ATTENTION ALL
Master Builder
CLUB MEMBERS
EXTRA BONUS POINTS
See Page 52
Sept. 25
Heath
Heathkit
Helping you make things better

1 HERO® JR. – the personal robot that makes *you* "very special"

The versatile and entertaining HERO JR. is a fully preprogrammed personal robot with speech output, light and sound sensors, an ultrasonic sonar, drive and steering motors and an on-board computer control system.

Now Only
$399.95

DOUBLE MASTER BUILDER POINTS **on HERO JR. packages**

- **Has a dynamic personality consisting of six traits**
- **Sings songs, tells nursery rhymes, plays games**
- **Guards your home and challenges intruders**
- **Wakes you up on time and announces special dates**
- **Lets you modify his personality as desired**
- **Add capabilities with additional plug-in cartridges**

Meet the first affordable, personal robot with a dynamic personality...HERO JR. A friendly robot, HERO JR. will fit right in with your family and into your home. He sings songs, plays games, tells nursery rhymes, recites poems, guards your home and he can even wake you in the morning and guide you through an exercise routine. HERO JR. will explore his surroundings and will seek to remain near his human companions. HERO JR.'s personality is preprogrammed and doesn't require any computer programming skills to operate. If you do wish to program HERO JR. you can with a home computer and the optional RS-232 Accessory and BASIC cartridge.

The traits comprising HERO JR.'s dynamic personality include: singing songs like "Daisy" and "America"; speaking preprogrammed English phrases; exploring and moving about, using his sensors to help avoid obstacles, and seeking out humans; playing games such as "Cowboys and Robots" and "Let's Count"; telling a nursery rhyme; and gabbing in "Roblish" (a robot gibberish that sounds like English). All routines are stored in 32K of built-in ROM. Additional functions can be easily added to HERO JR. through optional plug-in cartridges.

In addition to these six traits, HERO JR. has an internal clock with a 100-year calendar that can even compensate for Daylight Savings Time. With this timekeeping ability, HERO JR. can act as an alarm clock and awaken you at a specified time. After your wake-up call, he listens to be sure you are awake or permits two ten minute snoozes if you desire. HERO JR. can also be made to announce the week day, date and time at predetermined intervals or just at one important time and date. With his 2K of RAM, HERO JR. can store and remind you of events such as birthdays and anniversaries – up to 16 dates per year.

A single-button DEMO feature activates a built-in "Robot Variety Show" which demonstrates the Robot's ability to see, hear, speak, tell time and move. You can even participate in the show as HERO JR. tells you what to do and when. To see, hear, speak, and to move about HERO JR. uses a light sensor, ultrasonic sonar and optional infrared detector, sound detector, speech synthesizer and an internal clock which are controlled by an on-board computer using a Motorola 6808 microprocessor. The sonar is accurate from 4½" to 13'. An optional infrared sensor adds superior heat/motion detection capability.

HERO JR. can duplicate all English sounds using its built-in Votrax SC-01 phoneme synthesizer. This permits the Robot to say just about anything. Volume and pitch adjustments tailor the Robot's voice to whatever sounds best to you. All of HERO JR.'s vocabulary is preprogrammed for you.

HERO JR. can perform many useful tasks, including guarding your home against intruders with a coded security system. The Robot gives a verbal warning and asks for a password when his sensors detect a presence. No answer or the wrong answer cause HERO JR. to activate a GDA-2800 Security System (page 18). HERO JR. can guard a specific area or randomly patrol your house. Although HERO JR. normally speaks, sings and performs tasks between moving about at random, an optional wireless remote unit allows the Robot to be manually driven from place to place. HERO JR. will also speak while moving under remote control. The remote operates at 75 MHz up to 100 feet away.

HERO JR. is powered by two six-volt rechargeable batteries and plug-in wall charger (included). It operates about 4 hours, with a normal amount of exploring. He randomly enters a SLEEP mode which conserves battery power by keeping only critical circuits energized. You can manually make HERO JR. enter or leave this mode. HERO JR. is 19" tall and weighs 21½ lbs. He can carry your favorite beverage (up to 10 lbs.) in a 94 cubic inch compartment built into his head. Three wheels enable him to move and he has a 17-key keypad which permits the owner to modify his personality or initiate a task. The alphanumeric keypad has clearly marked function keys including Sing, Play, Poet, Gab, Alarm, Guard, Help, Plan, Set Up, and Enter. Eight LED's flash in time with his speech. HERO JR. is easily assembled in about 20 hours.

Kit RT-1, HERO JR., Shpg. wt. 32 lbs. ..... **Was $599.95 NOW ONLY 399.95**

SAVER! Save $239.75 with Kit RTR-1-3. HERO JR. with Infrared Motion Detector, Remote Control and Cartridge Adapter accessories. Plus the Songs, Phrases and Rhymes #1 and Special Occasions cartridges. *Order the RTR-1-3 and receive double Master Builder points on HERO JR. This catalog only!*
Shpg. wt. 56 lbs. ..... **Was $749.95 NOW ONLY 649.95**

SAVER! Save $204.60 with Kit RTR-1-4, HERO JR. with Cartridge Adapter Accessory and seven cartridges: Songs, Phrases and Rhymes #1; Animals, Blackjack and Tic Tac Toe; Special Occasions; Math Master; Riddle Robot/Tongue Twister; Program Language; and Musical Chairs. *Order the RTR-1-4 and receive double Master Builder points on HERO JR. This catalog only!*
Shpg. wt. 47 lbs. ..... **Was $649.95 NOW ONLY 549.95**

Accessory kits for HERO JR.:

RTA-1-1, Infrared Motion Detector Accessory detects rapid changes in temperature within a zoned range of approximately 35' long x 20' wide. Includes two window stickers that read "Warning, This Area Protected By A Security Robot." Shpg. wt. 1 lb. **119.95**

RTA-1-2, Remote Control Accessory offers manual, wireless control of HERO JR.'s movements up to 100 feet away, operates at 75 MHz, Shpg. wt. 2 lbs. . **179.95**

RTA-1-3, RS-232 Accessory allows you to program HERO JR. in BASIC (RTC-1-8) from a terminal, or computer (requires HCA-10 or HCA-11 RS-232 cable on page 95 and terminal emulation software), Shpg. wt. 1 lb. **49.95**

RTA-1-4, Two extra batteries, Shpg. wt. 5 lbs. **59.95**

RTA-1-5, Cartridge Adapter, permits use of optional plug-in cartridges that increase HERO JR.'s capabilities. Includes additional 8K RAM, 1 lb. **49.95**

Plug-in cartridges for HERO JR. (all require installed RTA-1-5):

RTC-1-2, Songs, Phrases and Rhymes #1 Cartridge increases HERO JR.'s vocal routines and automatically adds to the Robot's personality, 1 lb. **19.95**

RTC-1-3, Animals, Blackjack and Tic Tac Toe Cartridge enables you to play these additional games with HERO JR., Shpg. wt. 1 lb. **39.95**

RTC-1-4, Special Occasions Cartridge adds songs for special occasions, includes two versions of Happy Birthday (one using master's name), Jingle Bells and Auld Lang Syne, Shpg. wt. 1 lb. **19.95**

RTC-1-5, Math Master Cartridge, a timed math game, Shpg. wt. 1 lb. ... **24.95**

RTC-1-6, Riddle Robot/Tongue Twister Cartridge, Shpg. wt. 1 lb. **24.95**

RTC-1-8, HERO JR. BASIC Cartridge contains special enhancements for speech, movement, sensors and integer math; and allows the owner to write programs using a video terminal or home computer running a terminal emulation program, requires RTA-1-3 RS-232 port, Shpg. wt. 1 lb. **49.95**

NEW! RTC-1-9, HEROBICS Exercise Cartridge offers 4 levels of difficulty and 10 exercises the whole family can benefit from, Shpg. wt. 1 lb. **29.95**

RTC-1-10, HERO JR. Program Language Cartridge, allows you to program the Robot through its keyboard, Shpg. wt. 1 lb. **39.95**

RTC-1-11, Musical Chairs Cartridge, play titled game plus Acey-Ducey and Robot Mind Reader with HERO JR., Shpg. wt. 1 lb. **34.95**

2 Heath's most advanced computerized weather station gives complete meteorological data instantly

FALL SAVINGS SPECIAL
cut $30
Now
$369.95 Kit
This Catalog Only

- **Displays time and date, indoor and outdoor temperatures in F or C, wind speed and direction, and barometric pressure – whether it is rising or falling and rate of change**
- **Microprocessor accuracy with memory storage of past weather data so you can see trends**
- **Remote windcup-and-weathervane transmitter assembly mounts on a 1" to 1½" mast, such as a TV antenna mast, for years of dependable service**
- **Professional-looking solid walnut cabinet ends with brushed-aluminum trim panel**

The Heathkit Digital Weather Computer uses a microprocessor to instantly give you accurate past and present weather data to aid in forecasting future activities. For professional weather watchers, farmers, boaters, science teachers – for anyone going outdoors – the weather station shows you what to expect. ALL the important weather information is at your fingertips.

Complete weather information at the touch of a button: The ID-4001 Digital Weather Computer gives you the time in AM/PM or 24-hour format, plus the date for log entries; both the indoor and outdoor temperatures, whether above zero or below, in Fahrenheit or Celsius scales; outdoor wind chill factor, plus the indoor/outdoor minimum and maximum temperatures since last memory clearance; instantaneous wind velocity with digital accuracy and 16-point compass resolution, in mph, kph or knots; the average wind speed and direction, and peak

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gust since last cleared; barometric pressure with four-digit accuracy, in selectable inches or millibars, and whether rising or falling and rate of change.

Our electronic almanac has more memories to store data: It records high and low temperatures, minimum and maximum barometric pressures, peak wind speed, and most importantly, the time and date each occurred. The data is stored in memory until you choose to clear it. Even the rate of barometric change is calculated – so you know when a major storm is about to develop. Connection to an external battery will hold memory contents in case of a power failure.

The anemometer, weathervane and remote transmitter were designed using an aerospace wind tunnel to ensure reliable operation under adverse weather conditions. A compact boom assembly relays data to the computerized console indoors. The transmitter utilizes solid-state infrared sensors and optical encoding transmission technology to provide a higher degree of accuracy than is possible with conventional, friction-sensing mechanical devices.

In addition, the barometer readings are derived from a newly-developed piezo-resistive silicon bridge transducer that senses the most minute changes in atmospheric pressure, from 28 to 32 Hg (inches of mercury). The four-digit readout also has separate indicators to show whether the pressure is rising or falling. An output for interfacing with a computer is available for even more sophisticated weather forecasting, research and pattern forecasting.

Beautiful styling and an easy-to-read digital display: Not only does this Weather Computer provide more data, but its functionally elegant design will blend in with almost any decor. The solid oiled-walnut cabinet is trimmed in brushed aluminum. The ID-4001 is an easy, enjoyable kit to build. It requires 8-wire cable which may be ordered separately. The assembled and tested IDW-4001 comes with 100 feet of 8-wire cable.

Kit ID-4001, Shpg. wt. 15 lbs. ..... **Regularly $399.95 THIS CATALOG 369.95**

Computerized Weather Station factory assembled and tested.
IDW-4001, Shpg. wt. 25 lbs. **699.95**

ID-4001 SPECIFICATIONS: DIGITAL CLOCK/4-YEAR CALENDAR: Time Accuracy: Determined by accuracy of AC line. No accumulative error. **WIND VECTOR: Accuracy:** ± 5% or better. **Direction Display: Accuracy:** ± 11.25 degrees. **THERMOMETER: Temperature Range:** – 40° to 70°C; (– 40° to 158°F). **Accuracy:** ± 1 on Celsius readings; ± 2° on Fahrenheit readings. **BAROMETER: Pressure Range:** 28.00 to 32.00 in. Hg (inches of mercury), 981.9 to 1050 millibars. **Accuracy:** ± 0.075 in. Hg, ± 0.01 in. Hg /C. **Operating Temperature:** Outdoor assemblies, 40 C to + 70°C (- 40°F to 158°F). Unit, 15° to 35°C (59° to 95°F). **Power Requirements:** 120 240 VAC. Provision for external battery connection for memory backup during power failures. **Dimensions:** 7¼" H x 16" W x 6" D. **Weight:** 9 lbs.

3 Five-function weather station provides accurate data

Only
$159.95

- **Monitors barometric pressure, indoor/outdoor temperatures, wind speed and direction**
- **Temperature-compensated barometer can be used to an altitude of 10,000 feet**
- **All solid-state circuitry requires a minimum of power from the AC line**

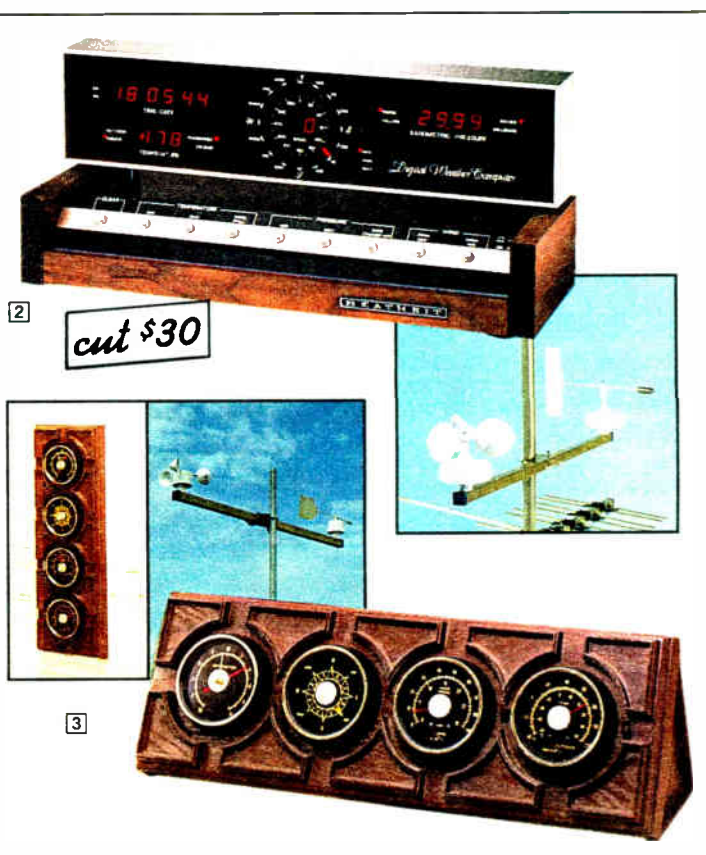
For the price, you can't beat the features or the accuracy of the ID-1290 Weather Station. Designed for quality and reliability, it contains professional-grade sensors; all solid-state circuitry which operates from 120 VAC with minimum power consumption for maximum component life; and a non-corroding remote transmitter assembly that ensures years of trouble-free service.

Heathkit's ID-1290 provides instant and accurate weather information. True indoor/outdoor temperatures are displayed in Fahrenheit and Celsius with a switch to select indoor or outdoor readings. A sensitive barometer helps you keep on top of the most significant changing atmospheric pressure conditions. Wind speeds can be read in two ranges: from 0 to 30 mph or from 0 to 90 mph.

The eight wind direction indicators provide a 16-point compass resolution when two adjacent indicators are lighted. The anemometer/weather-vane mounts on any standard 1" to 1½" mast. The ID-1290 is a four-evening kit which may be wall-mounted or used as a desk set with the included stand.

Kit ID-1290, Shpg. wt. 8 lbs. **159.95**

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°F, ± 2°F (typ. INDOOR); - 40° to + 120°F (typ. OUTDOOR). **Barometric Pressure:** 28-31 inches of mercury within 0.5 inches, accurate up to altitudes of 10,000 ft. **Operating Temperature:** Receiver, 32° to 100°F; Transmitter, 40° to + 120°F. **Wind Direction:** 16-point resolution by lighting two adjacent lights. **Dimensions:** Wall mounted, 20½" L x 7" W x 2" D. Desk mounted, 6¾" D. **Weight:** 7 lbs.



8-Wire Cable for the ID-4001, ID-1290 and ID-1590 Instruments

IDA-1290-1, 50' cable, Shpg. wt. 2 lbs. **9.95**
IDA-1290-2, 100' cable, Shpg. wt. 4 lbs. **16.95**
IDA-1290-3, 150' cable, Shpg. wt. 6 lbs. **23.95**

1 Practical Digital Indoor and Outdoor Thermometer

$84.95

- **Digital display of indoor and outdoor temperatures**
- **Continuous or alternating Fahrenheit or Celsius display**
- **Electronic accuracy and reliability with Heathkit quality**

When you compare the advantages this Digital Indoor/Outdoor Thermometer has over a conventional mercury bulb "sun-or-snow" thermometer, you'll wonder how you did without one for so long. The big, red ½" display digits can be seen easily from across the room, at night and in bright daylight. Eliminate the guesswork in getting accurate temperature readings.

The ID-1390B Thermometer monitors temperature readings from two sensors for accurate indoor/outdoor readings. Measures temperatures from –30°F to 120°F outdoors and indoors. This thermometer has an accuracy of ±1° from 20°F to 120°F, ±2° from –40°F to 120°F. The 2½ digit display has plus and minus indicators for quick identification of above- and below-zero readings. Select Fahrenheit or Celsius temperature scales, with a continuous reading of indoor or outdoor temperatures, or alternate readings of both. The 10' indoor and 75' outdoor cables (included) let you place the sensors almost anywhere.

Step-by-step instructions make this kit easy to assemble and calibrate, and it is a practical gift that gives year-round value. Operates at 120 VAC, 60 Hz (order model ID-1390BE for 240 VAC, 50/60 Hz operation). Small size (2½" H x 7" W x 5" D) and an attractive black Cycolac cabinet with teakwood trim make this Thermometer a handsome addition almost anywhere in your home. Styling is the same for the ID-1590 Digital Wind Speed/Direction Indicator. *Now get double Master Builder points when you buy the ID-1390B.*

Kit ID-1390B, Shpg. wt. 4 lbs. **84.95**

2 Accurate Digital Wind Speed/Direction Indicator

$99.95

- **Check wind speed and direction with electronic accuracy**
- **Read wind speeds in mph, kph or knots, from 0 to 99**
- **Non-corroding outdoor transmitter for years of service**

This ID-1590 Digital Wind Indicator skimps on price, but certainly not on accuracy or reliability. The outdoor transmitting unit is one of the best around. It's designed to give you precise wind speed and direction, year after year. The anemometer and weather vane are constructed from non-corroding waterproof materials for error-less readings under any condition.

The indoor console features an easy-to-read seven-segment display and can be wired to report in two of three scales: mph, kph and knots. The readout displays wind speeds on these scales from 0 to 99. Incandescent bulbs mark the principal compass points, providing 16-point resolution by temporarily lighting two adjacent bulbs simultaneously. It uses the same transmitter boom as the ID-1290 (shown on page 3).

In only three evenings, you can have this Wind Speed/Direction Indicator working for you. And you can calibrate it for true north to gather weather data – or for magnetic north if you are a pilot. Only two simple adjustments are required to place the Indicator in operation, and these can be performed without test equipment. Requires 8-wire cable (see page 2). Operates on 120 VAC.

Kit ID-1590, Shpg. wt. 7 lbs. **99.95**

3 Relative Humidity Indicator Monitors air moisture

$99.95

- **Monitors the relative humidity to improve your living environment and reduce heating/cooling costs**
- **Costs half as much as comparable units and offers more**

The ID-2295 Relative Humidity Indicator uses two electronic sensors to let you know the relative humidity indoors and outdoors. Save time and dollars when you know if it's dry enough outside to paint in the summer or time to turn on the humidifier in winter to save on your heating bill.

Electronic sensors provide accuracy and reliability: Heath's electronic sensors, unlike most barometers that use animal membrane or hair, uses a conductive film covered with a layer of gold for greater reliability – and electronic sensors permit making accurate readings in remote locations. Place the console in a convenient location, the two sensors where you want to measure relative humidity.

With both sensors connected, the console can display readings alternately, 1.5 or 5 seconds apart, or can be switched for a constant display of either reading. Bright red ½"-high digits display the humidity by percentage, from 0 to 99 percent. LEDs identify which sensor's readout is being displayed. A 100-foot easily-concealed transmission cable is included. Assembly and calibration requires only two or three evenings. Console measures 2½" H x 7" W x 5" D.

Kit ID-2295, Shpg. wt. 6 lbs. **99.95**

4 Save $100 on 25" Diagonal TV Computer System

At first glance, your GR-3000 looks like a normal TV, but revolutionary new hardware, superior performance and advance design make it the world's most talented receiver. And it's all available from your armchair.

The Remote Control unit uses infrared telemetry to perform some never-before-possible computerized TV magic. Light-touch buttons have audible feedback and provide special functions only possible with the GR-3000 TV.

A special 3-line information display appears briefly on the screen by command or when channels are changed. It identifies the tuned station, current time in the selected 12- or 24-hour format, and current date. A fourth, accessory line shows the function in use or Auto-Rotor compass rotation and direction status.

Automatically set your antenna for optimum reception. The microprocessor-guided GRA-3000-2 Auto-Rotor Accessory Module seeks a maximum signal level when you select any one of the 82 addressable channels. It memorizes antenna orientations and returns to them when those channels are selected.

A "Learn" mode with eight channels of input space (94 bytes of soft memory) will let you custom-program up to eight different sequences of TV operation and repeat them with a single command.

The GR-3000 is cable compatible for immediate installation in equipped areas. Direct audio and video input and output jacks on the rear panel permit you to connect and switch between a video recorder/disc player or standard channel reception. Two 6" x 9" and two 2" tweeters supply excellent sound.

A multi-level video display consists of five different display screens. First is the standard video screen; second is a backdrop screen which can be set for any of sixteen different colors; third is a pattern/text screen for alignment/test purposes and built-in help messages; next is a 40-character display screen for configuring on-screen displays and messages; the fifth is a computer-generated screen, to display text and graphics generated by an external computer.

Kit GR-3000, 129 lbs. Motor Freight ..... **Was $799.95 NOW 699.95**

$uper $aver: Get a complete deluxe 25-inch TV Computer system that includes a GR-3000, a GRA-3000-1 Programmer Accessory Module, a GRA-3000-2 Auto Rotor Accessory Module with a GDA-1184-1 Electronic Rotor Assembly, and either a small GRA-705-25 or large GRA-715-25 TV cabinet at great discount prices.

Kit GRS-3000-1 with small TV cabinet, 256 lbs., Mtr. Frt.
Regular Price...1159.75 Discount Price **699.95**

Kit GRS-3000-2 with large TV cabinet, 280 lbs., Mtr. Frt.
Regular Price...1209.75 Discount Price **699.95**

Kit GRA-3000-2, Auto Rotor Accessory Module, Shpg. wt. 2 lbs. **19.95**

GDA-1184-1, Cornell-Dublier Electronic Rotor Assembly Model AR-40, required for proper Auto-Rotor operation, Shpg. wt. 11 lbs. **89.95**

GRA-3000-1, Programmer Accessory Module gives you preset control of your GR-3000 Television Set. You can preset your TV programming in the weekly mode for a day, or an evening – to repeat once a week by day and time, or once a year.

Kit GRA-3000-1, Shpg. wt. 2 lbs. **199.95**

4 **Large cabinet for the GR-3000 Television Computer System.** Has oak veneer parquet top and sides with antique-finish metal hardware and latticework. Hardwood framing. 32½" H x 50½" W x 20" D with casters and tube cap.

GRA-715-25, 136 lbs. Motor Freight **199.95**

5 **Small cabinet for the GR-3000 Television Computer System.** Antique latticework accents distressed-finish oak veneer. 33" H x 43" W x 20" D with casters, cap.

GRA-705-25, 112 lbs. Motor Freight **149.95**

6 Zenith TV Stereo Adaptor enhances TV viewing

Make quality stereo broadcasts part of your television entertainment as soon as these signals are available from your local TV station using a method developed by Zenith and adopted by the TV industry as a standard. In addition, second audio programming (such as a second language) can also be decoded. Mode settings for auxiliary stereo, extended stereo and mono audio are also available. Adjust the bass, treble and balance controls to suit your individual taste. Works with Heath GR-2502, or Zenith TVs with an "IF tap output." Add-on kits (below) are available for many other Heath TVs. Uses 120 VAC, 2¼" H x 16¾" W x 13⅜" D.

GDZ-524, Assembled and tested, Shpg. wt. 12 lbs. **179.95**

GDA-524-1, Cable Adapter Kit allows use of the GDZ-524 with Heath GR-1901, GR-1902, GR-2501 and GR-3000 TV's, Shpg. wt. 1 lb. **9.95**

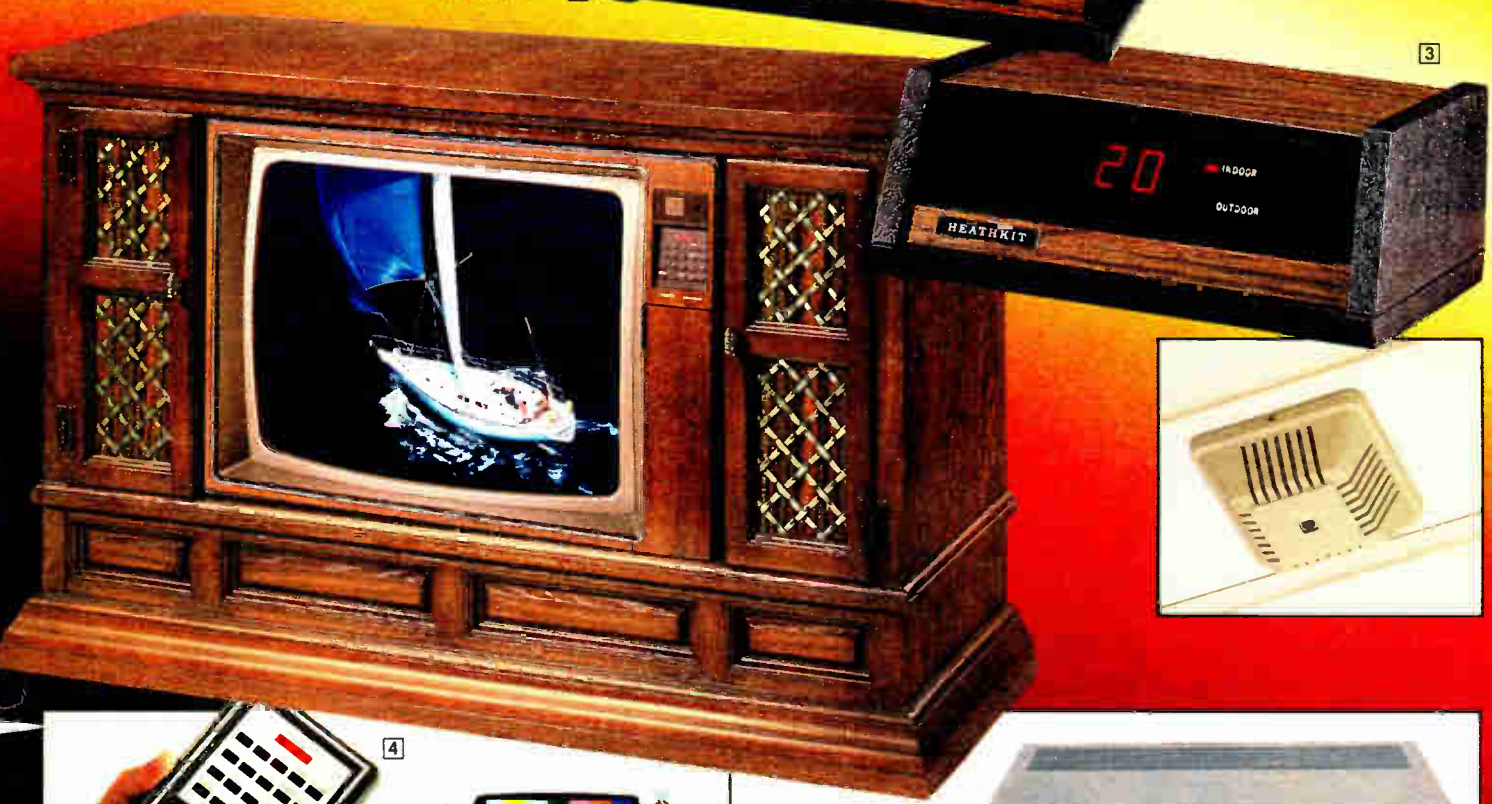
GDA-524-2, Cable Adapter Kit allows use of the GDZ-254 with Heath GR-300, GR-400, GR-500, GR-2000, GR-2001 and GR-2050 TV's, 1 lb. **9.95**

Discover the fun of kitbuilding at your Heath/Zenith Computers & Electronics Center.

1

DOUBLE MASTER BUILDER POINTS

2



3

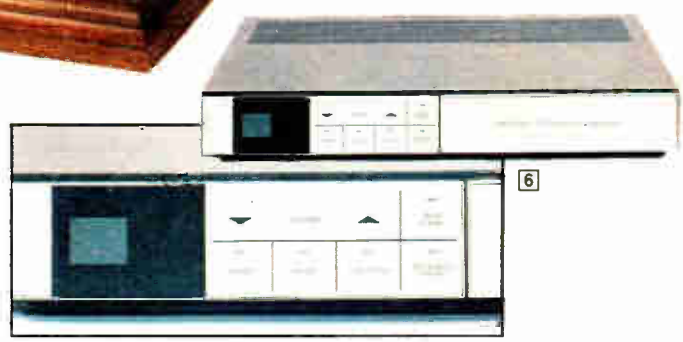
4

Five different, overlapping screens

Infrared Remote provides complete control of TV and special functions

5

Simulated TV pictures



6

Stereo Adaptor decodes stereo broadcast TV sound

- Decodes and plays broadcast stereo TV sound through a TV's speakers or an external amplifier and speaker
- Separate adjustable bass, treble and balance controls

[1] Advanced System 3 GR-2502 25-Inch Diagonal Color Television kit with optional Space Phone®

Dramatic TV for only

$649.95

Kit

- **Colors remain "like new," year after year with exclusive automatic CRT tracking feature**
- **Improved picture sharpness, even at high brightness levels, and enhanced highlight detail made possible by a high-resolution tri-focus picture tube**
- **Clearer pictures with greater resolution provided by a special video filter plus a comb filter**
- **Greater user conveniences with optional space phone and antenna switching accessory**

A lot of your friends will buy color TV sets this year. *You can build one!* Both the outstanding value and magnificent rewards of this easy-to-build kit can be yours in as little as five fun evenings.

High fidelity picture sharpness is yours with a Peak Resolution Picture circuit that achieves 25% greater detail than ordinary TV by reproducing up to 330 lines of broadcast resolution. This comb filter eliminates shimmering, spurious color and makes picture detail 'pop out' sharp and clear for a lifelike degree of clarity found previously in only the most expensive, professional-quality video monitors. Our Tri-Focus picture tube has three concentrated focusing actions instead of just one – for cleaner, brighter image. The 100% modular chassis design of the GR-2502 guarantees outstanding reliability by using fewer inter-connections, with most modules factory pretested and aligned before you unpack the kit.

Like a chromatic control center in your TV set, the sophisticated Color Sentry combines 8 automatic picture and color sub-systems for magnificent viewing pleasure. It maintains accurate color level, life-like flesh tones, tint and contrast – even adjusts the picture brightness as surrounding room lighting changes. One button does it all for you...scene to scene, channel to channel...automatically!

A sharpness control lets you adjust the GR-2502's level of picture definition. Advanced digital circuits scan and lock on the broadcast signal, eliminating any kind of vertical and horizontal hold controls. A no-wear, quartz PLL Varactor electronic tuning system seeks out and fine tunes the exact station frequency. Because the tuners are electronic, they have no moving parts to corrode, wear or cause noisy picture problems. A power-sensing voltage regulator helps conserve energy by supplying only the power needed by the TV and maintaining a stable chassis voltage. Electronically self-regulating, it virtually eliminates the effects of household line variations and provides a more constant voltage for improved component and picture tube life. Solid-state automatic fringe-lock circuitry provides unshakable picture stability on fringe area reception. A special phase-locked AFC switch 'pulls in' off-frequency signals from cable or master antenna systems and video games. For optimum clarity, a picture control permits you to adjust the contrast and color levels, which maintain proper balance for varying room light conditions. Altogether, the most impressive picture you can build!

Advanced System 3 means greater value. Together, the EFL Tri-Focus picture tube, cool-running Triple-Plus chassis, and advanced Color Sentry combine to create the sharpest, most realistic picture in Heath history! You're assured of fewer service calls, greater reliability and ease of operation.

