving in light mist and fog. 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.

Kit CH-1068, Shpg. wt. 2 lbs. . . \$15.95

CH-1068 SPECIFICATIONS — Delay Interval: 5 to 30 seconds minimum. Sweeps interval: .5 to 10 seconds minimum. Input voltage: 13.8 volts DC, $\pm 20\%$. Positive or negative ground. Wiper System Compatibility: (Electric Only) GM: All single and two speed systems. Ford: Most small and intermediate models. Not compatible with full size models or '72-76 Torino, or Montego, '74-'76 Cougar. Chrysler: Single and two speed systems on small and intermediate models which do not use a motor reversing parking system. Ask dealer about your car's system. AMC: Single and two speed systems. Other models: Electric wipers which do not use a motor reversing parking system. NOTE: Heath does not supply automotive wiring diagrams for this unit.

Emergency Strobe Light



Makes you visible so emergency help gets there quick! Just insert the adaptor plug provided into your car's cigarette lighter. A 12 ft. cord lets you place the flashing light in any spot on the car. Has non-marring magnetic base plate, highly visible flashing strobe with amber dome lens. High-impact plastic case is moisture and corrosion resistant, has storage for cable.

Kit GD-1026, Shpg. wt. 3 lbs. \$29.95

GD-1026 SPECIFICATIONS: Supply voltage range: 13.8 VDC $\pm 20\%$. Power consumption: 5 watts nominal. Flash voltage range: 450 VDC $\pm 20\%$. Flash repetition rate: greater than 1 per sec. Operational temperature range: -30°C to $+60^{\circ}$.



\$69⁹⁵
 WAS 79.95

Comfortable hand-contoured grip with trigger to operate voice or yelp.

Rectangular horn speaker for outstanding efficiency and voice or yelp sound projection

SAVE!

20-Watt Portable Megaphone/Yelp Alarm

The GD-1818 is a quality power megaphone for voice projection, with a built-in alarm that produces an attention-getting "yelp" sound. It's ideal for outdoorsmen, boat owners, fire and police departments, track and field coaches, etc. The noise-cancelling microphone amplifies your voice only with minimum background noise. Turning on the "yelp" switch produces a single downward wail each time you pull the trigger. A volume control sets the voice level. The GD-1818 can be wired for a continuous-tone, instead of the yelp sound, making it useful as a portable horn for boats, dune buggies, etc. Operates on eight "C" cells (not supplied). Rugged high-impact plastic case is spray resistant for use on water.

Kit GD-1818, Shpg. wt. 6 lbs. Was 79.95, NOW 69.95

GD-1818 SPECIFICATIONS: Power Output: 20 watts peak voice power. Yelp Alarm: single downward wail with automatic shutoff. Optional continuous tone selected during construction. Pilot Lamp: indicates Yelp or continuous tone. Power Source: 12 volts (eight "C" cells). Weight: 4 lbs. 12 oz. with batteries. Dimensions: Horn end, 8 3/4" W x 6 1/4" H, 14 1/2" long overall.

Cab-to-Camper Intercom

Includes Master, Remote and Cable

\$29⁹⁵

3-position switch on Master selects "Standby", "Monitor" or "Talk" modes. Remote can initiate calls and has "Radio" position to bring music into camper from cab radio. Requires 12 volt, 250 mA power source. Shpg. wt. 5 lbs.



Kit GD-160, Master, Remote & Cable \$29.95

GDA-160-1, Accessory Plug. For quick disconnect when camper and cab are separated.

Shpg. wt. 1 lb. \$4.50

Heath-recommended 40-CHANNEL CB Two-way Radios!

Heath
Price
\$169⁹⁵



Midland 40-channel mobile with volume on mike

Model 77-888. Offers super-quality and convenience with an extra volume control on the mike for easy use while driving, phase-locked-loop synthesizer for complete 40 channel operation without extra crystals. Has lighted S/R/F/SWR meter, built-in SWR bridge and calibrator for tuning antenna. Has PA function, audio tone control, noise blanker, ANL and Delta-tune. Antenna Warning Light indicates excessive VSWR. With PTT mike, coiled cord and mounting bracket. 2¼" H x 7" W x 8¼" D. "Omni-power" operation for any 12-volt system, positive or negative ground.

GWP-2196, Shpg. wt. 7 lbs. Assembled **169.95**

Heath
Price
\$249⁹⁵

**SUPER BUY ON
LATEST SSB!**



Midland 40-channel SSB/AM mobile CB Transceiver

Model 79-892. Gives you all 40 AM CB channels plus upper and lower sidebands for a total of 120 operating channels and more range than AM. Delivers 4-watt output (12 watts PEP SSB). Has SSB clarifier control, RF gain control, noise blanker, hi/lo tone switch, PA switch, S/R/F meter. With mike and mounting bracket. 2½" H x 7½" W x 9½" D. For 12 VDC positive or negative ground.

GWP-2197, Shpg. wt. 8 lbs. **249.95**

Heath
Price
\$139⁹⁵



Royce mobile CB Radio with Gyro-Lock

Model 675. Features Gyro-Lock (Phase Lock Loop) circuitry for 40-channel transmit/receive on Royce's famous "wireless" chassis. Has a big illuminated S/R/F meter, continuous fine tuning control, pushbutton automatic noise limiter, pushbutton PA/CB switch, pushbutton RF gain control. AMC for maximum "talk power;" LED transmit light. Full-size plug-in microphone. Modular-design chassis for reliability, with jacks for external/PA speaker. 2¾" H x 7¾" W x 8¾" D. 12 VDC positive or negative ground operation; power cord included.

GWP-2184, Shpg. wt. 8 lbs. Assembled **139.95**

Royce 40-channel Base Station

Model 621. Has all the convenience features you could want in your CB base station, and performance that makes it a real value. Sophisticated styling, too, with walnut end panels, charcoal gray top, black control panel and satin aluminum grille. Dual power supply operates from 117 VAC or 12 VDC. Variable tone control, automatic noise limiter, delta tuning for off-frequency stations, tape recorder jack, variable squelch to quiet the receiver between calls. Dual conversion receiver has ceramic filter for razor-sharp selectivity. Extra-large easy-to-read channel readout dial; illuminated S/R/F meter; bar-type Transmit and Modulation lights. 4½" H x 12" W x 8" D.

GWP-2186, Shpg. wt. 14 lbs. Assembled **189.95**
84

Heath
Price
\$149⁹⁵



Royce digital 40-channel mobile CB

Model 680. Feature-packed all-channel CB 2-way radio has a digital readout dial system that shows channel selection in bright LED numerals. Gyro-Lock (Phase Lock Loop) 40-channel crystal system. Big S/R/F meter, pushbutton ANL and PA/CB switches, fully variable squelch control. IC audio stage with 6-watt RMS output. Amplified AGC; 3 ceramic filters; tuned RF stage in the dual conversion receiver. AMC circuit for peak "talk power." Jacks for external/PA speakers. Rugged vinyl-clad metal cabinet. 2¾" H x 8¾" W x 8¾" D. For 12-volt DC positive or negative ground. Includes mike, DC cord.

GWP-2185, Shpg. wt. 7 lbs. Assembled **149.95**



Heath
Price
\$189⁹⁵

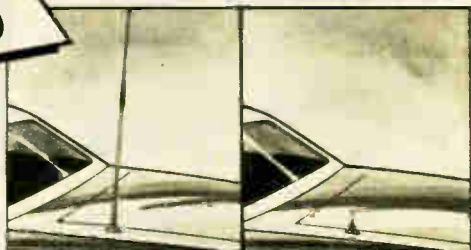
- Operates 120 VAC or 12 VDC
- Nicely styled for desk or console
- Crystals for all 40 channels included

Antenna Specials!

Retractable Electric Mobile CB Power Antenna

SAVE \$20

Now Only **\$39⁹⁵**



Up and operating when you want it — out of sight when you don't.

Tenna CBE-10. The answer to one of the biggest problems CB'ers have today — theft. With a flick of the switch inside your car, the antenna extends to its full height and turns your CB radio on. Another flick of the switch, the antenna disappears into the fender and turns the radio off. No one spots your CB antenna — the giveaway that there's a rig in your car. Smooth-running electric motor is designed for years of trouble-free operation. Has adjustable SWR, waterproof seals between sections to maintain contact in any weather, dual chrome-plated mast. With 18' RG-58/U coax cable, all hardware for easy mounting.

GDP-110, Was \$59.95
Shpg. wt. 8 lbs. **39.95**

Low-priced CB Antennas

1 A-S M-176 "Quick-Grip" Mobile Antenna. Trunk lid mount (no holes to drill). 46" high. Weatherproof coil; 17' coax. Shpg. wt. 3 lbs.

GDP-2121 **14.95**

2 A-S MR-180 "Flipper" Mobile Antenna. Raingutter mount (no holes to drill). With 10' coax. Shpg. wt. 2 lbs.

GDP-2122 **14.95**

3 A-S M-117 "Super Magnum" Base Antenna. ½ wave end-fed; gives 3.75 dB gain, improves S/N 6 dB! Static-reduction ball. Shpg. wt. 9 lbs.

GDP-2120 **29.95**

4 A-S M-125 Rooftop Mobile Antenna. Snap mounts in ¾" hole. Loading coil. 46" h; 17' coax. Shpg. wt. 2 lbs.

GDP-2123 **14.95**



\$64⁹⁵ Kit

Concealed horn



Exterior horn



Heathkit GD-18 Deluxe Mobile Siren/PA

As an electronic siren, the GD-18 boasts a full 55 watts of power. A manual "wail" button lets you override the PA function if you need the siren without resetting the function switch. When used as a PA system, the GD-18 amplifies your voice with a full 20 watts of power. The GD-18 can also be used as a radio call alert — so even if you're away from your vehicle, you can be alerted to important calls. Has push-to-talk noise-canceling mike. Select your choice of high-output speakers — either concealed or exposed horn. Concealed speaker requires 4½" x 4½" x 13" behind grille. NOTE: please check the required standards for mobile sirens in your area.

Kit GD-18, Shpg. wt. 6 lbs.	64.95
Assembled WD-5130, siren/PA amp, Shpg. wt. 6 lbs.	89.95
Assembled GDA-18-1, exterior horn, Shpg. wt. 10 lbs.	64.95
Kit GDA-18-2, concealed horn, Shpg. wt. 10 lbs.	64.95
Assembled WDA-513C-2, concealed horn, Shpg. wt. 10 lbs. . . .	79.95

SAVE on systems!

If purchased separately, 129.90.

GD-18A (Kit GD-18 and Exterior Horn) Shpg. wt. 21 lbs. **121.95**

GD-18B (Kit GD-18 and Concealed Horn) Shpg. wt. 21 lbs. ... **121.95**



ONLY \$19⁹⁵

Heathkit Mobile Security System Protects your car

Ideal for cars with CB rigs, tape players, etc. Under-dash alarm set switch has a 5-15 second adjustable delay so you can enter or leave your car without sounding the alarm. 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 sounding the car horn. With all switches and hardware. Alarm unit, 2½" H x 4¾" W x 5" D. For 12 VDC negative ground only.

1 Kit GD-1157, Shpg. wt. 3 lbs.	19.95
2 Kit GDA-1157-1, Optional Siren Accessory, 2 lbs.	19.95
Kit GDA-1157-2, Optional Horn Relay (not shown). Shpg. wt. 1 lbs.	2.95



Easy-to-build Digital Readout Tachometer

Reads your engine's RPM, even in direct sunlight, on the ½"-tall numeric display. The readout shows 1st 2 digits, multiply by 100 for actual rpm. A dimmer control adjusts the brightness for safe nighttime driving. The CI-1079 operates with conventional ignition systems, capacitive discharge systems (like the Heathkit Model CP-1060), and factory electronic ignitions. For 4, 6, 8 cylinder 4-cycle engines; 2, 3, 4 cylinder 2-cycle engines; 2, 3, 4 rotor Wankels. Easy installation — simply connect the CI-1079 directly to the primary side of the ignition coil. For engines with magnetos or without access to the primary, order the optional inductive pickup below.