Your new GR-2502 comes with our Computer Space Command Remote Control for scanned or direct access channel selection, on/off with variable volume, on-screen display of channel with current time, and using the Advanced Space Phone. An easy-to-read, on-screen channel/time display appears briefly when channels are changed, or recalled from set or remote control. Expanded 178-channel tuning capability lets you select from up to 122 cable offerings as easily as VHF and UHF, except scrambled premium services.

Advanced Space Phone is one option worth its price in convenience alone. With it you can take or make calls anywhere in the world. A dialed number prints out on the TV screen, and in case you get a busy signal you can even program the remote to redial automatically. The TV set itself is readily connected to any telephone line to work as a sensitive speaker phone, so you don't have to leave your easy chair...and the whole family can participate in conversation! And if you don't want the other party to overhear what's being said in the room, there's even a Mute button on the remote control you can touch for complete privacy.

Equipped with a stereo audio system, the GR-2502 has a five-watt RMS per channel stereo amplifier with a frequency response from 100 Hz to 10,000 Hz into 8 ohms with 2% or less total harmonic distortion. Separate bass, treble and balance controls are provided plus a hi-filter switch and a mode switch for auxiliary stereo or TV audio. Two 5" x 7" oval speakers and two 2" tweeters provide clean, rich audio. Video/audio input/output jacks are also provided.

Put the GR-2502's custom-installable chassis behind a wall, mount it in a cabinet of your own custom design or save when purchasing your kit with one of the fine furniture cabinets featured on page 7. Clearly written and fully illustrated, the step-by-step assembly manual has all directions, dimensions and templates necessary to install the TV successfully. No instrument alignment is required. The kit includes a crosshatch generator which you build and use to perform the convergence and color purity setup. After just 15 hours average build time, you can touch the Power button on your GR-2502 and begin to admire a beautiful, lifelike parade of pictures you'll be proud to show off always.

The commanding 25" Heathkit GR-2502 has a lot more of what you're looking for – top-of-the-line features and performance plus the utmost in service simplicity.

Kit GR-2502, Shpg. wt. 100 lbs., Motor Freight **649.95**

Kit GRA-2502-1, Advanced Space Phone accessory, 2 lbs. **49.95**

SAVER! Save $100.00 on a GR-2502 TV and a Classic cabinet.
GRS-2502-1, Shpg. wt. 185 lbs. Mtr. Frt. **699.90**

SAVER! Save $100.00 on a GR-2502 TV and a Modern cabinet.
GRS-2502-2, Shpg. wt. 182 lbs. Mtr. Frt. **749.90**

GSZ-4600, Assembled Remote Antenna Switch Accessory, allows selection of four different antenna sources by front panel or remote control, includes AC power supply, Shpg. wt. 4 lbs. **29.95**

[2] Advanced System 3 GR-1902 19" Diagonal Color Television kit provides excellent performance

Save $50

$399.95 Kit

- **New CRT tracking system keeps your picture looking brand new – day after day, year after year**
- **Quartz-controlled tuning of 178 cable and standard broadcast channels with infrared remote control**
- **Built-in VHF/UHF antennas; earphone included**

This space-saving table-top model unites a 19" size and spectacular System 3 technology in a meticulous kit design you'll take great pleasure in building.

Inside the GR-1902, you'll find circuit improvements that offer enviable advantages over other color TVs. First, the chassis. Cool-running and 100% modular in design, it consists of a clean, uncluttered arrangement of modules. Every module is 100% pre-tested and aligned for outstanding reliability.

The Tri-Focus Picture Tube attracts your eye with exceptional – almost three-dimensional – sharpness and detail. It uses an ultra-high-resolution EFL Electron Gun with three extended focusing actions to concentrate the beam and produce a smaller spot than is possible in one-element guns. The precise horizontal alignment brings you an increased image crispness, better highlight definition and crystal clear resolving power, with proper levels of color intensity, tint and contrast.

A new, advanced Color Sentry corrects the picture 30 times per second. Eight essential hue and picture sub-systems work together to deliver critically sharp and vivid color reproduction every time...automatically!

For extra depth and visual presence, the amazing detail-adding PRP (Peak Resolution Picture) comb filter circuit achieves maximum optical resolution by reproducing all 330 lines of detail being transmitted.

The GR-1902 gives you 178 UHF/VHF/CATV channel capability without a converter (except for scrambled programs). Connect cable directly to the set, and you're in touch with 122 easily-selected cable channels.

No fine tuning adjustments needed – ever! In every Advanced System 3 television, a quartz controlled, synthesized channel tuner provides super accurate reception.

A handy slim-line infra-red Computer Space Command remote control offers direct access or two way scanned channel selection, volume up/down, muted sound, recall of on-screen channel/time display, and on/off power control from anywhere in the room.

The elegantly finished pedestal cabinet measures 17⅞" H x 26¾" W x 17⅛" D and includes detachable telescoping dipole and clip-on bowtie antennas. Provisions for external UHF/VHF and matched cable-ready CATV/MATV hookup are also provided, with switchable Normal/Special AFC.

To match the pleasing performance of what you hear to the clearly superior picture you see, a 1.5 watt amplifier and two 3" x 5" acoustically optimized speakers are used to send out warm, full-bodied sound. For truly room-filling response, the GR-1902 can be connected via an Audio Output jack to your high-fidelity system for richly-toned soundtracks that will enhance your enjoyment of concerts, culture and film. Includes private earphone with 15' cord for discreet listening, and all tools for setup/alignment.

Kit GR-1902, Shpg. wt. 101 lbs. ..... **Was $449.95 NOW ONLY 399.95**

GRA-1901-1, Mobile TV Cart (shown), Shpg. wt. 10 lbs. **24.95**

GRA-2502-1, Advanced Space Phone Accessory, Shpg. wt. 2 lbs. **49.95**

GSZ-4600, Assembled Remote Antenna Switch Accessory, allows selection of four different antenna sources by front panel or remote control, 4 lbs. ... **29.95**

Credit Card Orders Call TOLL-FREE: 800-253-0570. Alaska and Michigan Residents Call: 616-982-3411.

The GR-2502's hide-away control panel reduces tampering with TV adjustment

Quartz-controlled electronic tuning gets rid of the need for fine tuning and eliminates the normal wear-and-readjustment common with mechanical tuners. Select any channel being telecast in your area. A built-in computer selector instantly seeks out and locks on to the exact frequency. Have sharp, color-fast television at your fingertips or from a remote location! The panel closes after making those fine adjustments.

1

Large-Scale Integrated Circuits let these TVs run cooly and economically. Modular construction minimizes connections and makes repair quick and easy – should it ever be required a few years down the line.

Simulated TV pictures

Choose the cabinet to suit your decor

Four speakers, two on each side, surround the picture to provide more realism. Choose the elegant Classic or the smart Modern cabinet. Have an attractive piece of furniture and probably the best TV available.

Elegantly styled Classic console features the warm tones of richly-grained Pecan finish on top and sides made from durable wood products. Simulated wood front and base matches finish. Cabinet measures 32⅛" H (with casters) x 43½" W x 19¼" D (add 2⅝" to depth for tube cap).

GRA-706-25, 85 lbs. Mtr. Frt. **149.95**

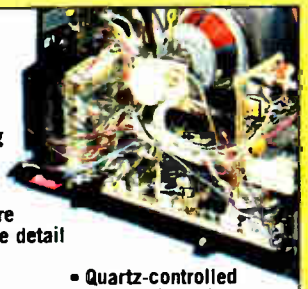
Beautifully proportioned, symmetrical design marks this Modern console for the GR-2502. Oak veneers on top, ends and base add to its smart styling. The front is framed with hardwood solids. The cabinet measures 28⅞" H (glides included) x 42½" W x 18" D (add 2⅝" to depth for tube cap).

GRA-716-25, 82 lbs. Mtr. Frt. **199.95**

Make and receive phone calls using the optional Advanced Space Phone Accessory

2

QUALITY FEATURES



- Single UHF/VHF/CATV 75Ω antenna input
- New auto CRT tracking keeps colors like new – year after year
- Peak Resolution Picture Circuit adds 25% more detail
- Internally shielded tri-focus picture tube
- New switchable video filter removes excess picture-noise
- Quartz-controlled electronic tuning of 178 channels
- Complete picture and sound control with audio output

Get the most from TV and video entertainment with these fine products

1 Compact TV with radio goes almost anywhere

$159.95

- **Covers all VHF/UHF channels plus AM/FM radio bands**
- **Operates on AC, batteries or rechargeable pack**

The GRZ-5010 combines a 5-inch diagonal black and white TV, and an AM/FM radio in a compact unit that weighs just 6 pounds without batteries. Have all 82 VHF and UHF channels, as well as AM and FM broadcast stations at your fingertips with this versatile and convenient TV. A no-wear electronic tuner and calibrated cylinder dial permit easy channel or station selection without drift. Adaptable to various power supplies, the GRZ-5010 includes a detachable 120 VAC power cube, DC car cigarette-lighter adapter and cable.

Tune in to your favorite radio and television stations with the built-in omnidirectional collapsing antenna or hook-up to an external antenna with 300-ohm antenna input terminals. For your convenience, the GRZ-5010 also has an easy-carrying handle and earphone. TV measures 7¼" H x 6" W x 11⅛" D.

GRZ-5010, Assembled and tested, Shpg. wt. 9 lbs. **159.95**

GRZ-5005-1, Rechargeable Battery Pack, Shpg. wt. 3 lbs. **19.95**

2 Put the CASIO TV-21 television in your pocket

NEW

- **Continuous electronic scan tuning**
- **Ideal for viewing instant replays and action close-up at your favorite sporting events**

This black-and-white TV is perfect for the businessman or the sports fan. You can carry the GVP-3412 in your shirt pocket. It doesn't even need a rod antenna – the earphone acts as the antenna! The 2" diagonal screen provides sharp, clear images. You select a channel simply by choosing either UHF or VHF bands and touching the up or down key. The GVP-3412 will scan to the nearest station with a strong signal. The GVP-3412 has a channel display, tuning indicator, volume and brightness controls. An optional backlight enhances night-time or dim light viewing. Measures 2 7/16" H x 4⅝" W x ¾" D.

GVP-3412, Assembled and tested, Shpg. wt. 2 lbs. **99.95**

GVA-3412-1, Backlight Accessory, Shpg. wt. 1 lb. **14.95**

3 Take CASIO TV-1000 with you for quality TV viewing

NEW

- **Bright color picture on unusually large 2.6" diagonal screen**
- **Press a button and the electronic tuner scans the stations**

Take this TV along on family outings. The tiny CASIO TV-1000 has a large high-resolution LCD screen and speaker so the whole family can watch together. A backlight enhances viewing in the dark. Features electronic scan tuning; brightness, tint, color and volume controls; channel display; earphone jack and audio-video jack. 3¼" H x 6 5/16" W x 1⅜".

GVP-3413, Assembled and tested, Shpg. wt. 3 lbs. **299.95**

4 Smart Outlet Box for audio/video systems

- **Remote operation lets you conceal the outlet box – hiding messy cords**

Power to ten other sockets is switched on when a device plugged into the control socket is turned on. Great for audio, computer systems, or work benches. Protects units from line surges to a maximum 325 watts at 6500 amps. Maximum control power is 250 watts at 2A; and 1200 watts at 10A for all other outlets. The twelfth outlet is unswitched for constant AC devices. *Worth double Master Builder points.*

Kit GD-1295, Shpg. wt. 4 lbs. ..... **This catalog only 44.95**

5 Personal 13" diagonal color TV with remote control

- **Has quartz PLL tuning, electronic tuner and other quality features**

This bedroom, kitchen or camper sized TV has everything including remote control. A quality Zenith television, it features an electronic tuner that eliminates many of the problems that plague mechanical tuners. It also has quartz PLL tuning for accurate tuning of 157 channels. Other features include a tri-focus picture tube, American Walnut finish with polished nickel-gold color trim, pedestal base, foldaway carrying handle and much more.

GRZ-1319, Assembled and tested, Shpg. wt. 36 lbs. **359.95**

6 Heathkit's Video Organizer switches RF sources

- **A versatile 'control center' for your home video system**

The Video Organizer eliminates the confusing mess of cables that accumulate behind your television when you use multiple inputs. Eight input and output jacks allow complete connection to your set: UHF/VHF antennas, community cable service, subscription TV, video disc player, video games, computer and other equipment such as a satellite receiver, video camera or security monitor.

Ten buttons allow selection of any of six different program sources for immediate viewing without changing cable connections. Choose up to three sources for recording on your VCR. You can even view one source while recording another. The Organizer has better than 60 dB isolation, less than 3.5 dB insertion loss and excellent RF shielding to maintain pure picture quality. An ideal beginner's kit, the GS-4500 is a one-evening, no soldering kit which includes three 48" 75-ohm coaxial cables with connectors and an AC power adapter. It has a walnut-grained cabinet measuring 10⅞" L x 7" W x 2⅝" H.

Kit GS-4500, Shpg. wt. 7 lbs. **49.95**

7 Economy VHS recorder fits into your budget

NEW

- **14-day, one-event programmable auto record timer**
- **Includes wireless remote control**

This economical VHS recorder features SP or EP speed for up to 8 hours of recording and automatically switches to the correct speed for SP, LP or EP playback. The GDZ-1801 also features automatic front self-loading, instant record for up to eight hours, automatic rewind, 2-way speed search, still picture and time elapsed indicator. The VCR has 82-channel quartz tuning with two-speed up/down channel scan. The Infrared VCR remote control may also control many Zenith televisions and Heath models GR-2501, GR-2502, GR-1901,and GR-1902 for convenient single remote operation of your video system.

GDZ-1801, Assembled and tested, Shpg. wt. 21 lbs. **399.95**

8 Four-head VHS recorder with remote control

NEW

- **14-day, four-event programmable auto record timer**
- **Still, pause and frame by frame viewing**

The GDZ-2100 provides quality features at an economical price. This VHS video recorder also comes with an infrared TV/VCR remote control.

Its many features include: automatic front self-loading; four-head rotary scanning with SP or EP recording and SP, EP or LP playback; automatic rewind at tape end; 2-way picture speed search; still picture, pause and frame by frame viewing; selectable tape counter/lap-time indicator and 157 channel quartz electronic tuning with direct access and two speed up/down channel selection.

GDZ-2100, Assembled, Shpg. wt. 21 lbs. **499.95**

9 Six-head VHS recorder loaded with features

- **Full-featured video cassette recorder with two channel stereo**
- **Three speeds with up to eight hours of recording and playback**
- **Includes remote keyboard control unit**

One of the new generation of VHS video recorders from Zenith, the GDZ-4000 is cable ready with direct quartz tuning access to 136 channels. The GDZ-4000 has a 14-day programmable auto-timer which lets you select and record up to eight events with up to eight hours of recording and playback. Record and playback at EP or SP (LP available for playback). Connect a camera to record video and two audio channels with this sophisticated VCR.

GDZ-4000, Assembled, Shpg. wt. 27 lbs. **1099.95**

Finest quality Zenith VHS video tapes

GDZ-2000-2, T-60, Shpg. wt. 1 lb. **7.95**
GDZ-2000-3, T-120, Shpg. wt. 1 lb. **8.95**
GDZ-2000-4, T-160, Shpg. wt. 1 lb. **14.95**
GDZ-2000-5, T-120 SHG, for optimum quality, Shpg. wt. 1 lb. **12.95**

10 Add realistic sound with Stereo Synthesizer

- **Use the ADP-1501 to get high-quality stereo sound from any TV or VCR**

Turn your monaural sound into stereo sound with the ADP-1501 Stereo Synthesizer. Simply add this unit to your television or VCR to enjoy high-quality, realistic stereo sound with your favorite TV shows and movies.

The Stereo Synthesizer uses the same technique as professional studios to transform a monaural source into realistic stereo. A new circuit using active filters and a unique summing circuit create a comb response. You can even use the compact ADP-1501 with portable units since it operates on either 12 VDC or 120 VAC.

ADP-1501, Assembled and tested, Shpg. wt. 3 lbs. **99.95**

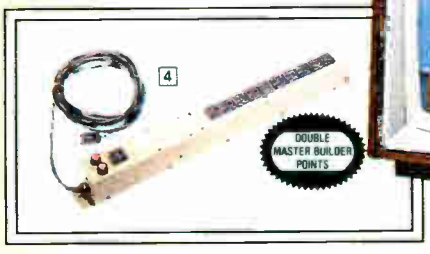
Use your Visa or MasterCard credit cards to purchase your kit!

1 Portable TV radio goes anywhere

2 Large screen and speaker allow everyone to watch

3 You can have a TV right in your pocket

Simulated TV pictures



4

5 Personal TV comes with remote control

6

NEW 7 Quality VHS video recording within everyone's price range

NEW 8 Get extra features and remote control with this VHS recorder

9 Great hi-fi sound to go with great VHS video recordings

11 Dual mini-cassette Video Movie Camera/Recorder

- Includes high performance zoom lens
- Nine mode indicators and five alarm indicators
- Lightweight, all-in-one camera weighs only 4.7 pounds

See your movies immediately when you use this versatile and complete cassette-loaded video camera. Exposure is automatic and electronically monitored to deliver outstanding recordings. You can replay recordings through the viewfinder or through your television set.

You get an entire video system in a camera with the compact GDZ-6000. It features a high-performance auto-zoom lens, electronic viewfinder, auto white balance, iris control and more.

GDZ-6000, Assembled and tested, Shpg. wt. 10 lbs. 1399.95
GDZ-6000-1, Cassette Adapter permits standard VCR replay, 1 lb. 39.95
GDZ-6000-2, Compact Video Cassette, Shpg. wt. 1 lb. 7.99
GDZ-6000-3, AC Power Supply/Battery Charger, Shpg. wt. 4 lbs. 129.95
GDZ-6000-4, High Capacity Rechargeable Battery, Shpg. wt. 1 lb. 44.95
GDZ-6000-5, Shoulder Mount and Strap, Shpg. wt. 1 lb. 39.95
GDZ-6000-6, Solid Carrying Case, Shpg. wt. 5 lbs. 109.95

Enjoy realistic stereo sound from your TV or VCR

10

11 A system in itself, a compact video movie camera/recorder using mini-cassettes

Enjoy the ultimate in accurate, elegant timekeeping with these Heathkit clocks

1 This modern digital floor clock has up-to-the-minute styling and technology

$239.95

- **Bright digital display adjusts to ambient room light**
- **Handsome cabinet makes this a valued furnishing**
- **Smoked glass shelves display books, knick-knacks**
- **Excellent kit for the first-time builder**

Add elegance to any room in your home with this distinctive Digital Floor Clock. The GC-1195 is housed in five feet of handsome simulated walnut veneer cabinet with anodized corner pieces.

The bright, 3¼"-high digital readout adjusts to surrounding light for a subtle gold-toned display. The display will flash to let you know when there has been a power disruption.

An excellent first-kit project, the GC-1195 Digital Floor Clock displays hours and minutes with the center colon pulsing once each second. The clock may be set to the correct time with two easy-to-use advance switches on the bottom of the clock chassis.

An attractive piece of furniture as well as a timekeeper, the Floor Clock will fit in with almost any decor. The clock features four smoked glass shelves. These ¼" shelves are perfect for showing off your knick-knacks, plants or books.

The GC-1195 Digital Floor Clock operates on 120/240 VAC. Its dimensions are 60½" H x 14" W x 9½" D.

Kit GC-1195, Shpg. wt. 58 lbs. **239.95**

2 Have the ultimate in timekeeping accuracy with Heath's NBS atomic synchronized clock

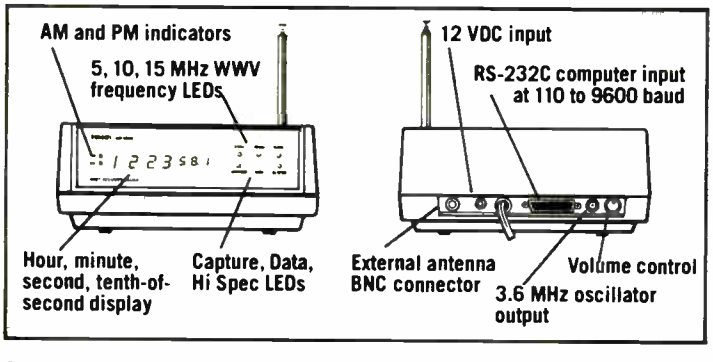
SAVE $20 This Catalog Only

Regularly $249.95
NOW
$229.95

- **Synchronize with the NBS cesium-atomic clock**
- **An accuracy of ±10 ms when Hi Spec LED lights**
- **An ASCII computer output provided by RS-232 Accessory**
- **Audio monitor allows you to listen to audio broadcasts on WWV frequencies**

The National Bureau of Standards (NBS) provides the definitive time standard for the United States. You can lock onto this standard with the GC-1000 Most Accurate Clock for unparalleled accuracy. The GC-1000 sets itself to the correct time when it locks onto WWV, the NBS radio station. The Most Accurate Clock will reset itself to the correct time even after a power failure.

It's the first affordable, microprocessor-based time machine with a "Hi Spec" accuracy of ±10 milliseconds. The NBS radio station transmits a one-minute stream of time-code data containing day of year, hour and minute data in Universal Coordinated Time (UTC) with a correction factor for UTC1 time, which compensates for the earth's rotational wobble.



An RF receiver scans the 5, 10 and 15 MHz frequencies of WWV and locks onto the strongest signal. An audio monitor permits you to listen to the audio broadcast on these frequencies. To improve reception of WWV frequencies, an external antenna is recommended but may not be required in your area.

Ultimate accuracy: The front panel provides a bright digital readout in hours, minutes, seconds and tenths-of-seconds. An RS-232C Accessory allows this data, along with the date, to be fed to your computer.

LED's show which WWV frequency is being received, when 'capture' of the time-encoded NBS carrier occurs, when data is being received and when the Clock is at "Hi Spec" accuracy. Simple switch changes permit setting the Clock for any of the world's standard twenty-four time zones. During noisy reception conditions, the GC-1000 keeps time with its own crystal oscillator. The RF receiver circuit board is preassembled and factory aligned. Propagation delay can be set for up to 18.75 milliseconds, a distance of 3600 miles from WWV. Internal 3.6 MHz oscillator signal is available at the Clock's rear panel.

The GC-1000 Most Accurate Clock comes with a connector and seven feet of cable for connection to an external antenna. The Most Accurate Clock can be powered with standard home 120 VAC or by 12 VDC power supplies, such as marine or aviation storage batteries.

Kit GC-1000, Shpg. wt. 7 lbs. ..... **Regularly $249.95 THIS CATALOG 229.95**

GCA-1000-1, RS-23C Output Accessory, Shpg. wt. 1 lb. **49.95**

GCW-1000, Assembled and tested Most Accurate Clock with RS-232C Output. Shpg. wt. 6 lbs. **425.00**

GC/GCW-1000 SPECIFICATIONS: Receiver: AM super heterodyne, single conversion with tuned RF amplifier. **Sensitivity:** 1 μV or less for 10 dB S + N/N. **Audio Output:** 250 VmW into 8 ohms. **Clock Accuracy:** Within ± 10 ms when Hi Spec LED is on. **Internal Oscillator Output:** 3.6 MHz. **Power Requirements:** 120/240 ± 15 VAC, 50/60 Hz @ 100 mA or 11-16 VDC @ 750 mA (150 mA with display turned off). **Dimensions:** 3⅞" H x 9" W x 6¼" D (9.8 x 22.9 x 15.9 cm) less antenna.

3 Heath's Digital Wall clock fits anywhere

$49.95

- **Quartz-crystal accuracy of ±1 minute per year**
- **Runs up to two years on a single 1.5 "A" alkaline cell**
- **1" high LCD digits provide a clear, legible display**
- **Displays time in 12- or 24-hour format**

Have the accuracy you'd expect from an expensive quartz watch with the GC-1720 Digital Wall Clock. A crystal oscillator and integrated circuit insure the clock's split-second precision and reliability. The Wall Clock is easy to set when changing to or from daylight savings time, moving the clock or changing the batteries.

Battery powered operation eliminates worries about power outages and accidental disconnection. Put a GC-1720 Wall Clock in a cabin, RV, boat or just about any place since the case measures a slim 7⅛" wide by 5¼" high by 1½" deep.

This attractive Wall Clock blends with almost any decor since it is housed in a simulated wood-grain finish oak cabinet. The cabinet is also sturdy and lightweight, making it ideal for the boat or cabin.

The GC-1720 Digital Wall Clock is an easy-to-build beginner's kit that takes just one evening to assemble.

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

GC-1720 SPECIFICATIONS: Accuracy: ±1 minute per year, after adjustment according to instructions. **Display:** 4-digit and pulsing colon LCD, 1" digit height. **Time Format:** 12-hour or 24-hour. **Power Requirement:** One type "AA" 1.5 volt penlight battery (not included). **Battery Life:** One year with carbon-zinc cell; two years with alkaline cell. **Dimensions:** 5¼" H x 7⅛" W x 1½" D.

4 Enjoy Heath accuracy and style in the practical and economical Digital Alarm Clock

$29.95

- **Displays time in 12- or 24-hour format**
- **Snooze alarm, flashing display with power disruption**
- **Display automatically adjusts to ambient light**

The four-digit blue-green fluorescent display automatically adjusts to ambient light conditions. The GC-1107 displays hours and minutes in either 12-hour or 24-hour time (with AM/PM indicators in the 12-hour mode). A flashing display lets you know there's been a power disruption.

Space-age accuracy is provided by a metal-oxide semiconductor (MOS) integrated circuit. Fast and slow setting switches make it easy to accurately set the time. And rear panel switches make it easy to turn off the alarm or set the alarm for an extra 9 minutes of sleep.

Get started in kitbuilding today – and add a new pleasure to your life! Our easy-to-build Digital Alarm Clock kit includes a handsome simulated wood-grain cabinet, built-in speaker and an easy-to-follow assembly manual.

This practical Alarm Clock operates on 120 or 240 VAC, 50/60 Hz. Overall dimensions: 2¼" H x 7" W x 4¾" D.

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

Credit Card Orders Call TOLL-FREE: 800-253-0570. Alaska and Michigan Residents Call: 616-982-3411.

5 See Halley's Comet with this top quality telescope

NEW

- **View Halley's Comet for almost a year with the TL-400**
- **Optional Drive Motor & Camera Mounts for photography**
- **Super 4.5" Reflector attractively priced from Celestron**

1985 is the year of Halley's Comet and the year to buy a telescope to view this phenomenon as well as dozens of other planetary and deep space objects. View the Rings of Saturn, Mars, the phases of Venus and four of Jupiter's moons! Show your children the Great Nebula, Andromeda Galaxy, and dozens of other celestial objects. Throw a "Comet Party" or two for you and your friends. The TL-400 gathers 265 times the light of the human eye and all optics are coated. It features a German made precision equatorial mount with setting circles to help you locate new objects and it includes two eyepieces (25mm = 40 power; 10mm = 111 power), 6 x 24 Finderscope, accessory tray, dew shield and lens cap. Order the optional Pulse Motor Drive and appropriate Photography Set and use the telescope to photograph the heavens. Don't miss Halley's Comet – it won't be visible again for 76 years. See it and enjoy many years of stargazing pleasure with the Cometron Reflector Telescope.

TL-400, (Some Assembly Required), Shpg. wt. 35 lbs. **499.95**

TLA-400-1 Pulse Motor Drive for easy viewing and photography, compensates for rotation of earth to track objects, Shpg. wt. 2 lbs. **119.95**

TLS-400 Telescope T-mount Adapter and Camera Ring Set for your 35mm SLR, TLS-400-C, -M, -N, or -P (Specify for Canon, Minolta, Nikon, or Pentax by using appropriate suffix such as TLS-400-N for Nikon), 1 lb. **9.95**

SAVER! Save $49.90 by ordering Telescope, Pulse Motor Drive & Camera Adapter all at once! **TLS-400-1** (Specify Camera on order), 38 lbs. **599.95**

Useful, easy-to-build Heathkits for the home, the hobbyist and the family

The Heathkit® Pledge

Our instruction manuals are written with you, the builder, in mind. They begin with an introduction to the product and a soldering guide for the first-time builder. Step-by-step instructions and clearly-detailed illustrations take you through every phase of construction. In case of difficulty, there's a troubleshooting guide. You can even call or write the Heath Technical Consultants for prompt, courteous answers to any special questions. You can't go wrong, because our ever-growing popularity around the world is based on this one simple pledge:

"We won't let you fail!"

1 Rechargeable Portable Light makes it easy to see

$39.95

- **Provides more light over a wider area than conventional, harsh flashlights**
- **Operates for hours on a charge – recharges overnight on 120 VAC or 12 VDC**

Indoors or out, the Heathkit Rechargeable Portable Light will bathe your working area with a bright, yet soft-on-the-eyes fluorescent light for a multitude of uses. Helps you to clearly see a wider area without sharp, eye-straining shadows. Safer to use than fire-hazardous candles and kerosene lamps in a power outage or while camping. And it saves money by recharging over and over for just pennies. "Soft start" feature extends tube life. 120 VAC and car lighter socket chargers included. A single charge lasts for several hours. Heavy-duty metal case with handle is 10⅝" H x 3⅛" W x 5" D. It's designed to survive rugged use – perfect for camping or night work and emergencies – *always ready when you need light!*

Kit GD-1246A, Shpg. wt. 6 lbs. **39.95**

2 Electronic Metronome gives you a perfect beat

$29.95

- **Variable between 40 and 210 beats per minute**
- **Reliable performance in cherry-finish birch enclosure**

Whatever instrument you play, the Heathkit Electronic Metronome will maintain a steady beat so you can practice confidently at the correct tempo. Uses a sound board and solenoid to produce an authentic metronome sound.

Front panel control lets you set the tempo you need. A rear panel control lets you adjust the volume from soft to a loud, conventional "tick-tock" rhythm. Includes a handy label so a student can relate the number of beats per minute to tempos in different time signatures.

Kit TD-1257, Shpg. wt. 2 lbs. **29.95**

3 This AM Portable Radio is an easy kit to build

$18.95

- **Designed for the first-time kit builder**
- **Optimum AM reception, almost anywhere**
- **Improved circuitry for extended battery life**

A perfect kit that will thrill any youngster! Excellent AM sensitivity gives sensational reproduction of voice and music with a clear, even tone. Take this great little performer with you anywhere for extra fun. High-gain ferrite rod antenna delivers long-distance reception. Uses 9V battery (not included) or PS-2350 Battery Eliminator on page 42. Includes earphone for private listening.

Kit GR-1009, Shpg. wt. 2 lbs. **18.95**

4 Heath's Ultrasonic Cleaner for delicate items

$99.95

- **For those almost-impossible special cleaning chores**
- **Cleans and sanitizes most precious items that might be damaged by abrasive scrubbing or harsh cleaners**

This scientific method is the fastest, most effective way to clean dirt, stains and undissolved solids from hard-to-clean jewelry, watch parts, glass, coins, components, dentures, paint brushes, etc. Cleaned objects sparkle like new! All delicate items, except pearls and turquoise, are safely cleaned without abrasion.

The GD-1151 Ultrasonic Cleaner is efficient, with a maximum power consumption of only 100 watts. Use a standard laundry detergent or softener at any temperature between 32° and 122°F. Filling the 6" L x 4" W x 2⅜" D tank with one inch of cleaning solution only requires about 1¾ cups.

Professional artisans, jewelers and watchmakers have used the ultrasonic method for years. This low-cost kit is easy to build, in two evenings – and it lets you take advantage of this safe and efficient cleaning process. 4⅝" H x 11" W x 5¾" D. Operates on 120 VAC.

Kit GD-1151, Shpg. wt. 5 lbs. **99.95**

5 Photoelectric Light Switch to protect your home

Great low-cost insurance against break-ins: Turns lights on in the evening, off at dawn – automatically. Gives your home a "lived-in" look to discourage unauthorized entry while you're away. Plug it into any outlet, adjust sensitivity and it controls lamps or other AC-operated devices up to 150 watts. Practical and beneficial security kit, 3½" H x 2⅝" W.

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

6 Photobeam Alarm Relay detects intruders

Multi-purpose system. Consists of mirror assembly and light source/photocell relay. Uses a narrow, reflected beam to catch intruders instantly, activating lights or any 120 VAC warning devices you have plugged in up to 300 watts total. It is sensitive to its own light source up to 25 feet away from its reflecting mirror. The electronics package has dimensions of 5⅜" H x 4⅜" W x 5¼" D.