Kit CI-1079, Shpg. wt. 3 lbs. 49.95
 Kit CIA-1079-1, inductive pickup, Shpg. wt. 1 lb. 5.95

CI-1079 SPECIFICATIONS: Power Requirement: 12 V, neg. gnd. only. Readout Accuracy: ±4% of reading, ±1 count. Update Time: 0.3, 0.2 or 0.15 seconds, depending on calibration point. Size: 1 7/8" H x 4 3/4" W x 4 3/4" D.

Digital Car Clock with 20-hour Trip Timer

A totally electronic, totally reliable timepiece, typically accurate within one minute per month. Bright, easy-to-read ½"-high numerals display the time in hours and minutes. A built-in elapsed timer displays elapsed time in minutes and seconds, for the first 20 minutes. After that, the elapsed time is displayed in hours and minutes up to 19 hours — 59 minutes. "Clock/ET" button lets you display either clock time or elapsed time, while the other function continues in the memory. Built-in AM or PM indicator. Includes all hardware required to mount the unit on or under the dash of your car, boat, camper, or motorcycle. Die-cast case.

Kit GC-1093, Shpg. wt. 3 lbs. 64.95

GC-1093 SPECIFICATIONS: Power Requirement: 10-17 VDC, neg. ground only. 300 mA max., display on. 30 mA max., display off. 4.5 volts minimum for clock memory. Accuracy: one min. per month, typical. Temp. Range: -30 to +60°C. Format: 12 hrs. with AM, PM and 20-hour rally timer. Dimensions: 1 7/8" H x 4 3/4" W x 4 3/4" D. Net Weight: 1 lb. 4 oz.

Digital Electronic MPG Monitor/Speedometer

An important driving accessory for every car! The CI-1078 reads 0-99.9 miles-per-gallon and 0-99 miles-per-hour on bright amber-orange ½"-high digits. As a miles-per-gallon monitor it helps you save gas and money every time you drive, as an electronic speedometer it gives you a much more precise reading than conventional speedometers. Has a dimmer control to adjust the display for comfortable night driving, handsome die cast case with burl-grain vinyl insert. Includes all hardware for mounting in or under the dash, or on car's floor hump. **Please Note.** Ingenuity and good mechanical skill is necessary for transducer installation. You may wish to employ a qualified mechanic to install the transducers for you (fuel flow transducer installation involves cutting and removing a portion of the fuel line). Since every make and model of car is different, we cannot provide exact information for every car. The CI-1078 is not compatible with fuel injected engines or diesels. Heath cannot be responsible for damages, labor charges or replacement parts associated with transducer installation. When ordering, please specify make, model and year of your car. Be sure your car is included in the speed transducer listing below. We cannot provide information on other models.

Note: The kits below differ only in the speedometer transducer supplied. Order the one that fits your car.

CI-1078-1. For speedometer cable mounting on: '55-'68 Chrysler Corp. Cars. '55-'71 Chrysler Corp. trucks; '55-'68 GM cars (except Opel); '55-'71 GM trucks (except LUV); '55-'68 Ford cars; '55-'72 Ford Trucks (except Courier); '55-'71 American Motors Cars; '72-'77 Gremlin, Sportabout and Hornet; '55-'66-Studebaker; '55-'77 Jeep; '55-'77 English Ford. For Cruise Control mounting on '69-'77 Chrysler Corp. cars; '69-'77 GM cars (except Opel); '55-'77 Ford cars.

Kit CI-1078-1, Shpg. wt. 5 lbs. 99.95

CI-1078-2. For transmission mounting on: '69-'77 GM cars (except Opel); '72-'77 GM trucks (except LUV); '69-'77 Chrysler Cars except Colt and Cricket; '72-'77 Chrysler trucks.

Kit CI-1078-2, Shpg. wt. 5 lbs. 99.95



Helps you find the best operating efficiency for your car or boat engine



Quartz-crystal timebase insures high accuracy



Saves you gas and money every time you drive

CI-1078-3. For transmission mounting on: All Opel cars; '72-'77 Audi; '55-'77 BMW; '55-'77 Mercedes; '55-'72 Saab; '55-'77 Volvo. For speedometer mounting on '55-'77 Porsche and VW.

Kit CI-1078-3, Shpg. wt. 5 lbs. 99.95

CI-1078-4. For speedometer mounting on: '69-'77 Ford cars; '73-'77 Ford trucks (except Courier).

Kit CI-1078-4, Shpg. wt. 5 lbs. 99.95

CI-1078 SPECIFICATIONS: Display: 3 digits, gas discharge. 0-99.9 miles per gallon. 0-99 miles per hour. Controls: Front — mpg/mph pushbutton switch, display dimmer. Rear — update control, mph calibration, mpg calibration. Speed transducer: DC generator. Flow transducer: Photo resistor sensor measures fuel flow, 1.5 to 12 gallons per hour with accuracy ±3% of maximum flow rate. Electronics: Accuracy: ±2% of maximum reading. Temperature Range: 0-60° C operating, -40° to +70° C storage. Power requirements: 10 to 17 VDC at 500 mA; 13.5 to 17 volts required to meet specifications. Display unit dimensions: 1 7/8" H x 4 3/4" W x 4 3/4" D. Display unit weight: 2 lbs.



1



2

1 Heathkit CD Ignition System improve's your car's performance

- Helps you get longer life from plugs and points
- Assures fast, sure starts in all kinds of weather
- Improves gas mileage to help you save money and energy

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. Not for fuel injection engines. 3 1/8" H x 3 3/4" W x 6" D.

Kit CP-1060, Shpg. wt. 3 lbs. 34.95

2 Breakerless Ignition Adaptor for CD Ignition Systems

Develops a timing signal that isn't subject to mechanical problems of point wear and bounce. Replaces the points of all pre-1975 GM V-8 engines, and all AMC V-8s with external dwell adjustment (not for others). Easy-to-build unit mounts inside engine com-

partment; sensor mounts inside distributor, without removing points. Designed for operation only with Capacitive Discharge Ignition Systems such as the CP-1060 or similar units. Shpg. wt. 2 lbs.

Kit CP-1051 Was 44.95 Now 24.95



15-Amp Automatic Battery Charger/Booster

Charges 12-volt car battery at 15-amp rate, boosts at 50-amp rate for quick start when battery is dead. Use on negative or positive ground. Circuit breaker protection.

Kit GP-1044, Shpg. wt. 22 lbs. 59.95

GP-1044 SPECIFICATIONS: Charge Rate at 120 VAC (primary): Boost, 50 amperes (max. 1 minute). Normal, 15 amps. Shuts off automatically after battery is fully charged. Output Voltage: Shuts off when voltage at terminal reaches 14.5 V. Power Requirement: 110-130 VAC, 60 Hz. Size: 6 1/8" H x 11 1/2" W x 7 3/4" D.



10-Amp Automatic Battery Charger

Keeps your car battery at full charge for easier starts. Better performance! Won't operate unless correctly connected, can't overcharge the battery. Easy to use — just connect the cables to 12-volt battery terminals and plug into AC outlet.

Kit GP-21, Shpg. wt. 13 lbs. 39.95

GP-21 SPECIFICATIONS: Charge Rate: 10 amperes maximum at 120 VAC line. Output Voltage: Between 13.2 VDC and 13.6 VDC. Power Requirement: 105-130 VAC, 60 Hz. Dimensions: 5 1/2" H x 9" W x 6 3/8" D.



Small Engine Tune-up Meter

Ideal for garden tractor, lawn mower, motorcycle, snowmobile, outboard motors, etc. Tests volts, ohms, dwell & continuity on 1 to 4 cylinder, 2 & 4 cycle engines. Built-in tach, snap-on pickup. Less batteries. (Not for Briggs & Stratton engines.)

Kit CM-1045, Shpg. wt. 4 lbs. 42.95

CM-1045 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 Source: Three 1.5 V "C" batteries. Dimensions: 9 1/4" H x 9 3/8" W x 5 1/4" D.

Hanson Basic Tester Set

Helps you keep your car in top shape! Includes Model 714 Remote Starter Switch, Model 715 Deluxe Compression Tester, Model 709 Vacuum/Fuel Pump Tester. CGP-1036, Assembled. Shpg. wt. 2 lbs. .. 11.95



GM Voltage Regulator Tester

Easy to use, fast and accurate! Shows condition of all 4 circuits in GM Delco Integral Charging System regulators. Simply insert regulator in self-heating holder, then follow procedure listed inside case top. Has single knob meter control, two indicator lights.

CTW-1170, Assembled, Shpg. wt. 16 lbs. 99.95

CTW-1170 SPECIFICATIONS: Test Voltage: 16.5 VDC. Sense Voltage: Adjustable 0-17 VDC. Voltmeter: 0-20 VDC ±3%. Short Circuit Current: 0.1A. Power Requirement: 120 VAC, 60 Hz, 150W. Case: Aluminum. Dimensions: 7" H x 11" W x 7" D.



87



Includes adaptor
for use with
GM HEI
ignition systems



Test gear to keep your car running great

Heathkit CO-1015 Ignition Analyzer

\$159⁹⁵

- Built-in rpm indicator
- Clamp-on inductive pickup for easy hookup
- Easier to use than meter type analyzers

Detects shorted spark plugs, bad ignition points, defective wiring, worn distributor parts, incorrect dwell angle, plus coil or condenser defects and transistor or capacitive discharge circuitry problems. Can be used with any standard, transistorized or capacitive discharge ignition system on four, six or eight-cylinder engines with distributors.

You select one of four different patterns — primary or secondary, in either parade or superimposed display. For detailed analysis, the horizontal sweep can be expanded 10 to 1, vertical sweep 2 to 1. The optional 12-volt inverter mounts permanently to the unit's rear panel, for portable or "on the road" tests. Includes adaptor for use with General Motors High Energy Ignition systems.

Kit CO-1015, Shpg. wt. 22 lbs. 159.95

Kit COA-1015-1, 12-Volt Inverter, Shpg. wt. 3 lbs. 32.95

WOA-5104-1, Assembled 12V Inverter, Shpg. wt. 3 lbs. 39.95

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: $\pm 5\%$ 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 $\pm 5\%$ of full scale. Dimensions: 7" H x 10½" W x 17½" D.

Low-cost professional-grade Engine Analyzer

\$69⁹⁵

- Color-coded meter for easy readings
- 3% accuracy on all ranges
- Complete with all leads and accessories

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.

No need to recalibrate the unit between functions — all you do is turn the rotary switch to the desired range and you're ready to test. Operates on 3 standard "C" batteries (not supplied). Has convenient carrying handle. Comes complete with all leads and accessories, ready to build quickly and use.

Kit CM-1050, Shpg. wt. 8 lbs. 69.95

CM-1050 SPECIFICATIONS: Voltmeter Ranges: 0-3.2 V DC, 0-32 V DC, $\pm 3\%$ of full scale. Ohm-meter: Two ranges: R x 1 (100 Ω center scale), R x 100 (10 k Ω center scale), $\pm 3^\circ$ arc. Tachometer: Two ranges: 0-1200 rpm, 0-6000 rpm, $\pm 3\%$ of full scale. Dwell Meter: Two ranges: 0-45° (on 0-60° scale), 0-60°, $\pm 3\%$ of full scale. Amperes: -5 to +90 amperes DC, $\pm 3\%$ of full scale. Spark Output: 0-50. Point Resistance: Good/Bad. Alternator: Good/Bad. Condenser: 0.22 μ F, 10%. Accuracy: $\pm 3\%$ of full scale. Cables 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. (#14). Dimensions: 7½" H x 10½" W x 8¾" D.