Kit GD-1021, Shpg. wt. 3 lbs. **19.95**

7 Battery Life Tester saves on replacements

$14.95

- **Ideal for users of portable instruments and equipment**
- **Check usable life of 1.2V to 9V batteries**

Test all popular-sized batteries and end waste – be certain a battery is dead before you throw it away. Does more than just give a "good-?-bad" reading like other testers – actually indicates *how much useful life* remains on a 0-to-5 meter scale. Tests alkaline or carbon-zinc 9V or 1.5V AA, C & D-size batteries, plus 1.2V rechargeables. Indispensible for households with many independently powered items – tape recorder/players, radios, cameras, toys, smoke or burglar alarms, flashlights, etc. Test eyelet snugs into front slot.

Kit GD-1703, Shpg. wt. 1 lb. **14.95**

8 Inexpensive, easy-to-build Freezer Alarm

$19.95

- **Prevent costly food loss from freezer failure**
- **Be alerted to a freezer door left open**
- **Freezer Alarm even works during a power outage**

Protect your meats and other frozen foods from spoilage by installing an instant alarm that warns of a failure in your freezer's cooling system or a door left ajar. Two-speed alarm beeps and red LED flashes at a slow rate if inside temperature rises above +20°F; faster if door stays open too long. Requires 2 "C" batteries (not supplied). Slide switch shuts off alarm. Includes 20' of thin hookup wire, plus mechanical, temp and water sensors – with application ideas.

Kit GD-1183, Shpg. wt. 2 lbs. **19.95**

9 Flood Alarm detects water, sounds loud warning

$24.95

- **Easy to install – monitors 24 hours a day**
- **Helps prevent costly water damage**

Don't take chances! Avoid expensive, messy water hazard in your home, office, boat, basement, RV, factory, garage – anywhere excess moisture threatens! The reliable Heathkit Flood Alarm will detect water when it first appears, giving you maximum time for corrective action *before it can do major damage.*

Use it in a hundred places: The water sensor sticks anywhere. When water touches the sensor foil, the Flood Alarm produces a loud, insistent beeping in time with a flashing red LED to get fast attention! Safeguard against water seepage in cellar, kitchen, bathroom, computer room; near dehumidifier, dish or clothes washer, leaky plumbing, sump pump – even place sensor on the edge of a windowsill to wake you if rain comes in an open breezeway. Size: 1¾" H x 3⅝" W x 4⅞" D.

Kit GD-1701, Shpg. wt. 2 lbs. **24.95**

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Heath products for the home, hobbies and your health

1 Program your doorbell to suit your mood

$49.95

- **Program it to play up to 16 beats of your favorite tunes**
- **Easily programmed for your mood or any special occasion**
- **Includes song book with over 50 programmable melodies**

Changing tunes is easy, by arranging wire leads on a one-octave 'keyboard' behind the front panel. The songbook includes 15 college songs, 7 seasonal songs plus 9 Christmas songs, 5 to commemorate special occasions – and many more to celebrate your mood. The assembly manual has programming instructions for a variety of tunes, or compose your own. Controls for adjusting volume, tone, speed and delay characteristics add synthesized variety to any tune. Attaches easily to existing doorbell transformer. And extra speakers may be wired on to spread the music around your home. You'll even know which door to answer, as the back door button will activate only a portion of the tune you select.

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

2 Use this Digital Scale to accurately monitor weight

DOUBLE MASTER BUILDER POINTS

- **Battery operated for accuracy and safety anywhere**
- **No-wear electronic strain-gauge mechanism sensitive to weight change as small as 1/10 of a pound or kg**

The Heathkit Digital Scale is a multi-purpose scale that offers far more accuracy than mechanical scales. Dieters and fitness enthusiasts can closely watch their weight improve, and everyone will enjoy a precision readout on items requiring accurate measurement. An electronic transducer element eliminates the springs and weights that wear out on conventional scales.

Four bright, easy-to-read ½" digits display the weight. You decide whether to wire the kit to read in pounds or kilograms. Features both manual and automatic modes; in manual, the display is on constantly and can measure weights as small as 2 ounces, to a 300-lb. capacity. On automatic, it conserves power by remaining off until weight is placed on the platform. *Earn double Builder points.*

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

3 Get consistent darkroom processing

$139.95

- **Programmable memory recalls up to 10 steps; precise auto-step sequencing and microprocessor control provide more accuracy than dial timers**
- **Waterproof front panel has selectable backlighting**

Have the precise timing required for quality color or black and white prints, and program the timing sequence you need for developing prints and films. Use memory for absolutely consistent exposures when making multiple prints, or make one-time Timer settings. The Programmable Darkroom Timer features a 4-digit timer and a 12-hour LED clock to synchronize printing and developing steps.

Audible alarm settings are available at 1, 30 or 60 second intervals in any combination, or once at the end of a programmed cycle. A 10-second, end-of-cycle alarm tells you when to begin pouring from the tank.

Kit PT-1500, Shpg. wt. 5 lbs. **139.95**
PTA-1500-1, Optional Single Foot Switch, Shpg. wt. 1 lb. **12.95**
PTA-1500-2, Optional Dual Foot Switch, Shpg. wt. 3 lbs. **29.95**
PTA-1500-3, Optional Auxiliary Outlet, Shpg. wt. 1 lb. **15.95**

4 3-Tune Doorbell greets with beautiful music

$19.95

- **Can be built and easily installed in a single night**
- **Adjustable volume carries tune throughout your home**
- **The low-cost way to put a difference in your doorbell**

If you want to replace your ho-hum doorbell, you'll be proud to install this Electronic Doorbell kit. The TD-2089 plays three different selections: an upbeat 4-note ring, a short tune (Beethoven's *Für Elise*) and a long tune (*Romance*). Two "C" cell batteries (not included) power the electronics while your present 10 to 16 volt doorbell transformer supplies your pushbutton circuits. The Electronic Doorbell is for use with unlighted doorbells.

Kit TD-2089, Shpg. wt. 1 lb. **19.95**

5 Find buried valuables on dry land or at the beach with Heathkit's Metal Locator

$219.95

- **Find valuable objects where most locators are useless**
- **Easy-to-read meter installs for left- or right-hand users**
- **Telescoping shaft collapses to 22 inches**
- **Search head folds flat for easy storage, portability**
- **Balanced for easy fatigue-free use**

Fully adjustable discrimination circuit filters background signals – screening out pulltabs, metal foil, bottle caps, ferrous and alloyed items. Have the sensitive pushbutton tuning of our best metal locator at a price far below the competition.

A ground balance mode pinpoints treasures even in high-mineral soil. A Very-Low-Frequency induction balance system provides silent operation until that coin or artifact enters the 6-inch diameter search head field of detection. Then a clear tone sounds that grows louder as you approach vertical center.

Use the Groundtrack anywhere. It's lightweight and portable, with a telescoping shaft that collapses for storage. Operates on 6 AA cells (not included) or the optional Rechargeable Battery pack, which includes AC outlet and DC lighter socket chargers for use at home or in-the-field.

Kit GD-1290, Shpg. wt. 5 lbs. **219.95**
GDA-1190-1, AC/DC Rechargeable Battery Pack, Shpg. wt. 2 lbs. **24.95**
HDP-1396, Mura Headphones, Shpg. wt. 2 lbs. **14.95**

GD-1290 SPECIFICATIONS: Sensitivity: Locates dime at 4" to 6" typical, may be less depending on soil conditions, mode of operation and amount of discrimination selected. **Method of Detection:** Induction-balance circuit. **Detector Output:** Meter, speaker, phone jack. **Power Requirement:** Six AA cells or Rechargeable Battery Pack. **Dimensions:** Extended height, 45½". **Net Weight:** 3.4 lbs.

6 Digital Thermometer for accurate measurements

If you need to accurately measure the temperature of liquids or air, this battery powered electronic thermometer delivers reliable readings every time. This micro-marvel weighs only 5.5 ounces and gives easy-to-read 4-digit temperatures in less than ten seconds on its red LED display. The Thermometer's wand senses from 32° to 230°F (0° to 110°C) with ±0.2°F (±0.1°C) biomedical accuracy and 0.5% overall accuracy with 0.1°F or C resolution.

GD-1226, Assembled and tested, Shpg. wt. 2 lbs. **49.95**

7 Take temperatures quickly with digital accuracy

Eliminate the squinting and guessing that's required when using a conventional mercury-bulb thermometer. This thermometer provides easy-to-read accuracy from 89.6° to 107°F within 60 seconds. When the F symbol stops blinking, the peak temperature is displayed in a digital readout. 10 sanitary probe covers (more can be ordered) and a battery are included with the GXP-2121.

GXP-2121, Assembled, Shpg. wt. 1 lb. ..... **NOW ONLY 13.95**

8 Electronic Digital Blood Pressure/Pulse Monitor

Eliminate troublesome trips to the doctor's office or clinic. Now you can take those blood pressure and pulse-rate measurements at home. Easy to use and easy to read, this Monitor is ideally suited for the office or home. Just place the cuff in place and inflate. Electronic metering does the rest. Battery powered for portable use – batteries included with unit.

GXP-2120, Assembled, Shpg. wt. 2 lbs. ..... **Was $79.95 NOW ONLY 59.95**

9 Put our Computer on your bike

If losing weight or exercising, this Bicycle Computer can help. Just enter the constant data into the computer memory banks: tire size, your weight, how far you want to ride and time of day. Then the Calculator takes over! Large LCD numerals give you your cycling distance in miles and kilometers, actual cycling time, speed (both average and peak) and the number of calories consumed. A built-in quartz clock and stopwatch monitor speed – a two-speed audible beeper helps you monitor your pace. For use with standard bicycle or spoked-wheel exercise bicycles. Installs in about 20 minutes. Uses two AA batteries (not included).

GXP-2105, Assembled, Shpg. wt. 2 lbs. **49.95**

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Advanced electronic security, remote control and home monitoring systems and devices

BSR X-10 Home Control System commands up to 16 groups of lights and appliances from one location

[1] **The Controller Command Console** is one of the most ingenious and useful home conveniences ever devised! Now, with a fingertip touch, *you're in complete control by remote control,* from beside the bed or wherever you plug it in. Console signals are transmitted over existing house wiring to the module of your choice. Just plug lights and appliances into the appropriate module. Use as many modules on the same code as you wish. Dim or brighten lights. Two "all lights on" and "system off" buttons provide extra security and savings.

Control lights, fans, TVs and stereos anywhere in and around your house from a single location. Or, place other Controller Command Consoles in different rooms for easy access to complete home control at all times. Since all commands are carried through the AC wiring of your home, your control can even extend to unattached garages, barns, sheds, and pool, porch or yard lights.

The Controller Command Console acknowledges each command entry by a flashing red LED on the front of the unit. It also includes an ultrasonic receiver and circuitry so that it can be controlled by the GDP-1511 Ultrasonic Cordless Commander described below. Flip-down cover hides command switches.

GDP-1510, Assembled, Shpg. wt. 2 lbs. **24.95**

[2] **The Ultrasonic Cordless Commander** transmits signals to the Controller Command Console from up to 30 feet away, using identical pushbuttons. This line-of-sight remote transmitter can duplicate every operation of the GDP-1510 Controller Command Console above.

GDP-1511, Assembled, Shpg. wt. 1 lb. **14.95**

[3] **Timer Command Console** runs everything on time. *Automatically!* Used with the modules, your home can run like clockwork, setting lights and appliances to your family's needs and lifestyle. The possibilities are virtually unlimited! Away for the weekend? The Timer is on guard, giving 24-hour control with a lived-in look and sound when you're gone – even simulates movement from room to room – so *nobody knows that nobody's home.* Features digital clock with two levels of display brightness. Fast and Slow set keys for easy setting and programming. Daily, Once, and a random Security code; Clear to erase a setting; All Lights On and Now for immediate security and control. No dimming feature. Now has full battery backup (four AA cells, not included) in case of power failure.

GDP-1520A, Assembled, Shpg. wt. 1 lb. **69.95**

[4] **Telephone Responder Console** is the remotest control of all. It lets you enjoy the freedom of calling from anywhere to control up to 8 groups of 120 VAC items. Give your home a lived-in look by activating a TV or a radio to discourage prowlers. Or, give your home a call to turn on most 120 VAC electric heaters, or window air conditioners and fans depending on the weather. Includes modular phone cable. Control center measures 2¼" H x 5¾" W x 5½" D. Remote Responder measures 1¼" H x 2¼" W x 5¼" D and requires one 9 volt battery (not included).

GDP-1515, Assembled, Shpg. wt. 6 lbs. **89.95**

[5] **The dream of a computer-operated home** or office is now a reality thanks to Heath's new 'universal' RS-232/C to BSR X-10 Interface kit! Connected between your present Heath or other computer and existing electrical wiring, it enables you to control up to 256 groups of modules with unlimited timing patterns.

The GD-1530 can be used with any terminal or computer system equipped with an RS-232C Serial Interface Port, no protocol is required or available. This port must be capable of a baud rate between 110 and 2400 baud to work correctly.

Programming syntax and simple MBASIC program samples, under H-DOS and CP/M operating systems, are included in the Appendix of the assembly manual. The command syntax for program control with the GD-1530 Interface is defined by the BSR format and is simple to learn and to use.

The GD-1530 Interface is a fast one-evening kit that can be assembled in about two hours. It has a red LED that flashes when a valid keyboard entry is being transmitted over the AC line. The GD-1530 operates on 120 VAC, 60 Hz and 3 watts. It measures 3" high x 6⅜" wide x 6⅜" deep (7.6 x 16.2 x 16.2 cm).

Kit GD-1530, Shpg. wt. 3 lbs. **99.95**

[6] **Lamp Module** receives signals from any of the consoles or the GD-1530 Interface to turn incandescent lamps on and off. And dim and brighten lamps through 16 individual levels. Handles up to a maximum of 300 watts.

GDP-1512, Assembled, Shpg. wt. 1 lb. **16.95**

[7] **Appliance Module** controls most other devices like televisions, stereos, radios, coffee makers, fans, heaters, etc. Operates lights and self-starting fluorescents, but only to turn them on and off. This module has maximum ratings of a 15 amp resistive load, ⅓ hp motor, 500 watt lighting load and a 40 watt TV/stereo load.

GDP-1514, Assembled, Shpg. wt. 1 lb. **16.95**

[8] **New Burglar Alarm Interface Module** increases the effectiveness of your security system by controlling other BSR modules on your circuit. Has selectable low-voltage or contact closure trigger inputs. If alarm is triggered, module can turn on selected lights and appliances (such as a siren), or selected lights can flash on and off, or only selected lights can turn on.

GDP-1519, Assembled, Shpg. wt. 1 lb. **44.95**

[9] **Wall Switch Module** replaces existing standard wall switches. Operates inside and outside lights by remote or local control. Responds to signals from any console controller or GD-1530 Interface. Also brightens and dims lights in 16 steps through remote control. It can handle a maximum load of 500 watts.

GDP-1513, Assembled, Shpg. wt. 1 lb. **17.95**

[10] **Three-Way Wall Switch Module and Companion** with independent on/off control. Replaces hallway and upstairs/downstairs 3-way switches. Responds like a lamp module. Handles a maximum load of 500 watts.

GDP-1516, Assembled, Shpg. wt. 1 lb. **24.95**

[11] **Air Conditioner Module** is a standard 240 VAC receptacle for air conditioners that's rated for a 15 amp load. See GDP-1517B below for alternate perpendicular-pronged type plug arrangement.

GDP-1517A, Assembled, Shpg. wt. 1 lb. **39.95**

[12] **Perpendicular-Pronged Module** is also a 240 VAC receptacle for air conditioners, but accepts perpendicular-pronged AC plugs and is rated for a higher 20 amp load. See GD-1517A for standard-type plug arrangement.

GDP-1517B, Assembled, Shpg. wt. 1 lb. **39.95**

[13] Use the Passive Infrared Security Light Control to invisibly detect movement or provide light when needed

- **The GD-3511 turns on lights to make an intruder believe he has been seen – scaring him off without disturbing your neighbors**
- **Light Control activates to deter intruders before damage is done**
- **Replace expensive, all-night floodlights with automatic security lighting**

Light is the most effective deterrent to crime, and the Heathkit GD-3511 turns on up to 500 watts of light when security lighting is needed. Since lights are activated only when intruders are present they believe they have been seen. Selective lighting also saves you money since lights are on only when needed. A passive heat sensor detects body heat (infrared energy) when an intruder enters the covered area. The Control then activates security lights – even an interior/exterior alarm can be sounded. An adjustable timing circuit automatically turns off lights after motion has stopped. Additionally, the Security Lighting Control has a built-in photo-transistor to deactivate the system during daylight hours.

Sensitivity, coverage pattern and lighting time are adjustable. You decide if you want the alarm to detect stray cats and dogs or just intruders and larger heat-emitting objects. The sensor unit is gimbal mounted so that you can also control the size and shape of the coverage area. The GD-3511 has a typical operating range of 35 feet, with a coverage width of 35 feet at that range. Lights remain on from ten seconds to more than fifteen minutes once motion leaves the protected area.

Use your existing floodlights or doorlights or use the GDA-3511-1 Dual Floodlight Accessory which attaches to the Lighting Control. The wall-mount unit houses two adjustable aim floodlights. Both Control and Accessory are waterproof. The GD-3511 connects to a standard 120 VAC, 60 Hz household power line and consumes only one watt when operating but not activated. Measures 14½" D x 5½" W x 4⁹⁄₁₆" H.

Kit GD-3511, Shpg. wt. 4 lbs. **149.95**

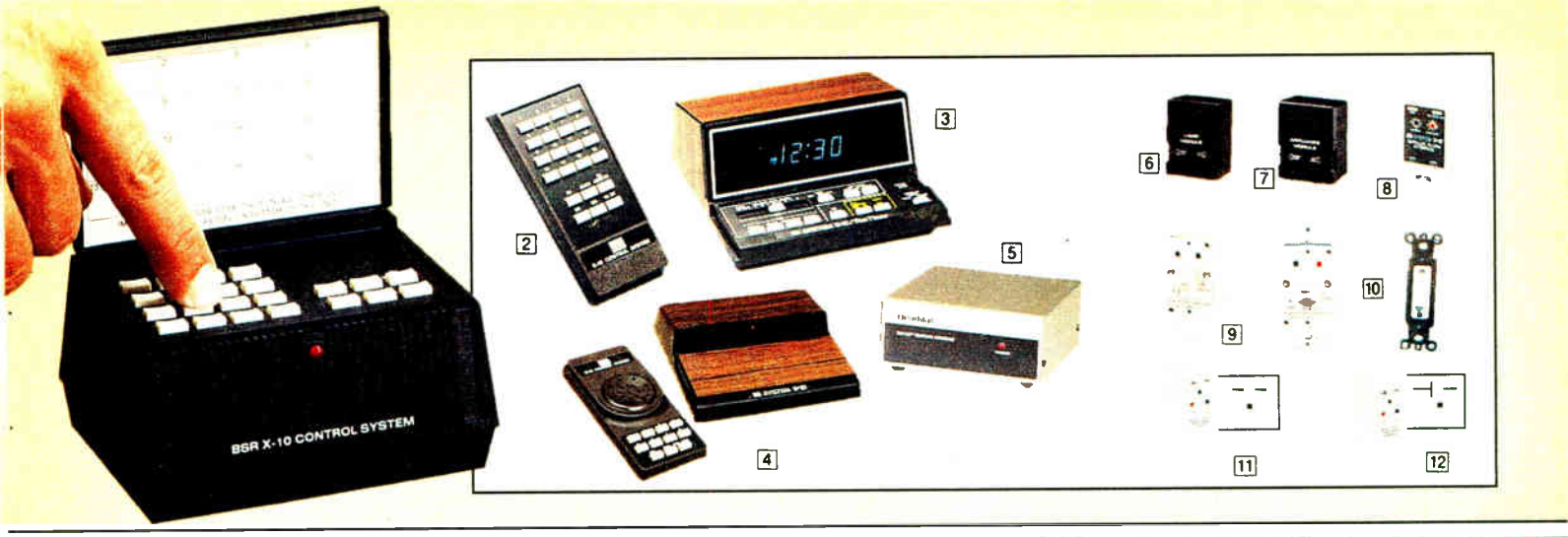
GDA-3511-1, Dual Floodlight Accessory, Shpg. wt. 5 lbs. **29.95**

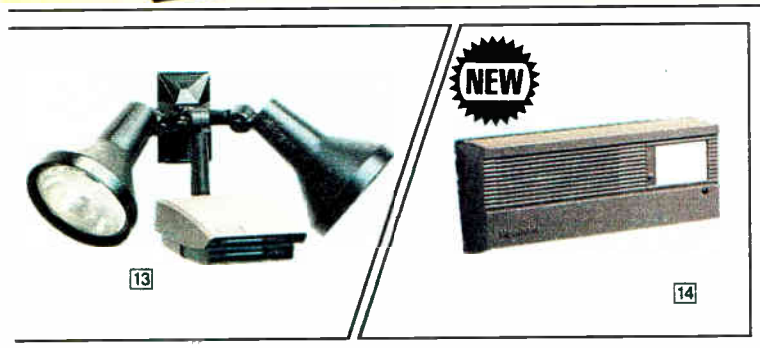
[14] Get 24-hour protection with unique Security Sentinel™ – verbal commands and up to eight floodlights deter intruders and protect your home

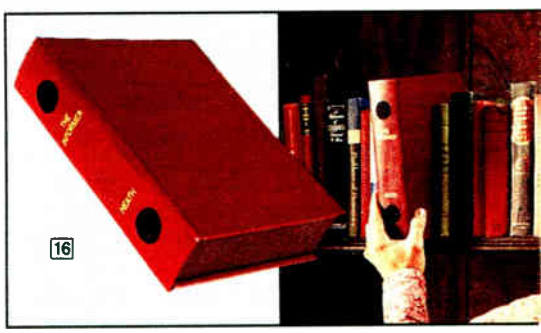
- **Effective infrared sensors detect intruders and activate system**
- **Commanding digitized male voice warns intruders – day or night**

Security Sentinel uses both light and sound to deter intruders, providing you with the maximum 24-hour a day security available in passive systems. Intruders believe they have been seen when the GD-3810 responds to their approach with a commanding verbal warning and, at night, activation of up to 1200 watts of lighting equivalent to eight 150 watt floodlights.

Use your Visa or MasterCard credit cards to purchase your kit!







Infrared sensors detect body heat within the GD-3810's coverage area, and activate the verbal message which is a man's voice that has been digitized for realistic reproduction. The verbal message is: "Warning. You are entering a secured area. Please exit immediately." During darkness, security lighting is also activated. A phototransistor circuit deactivates the peripheral lighting during the day. A Voice-Off feature deactivates the verbal warning for up to eight minutes while the unit still lights the way for family or guests. If more guests approach before the light goes off the unit automatically deactivates the verbal warning for an additional time period of the same length. You and your family or guests will never again have to approach the house in darkness.

Even the area underneath the unit is covered, providing complete coverage of an area of up to 40' by 40.' You can adjust the coverage area size and pattern to suit your needs. You can also set the sensitivity level of the sensors to detect stray animals or only intruders and larger heat-emitting objects. Inexpensive to operate, the GD-3810 connects to a standard 120 VAC, 60 Hz household power line. The GDA-3511-1 Dual Floodlight Accessory, which houses two adjustable aim floodlights, may be used with the Security Sentinel. 12½" D x 5½" W x 3½" H.

Kit GD-3810, Shpg. wt. 6 lbs. **199.95**

15 Protect your home from theft and damage with the ever vigilant SENSAPHONE Home Monitoring System

- **Lets you know about trouble in your home the moment it happens**
- **Automatically dials designated numbers and warns of problem in English**
- **Reports status of unattended home or office when you telephone**
- **Use as an automatic dialer that stores up to eight phone numbers**

Become the owner of a unique home monitoring system that informs you of conditions in your unattended home or office. SENSAPHONE continuously checks for power outages, excessively high or low temperatures, unusual sounds and disturbances like a smoke or fire alarm going off. and other alarm conditions when set up to do so.

Connected to your phone, SENSAPHONE reacts to an alarm condition by automatically dialing up to four telephone numbers in sequence until the warning message is received and acknowledged. SENSAPHONE talks to the receiving party by identifying itself, giving the time, stating the problem and switching on its built-in microphone so any unusual sounds, if any, can be heard.

Listen in on your house while you are away. Just call home. After a preprogrammed number of rings, SENSAPHONE answers and reports on all monitored conditions. Then it lets you listen to room sounds for yourself. Reassured, you can return to work or enjoying your vacation.

SENSAPHONE keeps working even though there's a power failure. It automatically switches to its battery power, six "D" cell alkaline batteries (not included), and calls to warn of a loss of electricity. It will also call out when its batteries are running low. Batteries last up to 15 hours when AC power is lost and the unit is in the ON mode and operational.

As an extra to your small investment, SENSAPHONE can be used as an automatic dialer storing up to eight of your most frequently called numbers and dialing them automatically at the press of a 1-key code. SENSAPHONE also gives the time and any monitored condition audibly at your command.

SENSAPHONE easily installs in a few seconds on any telephone line using a standard telephone modular jack. It can be used with or without a telephone. It measures 7¾" wide x 2" high x 8⅝" deep and weighs 2 pounds.

GDP-2156, Assembled and tested, Shpg. wt. 3 lbs. **199.95**

16 The *Informer*® Ultrasonic Intrusion Alarm

ONLY $69.95

- **"See" up to 25 feet away from unit**
- **Time delay lets you deactivate alarm**
- **No one but you will ever know it's there**

Disguised to look like a fine hardcover book, the Informer will sit quietly on bookshelf or table...until something or someone enters its wide field of surveillance. Ultrasonic sound waves thwart intruders by sensing their movements during entry. Then it will activate indoor/outdoor buzzers or alarms, table or floor lamps to alert you to an unfamiliar presence within your home.

Easy to set: Simply flip a hidden, back panel switch to activate the system. Two AC outlets on the back panel control lights and alarms you have plugged in. Ten seconds after the first movement is detected, the lamp outlet is triggered, suddenly turning on any lights you have connected. Approximately 30 seconds later, the alarm outlet is triggered. Has switch-selectable auto or manual reset. Adjustable control sets the sensitivity of the Informer to movement and therefore its operating range. Solid-state circuitry. Requires 120/240 VAC.

Kit GD-49, Shpg. wt. 5 lbs. **69.95**

SPECIAL FALL SAVINGS 10% OFF every item in Heathkit's RF Security System – *This catalog only!*

The GD-2800 system is easy to install and provides 24-hour security. It protects interior/perimeter zones, entrances and high risk areas.

- **One of the most advanced microprocessor-controlled systems available**
- **RF control eliminates the hassle of wiring and possible tampering**
- **8-channel receiver lets you customize the system to meet your needs**

[1] **RF Security Receiver/Processor Kit** with outdoor alarm horn and indoor annunciator speaker, processes all incoming signals to provide appropriate alarm warning action. Four modes (Off, Home, Away and Panic) control entire system operation. 'Home' monitors doors and windows while you're inside. 'Away' additionally arms indoor motion detectors. Five coded channels give separate alarms for door, windows, indoor motion, fire and emergency (Panic) situations. 'Auxiliary' and 'Panic' alarm channels alert you to special concerns like fire, breach of computer room, safe or gun cabinet – even if the system is off. Unique annunciator tone sounds from indoor speaker whenever a protected door opens, telling you when a youngster left to play or your daughter returns from a date; also sounds to confirm receipt of mode-change signal from Control Transmitters.

Other sophisticated features include: time-delayed entry/exit, power to drive two alarm horns, internal 12-hour stand-by battery, highly visible security warning labels for house exterior, system test mode, key-locking master power switch, four output triggering options for automatic dialing devices. Permits enforcement to be extended to nearby buildings, shed or garage within 200' receiving range. All mode operations are remotely controlled by GDA-2800-4 or GDA-2800-9 Transmitters (at least one is required).

Kit GDA-2800-1, Shpg. wt. 24 lbs. .. **Was $299.95 THIS CATALOG ONLY 269.95**

[2] **Passive Infrared Motion Detector/Transmitter** offers 25 x 35 foot indoor space protection without interference to TV remotes. Requires 9V battery.

GDA-2800-2, Assembled, Shpg. wt. 1 lb. **Was $139.95 THIS CATALOG ONLY 125.95**

[3] **Wired-Circuit Transmitter** protects doors and windows against entry, includes one magnet/reed switch. Also connects to GD-1701 Flood Alarm (page 12).

GDA-2800-3, Assembled, Shpg. wt. 1 lb. ..... **THIS CATALOG ONLY 35.95**

[4] **Command Transmitter** remotely controls entire System with 200' range.

GDA-2800-4, Assembled, Shpg. wt. 1 lb. ..... **THIS CATALOG ONLY 44.95**

[5] **Smoke Detector/Transmitter** sounds internal 85 dB alarm as well as GD-2800 System alarm.

GDA-2800-5, Assembled, Shpg. wt. 2 lbs. ..... **NOW ONLY 71.95**

[6] **WINDOW BUG Sensors and take-off contacts.** Package of four. Used with GDA-2800-3 Transmitter, each sensor protects up to 32 sq. ft. of glass surface.

GDA-2800-6, Shpg. wt. 1 lb. ..... **THIS CATALOG ONLY 35.95**

[7] **Magnetic/Reed Switch Set.** Package of four (one set shown) for single or parallel connection to GDA-2800-3 Transmitter and its applications.

GDA-2800-7, Shpg. wt. 1 lb. ..... **THIS CATALOG ONLY 17.95**

[8] **Passive Infrared Motion Detector** for hard wired security systems. Requires 6-18 VDC. (Not for use with GD-2800 Security System).

GDA-2800-8, Assembled, Shpg. wt. 1 lb. ..... **Was $99.95 NOW 89.95**

[9] **12-Button Digital Keypad Controller** operates in addition to or in place of the GDA-2800-4 Command Transmitter. Mounts near door for instant entry/exit control. Operates identically to the Command unit after entry of user access code.

GDA-2800-9, Assembled, Shpg. wt. 2 lbs. ..... **Was $109.95 NOW 98.95**

GDA-1800-3, Additional Outdoor Alarm Horn (like shown). 2 lbs. ... **NOW 22.45**

$AVER! GDS-2800-1 Starter Security System consists of one GDA-2800-1 Receiver kit, one GDA-2800-2 Infrared Motion Detector/Transmitter, one GDA-2800-3 Wired-Circuit Transmitter and one GDA-2800-4 Command Transmitter, Shpg. wt. 20 lbs. ..... **Was $499.95 THIS CATALOG ONLY 449.95**

SPECIAL FALL SAVINGS 10% OFF these convenient phones and phone accessories – *This catalog only!*

[10] Cordless portable telephone provides freedom

cut $12

- **Portable operation up to 1000 feet away from base unit**
- **Security system protects your line from unauthorized access**

$107.95

Take the handset of the Freedom Phone 750 and use it up to 1000 feet away from the base unit.

Use pulse or tone dialing to access custom calling services. Other features include one-button automatic redial; separate mute button; dual-tone coded security system; high/low volume control switch; clear button; operates on easily recharged nickel-cadmium batteries. The system includes desktop control unit which may also be wall-mounted, dial-out & receive handset, connector cord with modular plugs and user's manual.

GDP-1342, Assembled, Shpg. wt. 3 lbs. ..... **Was $119.95 NOW ONLY 107.95**

California law requires the following statement: FCC-approved Freedom Phone 750 will be serviced under provisions outlined in the manufacturer's warranty.

[11] Save time and money with the Demon Dialer

cut $9

- **Automatically redial busy and unanswered numbers**
- **Accurately dial lengthy Alternate Long Distance numbers**
- **Expansion lets you store up to 176 seven digit numbers**

The Demon Dialer's memory stores 93 7-digit numbers, 60 11-digit numbers or 55 23-digit numbers. The Memory Expansion Accessory almost doubles the memory. A 3-volt battery provides memory protection in case of power failures.

Computer-controlled by an on-board CPU, the Dialer instantly and automatically dials numbers of up to 32 digits stored under easy-to-remember 2- to 6-digit letter/number codes you devise. Two-key sequences will redial or 'Demon Dial' after the first try. The Demon will silently dial a busy number 5 times in the 1st minute, every 2 minutes for 10 minutes and every 10 minutes for up to 2 hours. While it 'Demon Dials,' incoming calls can still be received, and a success signal alerts you when the party being called answers. Six simple commands give you complete control of this versatile instrument which operates with any telephone and extension phones equipped with touch-tone service.