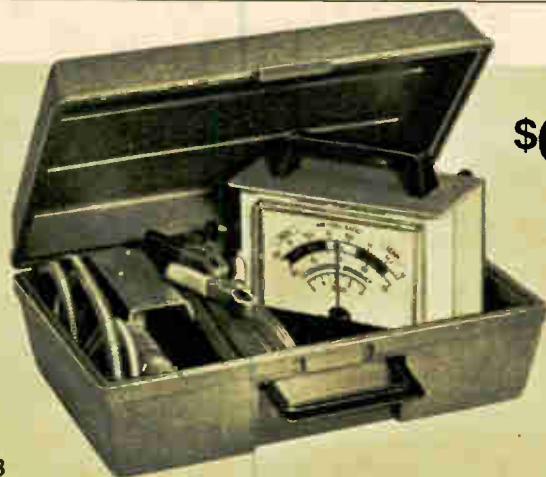
Exhaust Gas Analyzer checks fuel efficiency

- Shows air-fuel ratio and percent of carbon monoxide
- Helps you tune-up your car for peak performance
- Includes all you need for fast and easy hookup

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. The CI-1080 is essential when you're tuning up a car which must meet specific requirements for exhaust emissions, or when you simply want peak operating efficiency. Comes with all cables and tubing for easy connection.

Kit CI-1080, Shpg. wt. 6 lbs. 64.95

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 μ A. 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.



\$64⁹⁵

Kits for Better Fishing



1 **\$89⁹⁵**

1 Heathkit Dual-Range Depth Sounder

Shows depth, type of bottom, schools and individual fish, submerged objects. A high-pitched "beep" alerts you to shoals or objects projecting above any preselected depth from 5 to 240 ft. Has switch-selected 0-60 and 0-240 ft. ranges. Fixed noise rejection, polarity pro-



2 **\$59⁹⁵**

tection, super-bright neon indicator. Gimbal mount, quick-disconnect power and transducer leads. Shpg. wt. 8 lbs.

Kit MI-1031-1, with thru-hull transducer, 15' coax. **89.95**

Kit MI-1031-2, with transom transducer, 25' coax. **89.95**

2 Heathkit Single-Range Depth Sounder

As above, single 0-240 ft. range, no alarm. Shpg. wt. 8 lbs.

Kit MI-1030-1, with thru-hull transducer and 15' coax. **59.95**

Kit MI-1030-2, sounder with transom transducer and 25' coax. . . **59.95**

3 Heathkit Dual-Range Fish Spotter® Sounder

The Heathkit MI-2901 Fish Spotter® Sounder has adjustable audible alarm you set to sound off at any depth to 240 ft. Fish swimming between surface and preset depth will trigger alarm. *Includes two switch-selected ranges (0-60' and 0-240')* for sharper definition; noise rejection circuit; bright neon-flasher for precise depth reading. Rugged aluminum cabinet. Portable suction-cup transducer bracket. Powered by two 6-volt lantern batteries (not included).

Kit MI-2901, Shpg. wt. 8 lbs. **89.95**

Kit MIA-2900-1, Scanning Transducer Bracket, Shpg. wt. 4 lbs. **19.95**

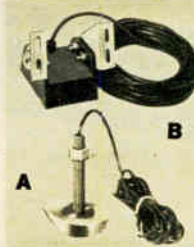
MI-2901 SPECIFICATIONS: Accuracy: $\pm 2\%$ with motor speed of 2400 rpm in the 0-60' range and with motor speed of 600 rpm in the 0-240' range. Sounding: Rate: 40 times per second on the 0-60' range, 10 times per second on the 0-240' range. Frequency: 200 kHz, $\pm 5\%$. Noise Rejection: Fixed at approximately 500 microseconds integration time. Power Requirement: 12 VDC. Dimensions: (Less Handle): 7" H x 6" W x 11" D.

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

Kit MI-2900, Shpg. wt. 8 lbs. **59.95**

5 Heathkit Scanning Transducer Bracket: Designed for use with Heathkit MI-2901 and MI-2900 Fish Spotter® sounders. "C" clamp mounting. For 1 3/8" cylindrical transducer.

Kit MIA-2900-1, Shpg. wt. 4 lbs. **19.95**



These depth sounders are available with either through-the-hull or transom-mount transducers. The transom mount unit (B) is recommended for high-speed craft with planing hulls. The through-the-hull transducer (A) is ideal for a permanent mount on larger boats.

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: 6 1/2" H x 5 3/4" W x 7 1/4" D.



\$89⁹⁵

3 **Dual-Range Fish Spotter®**

4 **Economy Fish Spotter®**



5

The Thermo Spotter® thermometer

Completely self-contained with submersible sensing element on a 100-ft. cable. Kit includes operations manual with fish temperature preference charts. Uses 1.5-volt penlight battery (not included).

Kit MI-104, Shpg. wt. 3 lbs. **27.95**



It's Heath for better boating!

Heathkit Digital Depth Sounder

Lets you know depth of water below you from 2.5 to 199 ft.

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

Kit MI-101-1, With through-hull transducer, Shpg. wt. 7 lbs. . . . 149.95

Kit MI-101-2, With transom transducer, Shpg. wt. 6 lbs. 149.95

MI-101 SPECIFICATIONS: Accuracy: $\pm 2\%$, ± 1 digit. Current drain: 300-500 mA. Power requirement: 10-17 VDC @ 500 mA. Dimensions: $2\frac{1}{4}"$ H x $6\frac{5}{8}"$ W x $8\frac{1}{2}"$ D (less gimbal hardware).



\$149⁹⁵

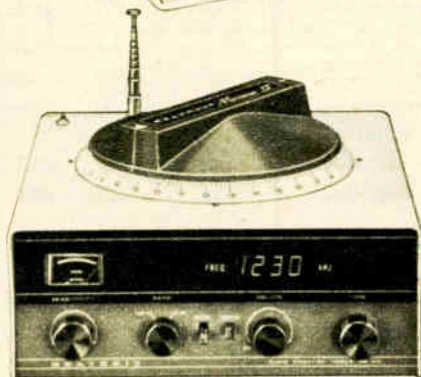
Heathkit Digital Radio/Direction Finder

Digital readout pinpoints AM or beacon stations

Keeps you informed on the 190-410 kHz LW band and standard AM. It identifies stations with a digital frequency readout, and gives you a heading from its big easy-read azimuth ring marked in 2° increments! Has excellent sensitivity, lighted meter for accurate null indications, telescoping sense antenna for an impressive bearing accuracy of $\pm 3^\circ$. Has front panel RF sensitivity control. Operates from 12 VDC system, or 6 "D" cells (not included). Battery-saver circuit cuts display off after 20 seconds, can be recalled instantly.

Kit MR-1010, Shpg. wt. 14 lbs. 199.95

MR-1010 SPECIFICATIONS: Sensitivity: Typically $30 \mu\text{V}/\text{m}$ (LW) for 10 dB S+N/N. Selectivity: (6 dB points): 3 kHz (LW); 5 kHz (AM). Audio Output: 1 watt. Speaker: built-in $3 \times 5"$. Current Drain: 450 mA (with display & meter); 110 mA (meter only); 30 mA (radio at typical listening level). Dimensions: $7\frac{1}{4}"$ H x $11\frac{1}{2}"$ W x $12"$ D.



Midland 45-Channel VHF Marine Radiotelephone

Has full legal 25-watt transmitter output

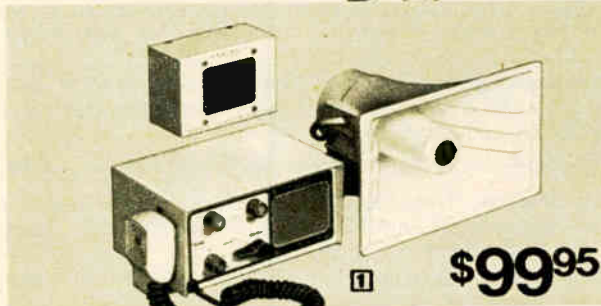
Model 13-535. Here's a full feature radiotelephone that's right for any boat! Covers marine channels 6-28 and 65-88 for transceiver operation, receives marine channel 15 and both NOAA weather channels. Has 25 W/1 W power switch, squelch control, phase-locked-loop tuning, lots more! Includes coiled-cord mike, mounting bracket, DC power cord.

MWW-4501, Assembled. Shpg. wt. 10 lbs. 399.95

A-S 8', 6 dB antenna with chrome ratchet base.

MWS-4511, Shpg. wt. 6 lbs. UPS 79.95

13-535 SPECIFICATIONS: Control: PLL synthesized with detent tuning. Connections: Microphone, external speaker, antenna, DC power. Power Source: 13.6 VDC (nominal) negative ground. Size: $3\frac{1}{4}"$ H x $8"$ W x $10\frac{1}{2}"$ D.



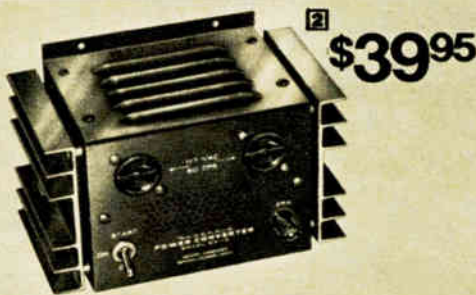
\$99⁹⁵

1 Automatic Foghorn/Hailer. Features a husky 55-watt amplifier; foghorn rate and duration controls; separate "listen" & "hail" gain controls. Includes low-profile weather-resistant deck horn, 20 ft. speaker cable, gimbal mount. Operates on 12 VDC power system, positive or negative ground. $4\frac{3}{4}"$ H x $9\frac{3}{4}"$ W x $9\frac{1}{4}"$ D.

Kit MD-19A, Shpg. wt. 15 lbs. 99.95

Kit MDA-19-1, Optional remote speaker for intercom use.

Shpg. wt. 2 lbs. 11.95



\$39⁹⁵

2 Economy Power Inverter. Operates electric razors, lamps, other small appliances from 6 or 12-volt input. Supplies 117 VAC square wave with up to 175 watts continuous power rating. Not for high starting current or sine wave AC equipment. 25-amp fuse.

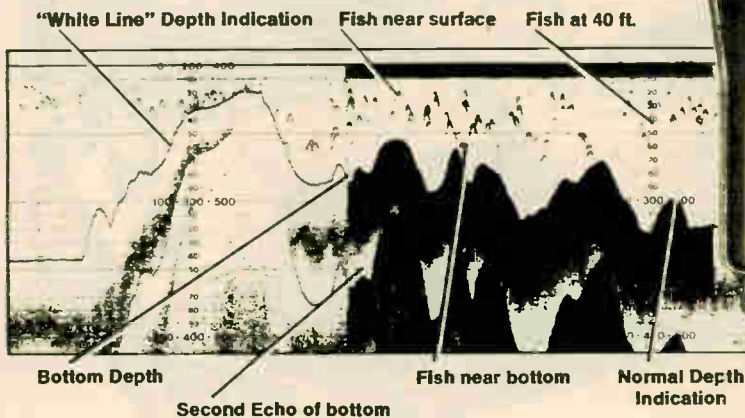
Kit MP-10, Shpg. wt. 8 lbs. 39.95

3 Marine Electronics Handbook — covers radios, codes, antennas, direction finders; clearly written. EDP-134 4.95

Find fish faster and easier!



Straight Line/White Line Depth Recorder —



Actual MI-2910 recording made at Lake Mead, Nevada 1976

The Heathkit MI-2910 is one of the most useful boating and fishing accessories you can own. It helps you find the fish, and it provides a permanent record of the best spots and depths so you can find your favorite spots again and again easily. Its bottom recording accuracy also makes it a valuable navigation aid for following coast line depths and mapping lakes. Best of all, it's priced a lot lower than comparable recording depth sounders.

An on-off sensitivity control adjusts the MI-2910 to indicate the bottom and fish or other objects above it. The MI-2910 will clearly indicate schools of bait and small fish as well as individual large fish. Holes and dropoffs are clearly shown for lake mapping purposes too. The extra-wide-beam transducer covers a larger area of water than most conventional units, so you get a better and wider "picture" of what's below you. Its three ranges (5' to 200', 200-400', and 400-600') makes it useful for virtually any lake or coastal area.



Available with through-the-hull or transom-mounted transducer.

Uses a straight line recording system for easier and more accurate chart reading and interpretation. A white line control lets you adjust the bottom indication to a fine line so objects or fish close to the bottom can be distinguished easily. A switch controlled marker puts a vertical line on the chart for

easy reference marking. A roll of paper lasts approx. 13 hours for continuous charting. And the two-piece case opens easily for convenient paper replacement.

The MI-2910 has two lamps to light the chart for easy operation at night. The weather-resistant case with gasket seals helps prevent water from getting in the recorder. A universal gimbal mount lets you install the MI-2910 just about anywhere, and remove it for theft protection and storage when not in use. With one roll chart paper.

Kit MI-2910-1, recorder with through-the-hull transducer and 30' cable. Shpg. wt. 17 lbs. **289.95**

Kit MI-2910-2, recorder with transom mount transducer and 30' cable, Shpg. wt. 17 lbs. **289.95**

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

MI-2910 SPECIFICATIONS: Power Requirement: 11-16 VDC at 1.6 amperes maximum. Depth Range: 5' to approx. 600'. Display: straight (vertical) line plotting on high contrast paper. Accuracy: better than 97% of indicated depth with belt motor speed at 320 rpm. Controls: Sensitivity control with power on-off switch. White line control with on-off switch. 0-200', 200-400' and 400' to 600' range switches. Marker pushbutton. Transducer: frequency, 50 kHz, ± 4 kHz. Beam Width: 35° at 3 dB. Cable length: 30 ft. Mounting: through-hull or transom. Chart Paper: Size, 3 $\frac{1}{4}$ " x 50' with pre-marked depth scales. Take-up speed, approx. $\frac{3}{4}$ " per minute. Running time per roll: approx. 13 hours. Dimensions: less gimbal bracket, 11" W x 8" H x 7" D. Net Weight: less transducer 6 $\frac{1}{2}$ lbs.

MR-1134 Marine-Band VHF Automatic Scanning Monitor



- **Priority channel selection**
- **Large, lighted channel indicators**
- **Automatic or manual channel selection**

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, simply push the button for the channel you wish to monitor. A 4-pole crystal

filter provides good selectivity (for crowded signal areas, use the optional 8-pole filter on page 28). A built-in telescoping antenna brings in plenty of signals, there's also provision for an external antenna. Handsome blue and white marine styling, rugged splashproof case. AC or 12 VDC operation. Easy kit assembly and no-instrument alignment. Order crystal certificates from page 28.

Kit MR-1134, Shpg. wt. 9 lbs. **99.95**

MR-1134 SPECIFICATIONS: Scanning Range: any 8 MHz segment of the 146-174 MHz frequency range. Sensitivity: 0.5 μ V or less for 12 dB SINAD. Adjacent Channel Rejection: -40 dB typ. (-55 dB typ. with optional 8-pole filter). Scan Rate: approx. 16 channels per second. Scan Delay: approx. $\frac{1}{2}$ second. Priority Channel Check: approx. 4 seconds. Dimensions: 3 $\frac{1}{4}$ " H x 8 $\frac{1}{2}$ " D x 11 $\frac{1}{4}$ " W. Net Weight: 5 lbs.

Do your own tuneups and save!



Super-bright xenon flash tube

Built-in meter measures distributor advance or engine RPM

\$64⁹⁵



\$24⁹⁵



CI-1096 Deluxe Timing Light with Built-in Advance Meter and Tachometer

Here's a really convenient, easy way to keep tabs on your car's engine timing and distributor advance functions. 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 12VDC power supply. Functions with all types of ignition systems.

Kit CI-1096, Shpg. wt. 3 lbs. **64.95**

CI-1096 SPECIFICATIONS: Useful Light Range: Up to 2 ft. in daylight. Triggering: Current pickup coil. Power Requirement: 12VDC battery or separate 12VDC power supply. Dimensions: 7 1/4" H x 2 5/8" W x 1 1/2" D.

Deluxe Timing Light — brighter than daylight

\$29⁹⁵



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.

Kit CI-1040, Shpg. wt. 3 lbs. **29.95**

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: 6 1/2" H x 2" W x 10" L.

Three-In-One Tune-up Meter

- Helps you keep your car in top shape
- Measures dwell, engine rpm and voltage
- Easy to use — just connect two leads to your engine
- Works with all factory-installed ignition systems

The CM-1073 combines a distributor cam dwell meter, an electronic tachometer and a direct-current voltmeter in a single, compact unit. Measures dwell angle on most 4-cycle, 3, 4, 6 and 8-cylinder engines. Shows engine RPM on two scales — 0-1500 RPM and 0-4500 RPM. Checks voltage from 0-20 volts.

Can be used with both 6 and 12-volt electrical systems with positive or negative ground, and with all new factory-installed solid-state and high-energy ignition systems. It has just two leads to connect to the engine and draws its power directly from car battery. Complete with leads, instructions and high-impact case. Easy kit assembly too.

Kit CM-1073, Shpg. wt. 4 lbs. **24.95**

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 — 0-4500 RPM. Voltmeter: Direct reading scale, 0-20 VDC. Power Requirement: 10 mA approximate average current. Meter: 4 1/2", 1 mA (100 degree movement). Accuracy: ±3% of full scale. Dimensions: 4 1/4" H x 8 1/2" W x 7 1/4" D.

Economy Solid-State Timing Light

Has the same fine features as CI-1040, but no inductive pickup. Flash can be seen in direct sunlight. Easy to use: connect one cable to battery, the other to spark plug. Insulated housing, polarity protected. With all cables. For all OEM ignition systems.

Kit CI-1020, Shpg. wt. 3 lbs. **19.95**

CI-1020 SPECIFICATIONS: Useful Light Range: Up to 2 ft. in daylight. Power Required: 12 VDC battery or 12 VDC supply. Size: 6 1/2" x 2" x 10".



ONLY **\$19⁹⁵**



Carry Anywhere Black and White Portable TV

\$154⁹⁵

The perfect
second set
— great gift
idea too!

- 12 VDC or 120 VAC operation
- Exceptional 12" diag picture

At home, the GR-104C plugs into a wall outlet. In your car, camper or boat, it works right from your 12-volt battery system. Outdoors, you can use it with its optional self-contained battery pack as a go-anywhere portable. Any way you use it, you'll get a crisp, clean, clear black-and-white picture of unsurpassed quality. Three video IF amplifiers provide superior gain and a 4-circuit VHF "memory" tuner brings in each VHF station with real precision. Has regulated power supply for drift-free operation, all-channel detent tuning, lighted channel indicators, telescoping antenna for VHF and a loop antenna for UHF. Rugged high-impact case with carrying handle for easy portability. Easy kit assembly with two circuit boards and a wiring harness. The VHF and UHF tuners are factory assembled and aligned. A battery-charging circuit is included with the optional Battery Pack. When the Battery Pack



Simulated
TV picture

is connected to the TV Set and the line cord is plugged into an AC receptacle, the battery automatically begins to recharge as soon as the set is turned off.

Kit GR-104C, Shpg. wt. 35 lbs. 154.95
Kit GRA-104-3, Optional Battery Pack,
10 lbs. 59.95

GR-104C SPECIFICATIONS: Picture Size: 74 sq. in. viewing area, 12" picture diagonal. Deflection: Magnetic, 110 degrees, 20 mm neck. Focus: electrostatic. Antenna Input Impedance: 300 ohm balanced. Tuning Range: VHF TV channels 2 through 13 (memory-type fine tuning). UHF TV channels 14 through 83. Picture IF Carrier: 45.75 MHz. Sound IF Carrier: 41.25 MHz. Sound IF: 4.5 MHz. Video Response: To 3.5 MHz. Audio Power Output: 500 mW into 24 ohm load. Power Requirement: 110-130 volts, AC, 48 watts; 12 volts DC at 24 watts. Overall Size: 11½" H x 15¾" W x 9¾" D.



Simulated TV picture

\$169⁹⁵



Beautiful Mediterranean cabinet for your GR-900 color TV

This fine furniture cabinet shows off your GR-900 to its best advantage. You've put a great deal of care into the construction of your GR-900 and this cabinet is the perfect complement to your work. It's fully assembled and finished so you only have to install your completed chassis and you're done. Your friends can't help but admire the combination.

Constructed of pecan-stained wood solids and veneers, with simulated wood-grain base and trim. Hardware features handsome Antique Gold finish. Accepts 2 speakers. 30¾" H x 48¾" W x 20½" D (23½" D with cup). Shpg. wt. 91 lbs.

Please allow 10 weeks for delivery.

GRA-404-25, Motor Freight 169.95

Antennas and accessories designed for better reception

1 "Super Antenna". VHF-UHF-FM. 60 elements. F/B signal rejection: VHF Lo, 21 dB; hi, 22 dB; UHF, 22 dB. 190" boom, 105" turning radius. Includes removable FM blocking elements.

GD-1461, 300 ohms, less mast and cable. Shpg. wt. 17 lbs. Motor Freight .79.95
75-ohm 84.95*

Deluxe "Fringe" Antenna. Not shown. Has 28 elements. Provides VHF reception up to 100 miles, UHF up to 60 miles. 131" boom, 80" turning radius. GD-1441, 300 ohm, less mast and cable. Shpg. wt. 25 lbs. 39.95
75-ohm 44.95*

*Order GD-298 and GD-1054 to convert to 75 ohms. Reg. \$8.90 — ONLY \$5 with antenna.

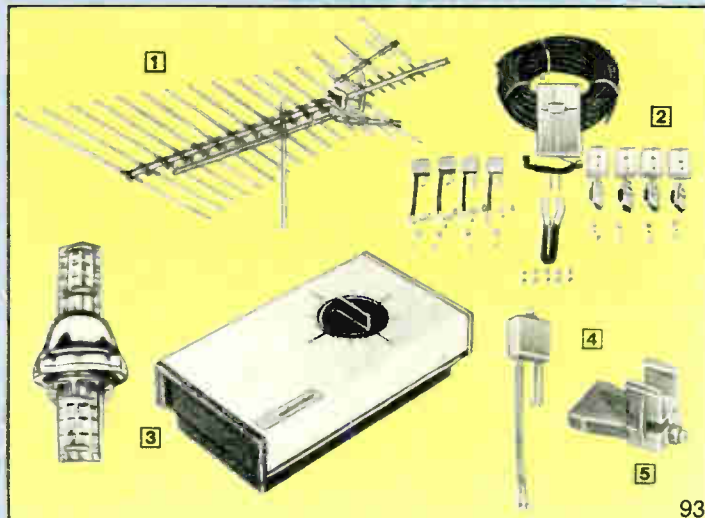
2 Coaxial distributor for 4-room TV/FM network — Takes single coax input from all-channel antenna, amplifies it to feed 4 wall outlets. Includes 200' coax cable, connectors, crimping tool, 4 matching transformers/splitters.