Kit includes AC power cube, 3-volt battery, two cables with modular plugs, series jack, user's manual and reference Dial Guide/List. 1⅝" H x 5⅞" D x 5⅛" W.

Kit GT-2217, Shpg. wt. 3 lbs. ..... **THIS CATALOG ONLY 80.95**

GTA-2217-1, Memory Expansion Accessory, Shpg. wt. 1 lb. ..... **NOW 17.95**

[12] Vacation/Home Sentry ends homeowner worries

cut 10%

- **Device detects low in-house temperatures-add more sensors to detect water, or other problems**
- **A quick phone call to your home activates the Vacation/Home Sentry and alerts you if something is amiss**

The Vacation/Home Sentry turns your telephone into a home information line while you are away. You or a neighbor simply call your number to find out if all is well. The Sentry monitors the house temperature. If it drops below 40°F you hear a 5 to 10 second beeping signal, if the temperature is normal you hear silence. Exterior sensors may be added to detect flooding and other problems.

Kit GD-1702, Shpg. wt. 2 lbs. ..... **THIS CATALOG ONLY 26.95**

[13] Replace phone bells with a Pleasant Phone Ringer

cut 10%

- **Select from four relaxing telephone signals**
- **Adjustable volume control with separate extension speakers**

Replace the boring ring-ring-ring of your telephone. A pre-programmed musical IC in this one-evening kit offers four delightful alternatives: a beeping signal, an upbeat four-note chime, ten seconds of Beethoven's "Fur Elise" or 20 seconds of "Romance." The battery operated Ringer simply installs between the phone and the outlet. Use two speaker terminals to extend melodies to other rooms. Has variable volume control. 1¼" H x 5⅞" W x 4¾" D.

Kit GT-1218, Shpg. wt. 1 lb. ..... **THIS CATALOG ONLY 26.95**

[14] Instant one-number access dialer for any situation

cut $7

- **Stop dialing lengthy 13-digit phone and billing numbers**
- **Dial an emergency number by simply picking up the phone**

The HOTSHOT is a unique one-number telephone dialer that quickly dials any number up to 31 digits. End the aggravation of dialing a 23-digit number to access Alternate Long Distance service. The Dialer is great for credit card checking, automatic prefix dialing, WATS line entry, security, hotline applications, and instant dialing of emergency numbers. The easy-to-program memory doesn't require battery backup since it's mechanically programmed. Plugs into any standard touchtone modular phone jack with Y-adapter (included in kit).

Kit GT-2218, Shpg. wt. 2 lbs. ..... **Was $69.95 NOW ONLY 62.95**

VISA MasterCard **Credit Card Orders Call TOLL-FREE: 800-253-0570. Alaska and Michigan Residents Call: 616-982-3411.**

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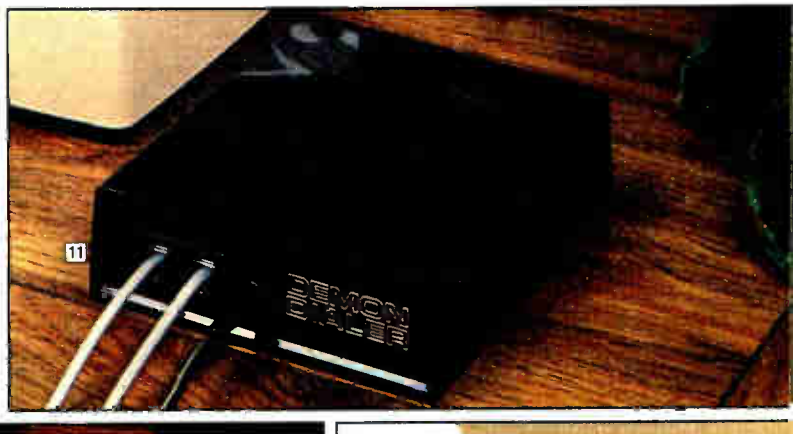
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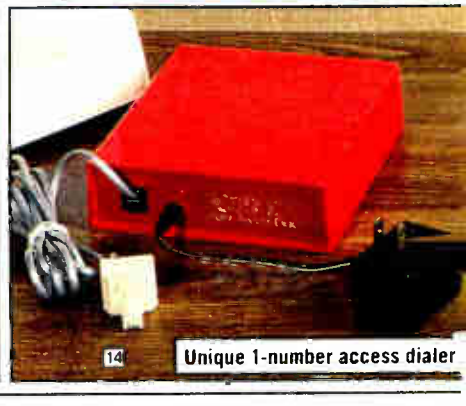
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Unique 1-number access dialer

Products to make your home more energy-efficient, convenient and healthful

1 Solar energy can save you fuel-dollars

Solar energy is economical for do-it-yourselfers

As the cost of fossil fuel continues to rise, and ecological debates increase the national awareness of our environmental responsibility, all forms of alternate energy will become even more promising. We offer the highest quality solar components on the market. You probably cannot hire a contractor to install a system this good. Plus, you can save up to 40% over a comparable dealer-installed system.

Designed as a complement to your existing water heating system, the NS-1100 system is properly sized for your own climate, home size, family and hot water requirements by a sophisticated computer program run at your nearby Heath/Zenith Computers & Electronics Center (also available by calling Heath's Marketing Service Dept. at 616-982-3411). ***Plug into the sun!***

Solar gives you the most for your money

- **New solar panel absorbs even more sunlight**
- **Federal Tax Credits can pay for 40% of the total system invoice purchase price**
- **Many states offer additional tax incentives**
- **Most systems recover cost in three years**
- **The Heathkit NS-1100-3 Manual Set answers all your questions about the system**

The NS-1100 system preheats water going to your conventional water heater – so instead of cold water, it receives solar-heated water. *This free preheating dramatically lowers the energy requirement of your water heater, allowing it to become a holding tank to keep water at the desired temperature.*

Build it in as little as three weekends: Only common carpentry and plumbing tools are required to assemble and install the NS-1100 Solar Water Heater in your home. The profusely illustrated, step-by-step Heathkit manual allows you to plan the complete kitbuilding and installation operation ahead of time. The NS-1100 Water Heater System includes all the components you need for kitbuilding and installation except ¾" copper pipe, insulation and solar fluid.

Declare your energy independence: Your first step is to order the NS-1100-3 Manual Set and contact a Heath/Zenith Computers & Electronics Center (or Heath Company at 616-982-3411) for the price of a system sized just for you. The manual clearly shows how easy it is to install the NS-1100 Solar Water Heater System, and our unique computer program will show you the tax incentives that are available – and the payback timetable you can expect – from the system.

Begin by ordering the NS-1100-3 Manual Set for the NS-1100 system! Written for people with little or no previous experience, it has the answers to all your questions – everything you need to know to install a customized Heathkit Solar Water Heater System successfully, including complete site evaluation, installation and operation information. A solar shade finder helps you find a site where no trees or buildings will block your solar panel from full sunlight. And the price of this Manual Set is deductible from the cost when you purchase a system.

$AVE twice with a 10% discount AND tax credits.

Most items for the NS-1100 Home Solar Heater System have been discounted 10% so you can start saving this year on your water heating bills. A Federal income tax credit of 40%, plus state credits (if available), will also help you pay for your NS-1100 Kit. This credit is not a deduction. It means you receive back 40% of the system cost.

NS-1100-3, Manual Set, 3 lbs. ..... **NOW ONLY 9.95**

Kit NS-1100-1, Plumbing Hardware pack for NS-1100 systems, 65 lbs., Motor Freight Collect ..... **Was $393.00, NOW ONLY 354.00**

NS-1100-12, 3' x 8' Solar Collector Panel and Mounting Hardware, 136 lbs. Motor Freight Collect ..... **Was $383.00, NOW ONLY 345.00**

NS-1100-4, 80 Gallon Capacity Solar Tank, 350 lbs., Shipped Motor Freight Prepaid ..... **Was $286.00, NOW ONLY 258.00**

NS-1100-5, 120 Gallon Capacity Solar Tank, 447 lbs., Shipped Motor Freight Prepaid ..... **Was $399.00, NOW ONLY 360.00**

NS-1100-6, 5 Sq. Ft. Heat Exchanger, 18 lbs. . **Was $113.00, NOW ONLY 102.00**

NS-1100-7, 8 Sq. ft. Heat Exchanger, 20 lbs. . . **Was $126.00, NOW ONLY 114.00**

NS-1100-8, 8 Sq. Ft. Double-Walled Heat Exchanger (required in Oregon, Los Angeles and Memphis areas), 24 lbs. ..... **Was $159.00, NOW ONLY 144.00**

2 Clear the air of dust, dirt and unhealthy contaminants

$149.95

- **No metalwork or wiring – complete instructions at every step**
- **Removes dust, dirt, cigarette smoke – even allergens**
- **Automatic – works with your furnace or air conditioner**

Today's well-insulated homes need the Heathkit Electronic Air Cleaner. With each cycle, it removes almost all airborne contaminants. The Electronic Air Cleaner works with your central heating or air conditioning system to automatically bring you cleaned and refreshed air you'll enjoy.

Easy to install in place of your old filter. 120 VAC, 60 Hz Power Supply measures 8" H x 12" W x 4" D. One power supply and at least one filter needed for operation – two filters can be used with a single power supply.

Electronic Air Cleaner Power Supply:

Kit GD-2196 (needs Filter Accessory below), Shpg. wt. 5 lbs. **149.95**

Filter Accessory GDA-2196-1, 20" x 25" x 1", 1000 cfm, Shpg. wt. 3 lbs. . **99.95**

Filter Accessory GDA-2196-3, 16" x 25" x 1", 800 cfm, Shpg. wt. 3 lbs. .. **99.95**

3 Heath's GD-1298 Office Air Cleaner

Save $100

$99.95

- **Removes pollutants and pollen, dust and odors**
- **Portable and efficient, with quiet operation**
- **A one-evening project for the novice kitbuilder**

Remove irritating pollen, dust, mold spores and smoke particles, some as small as 0.01 microns (less than one-half millionth of an inch) in diameter. Three filters improve your working or living environment: a washable, prefilter removes large particles; the permanent electrostatic filter removes small particles; and a replaceable, activated charcoal filter absorbs odors.

Kit GD-1298, Shpg. wt. 20 lbs. ..... **Was $199.95 NOW ONLY 99.95**

GDA-1298-1, Replaceable charcoal filter, Shpg. wt. 2 lbs. **7.95**

4 Quickly remove dust, dirt, allergens and smoke

Save $40

$249.95

- **Filtering eliminates 99% of pollen and 94% of harmful particles in the air**
- **Three filters purify the air and remove unpleasant odors**
- **Efficient, three-speed fan makes air-cleaning jobs easy**

The Heathkit Portable Electronic Air Cleaner takes on your toughest air-cleaning problems. Efficiently remove dust, dirt, smoke and other pollutants from 6,000 cubic feet – that's a 25' by 30' room with an 8' ceiling. Three speeds tackle a variety of jobs and three filters work together to keep your air clean and fresh. And this kit is simple to build – the power supply, variable speed fan control and filter are preassembled. Uses 120 VAC, 60 Hz. 26½" H x 17¼" W x 13½" D.

Kit GD-1297, Shpg. wt. 59 lbs. ..... **Was $289.95 NOW ONLY 249.95**

GDA-1297-2, Replacement Charcoal Filter for GD-1247/1297, 2 lbs. ... **9.95**

5 Substantially reduce your heating and cooling costs

- **Set the temperature you want for the time of day you want**
- **Program up to six daily settings, for a full week**

It makes sense! Program your furnace and air conditioner for a weekly cycle of temperatures between 60°-82°F. (Not for 2-stage systems).

Keep your home within 2° of the temperature you want, day-in/day-out. Use manual and "Slow-Cycle" functions to override programmed settings. Extra value – NE-1211 includes isolation relay (may be required with some systems).

Kit NE-1211, Shpg. wt. 1 lb. **59.95**

NEP-1210, Assembled, Shpg. wt. 1 lb. **79.95**

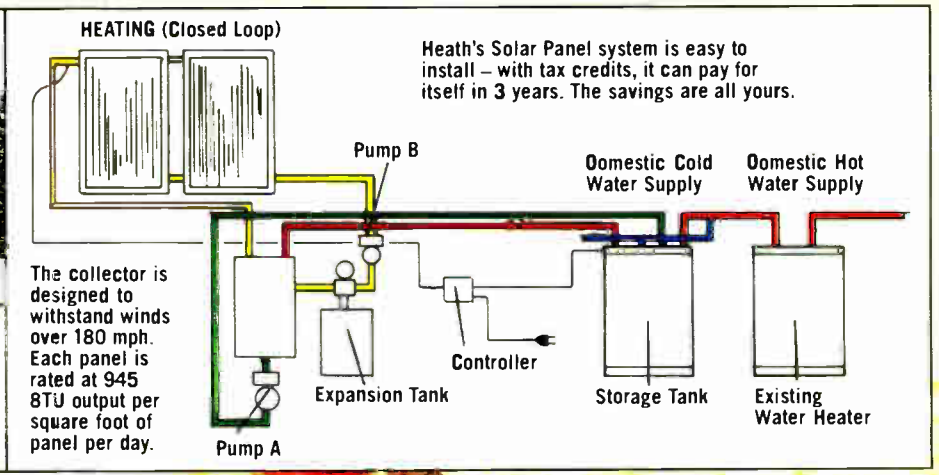
6 Sound-Activated Switch turns on lights for you

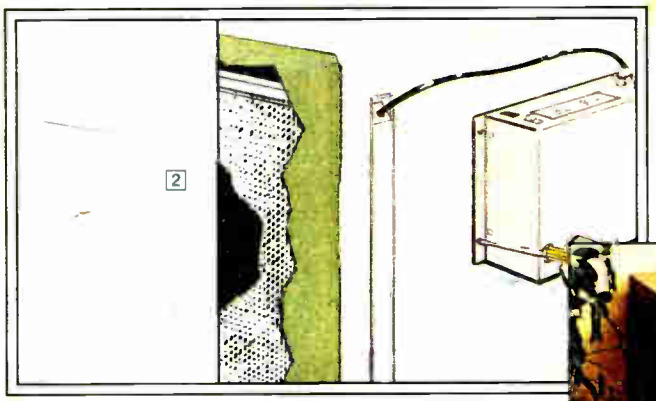
- **Instantly turns lights on when it hears you, turns them off when it doesn't**
- **LED helps you set audio sensitivity level**
- **Improves home security**

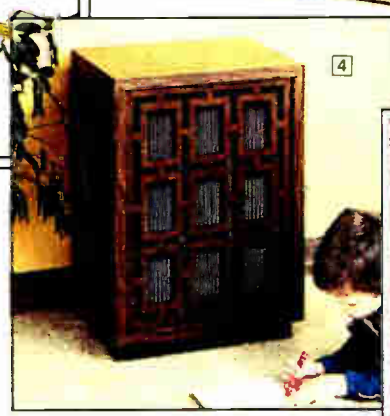
Provide extra safety in halls and on stairways. The Sound-Activated Switch turns on lights for you when you enter the area, and saves lots of money by turning them off after you've gone. Solves the problem of children leaving lights on. Operates up to 300 watts of 120 VAC lights. Only two controls – sensitivity adjustment sets the sound-triggering level, and a timing adjustment sets turn-off delay.

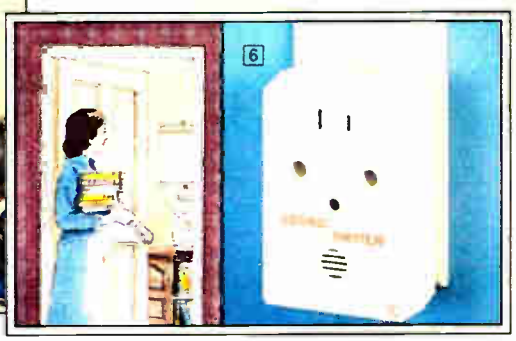
GDP-1270, Assembled, Shpg. wt. 1 lbs. ..... **Was $29.95 NOW ONLY 19.95**

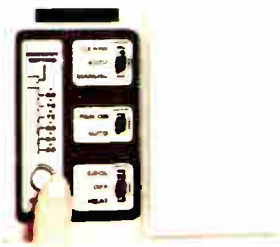
Discover the fun of kitbuilding at your Heath/Zenith Computers & Electronics Center.











Economize with the Heat Sniffer

FAST, EASY 1-EVENING KIT

$24.95

The NE-2112 is easy to use. Turn the unit on and adjust for silence. Then move the Sniffer's sensor along where heating/cooling losses might occur. Changes in temperature set off a beeping alarm and a flashing LED. Use in temperatures from 59°-95°F (15°-35°C). Requires 9-volt battery (not included).

Kit NE-2112, Shpg. wt. 2 lbs. **24.95**

Use the Watt Wizard to economize

Save money three ways: with a 15% tax credit, by reducing the power consumption of motorized devices and by protecting motors against burn-out

Triple savings: As an energy-monitoring device, the Watt Wizard qualifies for a 15% tax credit of the purchasing price – save part of the cost of running some motorized electrical devices and prolong the life expectancy of appliances. Just plug it in, and start saving. The Watt Wizard Power Factor Controller is proven efficient!

NEP-1662, Assembled, 1 lb. **39.95**

Fingertip on/off control of lights

$19.95

FAST, EASY 1-EVENING KIT

- **Can also be used conveniently for small appliances, TVs, fans**

Instant on/off control at your fingertips Maximum 300 watt load per unit; 150 watts per lamp. Use with TVs to 225 watts, fans to 180 watts and stereo, heaters, etc. to 300 watts maximum. Not for AM radios.

Kit GO-1287, Shpg. wt. 2 lbs. **19.95**

Heath Pro-Series Audio components bring studio quality and performance to the home

[1] GFT-1A Stereo Tuner from ADCOM features superior performance characteristics and ease of operation

$369.95

- **Digitally synthesized, quartz referenced tuning locks on to stations with an accuracy of 0.00025%**
- **Scan button automatically tunes the Tuner up or down the AM or FM frequency range**

Designed to maximize your listening pleasure, the GFT-1A combines outstanding specifications with simplicity of operation. Synthesized tuning ensures that your station is tuned in and stays locked in without any drift. Touch the scan button and automatically, or manually, tune up or down the frequency range. Program in up to eight FM and eight AM stations for instant one button tuning. An FM signal-to-noise ratio of 80 dB for mono and 75 dB for stereo provides you with the pure enjoyment of noise-free music.

FM sensitivity of 17.2 dBF in mono and 34.7 dBF in stereo for 50 dB of quieting is featured along with a capture ratio of 1.0 dB to bring in fringe stations. The receiver has a low 65 dBF harmonic distortion. Channel separation is 55 dB at 1000 Hz for clear listening. The tuner has a five-stage LED signal strength display and record level oscillator. 19" W x 3" H x 11½" D.

AJP-1801, Assembled, Shpg. wt. 14 lbs. **369.95**

[2] Flexible high-performance preamp gives you complete control over your audio system

$369.95

- **ADCOM GFP-1A accommodates two turntables, a tuner, two tape decks, and a signal processor, and provides very low noise input for a digital audio disk or high fidelity VCR**

The GFP-1A Preamplifier offers features and performance, and handles virtually every operating and listening condition you might encounter. It even has a built-in decoder for playing records made with the CX noise-reduction encoding process. And this excellent preamp is available at an attractively low price.

Extremely versatile, the GFP-1A has two separate phono inputs which can be used with most fixed-coil and moving-coil cartridges with the option of a switchable gain on one and a variable capacitance on the other. The tape monitor allows you to record from any input source or dub from one tape deck to another while listening to any other input source.

Other uncommon features of this high-tech preamplifier include: a built-in headphone amplifier, defeatable tone controls, separate preamps for both phono inputs, and a loudness compensation that moderately boosts both low (below 200 Hz) and high (above 10,000 Hz) frequencies. Tone-control characteristics are excellent with the midrange response unaffected even by extreme settings of the tone controls. Switchable infrasonic and ultrasonic filters remove rumble from warped records, and noise above 25 kHz. 19" W x 3" H x 12½" D.

APP-1802, Assembled, Shpg. wt. 16 lbs. **369.95**

[3] Sophisticated 10-Band Octave Equalizer tone control

Adjust the audio response of records, tapes and FM broadcasts to your creative taste by adding the Pro-Series Equalizer to your rack. It's an accessory that can dramatically enhance the performance of every other system component, and improve your environmental acoustics without contributing noise.

Control the total audio spectrum. The ISO-centered frequency band slide controls for each channel give you octave-by-octave boost or cut (greater than 10 dB) preference over the entire audible range. The slide controls let you eliminate 'live' or 'dead' room spots for smooth, flat-graph characteristics. You'll notice right away that selective frequency-band equalization can enrich cartridge response, cut harmful subsonics, boost deep bass response to the anatomical vibration level and put musical life back into your woofer, midrange and tweeter speakers.

A six-way mode/monitor combination network allows you to equalize, monitor, record or bypass your music system without rearranging cables. Useful left and right channel LED clipping indicators warn you of peak overload conditions within your system. Harmonic distortion is a low 0.001% from 20-20,000 Hz.

The AD-1703 Octave Equalizer tailors a stereo system to any home environment and enhances every component's performance. From reducing tape hiss to customizing recordings, the Equalizer improves almost all stereo systems for less than the cost of a good set of speakers. It fits any standard 19" rack.

Kit AD-1703, Shpg. wt. 17 lbs. ..... **LAST CALL 224.95**

[4] Active Audio Processor increases your music's dynamic range and adds life to your recordings

Dynamic range is to music what perspective is to painting or photography. It gives audio depth and feeling. Some of the dynamic range in most music is lost in the recording or broadcast process, but the expansion circuit in the AD-1706 can restore up to 8 dB of this loss. You'll discover your music has even more realism, better definition and lower background noise while maintaining full response and ultralow distortion – even at high volume levels.

Superb noise reduction circuitry sifts out up to 10 dB of noise from records and hiss from tapes, increasing your system's total dynamic range up to 18 dB. A 7 kHz linear-phase high frequency filter can reduce ultrasonic noise in unusually noisy material such as AM broadcasts, TV and cassette tapes.

Front panel LED's precisely indicate relative noise reduction and dynamic range expansion levels. Compatibilities between the built-in tape monitor and mode selector switch let you apply processing either during or after recording, specify the Processor insertion point or bypass the Processor.

The AD-1706 can be mounted in any standard 19" rack. Handles ease the installation process. Dimensions: 19" W x 14" D x 5¾" H.

Kit AD-1706, Shpg. wt. 18 lbs. ..... **LAST CALL 299.95**

[5] Reduce distortion and improve low-end response

The Variable Electronic Crossover adds a separate bass channel to your audio system. Used with a subwoofer, the component will give you a more accurate crossover alignment for lower distortion and clearly-improved low end response down to as low as 20 Hz!

Frequency scale crossover points up to 6 kHz at 40, 60, 80, 100, 125 and 150 Hz. Switches select 6 dB/octave or 18 dB/octave slopes for flat frequency response at crossover points and well-defined imaging.

Outputs for stereo, monaural and bridged hookup allow you to connect another amplifier and subwoofer to your audio system. The Variable Electronic Crossover also has bass level control, crossover bypass switch and a 15 Hz infrasonic filter to remove annoying record warp noise.

Kit AD-1702, Shpg. wt. 15 lbs. ..... **LAST CALL 199.95**

AEA-1800-3, Solid Oak End Panels, Shpg. wt. 2 lbs. **19.95**

[6] Build the finest high-level Stereo Power Amplifier

The phenomenal dynamic range of sophisticated new audio sources requires more power and more headroom to faithfully reproduce the total sound spectrum. Without sufficient power, musical peaks become hard-clipped and the dynamic range is compromised. In addition, amplifiers driven to clipping can have more than 40% harmonic distortion and may force a speaker to dissipate twice the normal amount of heat.

The Pro-Series AA-1800 Amplifier has the power modern recording techniques require. It delivers 250 watts continuous power per channel into an 8-ohm load; and on those troublesome transient peaks, the AA-1800's typical dynamic headroom of 3 dB translates into 500 watts per channel. Enjoy clean sound with the Pro-Series Stereo Amplifier. Hum and noise are reduced a full 85 dB, and sound/phase distortions are virtually eliminated.

A patented protection system double-safeguards your speaker from damaging input signals. Special overload and high-frequency cutoff circuitry, a thermal circuit breaker and 8-second turn-on/turn-off circuits further protect your audio system from destructive voltages, disconnecting the speakers and causing a front panel LED to glow. Massive heat sinks cool the electrical network while LED's for each channel precisely indicate full power output.

Two line cords with remote AC switching relieve your preamp from the burden of transferring high current. The Amplifier is designed for mounting in an EIA standard 19" equipment rack. Large handles are provided on each side of the front panel for easy installation when rack mounting.

The AA-1800 reproduces music with uncompromising accuracy. Distortion specifications are low, less than 0.025% harmonic distortion from 20 to 20,000 Hz and less than 0.03% transient intermodulation distortion.

As reported in High Fidelity magazine: "In short, the AA-1800 is as fine an amplifier as one could want, sonically neutral, and powerful enough for just about any reasonable domestic application. And provided you don't mind spending a few evenings behind a soldering iron, its price is a bargain."

Kit AA-1800, Shpg. wt. 75 lbs. **649.95**

Use your Visa or MasterCard credit cards to purchase your kit!

Heath Pro-Series Test Equipment for your audio system

Improve the accuracy of any sound system with Heath Pro-Series test equipment. Evaluate your system and increase your listening pleasure with the AD-1308 Portable Real-Time Spectrum Analyzer, plus the optional ADA-1308-1 Power Supply/Rack Mount Accessory for the Heath rack mount cabinet, and the AD-1309 Pink/White Noise Generator.

These professional audio test instruments will help you determine how good your stereo or sound system is, and how you can make your audio system sound even better.

For more information about these versatile test instruments see page 26.

1 Heathkit AS-1373 deluxe 3-Way Speaker System will please even the most critical music listener

- **Careful design delivers superb source accuracy and wide dynamic range; mirror-image driver mounting creates a sharp stereo image**
- **Compare the performance with speakers costing twice as much**

Designed for use with the best audio components, the 10" woofer provides gutsy, well-defined bass response, with a 500 Hz woofer/mid-range crossover frequency to ensure smoothness and minimize intermodulation distortion. The 4½" mid-range driver has a polyester-damped subenclosure to prevent woofer reflections, while a 1" dome tweeter exhibits power handling and definition, with full 120° horizontal dispersion at 12 kHz. In addition, flush-mounted drivers create a sharply focused sound image.

Driven to sensational sound by as little as 10 watts, a higher-powered amplifier like the AA-1800 (on page 24) can deliver up to the maximum rated 200 watts to reveal an awesome dynamic range and three-dimensional clarity. Music will take on a new feeling as you listen to your favorite selections.

A sophisticated crossover circuit (a weak link in many systems) is every bit as rugged as the drivers. In addition, two subtle but effective controls match the mid- and the high-frequency response to your room's acoustics. And the AS-1373 provides maximum protection by individually fusing each driver, thereby virtually eliminating expensive burnouts. Both fuses and controls are easily accessible behind the handsome foam grille that is more acoustically transparent than ordinary grille cloth. Comes with fully assembled walnut-finish veneer cabinet.

Kit AS-1373, Shpg. wt. 68 lbs. ..... **LAST CALL Each 224.95**

AS-1373 SPECIFICATIONS: Frequency Response: (± 3 dB): 40-20,000 Hz. **Maximum Power:** 250 watts per channel. **Crossover:** 500 Hz (12 dB/octave) and 3000 Hz (12 dB/octave). **Controls:** 3 kHz switch, flat or 2.5 dB attenuation; 10 kHz switch, rolloff or flat. **Dimensions:** 26" H x 14½" W x 11⅞" D.

2 Audiophile quality in a medium-powered 30-Watt Stereo Receiver from Heath's Pro-Series engineers

$349.95

- **All-in-one audio quality – designed for highest fidelity first, then for high styling**
- **An array of exceptional specifications with a multitude of versatile features and more performance for your dollar with our high 2.5 dB (53 watt) dynamic headroom**

30 WATTS, MINIMUM RMS, PER CHANNEL INTO 8 OHMS WITH LESS THAN 0.009% THD FROM 20-20,000 HZ

The AR-1250 Digital FM Stereo Receiver is ideal for the college student, apartment dweller or budget-minded audiophile who wants a high-quality, medium power stereo system. Easily assembled in four evenings, this Receiver fuses the best in audio technology with versatile features.

Heath's award-winning Pro-Series engineers designed the AR-1250 to meet the highest standards of accurate audio reproduction – just check the Receiver's outstanding specifications. Excellent FM sensitivity and very low distortion allows you to enjoy clear FM reception at an extraordinarily low price.

Ease-of-use and versatility are part of the design with a bright green digital frequency display, a bar graph display of instantaneous signal strength and power output level, and exact LED center-tune and stereo locking indicators. Select A or B speaker systems, or both. A pre-amp-out/power-amp-in adapter loop makes adding an equalizer, audio processor or electronic crossover very easy. Three source switches route the audio signal with full monitor or dub from one tape deck to another, or listen to any source while recording from another source.

Connect up to two tape decks, headphones, power amp, or auxiliary sources like a TV, turntable, etc. And shape the amplifier response with bass, treble, flat and loudness controls. In addition, switch-in low and high frequency filters for selective noise rejection of frequencies below 30 Hz and above 7 kHz.

Kit AR-1250, Shpg. wt. 23 lbs. **349.95**

SPECIFICATIONS: FM SECTION: Mono/Stereo. Usable Sensitivity: 1.9 µV (10.8 dBf)/3.5 µV (16.1 dBf). **50 dB Sensitivity:** 3.5 µV (16.1 dBf)/38 µV (36.8 dBf). **S/N Ratio:** 70/65 dB. **Hum and Noise:** 65 dB. **Harmonic Distortion:** 0.15%/0.3%. **Frequency Response:** 30-15,000 Hz @ ± 1.5 dB. **PREAMPLIFIER: Frequency Response:** 20-20,000 Hz @ ± 0.5 dB Phono, 20-20,000 Hz @ ± 0.3 dB Aux. **THD and IMD (2 V out):** 0.009%. **Input Sensitivity (0.5 V out):** 1.25 mV Phono, 100 mV Aux. **Input Overload:** 150 mV Phono, 10 V Aux. **S/N:** 75 dB Phono, 85 dB Aux. **AMPLIFIER IMD:** 0.012%. **TIM:** <0.02%. **Frequency Response:** 20-20,000 Hz @ ± 0.2 dB. **1 kHz Separation:** 50 dB. **A-Weighted S/N:** 95 dB. **Power:** 120 VAC/60 Hz. **Antenna Connections:** 300 & 75 ohm. **Convenience Outlets:** 1 switched, 1 unswitched (200 W max). **Dimensions:** 4½" H x 17" W x 15¼" D.

3 Lab-grade Portable Real-Time Spectrum Analyzer

- **Use it anywhere, even in your car – operates on six "C" batteries**

An impressive value: As the world's first hand held, microprocessor-controlled ½- and 1-octave Real-Time Spectrum Analyzer, Heath's new Pro-Series AD-1308 is a breakthrough in uncompromising mobile capability. It has comparable specs and more features than many units costing thousands of dollars. It gives the audio technician, recording engineer or home music enthusiast, a precise means of special evaluation for their daily work or increased listening pleasure.

Sound you can see: The AD-1308 displays line input or acoustic-pickup spectral response and sound pressure level, making it possible to optimize your entire audio system. The AD-1308 features 1 or 3 dB scaling for accurate setups.

Five memories let you store and recall responses for instant comparison, plus an exclusive Difference mode displays the difference between any two sources. A thumbwheel attenuator selects the scaling in 10 dB steps from 50 to 120 dB SPL, with standard ANSI fast, slow or peak response modes and A or C weighting for precise SPL or 'noise exposure' measurements.

To ensure absolute measurement accuracy, every microphone element is tested individually, and a ROM chip programmed to correct for frequency response errors. A machine-drawn calibration curve is also supplied.