GD-248, Shpg. wt. 11 lbs. 89.95
GD-328, 100' coax. w/connectors and antenna boot installed, Shpg. wt. 4 lbs. 10.95

3 Deluxe Cornell-Dubilier Antenna-Rotor System. Consists of control box and rugged outdoor rotor for dramatically improved TV and FM reception. Heavy-duty 1 rpm rotor has positive automatic stop, instant reverse. Supports antennas to 150 lbs. Lower mast clamp accepts 7/8" to 2" dia. masts. Solid-state control box has 360° rotor control, plugs into AC outlet. Requires 5-wire cable (not supplied).
GDP-1176, Shpg. wt. 14 lbs. 54.95

4 75/300 Ohm Transformer-Splitter. Matches one 75 ohm coax to separate VHF, UHF 300 ohm leads.
GD-298, Shpg. wt. 1 lb. 4.95

5 All-Channel Matching Transformer. Converts 300 ohms to 75 ohms for coax.
GD-1054, Shpg. wt. 1 lb. 3.95



Heathkit GR-2001—the computerized, digital color TV

Heath's GR-2001 is the most sophisticated, best performing color TV we've ever designed, but it is also much more. It is the heart of a total home viewing system — a Computer TV!

Complete Programming Capability: This Computer TV system allows you to program your set for an entire evening's viewing. Simply enter the time at which you want the set to change channels. Then, enter the channel number you want. You can program up to 32 channel changes within two 12/24-hour periods! Program the first for your daytime viewing schedule, the second for evening shows. Or, program the first for weeknights, the second for weekends. You can even preselect the programs young children can watch! There are an almost infinite number of uses for the Programmer.

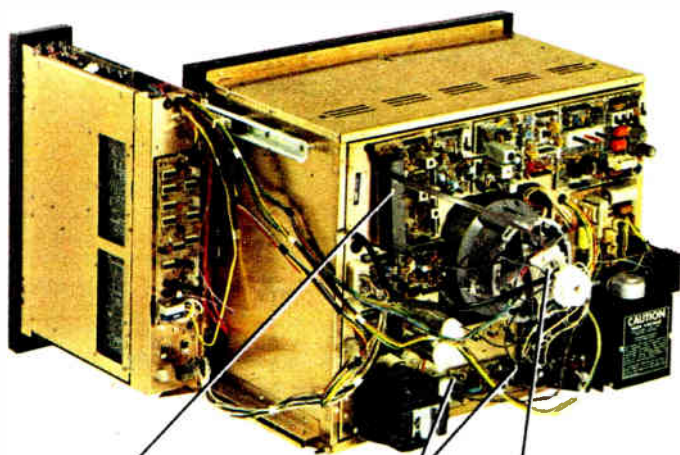
Our Best Color Picture and Sound Ever! The TV set itself contains dozens of circuit refinements and improvements designed to give you the best picture and performance you've ever seen. New phase-locked loop horizontal and vertical oscillators provide a rock-steady picture — it's so adjustment-free that we've eliminated conventional

horizontal and vertical hold controls! Audio and video muting provides quiet between-channel tuning. The Automatic Gain Control circuit has been significantly improved to provide better resistance to airplane flutter. The sound signal even has its own separate IF stage to give you real hi-fi sound from a TV! The GR-2001 also has the self-service features Heathkit TV is famous for — built-in dot generator, centering and convergence circuits and a built-in test meter.

Fully Automatic Antenna Rotor: The Automatic Antenna Rotor is another Heathkit innovation. Instead of manually rotating the antenna each time you change stations, the Automatic Rotor control turns the antenna to the correct heading each time you change channels. You can select up to eight separate antenna headings with up to three stations per heading!

Remote Control Convenience: The wireless remote control is the best we've ever offered with improved circuitry for greater range and reliability. It provides continuous volume control, up/down channel scan, tint adjustment, power on/off — all at the touch of a button.

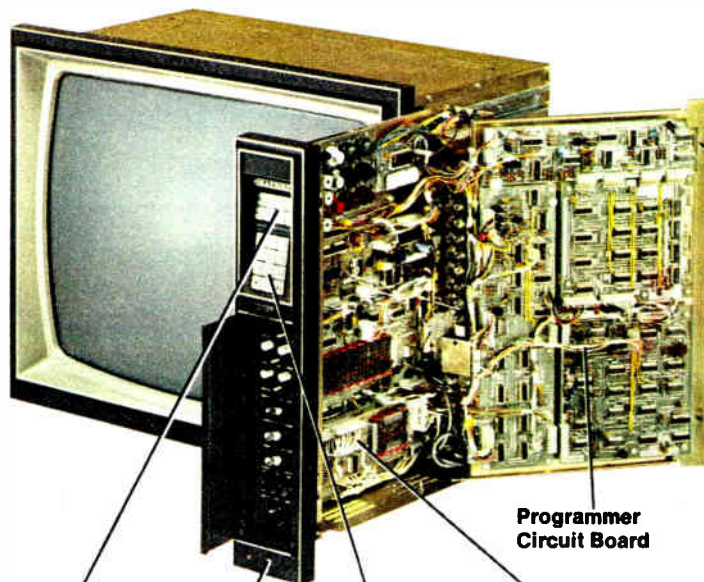
Look at these "Total" performance and convenience features!



1 Separate Audio Circuitry

2 PLL Horizontal and Vertical Hold Circuits

3 Black-Matrix Picture Tube



4 Programmer Keyboard

5 Remote Control

6 Random-Access Tuning

Programmer Circuit Board

7 Automatic Antenna Rotor Control

1 Separate Audio Circuitry on the IF board. The GR-2001 gives you sound that's truly superb. The wide-range speaker (included) offers excellent fidelity too. And an audio output jack lets you listen to the TV sound through your stereo system.

2 Phase-Locked-Loop Horizontal and Vertical Hold Circuits. The GR-2001 "locks in" on any channel with a picture that's rock-steady and stable. There are no ordinary vertical and horizontal hold controls because you never need them — so you get consistently excellent pictures year after year.

3 Black-Matrix Picture Tube. The GR-2001's 25" (diagonal), ultra-rectangular picture tube provides one of the brightest, sharpest pictures in the world. The tube is fully shielded to maintain outstanding color purity.

4 Programmer Keyboard. These eight buttons allow you the instant access to the optional Programmer's static NMOS random access memory (RAM). Just enter the time and channel number you want — up to 16 changes in either of two switch-selected positions. Then the optional Programmer's memory takes over. While you sit back and relax, the GD-1185 Programmer automatically changes to the right channel at the right time.

5 Convenient Remote Control. The optional remote control lets you adjust volume, turn the set on or off, adjust tint, scan up or down through the pre-programmed channels — even turn the optional Programmer on or off. The advanced remote control receiver builds right into the chassis on the GR-2001.

6 Random-Access Tuning. The 3 x 4 keyboard lets you instantly choose any of 16 preselected stations. Switch from VHF to UHF, up or down, in any sequence, and be tuned in instantly, without switching through in-between channels. Up and down buttons on the keyboard also let you scan all the preselected stations. And the optional GRA-2001-9 lets you add up to 8 additional channels — up to 24 in all!

7 Automatic Antenna Rotor Control: A Heathkit exclusive! With the optional GD-1184 antenna rotor control, you can program the GR-2001 to automatically rotate your outdoor antenna system as it changes from one channel to another, for optimum reception on every channel. It's perfect for areas where stations are widely separated.



SPECIAL WARRANTY SERVICE PLAN FOR SOLID-STATE TV MODULES!

If a component proves defective during the 90-day warranty period, the modules will be serviced with no charge for parts or labor. If the problem is due to a construction error, the modules will be inspected and serviced at a charge of \$5.00 per module. After the 90-day warranty has expired, the module service fee is \$5.00 per module plus parts. All picture tubes warranted for two full years.

GR-2001 SPECIFICATIONS: Deflection: Magnetic, 90°. Focus: Electrostatic. Convergence: Magnetic. Antenna Input Impedance: VHF: 300Ω balanced or 75Ω unbalanced. UHF: 300Ω balanced. Picture IF Carrier: 45.74 MHz. Sound IF Carrier: 41.25 MHz. Color IF Subcarrier: 42.17 MHz. Sound IF Frequency: 4.5 MHz. Video IF Bandwidth: 4.06 MHz, at 6 dB down. HI-FI Output: Frequency Response: ±1 dB, 50 Hz to 15 kHz. Output voltage: Greater than 1.0 V RMS. Audio Output: 4Ω or 8Ω, 2 watts. Power Requirement: 110 to 130 volts AC, 60 Hz, 200 watts. Overall Dimensions: 20 1/8" H x 29 1/2" W x 21 3/4" D. Net Weight: 112 lbs.

GR-2001 with Programmer, Clock and Rotor Control

- GR-2001 Deluxe 25" Color TV **SAVE \$59.85**
- GD-1185 Programmer **# purchased**
- GRA-601 On-Screen TV Clock **separately,**
- GD-1184 Automatic Antenna **\$59.80**
- Rotor Control (less motor)

GRS-2002, 161 lbs. Motor Freight ... **899⁹⁵**

Order optional cabinet, page 97

Heathkit GR-2001 25" (diagonal) Color TV Kit

Even if you order it without the options below, it's still one of the finest sets you can buy anywhere! Order your choice of cabinets from page 97. Includes chassis, picture tube, one speaker.
Kit GR-2001, Shpg. wt. 146 lbs.,
Motor Freight **699.95**

Second Speaker for GR-2001. Fits in space on GR-2001 cabinets where indicated. With cables.
GRA-2000-7, Shpg. wt. 2 lbs. **6.50**

8-Channel Accessory for your GR-2001. Adds 8 more channels to the GR-2001's random-access tuning system (a total of 24 channels) for even greater versatility.
Kit GRA-2001-9, Shpg. wt. 1 lb. **9.95**

GD-1185 TV Programmer. Automatically changes channels at any time you select — up to 16 changes in either of two switch-selected 12/24-hour periods. Front-panel keyboard and on-

screen readout make it easy to enter any time or channel you want. It's the ultimate in convenience — and a Heathkit exclusive! Requires GRA-601 Clock below for operation.

Kit GD-1185, Shpg. wt. 8 lbs. **169.95**

Automatic Antenna Rotor Control. Automatically rotates your antenna to preselected directions for the best reception on each channel. Accepts up to 3 channels for each of 8 directions. Operates with or without GD-1185 above. For use only with existing Cornell Dubilier AR-40 rotor system (Heath GDP-1176 or GDP-258) or optional motor below.

Kit GD-1184, Shpg. wt. 6 lbs. **59.95**

GDA-1184-1, Rotor Motor. Requires 5-wire cable (not supplied). 11 lbs. **34.95**

Easy-to-build On-Screen Digital Clock. Displays the time in hours, minutes and, if desired, seconds in 12/24 hour format below the channel number. Easy-to-read white digits.

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

GR-2001 with Programmer and Clock

- GR-2001 Deluxe 25" Color TV **SAVE \$49.90**
- GD-1185 Programmer **If purchased**
- GRA-601 On-Screen TV Clock **separately,**
- Rotor Control (less motor) **899.85**

GRS-2001, 155 lbs. Motor Freight ... **849⁹⁵**

Order optional cabinet, page 97

Convenient Wireless Remote Control

Controls on-off, volume, up/down channel scan and tint, turns programmer on or off. Operates up to 20 ft. away from set.

Kit GRA-2001-6,
Shpg. wt. 4 lbs. **89.95**





Only Heathkit TV offers custom mounting options

Heathkit color TV's are sold without cabinets so you can do your own custom installation. Build into a wall, design your own console, etc. Or you can order one of our beautiful custom cabinets too!

Simulated TV Picture

Heathkit GR-2000 25" Diagonal Color TV offers outstanding performance and value

\$599⁹⁵

This is the set that brought color TV into the digital age — the Heathkit GR-2000. It offers one of the most vivid, realistic pictures in the industry today.

Total electronic tuning convenience

Simply touch a button on the front panel (or the optional remote control) and the sophisticated programmable digital counter sweeps up or down through any 16 pre-selected stations. And because the tuning is electronic, you eliminate noisy, unreliable turret tuners. Even the channel numbers are displayed electronically, right on the screen. They can be adjusted to remain on the screen for up to 1½ minutes, or permanently if you choose. And you can recall them by changing the channel or by tapping the Volume on the remote control.

A 25" (diagonal) color picture second to none!

Critics and owners have praised the GR-2000 for a bright, accurate color picture that seems to make programs "come alive". The picture tube provides outstanding brightness and sharpness thanks to its negative matrix and fully-illuminated phosphor dots.

Revolutionary electronics!

The GR-2000's circuitry is some of the most

sophisticated in the industry. It was the first TV to utilize a fixed IF filter which virtually eliminates adjacent-channel interference — especially important in urban areas crowded with stations. This advanced filter provides ideally-shaped bandpass and — unlike the "traps" used in most sets — it never requires alignment.

And the GR-2000 uses other advanced circuitry to assure superior performance — improved signal circuits for greater clarity and definition, DC-controlled contrast for reduced interference, an integrated circuit color amplifier for more precise, realistic tints, and an IC automatic gain control for excellent sensitivity, selectivity and noise rejection. You get a consistently excellent picture year after year.

Easy and fun to build!

The completely illustrated assembly manual makes it easy to feel the pride of "building it yourself." Almost all the circuitry mounts on plug-in printed circuit boards and factory-fabricated wiring harnesses minimize point-to-point wiring. You'll find that building a GR-2000 is enjoyable — and you'll be even prouder of its exceptional performance.

Save money on service!

Because you build the set, you can service it. All the circuitry you need is built in — a

digital-design dot generator, circuits for purity and convergence adjustments, vertical and horizontal centering circuits and a test meter. Much of the circuitry is accessible by pulling out the service drawer. You can keep your set in peak-performing condition with less inconvenience and expense.

Optional accessories make your set even more enjoyable!

The optional Clock Module adds the time to the on-screen channel readout. The time appears in 1" digits beneath the channel and the clock can be set for 4 or 6-digit readout in 12 or 24-hour formats.

The optional remote control provides wireless selection of channel, volume, tint, color intensity — it even turns the set on and off! Kit includes chassis, one speaker, and picture tube. Order your choice of fine-furniture cabinets from page 97. Shpg. wt. 147 lbs.

Kit GR-2000, Motor Freight 599.95

Optional Digital Clock for GR-2000.

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

Optional Remote Control for GR-2000.

Kit GRA-2000-6, Shpg. wt. 4 lbs. 89.95

Second Speaker for GR-2000. Fits in space on GR-2000 cabinets (where indicated). Includes all cables.

GRA-2000-7, Shpg. wt. 2 lbs. 6.50

Fine-Furniture Cabinets for your GR-2001 or GR-2000 Color TV

Fully assembled and finished —
the perfect "home" for your set



Simulated TV Pictures

Contemporary cabinet. Constructed of solids and veneers; oiled walnut finish. 28 $\frac{3}{8}$ " H x 46 $\frac{1}{8}$ " W x 20 $\frac{3}{8}$ " D. (24 $\frac{1}{8}$ " D including cup).

GRA-602-25, Shpg. wt. 78 lbs. Motor Freight159.95

Compact contemporary cabinet. Solidly constructed of wood solids and veneers, luxurious oil walnut finish. With cutout for one speaker. 34 $\frac{3}{8}$ " H x 33 $\frac{7}{8}$ " W x 20 $\frac{3}{8}$ " D (24 $\frac{1}{8}$ " D including cup).

GRA-606-25, Shpg. wt. 76 lbs. Motor Freight129.95

GR-2000 SPECIFICATIONS: Picture Tube: 25" (diagonal). Viewing Area: 315 sq. in. Deflection: Magnetic, 90 degrees. Focus: Electrostatic. Convergence: Magnetic. Antenna Input Impedance: VHF: 300 Ω balanced or 75 Ω unbalanced; UHF: 300 Ω balanced. Tuning Range: TV channels 2 through 83. (Preset any 16). Picture IF Carrier: 45.75 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: Output Impedance: 2200 Ω . Frequency Response: ± 1 dB, 50 Hz to 15 kHz. Harmonic Distortion: Less than 1% at 1 kHz. Output Voltage: greater than 1.0V rms. Audio Output: Output Impedance: 4 Ω or 8 Ω . Output Power: 2 watts. Dimensions: 20 $\frac{3}{8}$ " H x 29 $\frac{1}{8}$ " W x 21 $\frac{3}{8}$ " D. Power Requirements: 110 to 130 volts AC, 60 Hz, 200 watts. Net Weight: 112 lbs.

Deluxe Ultrasonic Remote Control for GR-2000 and GR-2050

Provides armchair control of on and off, volume, channel selection, color intensity and tint, activation of digital readout. Includes receiver for in-chassis mounting, hand-held transmitter. Operates up to 20 ft. away from set.

Kit GRA-2000-6, Shpg. wt. 4 lbs. 89.95



Digital Clock for GR-2000 and GR-2050

Shows time in hours, minutes and seconds with big, easy-to-read white numerals. Real convenience!

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

SPECIAL WARRANTY SERVICE PLAN FOR SOLID-STATE TV MODULES!

If a component proves defective during the 90-day period, the modules will be serviced with no charge for parts or labor. If the problem is due to a construction error, the modules will be inspected and serviced at a charge of \$5.00 per module. After the 90 day warranty has expired, the module service fee is \$5.00 per module plus parts. All picture tubes warranted for two full years.



Mediterranean cabinet with doors. Accepts 2 speakers. Solids & veneers; simulated wood-grain base & trim. Dark oak finish. Hardware finished in Windsor Antique Gold tone. 29 $\frac{1}{8}$ " H x 48 $\frac{3}{8}$ " W x 23" D. (26 $\frac{1}{8}$ " including cup).

GRA-605-25, Shpg. wt. 125 lbs. Motor Freight 259.95



Early American cabinet. Twin speaker capability. Distressed maple finished wood solids & veneers; simulated wood-grain trim. Hardware has Windsor Antique Gold finish. 31 $\frac{1}{8}$ " H x 47 $\frac{1}{8}$ " W x 20 $\frac{1}{2}$ " D. (24 $\frac{1}{8}$ " D including cup).

GRA-803-25, Shpg. wt. 83 lbs. Motor Freight 169.95

Mediterranean cabinet. Accepts 2 speakers. Crafted of solids & veneers; simulated wood-grain trim. Dark oak finish. Hardware features Antique Gold finish. Fully assembled and finished. 30 $\frac{3}{8}$ " H x 49 $\frac{1}{8}$ " W x 20 $\frac{3}{8}$ " D. (24 $\frac{1}{8}$ " D including cup.) Shpg. wt. 95 lbs.

GRA-604-25,
Motor Freight 169.95



GR-2050 21" (Diagonal) Color TV Kit with built in service modules to keep set in peak operating condition

Now the popular 21" diagonal Heathkit GR-2050 is also at a new low price! SAVE \$50 from our 1976 catalog price and give yourself and your family a lifetime of entertainment! Has the same outstanding features and specifications as the GR-2000 (see complete description on previous page), but in the popular size 21" diagonal measure screen.

Uses the same optional on-screen digital clock and remote control as the GR-2000. And it has the same bright and accurate color picture. You can order your choice of space-saving contemporary cabinet (shown in major illustration), or a luxurious Mediterranean style cabinet (below right).

Building the GR-2050 is a rewarding experience too. There are many modular circuits and coded wiring harnesses keep point to point wiring to a minimum. Has built-in service and adjustment circuits too — dot generator, service circuit board, centering and pincushion circuits — so you can keep it in peak operating condition year after year and save substantially on service.

Kit GR-2050, With chassis, picture tube, one speaker.

Shpg. wt. 122 lbs., Motor Freight **Was 599.95 Now Only 549.95**

Optional Remote Control for GR-2050. Described at left.

Kit GRA-2000-6, Shpg. wt. 4 lbs. **89.95**

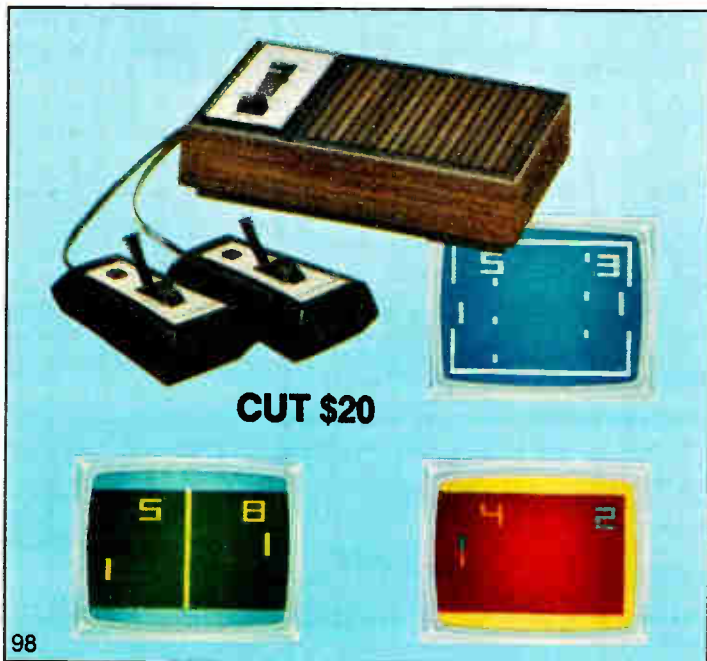
Optional on-Screen Digital Clock for GR-2050. Described at left.

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

GR-2050 SPECIFICATIONS: Same as GR-2000 page 97, except. Picture Tube: 21" (diagonal measure). Viewing Area: 226 sq. in. Dimensions: 18 $\frac{3}{8}$ " H x 26 $\frac{5}{8}$ " W x 19 $\frac{1}{4}$ " D.

Deluxe Mediterranean Cabinet for GR-2050. This romantic and stylish "home" for your GR-2050 is fully assembled and constructed of wood solids and veneers, with handsome dark-oak stain highlights and simulated wood-grain trim. Brown grille cloth. 28 $\frac{7}{8}$ " H x 38 $\frac{5}{8}$ " W x 19 $\frac{3}{4}$ " D (23 $\frac{3}{8}$ " D with cup). Shpg. wt. 89 lbs.

GRA-2050-2, Motor Freight **154.95**



98

**SAVE
\$50**
from '76 price



Space-saver Contemporary Cabinet for GR-2050. (Shown in illustration above). Fully assembled and finished with wood solids and veneers, walnut-stain finish, black foam grille. 28 $\frac{5}{8}$ " H x 30 $\frac{1}{2}$ " W x 18 $\frac{1}{2}$ " D (22 $\frac{1}{8}$ " W with cup).