Kit AD-1308, Shpg. wt. 5 lbs. **279.95**

SAVER! ADS-1308, Includes AD-1308 Spectrum Analyzer, ADA-1308-1 Power Supply/Rack Mount Accessory and AD-1309 Pink/White Noise Generator, 27 lbs. ..... Separately $449.85 **System Price 399.95**

AD-1308 SPECIFICATIONS: SPL and Spectrum Analyzer Display Range: 23-126 dB SPL. **SPL Accuracy:** ± 1 dB A-weighted. **Microphone Self-Noise Level:** <36 dB SPL. **A and C Weighting Filters per ANSI:** S1.4-1971 (Rev. 1976). **Fast and Slow SPL Response per ANSI:** S1.4-1971 (Rev. 1976). **Flatness on Direct Input:** ± 1 dB. **Input Impedance:** >10k ohms. **Input Sensitivity, 90 dBspl Range:** 0 dB = 350 mV RMS ± 10%. **Power Requirements:** 10.5 V, ± 10% @ 425 mA. **Low Battery Indications:** 6 V ± 5%.

4 Power Supply/Rack Mount Accessory

Affords the best way to install and power your AD-1308 in Heath rack mount cabinets, charge the batteries when using nickel-cadmium batteries for portable power, and couple your system's audio signals to the Analyzer. Sturdy 9-pin D-connector permits unit to "snap" in and out easily. Has paralleled phono jacks for each channel. Left, Right, L + R or L – R signals can be selected and displayed. Ample space to store small accessories, microphone and AD-1309 is provided behind a hinged, swing-up front panel.

Kit ADA-1308-1, Shpg. wt. 8 lbs. **119.95**

ADA-1308-1 SPECIFICATIONS: AMPLIFIER: Frequency Response: ± 2 dB, 10 Hz to 50 kHz. **S/N Ratio:** 50 dB ref. 200 mV. **L-R Common Mode Rejection:** 40 dB, 20 Hz to 10 kHz. **Input Impedance:** 22k ohms.

5 Accurate Pink/White Noise Generator

The AD-1309 supplies audio energy with the precise frequency characteristics to properly make measurements with real-time or swept-filter spectrum analyzer – at a fraction of the cost of comparable generators. Front panel phono plug outputs and rotary power level control. Operates on one 9 VDC battery.

Kit AD-1309, Shpg. wt. 2 lbs. **49.95**

AD-1309 SPECIFICATIONS: PINK NOISE: Frequency Response: ± 1 dB from 20 Hz to 20 kHz. **Output Level:** RMS average is >350 mV; peak is 1.5 V. **WHITE NOISE: Frequency Response:** ± 3 dB from 20 Hz to 20 kHz. **Output Level:** RMS average is >350 mV; peak is >1.5 V. **Dimensions:** 2½" H x 4⅛" W x 4" D.

6 Multi-purpose AA-18 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

This solid-state kit takes a minimum 250 mV signal from a source and amplifies it cleanly. Drives 8-ohm speakers to surprising sound levels – also can be used as a good headphone amplifier. The AA-18 is an ideal beginner kit. The AA-18 Mono Amplifier features rear panel speaker terminals and input jack. On the front panel are a headphone jack, power switch with 'on' lamp, and volume and tone controls. Dimensions are 2⅝" H x 7¾" W x 5½" D. It is fuse protected and operates on 120/240 VAC, 50/60 Hz at 5 watts maximum.

Kit AA-18, Shpg. wt. 4 lbs. **44.95**

VISA MasterCard **Credit Card Orders Call TOLL-FREE: 800-253-0570. Alaska and Michigan Residents Call: 616-982-3411.**

7 Infrared Stereo Headphone System gives you cordless headphone listening

NEW

- **Enjoy private stereo listening – without confining cords**
- **System works with any audio source and any number of listeners**

The freedom of cordless hi-fi listening can be yours with the Infrared Stereo Headphone System by Nady. Listen to your stereo or TV without disturbing others and without being tied to a bothersome cord. This affordable system uses infrared technology to convert sound into invisible infrared light waves. The waves are received by a sensor in your headphone and converted back into high quality stereo sound. The Infrared Stereo Headphone System is also an excellent aid to the hard-of-hearing.

Anyone wearing a headphone in the area can listen to the system. You can even set up more than one listening channel in the room by correct positioning of an additional transmitter for each channel. The transmitter covers a conical range extending up to 35 feet in front of the transmitter. Transmissions will not penetrate walls to disturb others using a system in an adjacent room. The transmitter easily plugs into the earphone or headphone jack of any equipment. A phone plug or adapter (not included) is required. An AC power adapter comes with the Stereo Headphone System. The adjustable-size headphone has a volume control, on/off switch, battery compartment for the required DC 9V battery, and auxiliary jack so that it may also be used as a standard headphone.

GDS-1431-1, Assembled Infrared Stereo Headphone System, includes Transmitter and Headphone, Shpg. wt. 9 lbs. **79.95**

Hands-Free Telephone Headset

NEW

- **Comfortable and easy to use headset**
- **For all standard business/home phones**

Your hands can work while you talk with the convenient Hands-Free Telephone Headset by Nady. Just plug the amplifier into the modular hand jack on your phone. The amplifier operates on phone line voltage so no batteries are needed. Volume adjusts up to 6 dB – louder than conventional phone handsets. Plug both your headset and handset into the amplifier so that a quick flip of a switch lets you change from one to the other.

GDP-1343, Assembled Hands-Free Headset, 1 lb. . **34.95**

Get high performance at a low cost – with Heath transceivers and accessories

1 Observe your signal with this Station Monitor

NEW

- **Ensure the purity and stability of your transmissions**
- **Add the Pan Adapter Module to see where other signals are on the band in relationship to your tuned frequency**

Continuously monitor your output with the HO-5404 Station Monitor which displays SSB, TRAP, or RTTY signals. Also use the Monitor with a receiver to view audio signals from other stations, or as an oscilloscope for testing.

Solve many common problems such as improper alignment or tuning, insufficient or excessive drive, poor carrier or sideband suppression, regeneration, parasitics, and CW key clicks. For testing, the Monitor displays audio signals from 10 Hz to 40 kHz with good sync capability and high input sensitivity. It also has a 10:1 vertical and horizontal input switch attenuator, with constant input impedance regardless of switch position.

For DX chasing add the HOA-5404-1 Pan Adapter Module board to view other signals within ± 20 kHz or ± 100 kHz from the receiver frequency.

Kit HO-5404, Shpg. wt. 13 lbs. **249.95**

Kit HOA-5404-1, Shpg. wt. 2 lbs. **99.95**

HO-5404 SPECIFICATIONS – GENERAL: CRT: 3RP1A; flat face; green, medium-persistence phosphor. **Graticule:** ¼" squares; 6 x 8 (1.5" x 2" viewing area). **Power Supplies:** Solid-state rectifiers, regulated amplifier supplies. **Power Requirements:** 110-130 VAC, 60 Hz, 22 watts. **RF SAMPLING SECTION: Frequency Coverage:** 80 through 6 meter (3.5-54 MHz) and up to 160 meters with reduced sensitivity. **Sensitivity:** ¼" vertical deflection at 10 watts, ¾" vertical deflection at 100 watts. **RF Power Limits:** Exciter Input (50-75Ω) 10 to 300 watts, Antenna Input (50-75Ω) 10 to 1000 watts. **Insertion Loss:** Negligible. **VERTICAL AND HORIZONTAL AMPLIFIERS: Input Impedance:** Vertical; 1 MΩ shunted by 125 pF. Horizontal; 1 MΩ shunted by 160 pF. **Sensitivity:** 60 mV per ¼" vertical deflection. **Attenuator:** 2-position switch; X1: 1 V RMS maximum, X10: 10 V RMS maximum. **Frequency Response:** Vertical; 10 Hz to 40 kHz typical. Horizontal; 10 Hz to 300 kHz typical. **SWEEP GENERATOR: Type:** Recurrent, automatic sync. **Frequency Range:** 10 Hz to 10 kHz in three steps. **DIMENSIONS:** 11¼" W x 12⅛" D x 4⅜" H. **NET WEIGHT:** 10.6 lbs.

2 The SS-9000 Deluxe Synthesized HF Transceiver sets new standards in Amateur Radio performance

HIGHEST TECHNOLOGY AT INCREDIBLY LOW COST

$999.95

Reduced $649

- **Microprocessor-based circuitry controls the entire operation for reliable, easy performance**
- **Entirely solid-state, broadbanded in design – this transceiver delivers 100 watts to a 50 ohm load**
- **A built-in Terminal Interface with an RS-232C I/O port allows instant and direct control of operating parameters via ASCII terminal, modem or computer**
- **Nine-band operability, including the newly allocated 10, 18 and 24 MHz WARC bands and WWV at 15 MHz**

The SS-9000 is a quantum leap forward in terminal-controllable communications gear. Streamlined for great results even without keyboard control, experienced amateurs will use it to set new high standards of performance. Designed for versatility, the SS-9000 operates in LSB, USB, CW-wide, CW-medium, CW-narrow and RTTY. Plenty of power gets signals out with low distortion rates while excellent sensitivity and selectivity ensure that you can read distant transmissions.

Completely synthesized for absolute accuracy: A crystal-controlled master oscillator provides exact reference to phase-lock the BFO and HFO for super stability and repeatability. Likewise, a single precise VFO is tied to each display through 256 bytes of CMOS RAM. This extended on-board storage capacity accepts three separate inputs per band for a total of 27 frequencies.

Dual digital display: You get a simultaneous working readout which gives serious contesters and DX hunters greater frequency-handling speed and agility. Pushbutton exchange with memory or opposite display permits instantaneous QSY capture. You have total, simple control of the SS-9000 with a variety of commands, including diagnostic error-prompting at the terminal.

The terminal interface: An "intelligent" controller circuit helps maintain communications protocol between front panel controls or terminal, for two-way control/monitor communication between the SS-9000 and a video terminal (as the H/Z 29, p. 98 and 99), hard copy ASCII teletypewriter, or computer.

Free software: A 5¼" hard-sectored floppy diskette demonstrates many ways of providing useful communication between the SS-9000 and an H-89 computer.

SS-9000, Assembled and tested, 35 lbs. ..... **Was $1649 NOW ONLY 999.95**

PS-9000 Power Supply/Speaker, provides 13.8 VDC for base operation with high temperature, short circuit and current surge protection, clock has independent 24- or 12-hour capability. Assembled and tested, 33 lbs. **249.00**

3 Heathkit HW-5400 Synthesized HF SSB/CW Transceiver is a price-performance triumph

DOUBLE MASTER BUILDER POINTS

- **PLL-synthesized stability with crystal accuracy**
- **Digital display with direct keypad frequency entry, two memories per band and mode/status symbols**

For the ham who dreams of owning the finest quality, multi-purpose equipment. Heath has created a kit-form rig, breaking the cost barrier to sophisticated, dependable talk power and microtech flexibility for home or field use. Controlled and monitored by an 8-bit microprocessor, the compact HW-5400 yields quick-change versatility in adapting to uncertain band conditions.

Three modes, eight bands and lots of power for HF excitement: It operates in USB, LSB, and CW on 80-10 meters with automatic sideband selection. Solid-state and broadbanded, with QSK for proficient CW ops, sixteen memories, power supply activation at the panel and defeatable amp relay for quiet keying.

Beats the QRM every time: A tremendously versatile Split-Memory Access function lets you review and change the transmit frequency while in receive with practically no information loss from the station in contact.

High resolution tuning employs an efficient dual-speed technique. Rapidly scan a band in 1 kHz increments, while tuning to pick out closely-packed calls for more QSOs over a narrow frequency range at 50 Hz per step. You also get total Transceiver status at a glance, including current mode, T/R status, split operation, split-access memory handling and if transmit frequency is outside the band edge. Just three knobs command signal isolation and maintenance. *Now earn double Master Builder points when you buy the HW-5400.*

Kit HW-5400, Transceiver, Shpg. wt. 24 lbs. **499.95**

Kit HWA-5400-1, Power Supply/Speaker/Digital Clock provides a well-regulated, 13.8 volt source of DC power. Shpg. wt. 39 lbs. **179.95**

Kit HWA-5400-3, Frequency Entry Keypad for instantly synthesized direct QSY, and fast DX, contest and net work using the Split Memory Function. Improve contact agility with this cursor-controlled, single-digit, random or sequential access to any frequency and 50 Hz PLL accuracy. Shpg. wt. 1 lb. **59.95**

Kit HWA-5400-2, Deluxe 2.1 kHz 4-Pole SSB Crystal Filter provides sharper skirt selectivity in the IF bandpass for ten total poles of filtering and optimum receiver performance. Shpg. wt. 1 lb. **59.95**

SS-9000 SPECIFICATIONS – GENERAL: Tuning: 100 Hz per step, 5 kHz per knob rotation with pushbutton up and down scan (rate is internally adjustable). **Operation:** Split transmit/receive or transceive from either readout. **Synthesized Lock Indicators:** Visual indication when synthesizer is unlocked. Transmitter is disabled. **Frequency Coverage (MHz):** 1.8-2.0,* 3.5-4.0,* 7.0-7.3,* 10.1-10.15, 14.0-14.350,* 18.068-18.168,* 21.0-21.450,* 24.890-24.990, 28.0-29.7,* WWY @ 15.0 (*Extended Frequency Coverage). **Frequency Stability:** Less than 3 PPM from turn-on for first 15 minutes; Less than 3 PPM/hour drift after 15 minutes warmup; Less than 20 PPM drift from 0°C to + 40°C (single crystal-controlled 10 MHz frequency standard). **Modes of Operation:** LSB, USB, CW-Wide, CW-Medium, CW-Narrow, RTTY. **Power Requirements:** 11 to 16 VDC with a nominal current maximum of 25 amps at 100 watts CW output. Receiver current is 2 amps nominal. (*All specifications are referenced to 13.8 VDC at 25°C ambient). **Rear Panel Connectors & Control:** Antenna (SO-239), Linear ALC In, Linear ALC Adjust, Low Power Enable, Spares (5), DC Power Input, CW Key Jack, External Transmit Audio In (2), Speaker Out, External Receiver Audio, T/R In, T/R Out, Mute, Mute (inverted), External Relay (linear), and RS-232 Interface. **TRANSMITTER: RF Power Output:** SSB = 100 watts PEP minimum, CW & RTTY = 100 watts minimum. **Load Impedance:** 50 ohms. **VSWR:** Stable at any VSWR and load impedance. Cutback circuitry guarantees at least 80% of rated power at any VSWR less than 2:1 and a minimum of 15 watts at any VSWR. **Carrier Suppression:** 50 dB down from a 100 watt, single-tone (1000 Hz) output. **Harmonic Radiation:** 50 dB down below 50 MHz, 65 dB down above 50 MHz. **Spurious Radiation:** 50 dB down, except at 17 meters (40 dB down). **Third Order Distortion:** 30 dB down from a 100 watt PEP, two-tone output. **Unwanted Sideband Suppression:** 55 dB down from 100 watt, single-tone (1000 Hz) output. **T/R Operation:** SSB = PTT or VOX, CW = semi break-in. **CW Sidetone:** 750 Hz tone, adjustable level. **Microphone Input:** High impedance (25K ohm) with 55 dBm rating. **RECEIVER: Sensitivity:** 0.3 μV for 10 dB (S + N)/N SSB on the 40 through 10 meter bands, 0.5 μV on the 160 and 80 meter bands. **Selectivity:** 2.1 kHz at 6 dB down, 5 kHz at 60 dB down. CW filters, CWM = 400 Hz at 6 dB down and 1.5 kHz at 60 dB down. CWN = 200 Hz at 6 dB down and 1 kHz at 60 dB down. **Overall Gain:** Less than 1 microvolt for a 0.25 watt audio output. **Audio Output:** 1.5 watts into 4 ohms at less than 10% THD. **AGC:** Fast-attack with switch selectable Off, Fast and Slow decay. **Intermodulation Distortion (20 kHz spacing):** 70 dB. **Internally Generated Spurious Signals:** All below 1 μV equivalent. **RIT:** ± 250 Hz. **Dimensions:** 6⅛" H x 14" W x 13¾" D (15.6 x 35.6 x 34.9 cm).

PS-9000 SPECIFICATIONS – GENERAL: Output Voltage: 13.8 VDC, regulated (adjustable). **Maximum Output Current:** 25 amperes intermittent (50%, 10 minutes on-off) and 15 amperes continuous. **Power Requirements:** 110 to 130 VAC at 6 amperes or 220 to 260 VAC at 3 amperes, 50/60 Hz. **Regulation:** Less than 4% from no load to 25 amperes. **Ripple:** Less than 2% at 25 amperes. **Circuit Breaker:** 20 amperes for 110 to 130 VAC primary, 10 amperes for 220 to 260 VAC primary. **Current Limiting:** Overcurrent protected (set typically for 28 amperes). **Thermal Protection:** Automatic shutdown with overtemperature on the heat sink. **DUAL CLOCK: Display:** Two independent readouts with four digits and a colon. **Clock Format:** 12- or 24-hour display. **Accuracy:** Determined by the line frequency (no cumulative error). **Power Requirements:** 120 or 240 VAC, 50 or 60 Hz., 3.5 watts. **Cabinet Dimensions:** 6⅛" H x 9⅝" W x 13¾" D (15.6 x 24.4 x 34.9 cm). **Weight:** 33 lbs. (15 kg). Specifications apply when the Power Supply is used with the SS-9000.

VISA MasterCard **Discover the fun of kitbuilding at your Heath/Zenith Computers & Electronics Center.**

NEW

1 Monitor your own and other signals

HW-5400 SPECIFICATIONS – GENERAL: Overall Band Coverage: 80 through 10 meters, 10 MHz WWV; WARC bands operational. **Frequency Coverage:** 3.450 – 4.050, 6.950 – 7.350, 10.000 – 10.200, 13.950 – 14.400, 18.018 – 18.218, 20.950 – 21.500, 24.840 – 25.040, 28.000 – 29.750 MHz. **Frequency Readout:** 7-digit vacuum fluorescent display with special symbols. **Readout Symbols:** – (Split), – (Out of band), L (LSB), U (USB), C (CW Wide), C (CW Narrow), M (Memory), ¯ (Transmit). **Readout Accuracy:** To nearest 50 Hz. **Frequency Control:** Synthesized. **Synthesized Lock Indicators:** Display reads 'PLL' and LEDS show which loops are unlocked. Transmitter is disabled. **Dual Rate Frequency Tuning:** Slow = 50 Hz per step, 1.25 kHz per knob rotation. Fast = 1 kHz per step, 25 kHz per knob rotation. **Tuning Backlash:** None. **Split Frequency Operation:** Transmit from memory frequency, receive from displayed frequency. **Memory:** Stores two frequencies per band. **Frequency Stability:** Less than 50 PPM drift from turn on. **Modes:** SSB Normal and Reverse; CW, Wide or Narrow. **Operating Temperature:** 0° to 40°C. **Power Requirements:** 11 to 16 VDC, 120/240 VAC with optional AC power supply. All specifications referenced to 13.8 VDC. **RECEIVER: Sensitivity:** Less than 0.35 μV for 10 dB S + N/N. **Selectivity:** With standard filter, 2.0 kHz minimum at 6 dB to 6 kHz maximum at 60 dB; with HWA-5400-2 optional filter, 1.8 kHz minimum at 6 dB; CW active audio filter, 250 Hz minimum at 6 dB centered at 700 Hz. **Overall Gain:** Less than 1 μV for 0.25 watt audio output. **Audio Output:** 2 watts minimum into 4 ohms; less than 10% THD. **AGC:** Selectable Fast or Slow (no more than 8 dB audio change for a 100 dB or greater input signal range). **Intermodulation Distortion:** 70 dB minimum at 25 kHz. **Image Rejection:** 80 dB minimum. **IF Rejection:** 100 dB minimum. **IF Shift Tuning:** ± 600 Hz in Receive only. **Internally Generated Spurious Noise:** All below 1.0 μV. **Audio Hum and Noise:** Greater than 40 dB below maximum output. **Receiver Incremental Tuning:** ± 350 Hz. **TRANSMITTER: RF Output:** High SSB, 100 watts PEP power minimum, except 80 watts on 10 meters. CW, 100 watts minimum, except 80 watts on 10 meters. **Duty Cycle:** Continuous SSB (voice). 50% receive-transmit ratio on CW; 5 min. on, 5 min. off. **Load Impedance:** At least 90% rated power with less than 2:1 SWR. Protected against high VSWR. **Carrier Suppression:** – 50 dB minimum from a 100 watt, single-tone (1000 Hz). **Unwanted Sideband Suppression:** – 50 dB minimum from a 100-watt, single-tone (1000 Hz). **Spurious Radiation:** – 60 dB minimum, referenced to 100-watt output. **Third Order Distortion:** – 30 dB minimum from a 100 watt PEP two-tone output. **T/R Operation:** SSB = PTT or VOX, CW = full break-in (simplex only). **CW Sidetone:** 700 Hz to speaker or headphones. **Microphone Input:** High impedance (25k ohm) with – 55 dBm rating. **Operation with External Linear Amplifier:** Linear relay, linear ALC rear panel connections. **Front Panel Meter:** Automatically-switched S-units in Receive, ALC in Transmit. **Cabinet Dimensions:** 4¼" H x 11¼" W x 14" D (10.8 x 28.6 x 35.6 cm). **Weight:** 24 lbs. (10.9 kg).

HWA-5400-1 SPECIFICATIONS: Line Voltage: 120/240 VAC, 50/60 Hz. **Output Voltage:** 13.8 VDC at rated load. **Protection:** 20-ampere DC output fuse. 7- and 4-ampere slow blow fuses for 120 and 240 VAC primaries, respectively. **Output Current:** As required by Transceiver, up to 18 (20 peak) amperes during transmit. **DC Output Regulation:** 7% from receiver load to transmit load at 120 VAC primary; 4% additional with AC primary at 110-130 or 220-260 VAC. **Ripple:** 50 mV or less at rated load. **Duty Cycle:** 9 amperes DC continuous, 18 amperes at 50% (5 min. on, 5 off). **Speaker:** 4 ohms impedance, 300-3000 Hz response, 2 watts peak power. **Clock:** 4-digit blue fluorescent display in 12 or 24 hour format, synchronized to line frequency. **Cabinet Dimensions:** 4¼" H x 8½" W x 14" D (10.8 x 21.6 x 35.6 cm).

4 Heath's HW-99 Novice CW Transceiver is the ideal radio for the new Amateur Radio operator

NEW

- **Broadband circuits cover first 250 kHz of the 80, 40, 15 and 10 meter bands with RF power output greater than 45 watts**

Get off to a good start with the HW-99. Power, quality features and affordability make this durable transceiver an unusually good investment.

To give you the best possible novice CW transceiver we have combined many of the features found on the HW-9 Deluxe QRP CW Transceiver with plenty of power for easy contacts. Broadband design ends the need to tune circuits within a band. A doubly balanced mixer handles a wide dynamic range of signals with ease and eliminates the usual RF amplifier. AGC circuits provide superior performance.

Use of single frequency conversion in the main signal path reduces spurious responses and maintains superior image rejection. The HW-9 also has a balanced product detector, active-audio filter and a VSWR-protected power amplifier. A front panel bar display indicates relative signal strength in receive and relative power in transmit. The solid-state, compact HW-99 has a built-in AC power supply and operates on 120 VAC at 60 Hz.

Kit HW-99, Shpg. wt. 20 lbs. **299.95**

5 **SP-99 Station Speaker** is a 3" communications receiver speaker housed in an attractive cabinet designed to match the HW-9 and HW-99.

Kit SP-99, Shpg. wt. 3 lbs. **29.95**

HW-99 SPECIFICATIONS: TRANSMITTER: RF output power: 50 watts, except 40 watts on 10 meters. **Transmitter Frequency Offset:** App. 700 Hz. **Antenna Load Impedance:** 50 ohms unbalanced nominal. **Harmonic and Spurious Radiation:** – 40 dB minimum at rated output. **T/R Operation:** CW, full break-in to 30 WPM. **RECEIVER: Sensitivity:** less than 1.0 μV for 10 dB S + N/N. **Selectivity:** App. 450 Hz at 6 dB. **Dynamic Range:** 70 dB. **Image and IF Rejection:** 50 dB minimum. **Audio Hum Noise:** – 40 dB. **Audio Output:** 1 watt into 8-ohm load. **GENERAL: Frequency Stability:** Less than 200 Hz/hr drift after 30-minute warmup. **Power Requirement:** 120 VAC at 60 Hz. **Dimensions:** 11½" W x 10¾" D x 4⅝" H.

Special Offer for Novices

Get a $100 gift certificate good on any Heathkit product when you mail Heath Co. a photocopy of your license and the HW-99 registration card.

1 Be part of exciting new packet radio communication with Heath's HD-4040 Terminal Node Controller

NEW

We bring you the Heathkit version of the Tucson Amateur Packet Radio (TAPR) node controller, representing the newest frontier of Amateur Radio: terminal control and packet transmission. The HD-4040 opens your station up to error-free, high speed communication with almost no interference from others on the channel. And greatly increases your range by allowing relay of transmissions through up to eight intermediate stations. You get the best in packet radio equipment with the Heath TNC, which features a digipeater, automatic beacon and more. You also get the only RFI approved, FCC certified terminal node controller available.

The Heath TNC combines computer technology with Amateur Radio to open up the world of packet radio with its countless applications. Converse with a friend by satellite link, remotely program computers or receive computer programs over the air, and do it all quickly and without errors. The HD-4040 and packet radio make it all possible. Simply hook-up the TNC and a terminal or a computer with terminal emulation software to your existing transceiver.

Error-free communication even under adverse band conditions, is yours with the HD-4040. This packet radio interface provides terminal control of your existing equipment and allows data to be sent and received as packets of digital information. This not only greatly speeds the transfer of data but insures error-free transfer. Each burst of information, or packet, is automatically checked by the HD-4040 and will not be accepted until it is correctly received. When sending, the TNC repeats the transmission until it is acknowledged as correctly received. All this is done automatically by the HD-4040, you just type in your messages with the keyboard. The TNC acts as a teletypewriter so all communication is printed on your monitor. The HD-4040 and packet radio free you to concentrate on communicating, instead of worrying about QRM or missing information.

Most packet radio operates at 1200 baud and can run much faster. Since packet radio operates in bursts many users can operate on the same frequency at the same time. And you can use the same frequency for both calling and working channels. Packet radio also helps eliminate channel interference and preserves spectrum. The HD-4040 automatically monitors the channel and relays information only when the channel is open. You notice only a slight delay on heavily loaded channels. Three modes of operation: A conversation mode lets you converse with another operator; a command mode configures the TNC and allows use of a variety of operating commands; a transparent mode is used in computer file transfer. The HD-4040 uses AX.25 and VADCG protocols.

Automatic beacon and digital repeater add unique capabilities to Amateur Radio. The automatic beacon transmits your call letters and a message at the time intervals you set. The automatic digital repeater lets you relay transmissions from one operator to another – greatly extending the range of your equipment by relaying through up to eight intermediate stations. As long as power is supplied to the TNC it will act as a beacon and digital repeater – even if you are conversing with another operator or have turned off your computer or terminal. The TNC can store up to 2K of activity in memory, so you can receive messages while not at your station. You can also set the TNC to recognize only the calls you wish to receive.

A 6809 processor, a 32K ROM and 8K RAM are featured. The RAM or ROM can be expanded by adding up to 16K. Operating commands are stored in a two-band non-volatile RAM which does not require battery backup.

A built-in modem interfaces the TNC to your transceiver. This modem is capable of baud rates up to 1200 and filters input prior to demodulation. Filter constants are hardware selectable. Plug in an external modem and achieve baud rates up to 19,600 (with selectable clock) on UHF. Baud rate for either internal or external modem is adjustable through the keyboard. A header kit for 1200 baud operation is included. Ports include serial port for RS-232C terminal or computer interface for baud rates from 50 to 4,800 (optionally to 19,200), and parallel port for TNC status, command channel and diagnostic signal.

FALL SUPER $AVER
$50 OFF! Buy both the HD-4040 and any listed ICOM transceiver, then subtract $50 from the total.

You need no computer or programming knowledge to use the HD-4040. The TNC does all the computer work for you, freeing you to run your station. All you need is the HD-4040, a terminal (p. 87) or computer with terminal emulation software (p. 76-103) and an RS-232C cable. Technician or above licensing required.

Kit HD-4040, 7 lbs. **299.95**

HD-4040 SPECIFICATIONS: Processor: 6809. **Clocks:** 7.3728 MHz crystal oscillator for UART, switched capacitor filter, and E & Q systems. **Memory:** ROM, 32K (expandable to 48K), RAM, 8K (expandable to 24K). **Serial Port:** RS-232C interface to terminal or computer. Baud rates 50 to 1200 (optional to 4800). **Parallel Port:** Controller status and command channel and diagnostic signal port. **Non-volatile RAM:** 128 4-bit locations. **Protocols:** AX.25, VADCG. **Power:** 120V, 15 watts. **Dimensions:** 13⅝" x 7¾" D x 2⅜" H.

Compact transceivers are loaded with features

These ICOM transceivers pack a lot of power and are well-suited for use with the HD-4040 Terminal Node Controller. Take the mobile and handheld units anyplace, and use them with the TNC to access the world of packet radio.

2 140 MHz 2-meter Handheld Transceiver

- **ICOM IC-02AT covers 144 to 147.995 MHz frequencies**

The HWP-6402 features 10 memories, 32 PL tones and autopatch capability. Plus band or memory scan and priority channel, LCD S/RF meter, night display light and selectable repeater offsets. Produces 3.0 or .5 watts output. Includes nickel-cadmium battery pack, flexible antenna, AC wall charger and ear plug.

HWP-6402, Assembled, Shpg. wt. 3 lbs. **319.95**

144, 220 and 440 MHz ICOM Mobile Transceivers

These 25-watt mobiles are the smallest available. And they are completely self-contained with an internal speaker. Features include microphone with DTMF Keypad with up/down scan and memory scan, and internally adjustable transmit power. 32 PL frequencies may be selected by turning the main tuning knob. These frequencies may be stored into memory with other memory channel information for easy access. The nine memories store the receive frequency, transmit offset, offset direction and PL tone and are backed up with a lithium battery. Channel numbers appear on the display which correspond to PL tones actually being generated. Four scanning systems: memory scan, band scan, program scan and priority scan are featured with adjustable scanning speed. Measures only 5½" W x 1½" H x 7" to 9" D and comes with mount.

3 144 MHz ICOM IC-27A Mobile Transceiver

HWP-6420, Assembled, Shpg. wt. 6 lbs. **344.95**

4 220 MHz ICOM IC-37A Mobile Transceiver

HWP-6422, Assembled, Shpg. wt. 6 lbs. **379.95**

5 440 MHz ICOM IC-47A Mobile Transceiver

HWP-6450, Assembled, Shpg. wt. 6 lbs. **439.95**

6 SW-7800 Shortwave Synthesized Receiver

$349.95

- **Five-digit LED display provides 1 kHz frequency accuracy**
- **Lower Sideband, Upper Sideband, CW and AM (wide and narrow) modes of operation**
- **Excellent sensitivity and selectivity for clean signals**

The SW-7800 covers 150 kHz through 30 MHz continuously in 30 over-lapping, 1 MHz bands. Broadband front-end circuits eliminate the need to tune circuits within a band. The design of the wide-band front-end stages eliminates the need for the customary RF amplifier. This results in a receiver that can properly handle incoming signals within a wide dynamic range. An up-converting, double-conversion mixing design provides excellent image rejection.

Plus other features you'll appreciate: AGC time-constant switch. Muting provision to allow operation with a transmitter. Local/DX switch to protect against overload from very strong local stations. Front panel jack for taping received material – unaffected by volume control setting. Telescoping whip antenna for local reception and portable operation. Mobile operation is possible using any 11 to 15 volt DC source at ¾ amp. Only a VTVM is required for receiver alignment.

Kit SW-7800, Shpg. wt. 12 lbs. **349.95**

High-performance trapped dipole antenna for use with any general coverage or shortwave receiver. Eight high-Q parallel-tuned traps reduce length and isolate various segments of the antenna for full coverage of the 11, 13, 16, 19, 25, 31, 41, 49 and 60 meter bands.

HDP-7800, Shpg. wt. 3 lbs. **59.95**

SW-7800 SPECIFICATIONS: GENERAL: Frequency Coverage: 150 kHz to 30 MHz in thirty 1 MHz ranges. **Readout Accuracy:** Nearest 1 kHz. **Frequency Control:** Synthesized (PLL and LC VFO). **Modes:** USB, LSB, CW and AM (wide or narrow). **Sensitivity:** SSB/CW, less than 0.35 μV for 10 dB (S + N)/N; AM, less than 2.5 μV for 10 dB (S + N)/N. **Selectivity:** SSB/CW, 2.5 kHz min. at 6 dB; AM, 5.5 kHz min. at 6 dB. **Selectivity Shape Factor:** 1.5 at 6/50 dB. **Image Rejection:** 55 dB min. **OTHER: Antenna:** Built-in telescoping whip. Connection for 50 ohm, unbalanced, external antenna (SO239) and high-impedance wire. **Audio Output:** Internal speaker, jack for headphone or external speaker. **Muting:** External jack for use with transmitter. **Recorder Output:** Miniature phone jack. **Power Requirements:** 120 VAC, internally; 13.8 VDC at ¾-ampere, externally. **Dimensions:** 11½" W x 10½" D x 4⅝" H.