GRA-2050-1, Shpg. wt. 74 lbs.,

Motor Freight **124.95**

GD-1999 Universal Color TV Game

*Turns ANY TV set into a fun-filled Action Arena!
Play Hockey, Tennis or Handball right in your living room!*

Any TV, color or black-and-white, can provide your family with hours of fast-paced action. Just connect the GD-1999 to your present TV and name your game: Tennis for two, ice hockey for two (or one vs the machine) or handball for two. If you have a color set, the tennis court appears green, the handball court brown and the ice blue. You can adjust the racquet size (small, medium or large) to fit your level of proficiency. The ball is always served off the face of the racquet for more realistic play. You can even put "English" on the ball. A realistic "rebound sound" comes through the TV speaker. The ball speed automatically increases after 4 volleys for added realism and excitement. The score is automatically displayed in large, easy-to-read digits for 1.5 seconds each time a point is scored. The game ends automatically when a player reaches 15 points. The GD-1999 goes together in about an hour with simple mechanical assembly. The game board is fully assembled and tested, in fact, there's no soldering at all required! Installation is fast and easy, too! It is designed to remain permanently connected to your TV and will not interfere with normal TV operation when not in use. The two game controllers have 10 foot connecting wires so that you can operate and reset the games from your favorite chair. FCC Type Approved.

Kit GD-1999, Shpg. wt. 3 lbs. **Was 69.95 Now 49.95**



19" Diagonal Measure GR-500



17" Diagonal Measure GR-400

HEATH SPECIAL MONEY-SAVING OFFER! **SAVE \$73⁹⁰**

YOU GET TWO 2-HOUR VIDEOCASSETTE TAPES AND THE AUTOMATIC TIMER FREE WITH YOUR GDS-1230 PURCHASE!

Build yourself years of viewing pleasure with one of these Heathkit popular-size Color TV's

The same advanced design and precision engineering of our full-size console models, plus the features that have made Heathkit TV an industry leader. The precision in-line gun color tube has a negative matrix screen for far more contrast and brightness than conventional color tubes. As you turn the tuning knob, the channel numbers appear on the screen in big, white, easy-to-read numerals. You can even add an on-screen digital clock and the time in hours, minutes and seconds will appear right with the channel numbers. An automatic fine-tune circuit locks in on the best picture each time the channel is changed. And once you set the contrast, brightness, color and tint with secondary rear panel controls — a touch of the PPC button returns the picture to perfection instantly. The VHF tuner has a dual-gate FET mixer circuit with an RF amplifier for low noise, high gain, and low cross modulation. The four tuner circuits (most sets have only three) offer far greater selectivity so you can get a better picture, with less interference. Other features include detent VHF and UHF tuning, instant-on operation with front panel defeat, hi-fi output jack and TV speaker defeat switch; 75-ohm VHF antenna input.

- Kit GR-500**, less cabinet, Shpg. wt. 101 lbs., UPS **499.95**
GRA-500-1, walnut veneer table model cabinet (main illustration), 17¼" H x 25½" W x 14" D (17" D including cup), Shpg. wt. 28 lbs., UPS **39.95**
Kit GR-400 (less cabinet), Shpg. wt. 77 lbs., UPS **449.95**
GRA-400-1, walnut-veneer cabinet (16⅞" H x 24⅞" W x 12¾" D), (15¾" D including cup). Shpg. wt. 26 lbs., UPS **34.95**
GRA-403-18, roll-around cart. 22" H x 27" W x 15⅞" D, Shpg. wt. 17 lbs., UPS **21.95**
GRA-601, Digital Clock Accessory, Shpg. wt. 1 lb. **29.95**

GR-500, -400, SPECIFICATIONS: Deflection: Magnetic, 90 degrees. Focus: Electrostatic. Convergence: Magnetic. Antenna input impedance: VHF: 300 Ω balanced or 75 Ω unbalanced. UHF: 300 Ω balanced. Tuning range: TV channels 2 through 83. Picture IF carrier: 45.75 MHz. Color IF carrier: 42.17 MHz. Sound IF frequency: 4.5 MHz. Video IF bandwidth: 4.08 MHz at 6 dB down. Hi-Fi output impedance: 2200 Ω. Frequency response: ±1 dB, 50 Hz to 15 kHz. Harmonic distortion: less than 1% at 1 kHz. Output voltage: greater than 1.0V rms. Audio output impedance: 8 Ω. Output power: 1 watt. Power requirement: 110-130 VAC, 60 Hz, 200 W.

New Heath-Recommended Famous Sony Betamax™ 2-Hour Videocassette Recorder at BIG Savings!

Never miss a favorite TV program again! Record the shows you like for playback later, record when you're away with the optional timer, even record one show while watching another!

The videocassette recorder you've heard so much about. Now you can add a totally new dimension to your television viewing. Record and view any time you like. Just set the Betamax and your show is recorded (sound and picture) on the special ½" video tape cassette. Play it back with perfect sound and picture resolution whenever you're ready. The standard cassette will record up to two hours of programming. The cassette may be erased and used over and over again. The optional Betamax Timer allows you to record at a preset time so you can capture your favorite show when you're not at home. Easy to operate and easy to hookup to your TV.

The Betamax gives you complete access to all the shows on TV, and at this Heath special offer price, it's a terrific buy! Fully assembled and ready to use.

Heath Special Offer! Sony Betamax, Automatic Timer and TWO 2-Hour Videocassettes for the price of the Betamax alone!

GDS-1230, Shpg. wt. 62 lbs. **1260.00**

If purchased separately,

GD-1230, Betamax Alone. Shpg. wt. 55 lbs. **1260.00**

GDA-1230-1, Automatic Timer. Shpg. wt. 5 lbs. **40.00**

GDA-1230-2, 2-Hour Videocassette Tapes. 1 lb. each **16.95**



Digital Techniques—the course to take for a thorough understanding of modern digital electronics including microprocessors!

Only

\$49⁹⁵

text, records
and parts

Covers digital fundamentals, semiconductor devices for digital circuits, digital integrated circuits, Boolean algebra, flip-flops and registers, sequential logic circuits, combinational logic circuits, digital design and digital applications—requires completion of courses 1 through 4 or equivalent knowledge.

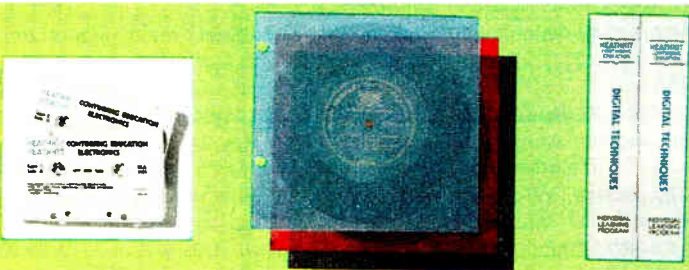
Heathkit Digital Techniques Self-Instruction Course

Comprehensive self-instructional course offers a thorough analysis of the latest digital techniques with particular emphasis on circuit design for the experienced technician, engineer or experimenter. Discusses TTL, ECL, CMOS, PMOS, NMOS; integrated circuits; SSI, MSI and LSI; ROM's, PLA's, microprocessors and computers, more. Shows you how to design digital circuits for virtually any modern electronic application.

The program assumes a prior knowledge of electronics, either completion of the Heathkit basic electronics courses or equivalent. It can be successfully completed by technically-oriented people with a math or science background. Requires ET-3200 trainer to perform experiments. The EE-3201 course includes text, records and 44 parts for 24 different experiments. Average completion time; 40 hours. 4.0 Continuing Education Units and certificate for passing optional final exam (pass grade 70%).

Course EE-3201, Shpg. wt. 9 lbs. **49.95**

EEA-3201, Optional Cassettes*. Shpg. wt. 2 lbs. **6.95**

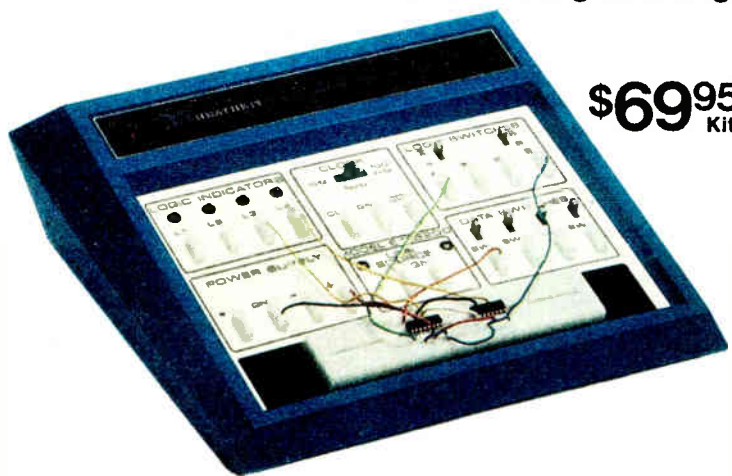


Order the digital techniques Learn-at-Home Course with Kit Trainer ET-3200. **SAVE \$9⁹⁵**
If purchased separately, \$119.90.
EES-3201, Course and Trainer.
Shpg. wt. 20 lbs. **109.95**

\$109⁹⁵

Important Note: These courses and trainers may qualify for a Federal Tax Deduction. Treasury Regulation 162-5 permits an income tax deduction for educational expenses undertaken to: (1) maintain or improve skills required in one's employment or other trade or business, or (2) meet express requirements of an employer or a law imposed as a condition to retention of employment, job status or rate of compensation. In many instances, your employer may re-imburse you in part or in total for taking these courses.

Heathkit Digital Design Experimenter/Trainer



\$69⁹⁵
Kit

to pulse logic circuits, 3-frequency pulse clock generator, 4 LED's for visual indication of logic states. Three regulated power supplies: +12 V, 100 mA current limited; -12 V, 100 mA current limited; +5 V, 500 mA, overload protected. Accommodates up to eight 14 or 16-pin dual-in-line IC's, also 24, 28 and 40-pin DIP's.

Kit ET-3200, Shpg. wt. 6 lbs. **69.95**

ETW-3200, Factory assembled Trainer, Shpg. wt. 6 lbs. **99.95**

Use it to perform all the experiments in the Heathkit Digital Techniques Course, also to develop projects, build and test prototypes, verify circuit operation, check digital IC's. Has solderless breadboard sockets, four binary data switches, 2 "no-bounce" switches

Deluxe Cassette Recorder



\$49⁹⁵

Play and
Record your
own cassettes

The ideal cassette player for the Heathkit Continuing Education Series cassettes, even lets you record so you can make your own notes and memos! Has volume and tone controls,

excellent voice response, easy cassette handling. 3" x 5 7/8" x 10 1/2". Battery-operated.

ECP-3800, Shpg. wt. 6 lbs. Assembled **49.95**

Amateur Radio Novice License Course

From Heath — world leader in Amateur Radio Equipment — a self-instruction course guaranteed to help you get your Novice ticket! In fact, it's so effective that if you fail to pass your FCC exam after completing the course — we'll REFUND your money for the course material!

\$24⁹⁵

There's no better way to learn about Amateur Radio!



Heathkit Self-Instructional Amateur Radio Novice License Course

This basic Amateur Radio course was designed by the Hams at Heath to teach you all you need to know to get your Novice License. It's the ideal way to learn Amateur Radio for CB'ers, electronics hobbyists and experimenters, anyone interested in world-wide two-way Amateur Radio.