Credit Card Orders Call TOLL-FREE: 800-253-0570. Alaska and Michigan Residents Call: 616-982-3411.

FALL SUPER $AVER! Save $50 when you purchase the HD-4040 with an ICOM transceiver

7 The HW-9 Deluxe QRP CW Transceiver gives you the performance of a more expensive model

Save $50.00

$199.95

- **Covers CW in 80, 40, 20 and 15 meter bands – expandable to 30, 17, 12 and 10 meter bands**
- **Front panel relative signal/power strength meter**
- **Continuously variable RF output, up to 4 watts**
- **Receiver Incremental Tuning for more versatility**

Superior design of the transmitter and receiver sections sets this transceiver apart from other low-priced transceivers. The HW-9's state-of-the-art performance will be appreciated by avid QRP operators, newcomers and old timers alike. Microelectronic circuits reduce transceiver weight, while providing a level of performance and features unexpected at this price. Among these features are: broadband design, wide dynamic range, AGC, single conversion, product detector, active audio filter and RIT.

Broadband design eliminates the need to tune circuits within a band. The wideband front-end uses a double balanced mixer and 4-pole crystal filter to handle wide dynamic range signals with ease. This eliminates the need for the customary RF amplifier in the receiver section. You also get superior performance through the use of AGC circuits.

A single conversion in the main signal path reduces annoying spurious responses and maintains high-quality image rejection. Signals are pulled through the sensitive front-end with ease.

A balanced product detector followed by an active audio filter provides excellent performance. RIT (receiver incremental tuning) permits you to tune the receiver 1 kHz above or below the transmit frequency.

Full break-in operation is permitted by solid-state transmit/receive switching. Other features of the HW-9 include continuously variable RF power output, and a front panel meter that indicates signal strength in receive and relative output in transmit.

Expand the transmission and reception capabilities from four to eight bands with the HWA-9 Accessory Band Pack. It allows the HW-9 to cover the 30, 17, and 12 meter WARC bands and the lower 250 kHz of the 10 meter band. This gives you full coverage on all the amateur bands from 80 through 10 meters.

Rugged and lightweight, the HW-9 is ideal for portable operation. The Transceiver can be powered from batteries, a lighter socket, solar photovoltaic array or by 120 VAC 50/60 Hz with the PSA-9 Power Supply below.

Kit HW-9, Shpg. wt. 8 lbs. ..... **Was $249.95 NOW ONLY 199.95**

Kit HWA-9, Accessory Band Pack, Shpg. wt. 1 lb. ..... **NOW 29.95**

Kit PSA-9, Accessory Power Supply, Shpg. wt. 4 lbs. ..... **NOW 19.95**

HW-9 SPECIFICATIONS: TRANSMITTER: RF Output Power: 4 watts, except 3 watts on 10 meters. **Transmitter Frequency Offset:** App. 700 Hz. **Antenna Load Impedance:** At least 90% of rated power with less than 2:1 SWR. Protected against high SWR. **Harmonic & Spurious Radiation:** – 35 dB & – 40 dB minimum, at rated output. **T/R Operation:** CW, full break-in. **RECEIVER: Sensitivity:** 0.2 μV for readable signal; 0.5 μV or less for 10 dB S + N/N. **Selectivity:** Wide, 1 kHz max. @ 6 dB; Narrow, 250 Hz @ 6 dB. **Dynamic Range:** 85 dB. **Image & IF Rejection:** 60 dB, min. **Audio Hum Noise:** – 60 dB. **Audio Output:** 1 watt into 8Ω. **GENERAL: Frequency Stability:** Less than 150 Hz/hour drift after 30-minute warmup. **Power Requirement:** 11-16 VDC, 12.6 specified. **Dimensions:** 4¼" H x 9¼" W x 8½" D.

Matching Wattmeter and Antenna Tuner

8 HF/VHF Wattmeter with 3:1 SWR bridge

- **Wire for three different frequency ranges**
- **Two power ranges, 0-5 and 0-50 watts**

Put your best QRP signal on the air with confidence and keep your low-watt station at peak power efficiency with the responsive HM-9 Wattmeter. It simplifies continuous metering of exciter or amplified output level and gives you a quick, exact SWR readout to fine-tune your antenna system.

An exclusive Heathkit option lets you wire the HM-9 for monitoring in three different ranges: 1.8-30, 50-54 or 144-148, MHz. QRP *fans will love it.* Active hams on the 2- and 6-meter VHF bands can use it to measure output of their barefoot and boosted HTs, mobile or base transceivers.

Kit HM-9, Shpg. wt. 3 lbs. ..... **Was $49.95 NOW ONLY 39.95**

9 50-Watt Antenna Tuner with 4:1 balun

- **100% transmatch to a wide range of output impedance and almost unlimited matching capability between 1.8 and 30 MHz**

The HFT-9 provides an exact, 100% transmatch to a wide range of output impedances, with a built-in 4:1 ferrite balun. Connectors for coaxial feed, balanced line and long-wire antennas. A large 12-tap, air-wound inductor with silver-plated wire and tap switch gives you an almost unlimited matching capability between 1.8 and 30 MHz. Continuously variable transmitter/antenna controls make optimum adjustments easy.

Kit HFT-9, Shpg. wt. 3 lbs. ..... **ONLY 49.95**

$AVER! **Save by buying a system.** The matching wattmeter and antenna tuner system work together to improve your power efficiency, QRP signal and transmatch.

Kit QRS-9, HM–9 HF/VHF Wattmeter and the HFT-9 50-watt Antenna Tuner, Shpg. wt. 14 lbs. ..... **ONLY 84.95**

Reliable economical accessories to give improved station performance

1 Innovative Phone Patch utilizes new design

NEW

Only **$49.95**

- **New design and circuitry eliminate hybrid transformers**
- **FCC approved and registered phone patch**
- **Filtering provides high degree of electrical isolation**

New design and special integrated active speech and transmission circuits make this Phone Patch a breakthrough in transferring audio signals between a telephone line and two-way radio equipment.

Runs on phone line voltage, with battery assistance in very low voltage conditions (battery not included). Ideal for voice-operated installations, the Phone Patch provides a high degree of electrical isolation from your radio equipment. And you can monitor your transmissions on the phone line. A built-in detector circuit allows adjustment with a VTVM or VOM for optimum separation between transmit and receive. The HD-1515 is an easy one-evening kit.

Kit HD-1515, Shpg. wt. 2 lbs. **49.95**

2 New Heathkit HD-1481 Remote Coax Switch

$89.95

- **No need to run a control line – the HD-1418 sends signals on your existing coax feed**

Conveniently control the switching of antennas from inside your station with the HD-1481 Remote Coax Switch. Two units, a remote and indoor control unit, interconnect through a single coaxial cable to eliminate the need for any multiconductor control cable. The remote unit, a tower- or mast-mounted RF remote coaxial switch, needs only one feedline to operate up to four antennas. It is rain tight and easily mounts with a single clamp.

The control unit contains the power supply and provides the switching signals to the remote. A front-panel switch selects the desired antenna. The HD-1481 can handle 2000 watts PEP and has a VSWR of 1.15:1 or less. It has an impedance of 50 to 70 ohms and has a loss at 54 MHz of less than 0.2 dB. The control unit operates from 120 VAC at 50/60 Hz and measures 2⅝" H x 5½" W x 7½" D. The remote measures 7⅜" H x 8⅜" W x 4½" D.

Kit HD-1481, Shpg. wt. 5 lbs. **89.95**

3 Dual HF Wattmeter measures up to 2000W PEP

$99.95

- **Reads PEP or average power from 1.8 to 30 MHz**
- **Has factory assembled and calibrated sensor**
- **An enjoyable and easy-to-build two-evening kit**

Installed in your transmission line, the HM-2140A monitors both forward and reflected power simultaneously. A second scale on the reflected meter reads SWR directly from 1:1 to 3:1 for fast easy measurement of your outgoing signal.

Measure your transmitter's output up to 200/2000 watts PEP (±5%) in the forward direction and up to 50/500 watts reflected. Pushbutton-switched high and low power ranges plus a factory-tested sensor ensure precise readings every time. Another dual-position switch enables you to read PEP or Average power.

The HM-2140A can be operated on a 9-volt battery (not included) or use 120 VAC with the PS-2350 Battery eliminator. A special switching circuit permits you to observe the battery condition at any time. The precision RF sensor can be mounted in the cabinet or used up to four feet away.

Kit HM-2140A, Shpg. wt. 5 lbs. **99.95**

PS-2350 120 VAC Battery Eliminator, Shpg. wt. 1 lb. **7.95**

4 Low-cost quieting Mura 8-ohm headphones

Make copying traffic a lot easier with the Mura SP-104 Headphones featuring a wide 40 to 15,000 Hz frequency range 2¼" dynamic speakers for clear comprehension, individual volume controls, and isolating ear cups. Headphones have 10-foot coiled cord with plug.

HDP-1396, Assembled, Shpg. wt. 2 lbs. **14.95**

5 Lightweight ProCom 300 headset frees hands

High-quality performance in a featherweight headset with exceptional audio performance. Receiver has a 100 to 3500 Hz frequency response while the microphone has a frequency response of 100 to 8000 Hz. Includes ON/OFF VOX. Aviation-style, single-side eartip receiver is ideal for listening to environmental sounds while monitoring the radio.

HDP-1497, Assembled, Shpg. wt. 1 lb. **99.95**

6 Low-noise professional ProCom 200 headset

Fully adjustable Telex headset for the amateur and professional offers almost hands-free operation. Boom-mounted, pivotal electret microphone has selectable high or low impedance. Both receiver and microphone have a frequency response of 100 to 8000 Hz. Phone cord has in-line ON/OFF VOX control.

HDP-1496, Assembled, Shpg. wt. 2 lbs. **99.95**

7 Highly accurate Dip Meter covers 1.6 to 250 MHz

$79.95

- **Injection and absorption modes let you measure energized and de-energized circuits, also acts as signal injector**

The multi-purpose HD-1250 has dozens of practical uses in your lab and hamshack. It can aid in finding the approximate resonant and operating frequency of either energized or de-energized circuits and help you adjust traps, detect parasitic oscillations and harmonics, measure unknown Q/L/C values, locate sources and frequencies of RF energy, or functions as a signal generator, relative field strength meter, or receiver alignment tool.

For a delicate instrument of this type, only exceptional-grade components are used. In the balanced Colpitts RF oscillator, silver mica coupling capacitors provide improved frequency stability. The detector uses a broadband MOSFET amplifier, hot-carrier diodes and a Q-multiplier for improved sensitivity and a better dip action. A responsive 150 μA meter movement yields sharper resonance indications. Includes a headphone jack for positive modulation monitoring. Operates on one 9-volt battery (not included) and goes anywhere you do.

Kit HD-1250, Shpg. wt. 4 lbs. **79.95**

HD-1250 SPECIFICATIONS: Frequency Range: 1.6 to 250 MHz. **Controls:** Tuning capacitor, oscillator level control, and ON/OFF switch. **Meter Movement:** 150 microamperes. **Solid-State Circuits:** 1 NPN transistor oscillator, 1 dual-gate MOSFET amplifier and two diffused silicon hot carrier diode detectors. **Power Source:** 9-volt NEDA type 1604 battery. **Net Weight:** (Meter, case and coils) 2 lbs. **Dimensions:** 2" H x 2¼" W x 5⅞" D.

8 CONTROLLED MAGNETIC Fixed Station Microphone

- **High-output, durable, totally reliable CONTROLLED MAGNETIC cartridge**

Heath's model HDP-444 Microphone was designed by Shure with amateur radio features. It has dual selectable output impedance and a frequency response tailored for speech intelligibility. A slide switch permits selection of high or low impedance. A second slide switch permits choosing between Normal and VOX operation. The push-to-talk switch bar allows for momentary or locked operation. A three-conductor plus shielded cable easily connects to any ham rig.

HDP-444, Assembled, Shpg. wt. 3 lbs. **59.95**

9 End your TVI problems with this low-pass filter

Solve emissive RF interference problems with this fine low-pass Barker & Williamson filter designed for use in the 160 to 10 meter frequency range. It provides a minimum of 70 dB of attenuation. Cut-off frequency is 34 MHz and has less than a 0.3 dB insertion loss. It has a 50 ohm impedance and rated for legal power.

HDP-3700, Assembled, Shpg. wt. 2 lbs. **34.95**

10 Twelve-socket power Outlet Strip has many uses

Handy HD-1274 Outlet Strip multiplies convenience by providing extra electrical outlets for your equipment in a hamshack, workshop, office, basement or garage. It has eleven fused 3-hole outlets that can be switched on and off. It also has one unswitched outlet that can be used for a clock or equipment equipped with memory saver circuits. The Outlet Strip is rated at a 10-amp maximum load and has a 12-foot cord. The HD-1274 is an excellent way to extend 120 VAC to a large group of equipment in one location.

Kit HD-1274, Shpg. wt. 4 lbs. **24.95**

11 Smart Outlet Box for Amateur Radio systems

- **Turns on power to ten other sockets, protects from line surges**

Power to ten other sockets is switched on when a device plugged into the control socket is turned on. Maximum control power is 250 watts at 2A; and 1200 watts at 10A for all other outlets. Twelfth outlet is unswitched for constant AC devices. Protects units from line surges and transient spikes. See page 95 for further details. *Buy now and get double Master Builder points.*

Kit GD-1295, Shpg. wt. 4 lbs. ..... **This catalog only 44.95**

Credit Card Orders Call TOLL-FREE: 800-253-0570. Alaska and Michigan Residents Call: 616-982-3411.

12 Coaxial Switch for routing up to 4 antennas

Sends RF source/receiver to 1 of 4 antennas or RF loads. Grounds extra connectors. Power handling capability of 1000 watts (2 kW PEP).

HD-1234, Shpg. wt. 1 lb. **19.95**

13 Heath 'Cantenna' load resistor dissipates RF

Handles 1 Kw of RF with VSWR's less than 1.5:1 for frequencies up to 450 MHz.

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

14 Specially designed short wave listening antenna

Heavy 14-gauge antenna covers 60-49-41-31-25-19-13-11 meters. Under 43 ft.

HDP-7800, Shpg. wt. 3 lbs. **59.95**

15 80 to 10 meter Cushcraft AV5 has long DX reach

Vertically polarized 25 ft. high omni-directional antenna provides complete CW and SSB coverage on 80-40-20-15-10 meters. Handles 2000 watts PEP.

HDP-1473, Shpg. wt. 10 lbs. **119.95**

16 Mobile Antenna for the 146 to 148 MHz range

Cushcraft 5/8-wave 2-meter mount with 90 lb. magnet, connector and coax.

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

17 Long-wire SWL Antenna for the serious listener

75 ft. antenna helps pull in distant stations. Copper line with 30' lead-in.

GRA-72, Shpg. wt. 2 lbs. **9.95**

1 *UltraPro* CW Keyboard sends letter-perfect code and offers the versatility of easy programming

$149.95

- **The most intelligent microprocessor-based CW keyboard, with more functions and user-flexibility than any other**
- **Four-level random practice mode allows 1000 different and repeatable, 3000-character training sessions with unique 'copy' mode to teach typewriter proficiency "hands on"**

The HD-8999 *UltraPro* CW Keyboard represents the long-awaited third generation of code computers. It contains a host of specialized prompting features and a simplified operating system that minimize key errors and increase the ease and accuracy of high-speed sending. Exclusive component-level diagnostic capability and two-key rollover (to keep up with proficient typists) make it the most advanced and first truly 'friendly' keyer. It uses a customized mcroprocessor and the latest in comfortable, 'human engineered' keyboard designs as a foundation for the most productive CW operating aid you can own. Status indicators, a non-volatile CMOS RAM (batteries included) and power-up diagnostics combine in what *73 Magazine* called "a compact gem of a keyboard."

Kit HD-8999, Shpg. wt. 7 lbs. **149.95**

HD-8999 SPECIFICATIONS: Key Nomenclature: 1 through 0 and A through Z in a standard QWERTY format. SET, WPM, PRAC/SPC'G, PROT/WT, PREV/SN, LOAD, STOP, TONE/CLICK, TUNE, DELETE WORD/DELETE, HOLD, SHIFT (two), AR, SK, BT, ES, KN, AS BK, DE and CQ. **Punctuation:** ?/"'-()!:; comma and period. **Speed Range:** 1-99 WPM. **Spacing:** less than or equal to speed. **Weighting:** Normal plus five 'light' and five 'heavy' settings. **Serial Number:** 1-9999, automatically generated. **Text Buffers:** 495 characters, total capacity. Individual buffers may be protected. **Keyer Output:** + 25 V @ 100 mA; 200 V @ 40 mA. **Memory Backup:** Three mini-cells (included) with typical 1 year life. **Sidetone:** 300-1500 Hz adjustable. **Indicators:** 4-digit display plus SET, MSG, LOAD, PRAC and type-ahead buffer status LEDS. **Operating Range:** 32-140 F (0-40 C). **Power Requirements:** 7.5 to 11 VAC or 11 to 16 VDC, 450 mA max. Input for PS-5012 120 VAC Adaptor (on page 33). **Dimensions:** 2⅞" H x 15½" W x 8" D.

2 Get in on the fun of the RTTY revolution with the HD-3030 RTTY Terminal Interface

$249.95

- **A "universal" terminal interface – works with most popular personal and home computers**
- **Built-in supply for noncomputer 20/60 mA TTY operation**

The features you need most for enjoyable copy: Weak or distorted signals are no problem. Six poles of active preselect filtering deliver strong, readable tones that print clearly, even in a crowded band. Optional filters for 425 and 850 Hz audio shifts enable even more performance. With separate RTTY and CW demodulator boards, 170 Hz standard shift, crystal-controlled AFSK generator, capability for full FSK with equipped transmitters, true mark/space detection, oscilloscope tuning outputs, front panel LED bargraph tuning, data and status indicators, the HD-3030 Terminal Interface has no equal in quality or function for the price. TTL and RS-232C I/O compatibility, plus a built-in loop supply make it a great buy and regardless of the rig or printer you prefer!

Kit HD-3030, Shpg. wt. 8 lbs. **249.95**

Universal 425/850 Hz Filter Circuit Board Accessory. Provides frequency shift of 425 or 850 Hz (builder's option). Plugs directly into HD-3030 motherboard.
Kit HDA-3030-2, Shpg. wt. 1 lb. **14.95**

170 Hz Preselector Filter Circuit Board Accessory. Dramatically improves performance of standard shift tones by removing strong adjacent channel signals.
Kit HDA-3030-4, Shpg. wt. 1 lb. **19.95**

HD-3030 SPECIFICATIONS: Displays: LEDs for Power, Send, RDA, Mark, Space. Ten-segment bargraph tuning indicator. **PUSHBUTTONS:** Power, Operate/Standby, Send/Receive, CW/RTTY, Send/Receive (Reverse Shift), Preselect/Bypass, and 170 Hz, 425 Hz, 850 Hz (independent and interlockable audio frequency shifts). **REAR PANEL:** Loop jack input (100 VDC @ 20 or 60 mA); 25-pin DB-25 I/O connector for TTL and RS-232 computers, terminals or printers; 120 VAC/340 W auxiliary power outlet; groundpost; line cord. **CW DEMODULATOR: Center Frequency:** 750 Hz. **– 3 dB Bandwidth:** 70 Hz. **– 20 dB Bandwidth:** 240 Hz. **Dimensions:** 3" H x 7½" W x 10" D (7.6 x 19 x 25.4 cm).

SUPER CW Software for Heath H-8 and H/Z-89 computers. Has auto CW-ID, user-configurable parameters, type-ahead buffer. Requires H-DOS 1.5 or above.
HOP-1010, Shpg. wt. 2 lbs. ..... **Was $49.95 NOW ONLY 29.95**

SUPER RTTY Software for Heath H-8 and H/Z-89 computers. ASCII/Baudot system uses full disk/graphics capabilities. Requires H-DOS 1.5 and 24K memory.
HDP-1020, Shpg. wt. 2 lbs. ..... **Was $49.95 NOW ONLY 29.95**

3 Heathkit's HD-3006 Crossfire Tuning Indicator

- **Quick and easy tuning of RTTY transmissions, without the need of an oscilloscope or costly equipment**

The Heathkit HD-3006 Crossfire is a visual tuning indicator for radioteletype (RTTY) communication. Sixteen LEDs make up the display. Eight vertical LEDs identify mark signal strength; eight horizontal LEDs do the same for space signal strength. Just tune your receiver for maximum vertical and horizontal display – you'll get a strong signal for your computer or printer.

The Crossfire has a wide voltage range and is compatible with almost any interface/terminal unit that has oscilloscope outputs for tuning. *Put your scope back on the workbench.*

Kit HD-3006, Shpg. wt. 3 lbs. ..... **Was $59.95 NOW ONLY 49.95**

HD-3006 SPECIFICATIONS: Display: Two 8-LED bars. Each bar requires approximately 14 dB no-signal-to-signal voltage ratio (5:1) for full use of the bars. **Input Level:** Threshold, 0.3 volts RMS on AC and 0.5 volts DC. Maximum, 15 volts RMS on AC and 15 volts DC. **Power Supply:** 8-16 volts AC/DC power cube (included with kit). **Dimensions:** 3¼" H x 5" W x 4" D.

Let Heath's Amateur Radio Courses put you on the air, at the level you want

4 Heathkit's Novice Course will get you on the air

$44.95

- **Communicate with nearly a million other hams all around the world...right from your own home or car...transmitting and receiving CW on a variety of frequencies**
- **Heath guarantees that you will pass the Novice FCC test – or we will refund the full purchase price of the course**

Join the expanding world of Amateur Radio. Where else do you have the opportunity to communicate one-on-one with such a diversity of people – this hobby spans all professions, in all countries. You'll probably get to know most of the hams in your area on a personal level, and you'll be able to participate in Novice field-day competitions, take part in Novice traffic nets to relay third-party messages and in case of an emergency you can provide a public service.

Long a leader in Amateur Radio technology, Heath has prepared a self-instruction program that's guaranteed to help you earn a Novice ticket. Everything you need to get your license and become a part of a privileged fraternity is in this comprehensive, well organized study package, including information on how you apply to take the latest FCC Novice exam. Also, it provides helpful guidelines for setting up and operating a good station when your license and personal call sign arrive.

The course is organized in nine separate learning modules corresponding to the subject areas you'll find covered in the Novice exam. Each subject is presented in a clear, step-by-step manner for upward progress at your personal learning rate.

At the end of each module, multiple-choice questions help you review and check your understanding and retention of the material. After Module 9, three practice exams and a final styled after the new FCC Novice examination impart the experience and test-taking confidence you want to pass the first time with flying colors.

The Course includes two audio cassette tapes full of important knowledge. The first is an introduction to Amateur Radio, an explanation of the RST signal reporting system, a review of electronic circuit components, and a study of practical circuits. The second tape will teach you the International Morse Code in letter groups quickly and effectively, and then help boost your send and copy speeds to 5 words per minute for the CW test.

ER-3701, Shpg. wt. 7 lbs. **44.95**
Kit HO-1416A, Code Oscillator (see below), Shpg. wt. 2 lbs. **19.95**

5 Build up your speed code with this handy kit

$19.95

- **Sturdy telegraph key with adjustable rebound, built-in speaker with volume and tone controls**

Use this CW Code Oscillator to get your code speed up and pass your FCC exam in a simple and inexpensive way. This handy Practice Oscillator features a telegraph key with adjustable rebound, built-in speaker, volume and tone controls, plus a headphone jack for private listening. And once you get your license, it can serve as a side tone oscillator for any transmitter using negative-grid block keying. 2⅝" H x 4⅛" W x 4⅜" D. Operates on 9V battery (not included).

Kit HO-1416A, Shpg. wt. 2 lbs. **19.95**

We'll help you get started in Amateur Radio

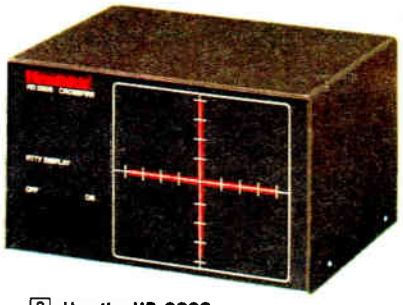
Save 23% by purchasing the ER-3701 Novice Course and HD-1416A CW Oscillator together. Includes 10% certificate good for up to $10 off Heathkit equipment.

$AVER! ERS-3701, Shpg. wt. 9 lbs. **49.90**

Discover the fun of kitbuilding at your Heath/Zenith Computers & Electronics Center!

1 This CW Keyboard lets you send letter-perfect code every time

2 The HD-3030 Terminal Interface will put you into RTTY inexpensively



3 Use the HD-3006 to fine-tune RTTY – put your scope back on the bench

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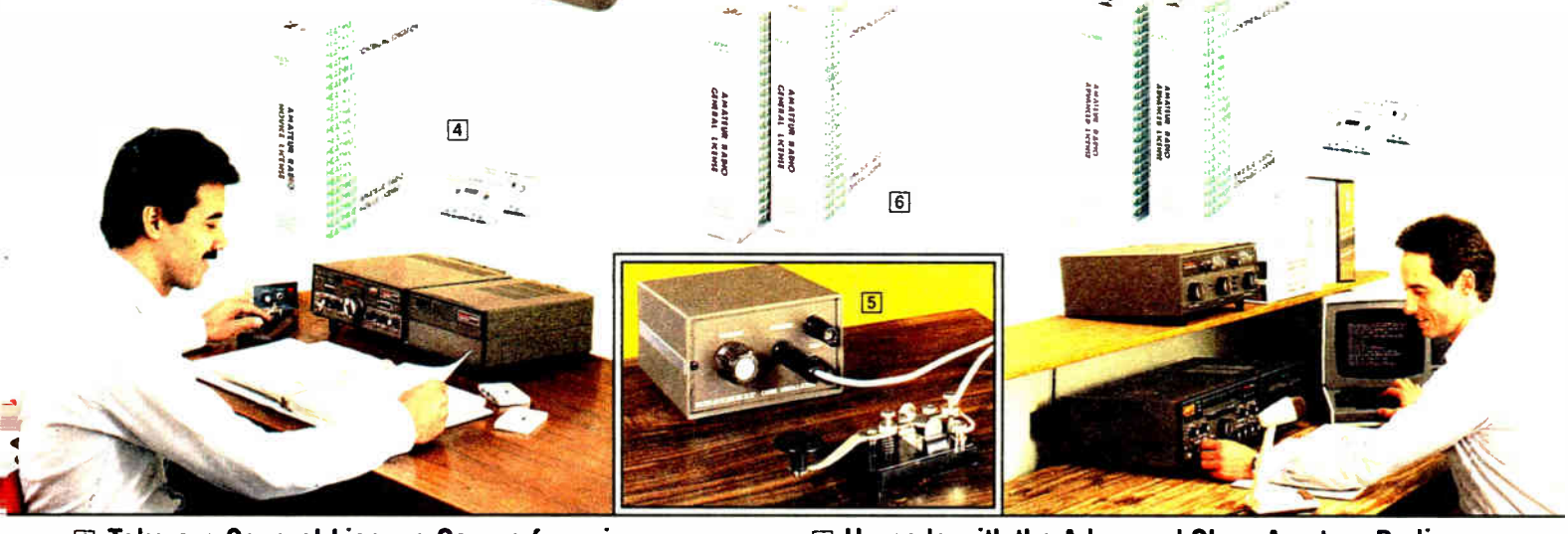

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6 Take our General License Course for voice communication and move up to the General Class

$64.95

- **Leave the CB or Novice bands behind and progress to the full range of Amateur Radio experiences. Send your words and images around the world**

Move up to the General Class and get all the added privileges – more frequencies to operate on, plus voice transmission, radio teletype, slow-scan TV, facsimile, satellite activity – an impressive list of incentives that add up to more QSOs, QSLs and thousands of new friends gained via these modes.

An informative text takes you through the subjects covered on the new FCC written test. Its in-depth coverage will give you a wealth of concentrated information – more than enough to pass either the Technician or General Class written examinations. Later, keep it handy as a valuable reference.

The Course provides extra code practice to bring your send and copy speeds up to 15 words per minute. Since the FCC requires only 13 wpm to pass the General exam, the extra 'two-word edge' gives you more confidence to pass the code test.

Four simulated FCC written tests give you test-taking experience, and allow you to review problem areas so you'll be better prepared for the actual exam. Once you pass your General exam, send us a copy of your new license or FCC notice of passing to receive 5.0 CEU's and a Certificate of Achievement.

We guarantee you'll pass the General Class exam – or we'll refund your money for the program materials when you return them with a copy of your FCC rejection notice. It's a claim exclusive to Heath.

ER-3702, Shpg. wt. 24 lbs. **64.95**

7 Upgrade with the Advanced Class Amateur Radio License Course to achieve Advanced Class status

$54.95

- **Well-organized to make the most efficient use of your time**
- **We guarantee you'll pass the FCC exam the first time – if you fail to pass the enclosed exam, we'll refund program cost**

Prepared with the General Class license holder in mind, ER-3703 is the first completely up-to-date compilation of the technical and examination material required to help you achieve Advanced Class status. It assumes you have a General license or have the equivalent skills and background knowledge.

Designed in the modular style proven most effective by educators, the Advanced License Course includes self-test reviews after each chapter to assure greater retention of the material. This format also makes it easy to identify problem areas *before* the FCC test. The self-instructional nature of the Course allows you to progress at your own pace and backtrack to review any subject.

Fully one-fifth of the 80-15 meter HF spectrum in four specific subbands (3750-3850, 7150-7225, 14150-14225 and 21200-21300 kHz) is allocated to the Advanced and Extra Class license holders. Why be left out? These are the choicest frequencies with more DX hot spots and experienced amateurs. Demonstrate your desire for self-improvement and upgrade your ticket with the Heathkit/Zenith Advanced Class License Course. Send us a copy of your new license or FCC notification of passing to receive 4.0 Continuing Education Units and a personalized Certificate of Achievement. Don't delay – start by ordering your guaranteed Course today!

ER-3703, Shpg. wt. 9 lbs. **54.95**

Versatile oscilloscopes for troubleshooting and a calibrator to maintain their performance

1 Triple Trace 60 MHz Oscilloscope available with optional autoranging digital display

FALL SUPER SAVER *cut $50*

A high-performance oscilloscope, the IO-4360 offers triple trace capability with a low input sensitivity up to 60 MHz. And with the optional IOA-4360 Time-Voltage Module, a powerful combination is brought together to increase your troubleshooting effectiveness and cut the time spent on alignments.

Multi-trace oscilloscope: Two channels use an attenuator network of 12 calibrated ranges from 2 millivolts/cm to 10 volts/cm. Accuracy of signal measurements in this range is within 3% using either AC or DC coupling. The third trace is available at the external input and can be viewed by pressing the IO-4360's front panel TRIPLE trace button. To add to it's versatility, the Channel 2 input of the IO-4360 Oscilloscope can be inverted and "added" to the input of Channel 1 for making differential measurements.

Extra wide DC to 60 MHz bandwidth: The high-performance IO-4360 Oscilloscope provides the bandwidth needed to view waveforms in both digital and analog circuits. Even though this multi-trace scope has a specified bandwidth of 60 MHz signals up to and beyond 90 MHz can be displayed on its 8 x 10 cm screen. Intensity, focus and astigmatism control trace brightness and sharpness.

Sweep control: Besides providing the sweep speeds to observe fast logic pulses, the IO-4360 also supplies a delayed sweep for fast and accurate timing measurements. Internal vertical delay lines ensure that the horizontal sweep starts at the beginning of the input signal. This permits you to view a complete vertical waveform. With a very fast 7 ns rise time, rapid rise-time signals are faithfully reproduced. Also providing sweep control is the calibrated time base. It ranges from 0.1 s/cm to 100 ns/cm in a 1-2-5 stepped sequence. And, any sweep speed can be expanded 10 times by simply pulling a switch. A delayed sweep allows you to view the leading edge of a waveform, as well as, select the exact portion of a signal for expansion by any factor you desire.

Complete trigger system: The IO-4360 can be triggered from either of the two vertical input channels, from the line voltage, or from an external trigger which is also the input for the third viewable trace. A filter network allows a choice of the AC, DDC, low or high frequency component of a signal to be used in triggering the scope. This filter network can also reject either the horizontal or vertical sync pulses of TV signals when using them to trigger video waveforms. Fine trigger adjusting is done with a precise level control. When a trigger signal isn't used, the baseline can be automatically displayed by using the scope's automatic mode.

Kit IO-4360, Shpg. wt. 41 lbs. . **Regularly $999.95 THIS CATALOG ONLY 949.95**

SAVER! Save $50.00 with a purchase of an IO-4360 and IOA-4200 Module.

IOS-4360, Shpg. wt. 53 lbs. **Separately $1299.90 THIS CATALOG ONLY 1249.90**

IO-4360 SPECIFICATIONS: Display Modes: Y1, Y2, Add (Y1 ± Y2), Dual trace, Triple trace, ALT/Chop. **Vertical: (Ch. Y1 and Y2) Deflection Factors:** 2 mV/cm to 10 V/cm, 12 steps in a 1-2-5 sequence; continuously variable to approx. 30 V/cm. **Accuracy:** Within 3%. **Bandwidth:** DC to 60 MHz (5 mV to 10 V/cm); DC to 50 MHz (2 mV/cm). **Rise Time:** 7 ns or less. **Delay Line:** Allows at least 20 ns of pretriggered waveform display. **Ch. Y3: Sensitivity:** 200 mV/cm or 2 V/cm. **Response:** DC to 25 MHz. **Rise Time:** <14 ns. **Accuracy:** Within 3%. **HORIZONTAL: Display Modes:** A, A int, B, and B. **Time Base Ranges:** 100 ms/cm to 0.1 μs/cm, 19 steps in 1-2-5 sequence, continuously variable to approx. 300 ms/cm. **Accuracy:** Within 3%. **Magnifier:** Times ten. **TRIGGERING: Source:** Y1, Y2, EXT, Line. **Coupling:** AC, DC, AC-HF, AC-LF, TV-V, TH-H. **Modes:** Automatic baseline, Normal, Single Sweep. **Hold Off:** Variable, including "B-ends-A" position. **GENERAL: Internal Calibrator Accuracy:** 1VP-P, within 2%. **CRT:** Mesh-expanded with 8 x 10 cm internal graticule. **Accelerating Potential:** 10 kV regulated. **External Z Axis:** Continuously adjustable. **Power Requirements:** 108-132 or 216-264 VAC, 50/60 Hz. **Dimensions:** 6" H x 11½" W x 18" D, with handle folded. Complete specifications are available by calling Heath Co. at 800-253-0570 or requesting ONLY the IO-4360 specifications on a catalog order form.

2 Optional Time-Voltage Accessory Module

- **Adds frequency counter and DC voltmeter capabilities to IO-4360**

Automatically analyze any waveform displayed on the IO-4360 Scope. Specifically designed for the Triple Trace Oscilloscope, the Time-Voltage Module displays time, frequency or ± DC voltages at whatever point the scope probe is placed. Just select the desired function on the module and press a button. The autoranging module then indicates the reading in a bright 3½ digit display.

Measure time intervals from 1.0 s to less than 20 ns and waveform frequencies from 1 Hz to 19.99 MHz. Read ± DC voltages from a low 0.1 mV to 199.9 V with an accuracy of 0.75%. Separate, isolated inputs enable the IOA-4200 to measure voltages up to a higher ± 1000 volts. Features automatic placement of the decimal point, plus time and frequency unit indicators.

Mark any portion of a waveform displayed on the IO-4360 Oscilloscope with variable scope reference and measurement cursors and easily obtain an instant readout of its period, frequency or pulse width. Just as easily, measure and display risetimes, burst or ringing frequencies, and the time difference between pulses.

Polarity and overrange indicators provide even more measuring convenience for the user of this low-profile accessory to the IO-4360 60 MHz Oscilloscope.

Kit IOA-4200, Shpg. wt. 7 lbs. **349.95**

IOA-4200 SPECIFICATIONS: TIME: Ranges: ±10 s to ±2.0 μs (1, 2, 5 fullscale sequence). **Basic Accuracy*:** ±2% of reading, ±1 count. **FREQ: Ranges:** ±1.0 Hz to ±0.5 MHz (1, 2, 5 fullscale sequence). **Maximum Display:** 19.99 Hz on 100 ms to 19.99 MHz on 0.2 μs. **Accuracy*:** ±3%, ±1 cm. **VDC (internal): Ranges:** ±2 V, 2V on 2 mV to 50 mV; 2 V, 20 V on 100 mV to 0.5 V; ±20 V, 200 V on 1 V to 10 V; autoranging. **Accuracy*:** ±1.0% (±0.75%); ±2 cnts. **EXT VDC: Ranges:** 2 V to 2000 V; autoranging. **Basic Accuracy:** ±0.5% (±0.25%), ±1 cnt. **GENERAL: Display:** 3½ digit, LED, automatic minus for negative, positive implied. **Dimensions:** 1½" H x 10¾" W x 9¾" D. *Accuracy specs are for built-in calibration. Numbers in ( ) are for laboratory standards calibration.

3 5 MHz Dual and Single Trace Oscilloscopes

- **Excellent 10 mV/cm input sensitivity with variable attenuation**
- **Triggered horizontal sweep stabilizes nearly all types of waveforms**
- **Special TV trigger coupling function allows easier TV signal triggering**

An outstanding value, the IO-4205 Dual Trace Oscilloscope is a welcome addition to the laboratory, service shop, or home work shop. It is a compact, versatile and easy-to-build test instrument that lets you study waveforms in many different types of electronic circuits. Its many features provide the accuracy and capability found only in higher-priced oscilloscopes.

The dual trace capability of the IO-4205 enables you to directly compare two signals, as well as, check phase and other timing functions. And the 10 mv/cm input sensitivity and DC to 5 MHz bandwidth of the IO-4205, allows you to use it in many fast, low-level waveform applications.

Seven calibrated time bases, from 200 ms/cm to 0.2 μs/cm, is another feature of this value-packed oscilloscope. In addition, each range is variable controlled for added accuracy and user convenience. With the IO-4205, you can even display X-Y signals by applying an external horizontal signal.

A stable triggering circuit, a feature found on more expensive scopes, brings the advantages of triggered sweep with automatic sync to the IO-4205. This scope also has a special TV setting in the triggering network which allows low frequencies to pass while rejecting high frequencies.

Other features include an 8 x 10 cm graticule and a bright CRT that allows the user to make quick and accurate waveform measurements without eye strain. A precise source of square waves like those provided by the IG-4505 (page 42) or the IG-4244 Calibrator (page 39) is needed to calibrate the IO-4205 Oscilloscope.

Kit IO-4205, Shpg. wt. 25 lbs. **349.95**

The IO-4105 Oscilloscope is an excellent, low-priced alternative to situations where only a single trace oscilloscope is needed. It has all the features and performance of the IO-4205 Dual Trace Oscilloscope with only one vertical input channel. Also requires IG-4505 or IG-4244 for calibration.

Kit IO-4105, Shpg. wt. 25 lbs. **279.95**

IO-4205/IO-4105 SPECIFICATIONS: Bandwidth: DC to 5 MHz, ±3 dB. **Sensitivity:** 10 millivolts/centimeter. **Attenuator:** 1-2-5 sequence, calibrated and variable. **Rise Time:** 70 nanoseconds. **Overshoot:** Less than or equal to 5 percent at 1 kilohertz. **Impedance:** 1 megohm, shunted by 38 picofarads. **SWEEP: Type:** Triggered. **Range:** 200 milliseconds to 0.2 microseconds in seven steps, plus variable. **Trigger Source:** Y1, Y2, External, Line. **Trigger Modes:** AC, DC or TV; plus or minus slope; automatic or normal. **HORIZONTAL: Sensitivity:** 0.1 volt/centimeter. **Bandwidth:** DC to 1 megahertz. **Impedance:** 1 megohm, shunted by 50 picofarads. **External Horizontal Input:** X1 and X10 attenuator, as well as variable. **GENERAL: CRT:** 5DEP31F, 8 x 10 centimeters viewing area, blue-green medium-persistance phosphor, 5-inch round flat-face tube. **Accelerating Potential:** Approximately 1.6 kilovolts. **Graticule:** Screened, 8 x 10 centimeters. **Power Requirements:** 120/240 VAC, 50/60 Hz. **Overall Dimensions:** 8" H x 13" W x 17" D.

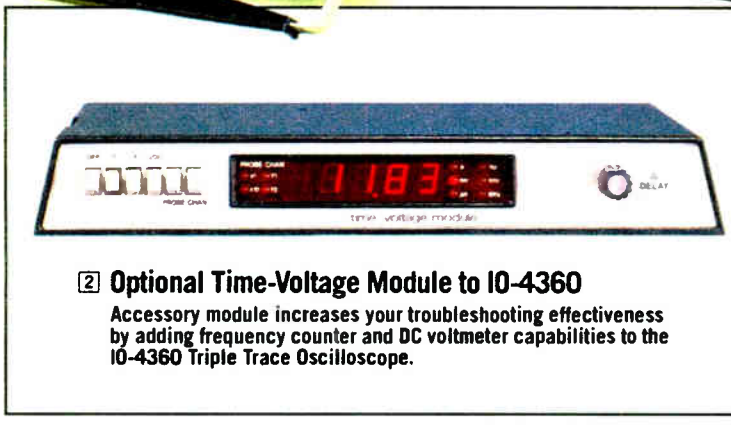
4 Dual Trace 10 MHz Oscilloscope offers a wide range of measurement capability in a lab-grade instrument

DOUBLE MASTER BUILDER POINTS

- **Precise performance with a DC to 10 MHz response and a 35 ns rise time to accurately display high-speed square waves**
- **Two vertical input channels with eleven calibrated ranges from 10 mV/cm to 20 V/cm including variable control**
- **Calibrated time base ranges from 0.2 s/cm to 0.2 μs/cm**

Combining excellent sensitivity, stability and versatility with most desired features; Heath engineers have developed a laboratory-grade oscilloscope that is

Credit Card Orders Call TOLL-FREE: 800-253-0570. Alaska and Michigan Residents Call: 616-982-3411.



2 Optional Time-Voltage Module to IO-4360

Accessory module increases your troubleshooting effectiveness by adding frequency counter and DC voltmeter capabilities to the IO-4360 Triple Trace Oscilloscope.

ideal for the wide range of measurements encountered in electronics, developmental laboratories and scientific research. And it is in the price range of the service technician as well as the part time hobbyist.

Select several methods of displaying a signal on the 8 x 10 cm rectangular viewing area. Either or both channels can be displayed as a function of time or of each other. At lower speeds both channels are displayed in a chopped mode to avoid flickering while at higher speeds both signals are displayed alternately. Front panel X-Y operation uses the scope's matched vertical amps.

A complete trigger system features various trigger signals including the choice of sampling either channel, an externally applied trigger signal or using part of the line voltage. To control the trigger input bandpass, a tri-level mode switch is provided. A special active TV filter cuts off unwanted high frequency signals for easier triggering on TV vertical signals.

Calibrating the IO-4210 requires an accurate source of square waves such as the IG-4505 on page 42 or the IG-4244 Precision Calibrator on page 39. A calibrated 1V P-P square wave signal is provided by the scope for checking scope probes. A component tester, included with the scope, allows you to check in-circuit and out-of-circuit electronic components. *Earn double Master Builder points with this laboratory-quality oscilloscope.*

Kit IO-4210, Shpg. wt. 28 lbs. **449.95**

IO-4210 SPECIFICATIONS: VERTICAL: Deflection Factor: Sensitivity: 10 mV/cm to 20 V/cm, 11 steps in 1-2-5 sequence. **Variable:** Continuous between steps to approximately 60 V/cm. **Accuracy:** 3%. **Vertical Response: DC Coupling:** DC to 10 MHz. **AC Coupling:** 2 Hz to 10 MHz. **Rise Time:** 35 ns. **Overshoot:** Less than 5%. **Attenuator: Vertical Input: Impedance:** 1 megohm, shunted by 38 pF. **Maximum Input:** 400 volts peak, combined AC and DC. **Connector:** BNC. **Modes:** Signal, Y1 or Y2 selected by position control; Dual, Chopped (200 kHz) or alternate automatically selected by time/cm switch. **HORIZONTAL: Time Base, Ramp:** 200 ns/cm to 0.2 s/cm, 19 steps in 1-2-5 sequence. **Variable:** Continuous between steps to approximately 0.6 s/cm. **Accuracy:** 3%. **Magnifier:** X5 (adds additional 2% to sweep accuracy). **EXTERNAL: Sensitivity:** Approximately 0.1 V/cm. **Impedance:** 1 megohm. **Polarity:** Positive input causes right-hand deflection. **Frequency Response:** DC to 1 MHz. **Connector:** BNC. **Trigger: Internal: Automatic:** Adjustable over 10 divisions. **Normal:** Adjustable over 10 divisions. **Slope Selection:** + or −. **Impedance:** 1 megohm, shunted by 40 pF. **Connector:** BNC. **X-Y: Y-Channel:** Same as vertical. **X-Channel:** Same as vertical, except response limited to 1 MHz. **GENERAL: Operating Temperature Range:** 50-104 degrees F (10-40 degrees C). **Power Requirements:** 120 VAC, 60 Hz, 70 watts. **Overall Dimensions:** 6⅞" H x 12⅞" W x 19¼" D (17.6 x 32.7 x 48.9 cm).

5 Precision Oscilloscope Calibrator helps maintain scopes at their peak performance level and accuracy

- **Provides accurate time and amplitude signals for calibrating most scopes**

A laboratory-precise calibrator, the IG-4244 provides a source of accurate time and amplitude signals for making critical oscilloscope adjustments and calibrations. With its range of outputs and accuracy, this quality instrument is exceptionally equipped for calibrating scopes with bandwidths over 100 MHz.

Two crystal oscillators supply twenty-four square wave signals with very accurate times from 0.5 seconds (2 Hz) to 10 nanoseconds (100 MHz) through a 1-2-5 sequenced range switch. The rise time of these signals is less than 1 nanosecond (with less than 2% or 10 mV aberrations) making them very well suited for use in high frequency compensation adjustments on oscilloscope vertical amplifiers. Time accuracy is held to a critical 0.015%.

Sixteen precise square wave voltages, at about 1 kHz, are available for scope vertical calibration and attenuator compensation networks. These voltages range from 1 mV to 100 V peak through a 1-2-5 sequenced switch. Also available is a sine wave signal output of approximately 1 kHz at 1 volt peak-to-peak. This signal is especially useful in adjusting scope trigger circuits.

In addition to its scope calibrator functions, the IG-4244 can be used as a bench standard for calibrating other test equipment. Or, this precise calibrator can be used as a signal source for testing equipment or other experimental projects. The IG-4244 is easily assembled in about 8 hours and uses 120/240 VAC (50/60 Hz). Its dimensions are 3" H x 7¼" W x 9½" D (7.6 x 18.4 x 24.1 cm).

Kit IG-4244, Shpg. wt. 6 lbs. **149.95**

SG-4244, Assembled and tested, Shpg. wt. 6 lbs. **249.95**

IG/SG-4244 SPECIFICATIONS: TIME: Range: 0.5 s to 10 ns. **Amplitude:** 0.5 s to 20 ns, 100 mV to 1 V peak; 10 ns, 100 mV to 0.5 V peak. **Rise Time:** <1 ns. **Leading Edge Aberrations:** <2% of peak-to-peak amplitude or 10 mV, whichever is greater. **Output Impedance:** 50 ohms, nominal. **VOLTAGE: Range:** 1 mV to 100 V peak in a 1-2-5 sequence. **Accuracy:** ±1%. **Rise Time:** <5 μs. **Frequency:** 1 kHz. **Sine Wave Frequency:** Approximately 1 kHz. **Amplitude:** Approximately 1 V P-P. **Power Requirements:** 120/240 VAC, 50/60 Hz, 25 watts maximum. **Dimensions:** 3" H x 7¼" W x 9½" D.

FALL SUPER $AVERS! 10% OFF every instrument on these two pages – *This catalog only!*

1 Versatile IT-2232 Component Tracer effectively increases your troubleshooting efficiency

$224.95 THIS CATALOG ONLY

- **Test unpowered circuit boards and components**
- **Quickly identifies defective circuit boards**
- **Displays comparisons between boards or components**

An extremely helpful troubleshooting tool, the IT-2232 enables a user to check digital and analog circuits that have no power applied to them. In either of its two channels, the Tracer can display the unique E/I characteristic curve of components or circuits on its 3-inch CRT. In the superimposed mode, two components or circuit boards can be easily compared as one channel uses a dotted line display made possible by a new patent-pending circuit. Two ranges, 5 and 50 volts, are provided for testing low and high voltage capacity devices.

Kit IT-2232, Shpg. wt. 15 lbs. ..... **Regularly $249.95 NOW 224.95**

IT-2232 SPECIFICATIONS: Display Modes: Channel A; Channel B; Dual. **Channel A:** Solid line trace. **Channel B:** Dotted line trace. **Test Voltages:** 5 volts and 50 volts peak-to-peak. **Current Limits:** 5 volts peak-to-peak at 5 milliamps; 50 volts peak-to-peak at 0.5 milliamps. **Operational Controls:** Focus, Intensity, Vertical and Horizontal Position. **Cathode Ray Tube (CRT):** 3RP1A, round 3-inch flat face. **Accelerating Potential:** Approximately 1.1 kilovolts. **Operating Temperature Range:** 50 degrees F to 104 degrees F (10 degrees C to 40 degrees C). **Power Requirements:** 120/240 VAC, 50/60 Hz, 22 watts. **Dimensions:** 4" H x 10" W x 12½" D (10.2 x 25.4 x 31.5 centimeters). **Weight:** 8.4 lbs. (3.8 kg.).

2 Handheld IM-2400 Frequency Counter

$134.95 THIS CATALOG ONLY

- **High sensitivity allows very low signal pickup**
- **Crystal oscillator maintains excellent accuracy**
- **Includes rechargeable batteries for true portability**

Measures frequencies in two ranges from 50 Hz to 512 MHz with a guaranteed sensitivity 25 mV RMS (typically 10 mV RMS). Seven digit LED display gives an excellent 10/100 Hz resolutions in low/high ranges. Uses five rechargeable 1.2 VDC nickel-cadmium batteries (included). Housed in rugged, compact case.

Kit IM-2400, Shpg. wt. 3 lbs. ..... **Regularly $149.95 NOW 134.95**
SMA-2400-1, Telescopic Antenna with BNC connector, 1 lb. ..... **NOW 8.95**
PS-2404, 120 VAC Battery Eliminator/Charger, Shpg. wt. 1 lb. ..... **NOW 7.15**
PS-2405, 240 VAC Battery Eliminator/Charger, Shpg. wt. 1 lb. .... **NOW 11.65**

IM-2400 SPECIFICATIONS: Frequency Range: 50 Hz to 50 MHz and 40 MHz to 512 MHz. **Input Impedance:** 50 Hz to 50 MHz range, 1 megohm shunted by less than 24 pF. 40 MHz to 512 MHz range, 50 ohms. **Input Protection:** 50 Hz to 50 MHz range, 150 volts RMS to 100 kHz derating to 10 volts RMS at 50 MHz. 40 MHz to 512 MHz range, 5 volts RMS. **Time Base: Frequency:** 10 MHz. **Setability:** ± 1 part per million (PPM). **Temperature Stability:** ± 10 PPM from 0 degrees C to 40 degrees C. **General: Gate Time:** 1.0 second or 0.1 second, switch selectable. **Resolution:** 50 Hz to 50 MHz, 10 Hz with time base set at 1.0 second. 40 MHz to 512 MHz range, 100 Hz with time base set at 1.0 second.

3 Accurate IM-2264 True RMS Digital Multimeter

$224.95 THIS CATALOG ONLY

- **True RMS readings of all AC voltages and currents**
- **Special diode test function checks semiconductors**
- **Features analog meter, alarm and crest warning LED**

True RMS reading digital meter: Capabilities include: five DC and AC voltage ranges extending from 0.1 mV to 1000 VDC and 750 VAC, six DC and AC current ranges from 0.1 μA to 10 A, and six resistance ranges from 0.1 ohm to 20 megohms. The IM-2264 also uses a special circuit that electronically converts all AC signals into true RMS values for accurate measurements of complex waveforms.

Additional features: An auto-polarity analog meter complements the LCD digital display making nulls, peaks and trends easier to follow. A switch-enabled alarm function allows quick testing of voltage and continuity. A flashing crest warn LED alerts the operator of possible erroneous readings of AC signals due to an excessive crest factor. Battery or AC operated with PS-2404 (p. 40).

Kit IM-2264, Shpg. wt. 7 lbs. ..... **Regularly $249.95 NOW 224.95**

IM-2264 SPECIFICATIONS: Voltage Ranges: 200 mV, 2 V, 20 V, 200 V, and 1000 VDC (750 VAC). **Basic Accuracy: DC:** ± (0.5% of reading + 1 count). **AC:** ± (0.75% of reading + 2 counts). **DC and AC Current Ranges:** 200 μA, 2 mA, 20 mA, 200 mA, 2000 mA, 10 A. **Basic Accuracy: DC:** ± (0.5% of reading + 1 count). **DC:** ± (0.75% of reading + 2 counts). **Resistance Ranges:** 200, 2 k, 20 k, 200 k, 2000 k and 20 M. **Basic Accuracy:** ± (0.5% of reading + 1 count). **Special Features:** Crest Warn Indicator, Audible Alarm, Analog Meter. **Dimensions:** 3" H x 8½" W x 11" D.

4 IM-2215 DMM provides bench meter features

$80.95 THIS CATALOG ONLY

- **Basic 0.25% DC accuracy when set to lab standards**
- **Checks semiconductors and in-circuit resistances**
- **Easy fingertip control of ranges and functions**

The IM-2215 supplies all the advantages of a DMM: a large and easily readable display, high accuracy and resolution, and superior overload protection. Other features include autozero, autopolarity and automatic decimal point placement. Maintains a high 10 megohm input resistance on DC/AC volts ranges. Large 3½ digit LCD display has overload and low battery status indicators. Powered by ordinary 9-volt transistor battery (NEDA #1604, not supplied) or from AC line voltage using the optional PS-2350 120 VAC converter. *Get this valuable handheld instrument and get double Master Builder points.*

Kit IM-2215, Shpg. wt. 2 lbs. ..... **Regularly $89.95 NOW 80.95**
IMA-2215-1, Rugged leather Carrying Case, Shpg. wt. 1 lb. ..... **NOW 13.45**
PS-2350, 120 VAC Battery Eliminator, Shpg. wt. 1 lb. ..... **NOW 7.15**

IM-2215 SPECIFICATIONS: DC Voltage: Ranges: 200 mV, 2 V, 20 V, 200 V, 1000 V. **Accuracy: Lab Standards:** ± 0.25% of reading + 1 count (SM-2215, ± 0.1%). **Built-in Standards:** ± 0.35% of reading + 1 count). **AC Voltage: Ranges:** 200 mV, 2 V, 20 V, 200 V, 750 V. **Accuracy: Lab Standards:** ± 0.5% of reading + 3 counts). **Built-in Standards:** ± 0.6% of reading + 3 counts. **DC and AC Current: Ranges:** 2 mA, 20 mA, 200 mA, 2000 mA. **Basic Current Accuracy:** 0.75% (DC), 1.5% (AC). **Resistance: Ranges:** 200, 2 K, 20 K, 200 K, 2000 K, 20 M. **Basic Accuracy:** 0.25%. **Dimensions:** 2" H x 3¾" W x 7½" L.

5 Five-function IM-2260 features economy

$107.95 THIS CATALOG ONLY

- **Convenient autozero, autodecimal and autopolarity**
- **Special test function checks diodes and transistors**

Excellent performer: Bright, easy-to-read LEDs in a 3½ digit display show DC and AC voltages in four ranges up to 1000 VDC and 750 VAC. Pushbutton switches select all functions including DC and AC current in five ranges up to 10 amps and resistance in five ranges to 20 megohms. Input protection is provided.

Special features: To help determine the condition of a diode or transistor, the IM-2260 measures forward conducting voltage and reverse leakage resistance. DC or AC operation is possible with either six "C" size batteries (not included) or a PS-2404 battery eliminator (p. 40). A built-in battery charger keeps nickel-cadmium batteries (if used) recharged.

Kit IM-2260, Shpg. wt. 5 lbs. ..... **Regularly $119.95 NOW 107.95**
SM-2260, Assembled and tested, 4 lbs. ..... **Regularly $189.95 NOW 170.95**

IM-2260 SPECIFICATIONS: Voltage: Ranges: 2 V, 20 V, 200 V, and 1000 VDC (750 VAC). **Basic Accuracy: DC:** ± (0.5% of reading + 1 count). **AC:** ± (1.0% of reading + 3 counts). **Frequency Response:** 40 to 1 kHz, ± 0.5%. **Input Impedance:** 10 megohms. **Current: Ranges:** 2 mA, 20 mA, 200 mA, 2000 mA, 10 A. **Basic Accuracy: DC:** ± (1.5% of reading + 1 count). **AC:** ± (2.0% of reading + 1 count). **Ohms: Ranges:** 2 k, 20 k, 200 k, 2000 k, and 20 M. **Basic Accuracy:** ± (0.25% of reading + 1 count). **Dimensions:** 3" H x 8½" W x 11" D. **Net Weight:** 2¾ lbs. (excluding batteries).

6 Deluxe handheld SM-77 multimeter features dual digital and analog measurement display

$107.95 THIS CATALOG ONLY

- **Manual and autoranging display with 0.3% DC accuracy**
- **"Touch-Hold" function locks in stable meter readings**

This easy-to-use 3½ digit multimeter combines the precision of a digital meter with an analog bar-graph display. Get all the advantages of a DMM: autozero, autopolarity, and autoranging with accuracy and high resolution. Each time you turn the meter on you activate a 2-second diagnostic self-test of critical functions and the battery. The "Touch-Hold" function holds the value of a stable reading in the display even when the probes are removed. A quality meter from FLUKE.

SM-77, Assembled and tested, 3 lbs. ..... **Regularly $119.95 NOW 107.95**
SMA-77-1, Soft Carrying Case, Shpg. wt. 1 lb. .... **Regularly $9.95 NOW 8.95**
SMA-77-2, Holster Case, Shpg. wt. 1 lb. ..... **Regularly $5.95 NOW 5.35**

SM-77 SPECIFICATIONS: DC Volts: Ranges: 320 mV, 3.2V, 32V, 320V, 1000V. **Sensitivity:** 0.1 mV (320 mV range). **Accuracy: 320 mV-320 V Range:** ± (0.3% of reading + 1 digit). **1000 V Range:** ± (0.4% of reading + 1 digit). **Input Resistance:** 10 megohms. **Overload protection:** 1000 V (500 V on 320 mV range only). **AC Volts: Ranges:** 3.2V, 32V, 320V, 750V. **Sensitivity:** 1 mV (3.2 V range). **Accuracy:** 3.2 V Range (45 Hz - 500 Hz): ± (2.0% of reading + 2 digits). **Input Impedance:** 10 megohms shunted by approx. 50 pF. **Overload Protection:** 750 VAC. **Ohms: Ranges:** 320, 3200, 32K, 320K, 3.2M, 32M. **Sensitivity:** 0.1 ohm (320 range). **Accuracy: 320 Range:** ± (0.5% of reading + 2 digits). **32M Range:** ± (2.0% of reading + 1 digit). **Power Supply:** Single standard 9V battery.

Use your Visa or MasterCard credit cards to purchase your kit!

cut $25

1

cut $25

3

cut $12

5

cut $15

2

IM-2400 Frequency Counter has 50 Hz to 512 MHz range

cut $9

DOUBLE MASTER BUILDER POINTS

4

IM-2215 DMM had 3½ digit display and full measuring capability

cut $12

6

SM-77 with LCD digital display and analog bar graph

Precision instruments to increase your testing, troubleshooting and servicing capability

1 Handy tester quickly locates phone problems

- **Eliminates unnecessary telephone company service calls**
- **Verifies basic telephone functions and phone line polarity, plus ring and line voltage levels**
- **Checks condition of telephone line cord**
- **Phone-line powered; no batteries to replace**

Check your home phone lines at your convenience with this handy Telephone Line Analyzer. It is easy to operate and can save you the cost of an unnecessary and expensive telephone company service call. It simply plugs into any modular phone jack and provides a fast indication of telephone line parameters that affect the operation of any phone.

With this handy tester, check your home telephone line for defective devices or too many phone products that could be loading down the phone line. After putting in a new extension line, check your do-it-yourself wiring for improper loading or shorts. You can even verify the condition of the phone line from the central office to the phone jack in your home.

Uncover other problems with the Analyzer such as reversed polarity which can cause polarity-sensitive telephone equipment to operate improperly. Even check a phone's detachable coiled cord to make certain that it is working properly. The Line Analyzer accepts all RJ-11 type plugs.

The Telephone Line Analyzer is a phone-line powered tester that needs no batteries or external power. It is completely safe to use on your telephone line. And its compact size, 2¾" H x 5" W x 1½" D (7 x 12.7 x 3.8 cm), allows you to store it most anywhere. The Analyzer weighs only 7½ ounces (0.2 kg).

ST-2204, Assembled and tested, Shpg. wt. 1 lb. **19.95**

2 Precise pulse signals from 1 Hz up to 5 MHz

$149.95

- **Generates a range of pulses at three separate outputs**
- **Independent control over pulse period, width and delay**
- **Indicator warns of overlapping width and period settings**

An essential instrument for digital and pulse applications, the IG-1277 Pulse Generator produces pulse repetition periods from 200 ns to 1 s (5 MHz to 1 Hz) with identical pulse width and delay ranges from 100 ns to 1 s in seven decade ranges. All ranges are continuously variable using a 1-decade vernier range control. The pulse width is fully adjustable to 100% duty cycle.

Three separate outputs, with fast rise/fall times. The 50-ohm output offers an adjustable DC offset with an open circuit range from 0.2 to 20 volts P-P including a rise/fall time that is less than 15 ns for a 5 volt level change. The TTL output drives loads using a fixed level for a logic "0" of less than 0.4 V and a logic "1" of greater than 2.4 V with a rise/fall time less than 25 ns. The third output can be used either to trigger oscilloscopes or to drive up to 3 TTL loads using the same logic levels as the TTL output.

Additional features include a manual trigger pushbutton switch. It allows you to generate a single pulse through a circuit to observe its operation at a slow rate. An overlap indicator is also provided to warn you that a selected pulse width is longer in time than the pulse period setting.

The Pulse Generator is a versatile and easy-to-use instrument with clearly labeled front panel switches and controls. Its overall dimensions are 3¾" H x 10" W x 12½" D (8.5 x 25.4 x 31.8 cm) and weighs 7 lbs. (3.2 kg). It operates on 120 VAC at 60 Hz and requires 30 watts of power.

Kit IG-1277, Shpg. wt. 9 lbs. ..... **Was $179.95 NOW ONLY 149.95**

3 Sine and square wave signals up to 100 kHz

- **Generates high quality signals for testing audio amplifiers and digital instruments, modulating RF generators, and more**

Designed for service and testing, the IG-5218 generates sine waves from 1 Hz to 100 kHz and square waves from 5 Hz to 100 kHz. The sine wave output, with less than 0.1% distortion, is adjustable through eight ranges from 0.003 to 10 volts and is monitored by a front panel meter. The separate square wave output has a 50 ns rise time and is available in three ranges up to 10 V peak-to-peak.

The Sine/Square Wave Audio Generator has a switch-selected 600 ohm internal load and features highly reliable solid-state circuitry. It has dimensions of 5⅛" H x 13¼" W x 7" D (12.8 x 33.1 x 17.5 cm) and weighs 7 lbs. (3.3 kg). Power requirements are 105-125 VAC or 210-250 VAC, 50/60 Hz, 6 watts.

Kit IG-5218, Shpg. wt. 10 lbs. **139.95**

4 Deviation Meter accurately shows FM output

- **Measures the FM output of transmitters and signal generators**
- **Checks peak FM deviation of signals between 25 MHz to 1000 MHz**

Measure the peak deviation (frequency modulation) of transmitters and signal generators whose carrier frequencies are between 25 and 1000 MHz with the IM-4180 FM Deviation Meter. Four pushbutton switches select modulation ranges from 2 to 75 kHz with coarse and fine tuning controls for locking in difficult UHF FM signals. Monitor a line directly or use an optional antenna.