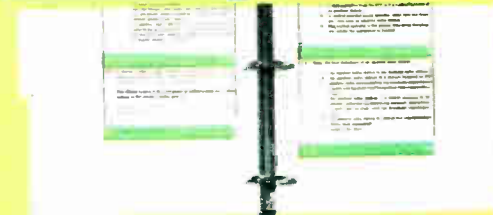
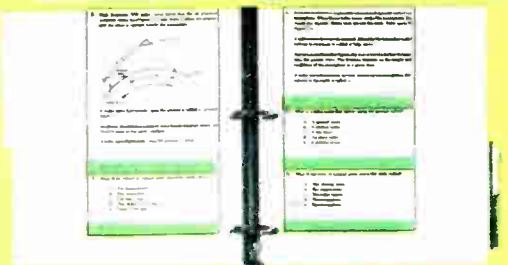
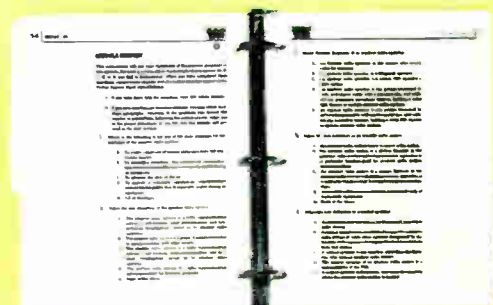
It employs the same, effective programmed techniques as in our other courses, so you can study and learn at your own pace. Covers rules and regulations, radio phenomena, operating procedures, emission characteristics, electrical principles, circuit components, practical circuits, antennas and transmission lines and radio communications practices. The course includes a programmed learning text and two audio cassettes to reinforce and personalize text material, and provide useful code practice.

Helpful operating aids include a glossary of common abbreviations, twelve most common Q signals, instructions for making your own antenna, international prefixes, Morse Code characters, a time zone cross-reference chart, a states check list, a wall-size full color frequency spectrum chart and a call area map of the United States. The course prepares you to take the Amateur Radio Novice FCC exam, and provides helpful guides for setting up and operating your own station once you pass the exam.

Course ER-3701, Shpg. wt. 7 lbs. 24.95

SAVE \$4.95! ER-3701 and HD-1416 Code Practice Oscillator, plus 10% discount certificate (see page 12). If purchased separately, \$34.90.

ERS-3701, Shpg. wt. 8 lbs. 29.95



New Self-Instructional Soldering Manual and Practice Kit

Learn how to solder properly for more kitbuilding enjoyment

\$9⁹⁵

Schools/Companies
Teach soldering using this effective, low-cost method!

Good soldering is a very important aspect of kitbuilding. This manual will teach you how to solder like a pro. Everything you need to learn soldering (except a soldering iron and small hand tools) is included. It's all made easy. The EI-3133 Solder Course is perfect for schools or industrial training too. The programmed instruction format is interesting and easy to follow. Included is a comprehensive final examination and a complete glossary of soldering terms, plus a practice kit for "hands-on" experience.

Course EI-3133, Shpg. wt. 2 lbs. 9.95



Heathkit Self-Instruction Electronics Courses

The fast, easy, low-cost way to learn about electronics—ideal for beginners or as “brush up” courses for those who work with electronics

You can't lose with our **MONEY-BACK GUARANTEE**

We're so confident you'll enjoy and benefit from these courses, that if for any reason you are dissatisfied, we will refund the full purchase price of the course text material, less trainer.

Courses start
as low as

\$2495
(less trainer)



Thousands of people just like you have already learned electronics the easy Heathkit way—and you can, too. The secret is our efficient approach to self-learning with easy, step-by-step “programmed” instructions; audio records to introduce and reinforce key concepts; self-evaluation quizzes to test your understanding; and interesting experiments that let you learn the easy “hands-on” way. All you need is a record player, small tools and a VOM. The optional Heathkit

experimenter/trainer is specifically designed to help you do the experiments in each course, and when you finish the course, you can use it to design your own circuits. After completing each course, you can take the optional final exam (passing grade 70%) and receive both a Certificate of Achievement and Continuing Education Units, a nationally recognized way of acknowledging participation in non-credit adult education.

These four basic courses will provide you with an

Course 1:

DC Electronics

*An ideal introduction
to electronics*

Covers current, voltage, resistance, magnetism, Ohm's law, electrical measurements, DC circuits, inductance and capacitance—provides a detailed survey of basic electronics.

Course 2:

AC Electronics

*Explains basic theory
of alternating
current*

Covers alternating current, AC measurements, capacitive and inductive circuits, transformers and tuned circuits—requires completion of course 1 or equivalent knowledge.

Discusses matter, atoms, current flow, voltage rises and drops, series and parallel connections, magnetic fields, voltage, dividers, network theorems, time constants and more. Includes all texts, records and 56 parts for 20 different experiments. Average completion time, 20 hours. 2.0 Continuing Education Units and certificate for passing final exam (passing grade 70%).

Course EE-3101, Shpg. wt. 6 lbs. 39.95

EEA-3101, Optional Cassettes*, Shpg. wt. 2 lbs. 6.95

SAVE \$9.95! EES-3101, Program with Kit Trainer. wt. 18 lbs. 89.95

Discusses waveforms, period and frequency, meters, scopes, series and parallel circuits, RC filters, dividers, phase shifts, reactance, vectors, transformer theory and more. Includes text, records and 16 parts for 8 different experiments. Average completion time, 15 hours. 1.5 Continuing Education Units and certificate for passing optional exam (passing grade 70%).

Course EE-3102, Shpg. wt. 6 lbs. 39.95

EEA-3102, Optional Cassettes*, Shpg. wt. 2 lbs. 6.95

SAVE \$9.95! EES-3102, Course with Kit Trainer, wt. 18 lbs. 89.95

Covers basic amplifiers, typical amplifiers, operational amplifiers, power supplies, oscillators, pulse circuits, modulation and demodulation with emphasis on integrated circuits—requires completion of courses 1 through 3 or equivalent knowledge.

Course 4: Electronic Circuits

Explains the operation of all the most common electronic circuits

Provides the practical, "hands-on" knowledge you need for electronic circuit design and development

Discusses amplifier functions and configurations, class of operation, audio characteristics, video amplifiers, buffers, IF's, rectifiers, voltage multipliers, voltage regulation, basic oscillators, RC waveshaping, clipping, AM, FM and SSB, modulation fundamentals and more. Requires an oscilloscope (such as the Heathkit IO-4541, page 67) for some experiments. Includes text, records, and over 110 parts for 18 different experiments. Average completion time, 40 hours. 4.0 Continuing Education Units and certificate for passing final exam (passing grade 70%).

Course EE-3104, Shpg. wt. 8 lbs. 49.95

EEA-3104, Optional Cassettes*, Shpg. wt. 1 lb. 6.95

EES-3104, Course with Kit Trainer, Shpg. wt. 14 lbs. 99.95

All
Courses

Heathkit Basic Experimenter/Trainer Kit

For the Heathkit DC, AC, Semiconductor and Electronic Circuits courses —helps you perform each project quickly and easily. And after you finish the course, it's ideal for "breadboarding" your own design projects. Has solderless breadboarding sockets, 2-range variable sine and square wave signal source, dual-variable power supplies for positive and negative voltages (both variable over 1.2 to 16 volts, 120 mA, both regulated and short-circuit protected), 1k and 100k linear potentiometers. Center tapped transformer provides 30 V rms, 60 Hz for line experiments.

Kit ET-3100, Shpg. wt. 5 lbs. 59.95

ETW-3100, Factory Assembled Trainer. Shpg. wt. 5 lbs. 89.95

\$59⁹⁵
Kit



overview of contemporary electronics

Course 3: Semiconductor Devices

Essential for understanding solid-state equipment

Covers fundamentals, diodes, zener diodes, special diodes, bipolar transistor operation and characteristics, FET's, thyristors, IC's and optoelectronics—requires completion of courses 1 and 2 or equivalent knowledge.

Discusses holes, current flow, N and P types, biasing, tunnels, and varactors, PIN, IMPATT, bipolar transistors, gain, cutoff and leakage current, FET's, SCR's, light sensitive and light emitting devices, more. Includes text, records and 27 parts for 11 different experiments. Average completion time: 30 hours. 3.0 Continuing Education Units and certificate for passing final exam (passing grade 70%).

Course EE-3103, Shpg. wt. 6 lbs. 39.95

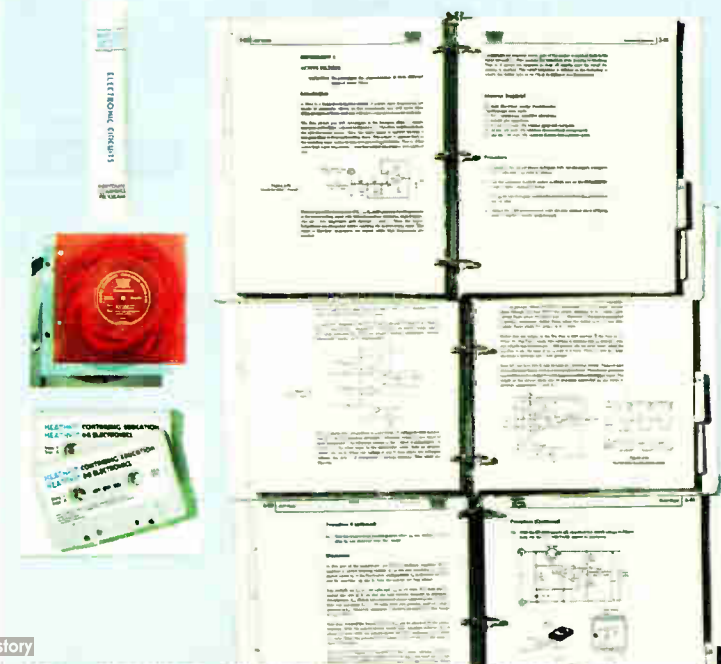
EEA-3103, Optional Cassettes*, Shpg. wt. 2 lbs. 6.95

EES-3103, Course with Kit Trainer. Shpg. wt. 17 lbs. 89.95

SAVE \$29.80! ETS-3114. All four programs and trainer.

Shpg. wt. 31 lbs. 199.95

Course 4





Bright Red LED Readout can be read from up to 10 feet away

Zeroing control lets you accurately weigh contents of a container

Auto-Manual Control selects automatic on-off or manual operation, allows weighing of lighter objects

Extra cable lets you place readout at eye level



\$99⁹⁵

Weigh yourself the "space-age" electronic way!

New Digi-Scale Electronic Scale

- 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 new Heathkit Digi-Scale is a digital readout "weighing machine" that shows your weight in big, bright, computer-like LED's. Even with a 300-lb. capacity, it reads out to 2/10ths of a pound. It's far more precise and easier-to-read than conventional dial scales, and it's priced lower than any digital electronic scale we've seen yet!

The "weighing machine" uses solid-state circuitry and a strain-gauge transducer element like those used in expensive electronic laboratory scales. There are no mechanical weights or springs to go out of adjustment and affect readings. It's ideal for dieting because it instantly shows small weight changes.

A zeroing feature allows fine adjustments for accurate weighing of small items (weigh the baby, but not the blanket). Has handsome burl walnut-finish platform with durable, moisture-proof cast aluminum housing. Battery-operated, so it's safe to use even after a shower. The kit includes extra cable so you can place the readout at eye level, on a wall, anywhere it's convenient. Operates on six inexpensive "C" cells, not included. Platform size, 11½" x 11½" x 1½". Readout/control, 6" x 3½" x 1½".

Kit GD-1186, Shpg. wt. 10 lbs. 99.95

Factory assembled and adjusted GD-1186.

GDW-1186, Shpg. wt. 9 lbs. 139.95

Look at these Special Heathkit Bargains for Fall!

Portable VHF/FM Monitor

SAVE \$10



See page 28

2-Meter Transceiver CUT \$30



See page 17

Clock/Weather Monitor CUT \$25



See page 74

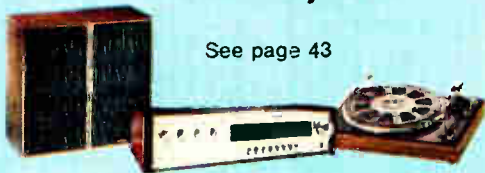
SAVE on Computer Systems

See pages 2-11



SAVE on stereo systems

See page 43



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Schlumberger

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BENTON HARBOR,
MICHIGAN 49022

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See index on page 3.

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