Added features include selection of correct de-emphasis for audio signals and a switch-enabled internal battery level check. Connect an 8-ohm speaker or headphones for audio monitoring. Front panel oscilloscope jacks enable you to observe signal waveshapes. Level controls are provided for adjusting meter sensitivity and audio output. Power is supplied by ten AA batteries or the optional Battery Eliminator for AC operation. Dimensions are 5½" H x 10⅜" W x 4¼" D (12.7 x 26.2 x 18.3 cm). It weighs 4¼ lbs. (1.9 kg).

Kit IM-4180, Shpg. wt. 7 lbs. **169.95**

Kit IMA-4180-1, Battery Charger/Eliminator, Shpg. wt. 2 lbs. **32.95**

SMA-2400-1, Swiveling Telescopic Antenna, Shpg. wt. 1 lb. **9.95**

5 Function Generator supplies three basic waveforms

- **Sine, square and triangle waveforms from 0.1 Hz to 1 MHz**
- **Compact and lightweight for easy transporting and bench use**

This versatile instrument supplies the basic sine, square and triangular waveforms needed for servicing electronic equipment or for driving experimental projects. These waveforms are produced over a frequency range from 0.1 Hz to 1 MHz. This wide range is divided into six frequency range segments through a front panel multiplier switch. Each smaller range is variably controlled by a front panel dial that adjusts the output frequency over a 100 to 1 ratio.

A front-panel BNC-type output jack supplies a 10 volt peak-to-peak signal into a low impedance 50-ohm load (20 volts peak-to-peak into an open circuit). A calibrated attenuator, adjustable in 10 dB steps from 0 to 50 dB, decreases the output of the generator in six steps. A variable attenuator provides a 0 to 20 dB of additional attenuation of the output signal. The variable attenuator also acts as the power on/off switch.

Compact and lightweight, this function generator takes up very little room on your workbench and can be easily carried to wherever you'd want to use it. With its handle removed, the generator measures 8⅞" D x 7¼" W x 3" H (22.2 x 18.1 x 7.5 cm) and weighs 4¼ lbs. (1.9 kg). It uses 105-130 VAC or 210-260 VAC at 50/60 Hz, 15 watts maximum.

Kit IG-1271, Shpg. wt. 7 lbs. **159.95**

SG-1271, Assembled and tested, Shpg. wt. 6 lbs. **225.00**

6 Rugged, accurate bench-type VTVM for the shop

- **Accurately measures +DC, −DC and AC voltages and resistances**
- **Make all measurements using a single probe**

The IM-5228 Vacuum Tube Voltmeter is designed for use by servicemen, engineers, maintenance people and by the hobbyist. It is simple, rugged and accurately measures ±DC and AC voltages, and resistances with the reliability required of a dependable high-use voltmeter. It measures ±DC voltages in seven ranges from as low as 1.5 volts to 1500 volts with a full scale accuracy of ±3%. With an accuracy of ±5%, you can measure AC voltages also in seven ranges from a low 0 to 1.5 volts RMS range up to the highest scale of 1500 volts RMS. Resistances are measured from 0.1 ohm to 1000 megohms, also in seven ranges.

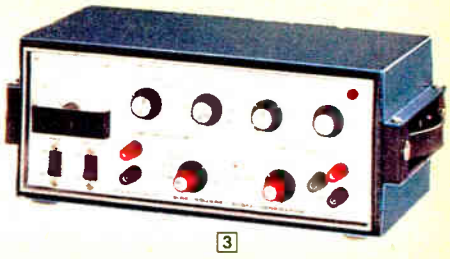
The IM-5228 eliminates the confusing tangle of multiple test leads by using a single probe for all measurements. This combination AC-OHMS-DC switching test probe plugs into a single front panel jack and also includes the ground lead. The VTVM's high 11 megohm input impedance doesn't significantly load circuits under test. A convenient center scale is provided for use in making null adjustments. A handy dB scale is also provided for use with audio equipment.

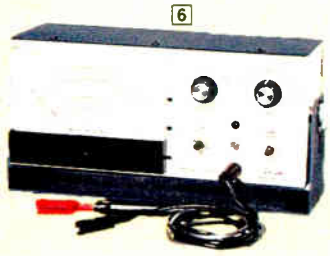
The IM-5228 VTVM's gimbal bracket enables you to mount the meter almost anywhere. The meter requires one "C" size battery, as well as 110 or 220 VAC, 50/60 Hz at 10 watts. Dimensions are 5" H x 12¾" W x 4¾" D and weighs 5 lbs.

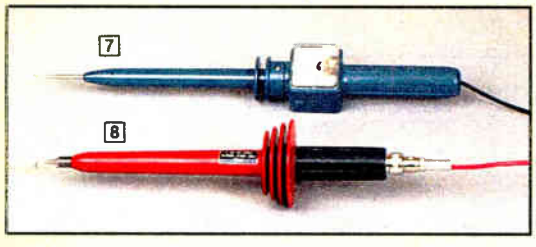
Kit IM-5228, Shpg. wt. 6 lbs. **79.95**

PKW-4, Assembled Replacement Probe for IM-5228, Shpg. wt. 1 lb. ... **19.95**

Credit Card Orders Call TOLL-FREE: 800-253-0570. Alaska and Michigan Residents Call: 616-982-3411.







7 40 kV high-voltage probe with built-in meter

- **Convenient probe for fast and easy high-voltage checks**

Self-contained probe measures extremely high positive voltages up to 40,000 volts (negative ground) with a full-scale accuracy of ±3%. Directly read all voltage measurements on the built-in meter for fast and easy operation. Probe body is molded of high-impact plastic to last for years of active field service and bench work while offering maximum insulation and lightest weight. This easy-to-assemble kit can be put together in one evening. Its dimensions are 1½" H x 1⅞" W x 15" L and weighs only 8 ounces.

Kit IM-5215, Shpg. wt. 2 lbs. **29.95**

8 Add kilovolt measuring capability to your meter

Use this accessory probe to extend the DC voltage measuring range of any 10-megohm input digital multimeter up to 30,000 volts. This high voltage probe multiplies DC ranges by a factor of 100. A red molded case with black molded handle houses a precision 2% resistor. Probe uses banana plug connector.

Kit IMA-100-10, Shpg. wt. 1 lb. **14.95**

SMA-100-10, Assembled and tested, Shpg. wt. 1 lb. **19.95**

9 Compact, battery-powered utility voltmeter

- **Features accuracy and simplicity in a general purpose meter**

An ideal first project for the beginner in electronics. This solid-state utility voltmeter takes only one or two evenings to assemble, is easy to operate, and can be used on hundreds of other projects, as well as around the home. It features four ± DC and AC voltage ranges from 1.7 volts up to 500 volts (DC accuracy is ±3% of full scale, AC accuracy is ±5% of full scale), and four ohmmeter ranges up to x1 megohm. In addition, the wide-band frequency response on the AC ranges covers the full audio frequency range and beyond. A low voltage on the ohmmeter ranges allows safe semiconductor checking.

Test leads are built into the meter's case which has overall dimensions of 9⅜" W x 5⅜" H x 9" D (23.8 x 13.7 x 22.9 cm). It weighs 2 lbs. (0.9 kg). Requires two 9-volt transistor batteries and one 1.5 volt "C" cell

Kit IM-5217, Shpg. wt. 4 lbs. **44.95**

10 Versatile 5-range clamp-on AC ammeter also measures AC voltages and resistances

$49.95

- **A rugged electrician's tool for testing electrical and lighting circuits, as well as balancing power circuits**
- **A homeowner's aid for checking appliance current usage and testing of AC circuits, motors and more**
- **Pointer lock switch lets you freeze meter reading before removing the meter from the conductor being checked**
- **Includes a set of test leads and a carrying case**

Really easy to operate, the SM-2206 Clamp-On Meter measures 50 and 60 Hz current flow in circuits or appliances by simply clamping its inductive pickup around a conducting AC wire. You don't need to break the line you are checking. Five current ranges of 6A, 15A, 60A, 150A and 300A allow monitoring of almost any AC circuit. For checking AC voltages, the meter has three ranges of 150V, 300V and 600V. A resistance range of 0 to 5 kilohms is also available for such uses as circuit continuity checks, and other home and shop resistance measurements.

A handy finger-operated pointer lock switch enables you to easily make hard to reach one-handed current measurements. Just snap the meter's inductive pickup around the wire you want to check, press the pointer lock switch with your finger, then remove the meter from the circuit – all with one hand. The AC current flow in the circuit can now be read, safely and accurately, directly from the clearly marked scales while the pointer is still locked into position. Press the lock switch again and the pointer is released, ready to take another measurement.

A rugged shock-resistant housing enables this meter to perform reliably through the constant use of an electrician on the job or after banging around in a collectables drawer of a homeowner waiting to be used. The meter's movement is also protected by the pointer lock-down switch. Single-switch operation also makes the meter more reliable with less parts to malfunction and easier to operate with less chance of incorrect function selection.

The SM-2206 Clamp-On Meter comes ready to use. It is assembled and tested so you can use it as soon as you take it out of the box. It comes with a set of test leads, a 1.5 V "AA" battery, a handstrap to prevent accidental drops, a spare resistance range fuse and carrying case. This is one meter that is sure to get a lot of use around the house.

SM-2206, Assembled, Shpg. wt. 2 lbs. **49.95**

Increase your testing and servicing capabilities with these economical Heathkit instruments

1 Low-cost CRT Tester and Rejuvenator

- **Test, clean and restore almost any color or B/W picture tube**
- **Optional socket adapter accessory widens range of testable CRTs**

A must for every TV shop, the IT-5230 offers pushbutton control of separate testing, cleaning and rejuvenation of almost all current color and black-and-white television picture tubes, even in-line-gun tubes. Each gun is individually controlled and monitored on its own grid current meter.

From the front panel you can precisely set the heater voltage of the CRT under test using a separate heater voltage meter. A cutoff control checks the operation of the tube's control grid and indicates a possible gassy condition. A front panel lamp indicates shorts in CRTs. A restore indicator glows brighter as a gun's current level is increased for an easy visual indication of rejuvenation. After rejuvenation, a separate cleaning process is applied to the guns to ensure proper tube operation. A special pushbutton provides a good indication of the life expectancy of the CRT. Included is a 4-foot heavy-duty test cable and four adapter sockets with instructions for assembling optional sockets. This tester operates on 120/240 VAC. It has dimensions of 5½" H x 13½" W x 10" D and weighs 7.7 lbs.

Kit IT-5230, Shpg. wt. 9 lbs. **139.95**

CRT Socket Adapter allows you to test even more CRTs on the IT-5230. Uses universal clip leads to hook up and test CRTs with known basing configurations.

ITA-5230-1, Shpg. wt. 1 lb. **29.95**

2 Portable FET/Transistor Tester does accurate checks

- **A quality instrument for checking semiconductor devices**
- **Large easy-to-read meter clearly shows tested values**

This highly accurate instrument tests transistors, diodes, FETs, SCRs, triacs and UJTs in- and out-of-circuit. Easy-to-read meter clearly shows the actual operating characteristics of a device (gain, transconductance and leakage current), not merely a "good/bad" rating. This tester features pushbutton control plus an internal battery check. Use color-coded test leads or built-in sockets. Powered by two 1.5 VDC "D" cells (not included). Dimensions are 5¼" H x 8½" W x 8⅝" D (13.1 x 21.2 x 21 cm) and weighs 3½ lbs. (1.6 kg).

Kit IT-3120, Shpg. wt. 5 lbs. **89.95**

3 Laboratory-grade 6-switch Decade Resistance Box

- **Has a wide range of values for all types of work**
- **Rugged housing holds up to heavy bench use**

Versatile substitution box provides resistance values from 1 ohm to 999,999 ohms in 1 ohm steps. All resistors are precision 1 watt, 0.5% tolerance type. Zero setting bypasses resistor box. The rugged 5" H x 7½" W x 6⅝" D (12.5 x 18.8 x 16 cm) metal case features two binding posts for easy test setups. The Decade Resistance Box weighs 2½ lbs. (1.1 kg).

Kit IN-3117, Shpg. wt. 3 lbs. **59.95**

Move with Heathkit into the growing and interesting field of programming and reusing EPROMs

5 EPROM Programmer lets you delve deeper into computer programming techniques and procedures

- **Program, duplicate, verify and simulate EPROMs quickly and inexpensively with microprocessor control**
- **Accommodates 2500 and 2700 series EPROMs**
- **Transmit to or receive data from a computer**

The versatile ID-4801 EPROM Programmer provides computer enthusiasts and advanced electronics hobbyists with an inexpensive instrument to further their knowledge and work in programming applications. The ID-4801 Programmer can be used to program, duplicate, verify, and simulate EPROMs that use a single power supply. These include popular 2500 and 2700 series EPROMS and other compatible devices up to 16K bytes. This easy-to-assemble programmer kit also provides engineers with a cost-effective method of quickly programming EPROMs for design purposes.

Ten distinct functions can be selected using the EPROM Programmer's 4 x 4 HEX keypad and six control keys. With the functions provided you can select a RAM memory location, enter or examine data, and increase or decrease the displayed memory address by one. You can also repeat data being entered for duplicating entire blocks of data without the tiresome entry of repetitive keystrokes. After your data is entered into the programmer's RAM memory you transfer it to a selected device using the Program EPROM Mode.

Save development time and avoid the need to program test ROMs. The ID-4801's Simulate Mode allows you to use the programmer's RAM to simulate ROMs in external devices. Connect an appropriately wired cable between the ID-4801's program socket and the socket of the ROM that is to be simulated. Test-run and modify your program until it is ready for error-free operation. Then load an EPROM with your fault-free program and place it into the external device.

Built-in editing features make this programmer an effective debugging tool. From the keypad, two separate modes let you insert and delete data from the displayed memory address. And a one- or two-byte Search Mode can be used to locate data bytes in RAM and then display both the data and the memory address.

EPROMs are prechecked before being programmed in the Program Mode. Before programming, the ID-4801 automatically tests the EPROM to make sure the selected address range is blank. If any address contains data, the Program Mode is exited. When all addresses are found to be blank, the user can then program the EPROM with data that is currently stored in RAM. As data is entered in each address it is also compared to the same RAM address for error-free programming.

Data can also be loaded from an existing EPROM into the Programmer's RAM memory using the EPROM to RAM Mode. After each data byte is transferred into RAM it is compared to the same EPROM address to check for a valid data entry. Then use the programmer's editing functions to revise data as desired. You can also use the Verify Mode to load a program into the programmer's RAM and then compare it to one or more EPROMs. This mode produces an identifying checksum signature that is unique to every program.

Transmit or receive data between the Programmer and most computers, microprocessor development systems, and other compatible instruments through an RS-232C port. This port is a 25-pin D connector and allows the transfer of data in an INTEL HEX format at a rate of 9600 baud.

Specific personality modules, wired by the user, are required for use in some modes for different EPROM configurations. Two blank personality modules are supplied with the programmer kit along with commonly used wiring diagrams. Extra modules are available as an accessory.

The ID-4801 EPROM Programmer is equipped with a 4K x 8 system ROM, and a 2K x 8 system RAM that can be expanded up to 16K with optional expansion accessories. Six LEDs indicate function selections while six 7-segment LEDs display addresses, data, and operation prompts. The programmer has dimensions of 15¾" W x 10¾" D x 4¾" H (39.6 x 27.3 x 12.1 cm). It weighs 6 lbs. (2.7 kg), and uses 120 VAC at 60 Hz, 16 watts maximum.

Kit ID-4801, Shpg. wt. 11 lbs. **349.95**

IDA-4801-1, Personality Module Accessory, contains five personality modules plus labels, Shpg. wt. 1 lb. **14.95**

IDA-4801-2, 8K RAM Expansion Accessory, contains additional RAM to expand the Programmer's memory up to 8K bytes, Shpg. wt. 1 lb. **19.95**

IDA-4801-3, 16K RAM Expansion Accessory, contains additional RAM to expand the programmer's memory up to 16K bytes, requires previous installation of IDA-4801-2 Accessory, Shpg. wt. 1 lb. **39.95**

6 Save dollars, erase EPROMs to use again and again

- **Erase all ultraviolet erasable integrated devices**
- **Fast and easy one-evening project; easy to use**

Cut your EPROM costs with the Heathkit ID-4803 EPROM Eraser. It will erase 24-, 28-, and 40-pin, ultraviolet erasable read only memory devices and other ultraviolet erasable integrated devices for you to use over and over again. This inexpensive eraser is a money saver for all computer or electronics hobbyists interested in EPROM programming. Place EPROMs into the locking tray and wait for them to be erased. A safety interlock system prevents accidental exposure to ultraviolet rays whenever the tray is opened.

Compact eraser has dimensions of 2½" H x 3¼" W x 13¼" L (6.4 x 8.1 x 33.8 cm) and weighs 3½ lbs. (1.5 kg). Uses 110 volts AC, 60 Hz at 10 watts.

Kit ID-4803, Shpg. wt. 4 lbs. **49.95**

Use your Visa or MasterCharge credit cards to purchase your kit!

1

2

3

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4 Logic Probe indicates HIs/LOs in TTL/CMOS circuits

Quickly and easily check any TTL or CMOS circuit. This handy probe detects and indicates high and low logic levels in 5 VDC TTL circuits up to 100 MHz and 15 VDC CMOS circuits up to 80 MHz. The probe will also indicate intermediate or "bad" logic levels. The presence and polarity of single pulses as short as 10 nsec duration will also be indicated. A memory LED turns on whenever a change takes place in the state of either logic level.

Two indicator lights are located at the tip of the probe for a clear view of what is happening without removing your eyes from the test point. Power is provided to the logic probe from the circuit under test through 34" leads with built-in strain relief and color-coded mini-clips. Detachable ground clip included.

The logic probe is insulated and features probe tip protection to a momentary −175 VDC and power lead protection to a continuous −25 VDC or +25 VDC (17 VAC) for one minute. The probe is a compact 9¼" long x 1" diameter (23.1 x 2.5 cm) and is a lightweight 2½ ounces (71 g).

Kit IT-7410, Shpg. wt. 1 lb. **39.95**

5 Program, simulate and duplicate EPROMs

6 Erase EPROMs for use over and over again

Personalized burnished brass Name Plate

Add your name to a kit product that reflects the care and skill you've invested in it. The Name Plate is made of solid brass, brushed to a jeweler's finish with a self-adhesive backing for easy, no-mess application.

for one plate **$2.00**

each, 2 or more **$1.60**

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***FREE** PERSONAL NAME PLATE with every kit purchased from this catalog.*

FILL IN THIS COUPON AND ATTACH TO YOUR KIT ORDER TO RECEIVE YOUR FREE PERSONALIZED NAME PLATE!

Yes. I'd like my friends to know I handcraft my kits with special care and pride. Please send *_____ solid brass name plate(s) with my name engraved on them.

Please print name plainly in capital letters using a maximum of 14 characters (including spaces) in the boxes provided below.

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City: _____ State: _____

GDP-1225 Zip: _____

*Limit one for each kit purchased on an accompanying order.

Heath precision marine instruments add new fun to boating and fishing

[1] Personal Loran Navigation Computer for marine and recreation use

NEW

- **Portable unit tells your location and guides you to your destination**
- **Return to favorite fishing spots or camps – memory stores 100 locations**
- **Completely self-contained – runs 50 hours on rechargable batteries**
- **Resolution is typically better than 150'**

This navigational unit is invaluable to the fisherman, sportsman or anyone who enjoys the outdoors. With it you can easily determine your location, heading, speed, distance from a destination, estimated time of arrival, the most direct route to a destination and navigational deviation from that route. The MNW-2980 will use either true or magnetic compass readings – whichever you prefer. A superior navigation instrument, the Heath MNW-2980 is surprisingly inexpensive and simple to operate. It takes the hassel out of navigation and puts you at the forefront of increasingly popular Loran-C navigation.

The MNW-2980 receives synchronized pulse transmissions from a chain of land-based Loran stations. The unit determines the time differences from these transmitting stations and displays position coordinates as degrees of latitude and longitude or as standard Loran-C Lines of Position (LOP's). Loran-C navigation may be used at sea or on inland lakes and waterways and in many land regions. Refer to the map on page 51 to see the Loran-C transmission area. The shaded portion of the map represents the coverage area.

Store up to 100 destinations or waypoints in the Loran's memory and use a series of waypoints to plot and follow a given course. Enter a "home" waypoint before you depart and find your way back simply by pushing the Home Key.

An excellent navigation aid for backpacking, boating and other recreational activities, the unit operates a full 50 hours on rechargable sealed lead acid batteries. It has a LCD display, watertight keypad, five notch filters, and telescoping antenna. It measures 7" W x 4½" H x 5" D and weighs 4 lbs.

MNW-2980, Assembled and tested, Shpg. wt. 10 lbs. **549.95**

[2] Gain an edge in commercial and sport fishing with an advanced Video Fish Recorder

$499.00

- **See below your boat down to 480 feet using eight ranges**
- **Designed for simple and easy installation**

Make your fishing ventures a lot more enjoyable and successful with the sophisticated MIP-2915 Video Fish Recorder. On its 5½" high-contrast, anti-glare screen appears a vast amount of information besides a picture of the bottom and any fish in between. A range scale divides the display with dashed lines into one of eight selected depth regions: 0-30', 30-60', 0-60', 60-120', 0-120', 120-240', 0-240', or 240-480'. Depth selection is determined by two range switches.

Also displayed on the screen are movable bar indicators that show the position of both the bottom and surface alarms. You select the maximum and minimum depth levels to warn you of a rising bottom or a strong fish echo. Four distinct shades of gray illustrate bottom conditions as well as the presence of fish. A brightness control adjusts the screen for varying light conditions.

The MIP-2915 also features an adjustable sweep speed for a broader or a more condensed image while a freeze position holds the image for analysis. A gain control adjusts the Video Recorder's sensitivity where needed. The MIP-2915 comes with a transom-mount transducer with 25' cable and bracket. Its five pound weight and compact 6" H x 7½" W x 7¼" D size enables the Recorder to be placed almost anywhere. Operates on +12 VDC and comes with a power cable. Manufactured for Heath Company by IMPULSE.

MIP-2915, Assembled, with Transom-Mount Transducer, 8 lbs. **499.00**

MIP-2914, Assembled with Through-Hull Transducer, 8 lbs. **549.00**

[3] Automatic, dual-range Digital Depth Sounder

Features self-adjusting range selection that monitors water's depth from 2' to 499'. Big LCD display with automatic night light shows depths in 0.1' increments to 9.9' and in 1' intervals from 10' to 499'. Has alarm settings at 2', 4', 10', 20' and 40' with built-in keel offset. Operates on 12 volts DC. *Worth double Master Builder points – this catalog only!*

Kit MI-2916-1, Depth Sounder with Through-Hull Transducer, 8 lbs. **189.95**

Kit MI-2916-2, Depth Sounder with Transom-Mount Transducer, 7 lbs. .. **179.95**

Kit MI-2916-3, Depth Sounder with Flush-Mount Transducer, 8 lbs. **199.95**

[4] Digital Remote Depth Sounder repeater station

Works with the MI-2916 with independent alarm/depth settings and keel-offset capability. Includes 25' connector cable and gimbal-mount bracket.

Kit MI-2917, Shpg. wt. 4 lbs. **69.95**

[5] Flush-mount Digital Remote Readout for sailboats

Operates like the MI-2917 and requires MI-2916. Has 5" diameter cabinet.

Kit MI-2918, Remote with visual warning only, Shpg. wt. 4 lbs. **89.95**

Kit MIA-2918-1, Audible alarm for MI-2918, Shpg. wt. 1 lb. **12.95**

[6] Two low-cost Heathkit Digital Knotmeter/Trip Logs

$99.95

- **Keeps track of nautical speed and distance with ±5% accuracy**
- **Tough, durable and designed to be used with all types of hulls**

The most accurate knotmeter/log of its kind. This precise knotmeter/Trip Log constantly computes and updates speed and distance every two seconds with ±5% accuracy. Transducers for the MI-2956 and MI-2958 both feature a special optimizing speed calibration that enables you to fine tune the circuits to the shape of your individual hull. Each has an easy-to-read LCD display with automatic backlighting for night outings. See your speed in mph (or knots), from 0.1 to 40 mph; or distance traveled from 0 to 99 miles (or nautical miles).

Order the MI-2918 Knotmeter/Trip Log for your sailboat or the MI-2956 Knotmeter/Trip Log for power boats. Choose from two types of transducers according to the size of your boat or your individual preference.

Kit MI-2958, Sailboat Knotmeter/Trip Log, Shpg. wt. 4 lbs. **99.95**

[7] **Kit MI-2956,** Powerboat Knotmeter/Trip Log, Shpg. wt. 4 lbs. **99.95**

MIA-2950-1, Through-Hull Transducer, Shpg. wt. 2 lbs. **39.95**

MIA-2950-2, Transom-Mount Transducer, Shpg. wt. 2 lbs. **29.95**

[8] Sensitive Deluxe Fish Recorder

Only $139.95

- **Increase your fishing enjoyment and success**
- **Two instruments in one – acts as depth sounder in addition to dual-range fish spotter**

A Heathkit Deluxe Fish Spotter should be standard tackle for any serious angler. It can help you increase the size and weight of your catches by detecting single or schools of fish swimming, and submerged objects between the surface and any preset depth you choose. Two sounding ranges, 0-60 or 0-240 feet, insure the high accuracy and sharp definition so important in an instrument of this type.

Two precision instruments in one portable package: The MI-2901 will locate the best fishing habitats and stand duly as a dependable depth sounder for navigation through unknown waters. Has sensitivity control, corrosion-resistant aluminum case, sun-shielded dial and watertight ceramic transducer element with suction cup mount. Powered by two 6-volt lantern batteries (not included).

Kit MI-2901A, Shpg. wt. 9 lbs. **139.95**

Scanning Transducer Bracket for use with MI-2901. Has C-clamp mounting, scans 360° and locks in any position. Accepts 1⅜" transducer element.

Kit MIA-2900-1, Shpg. wt. 4 lbs. **39.95**

[9] Deluxe Dual-Range Depth Sounder

- **Navigate safely and protect your hull from damage**
- **High pitched alarm warns you – there's no need to continuously monitor the readings**

Whether you're fishing, cruising or scuba diving, this Dual-Range Depth Sounder will add an extra measure of safety to your boating season pleasure. When selected, a high-pitched beeping alarm alerts you to shoals or submerged objects projecting above any preset depth from 5 to 240 feet, *thus eliminating the need for continuous visual monitoring.* Two ranges, one for depths to 60 feet and one for depths to 240 feet, provide extremely accurate readings instantly.

Depth Sounder with through-hull transducer and 25 feet of connector cable.
Kit MI-1031-1, Shpg. wt. 8 lbs. **119.95**

Depth Sounder with transom-mount transducer and 25 feet of connector cable.
Kit MI-1031-2, Shpg. wt. 8 lbs. **119.95**

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NEW

1 Personal Loran Navigation Receiver/Computer

Miles off course
Time to waypoint
Course made good

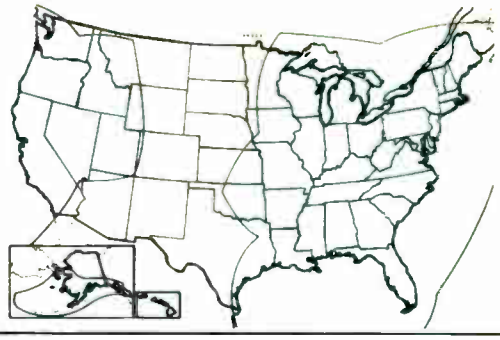
Speed in knots

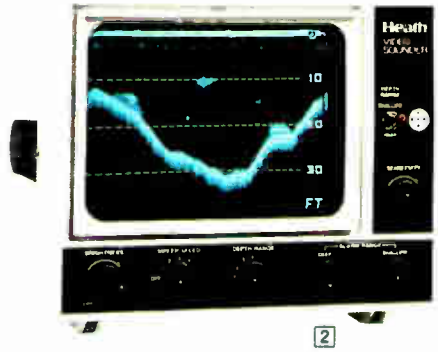
--OFF
LEFT
READY
WPT
1.2 3
1 9 SPEED
9 8 2 7 3°
9.7 1 MILES

Course to waypoint

Nautical miles to waypoint

Helps you find your location and destination





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3

DOUBLE MASTER BUILDER POINTS

4

5

9

7

6

Through-Hull Transducer

Transom-Mount Transducer

8

ANNOUNCING THE HEATHKIT MASTER BUILDER CLUB'S

First Master Builder

Jet Pilot John Lee of Burbank, California, is first to attain top status in the Club

Heath/Zenith Computers & Electronics and the Heath Company take great pleasure in honoring John Lee for his outstanding accomplishments in the art of electronic kitbuilding. At an awards ceremony on April 25 in Woodland Hills, California, the President's Cup was presented to Mr. Lee, along with his permanent Gold Master Builder Card, by Los Angeles Area Manager Steve Calkins and Woodland Hills Store Manager Dave Scott.

Building Heathkit products has been John Lee's hobby since the end of World War II and his interest continues unabated.

On his way to becoming the first Master Builder, Mr. Lee built an HS-151-22 IBM-PC compatible computer system and his second complete amateur station. Mr. Lee is a corporate jet pilot for Hehr International. Congratulations to John Lee, first Heathkit Master Builder.

New DOUBLE BONUS POINT PLAN For Members

The Heathkit Master Builder Club is for everyone – like you – who enjoys kitbuilding and appreciates bonus values and special recognition!

It costs nothing to join. All you do is ask at your local Heath Zenith Computers & Electronics Center and they will be happy to sign you up. Immediately you become a member and begin accumulating Points with every kit you purchase, leading from Builder, to Craftsman and on to Master Builder rating.

As you progress you'll receive valuable Master Builder Purchase Certificates that can be used to purchase Heathkit products, plus recognition of achievements.

Right now, don't miss out on the DOUBLE BONUS products shown in the adjoining column. They are among our most popular and interesting products – and the extra points they generate will help you move up rapidly in your club standing.

DOUBLE MASTER BUILDER POINTS

Look for this symbol for DOUBLE BONUS POINTS

It designates qualifying products throughout the catalog.

Products	Model	Double Master Builder Points
HERO® Jr Robot	RTR-1 thru 4	1000-1400
Indoor Outdoor Thermometer	ID-1390B	170
Digital Scale	GD-1186	200
Garage Door Opener	GD-3509	380
Transceiver	HW-5400	1000
Linear Amplifier	HL-2200	1170
Dual Trace Scope	IO-4210	900
Digital Multimeter	IM-2215	160
Auto Ignition Analyzer	CO-2600	1200
Digital Depth Sounder	MI-2916-1	380
(3 versions)	MI-2916-2	360
	MI-2916-3	400
Learning Computer Accessory	ETA-100A	2000
Breadboard Trainer	ET-3300B	220
Any kit 100 Series Computer		3200-3800
Monitor	HVM-122A	160
Plotter	IR-5208	700
Smart Outlet Box	GD-1295	90

Heathkit®
Master Builder
Club

Our name has changed...

from Heathkit Electronic Centers to **Heath/ Zenith Computers & Electronics.** Our new name reflects our determination to become one of the most important computer and electronics retailers in North America.

However...our commitment to provide a full line of electronic kit and assembled products ...and our commitment to customer service support..."We won't let you fail"...will continue without interruption.

Joseph M. Schulte
President

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Discover the fun of kitbuilding at your Heath/Zenith Computers & Electronics Center.

Heath/Zenith Education Courses are carefully designed to provide maximum efficiency and

Now you can apply famous Heathkit/Zenith learning courses to meet your special training needs. Success-oriented with just the right amount of technical theory and a maximum emphasis on real-world applications, Heathkit/Zenith Self-Study and Classroom Courses incorporate the very latest learning methods and materials that are available. Specify Heathkit/Zenith courses with confidence, because our pledge prevails:

"We won't let you fail."

Self-study courses provide effective training for those who can't be taken off the job for group class training, or who wish to enhance their electronics knowledge and skills. Individualized study courses are a convenient and effective means to update or enhance anyone's skills.

Each self-study course is designed to guide the user through important concepts. And audio-visual aids, available with many courses, help teach difficult concepts. Self-test reviews monitor and help ensure understanding of course material while experiments, using parts included with the course, provide needed experience.

Self-instruction courses include comprehensive final examinations. Several courses can even be applied for college credit (see Course Offerings chart).

Heathkit/Zenith Classroom Courses are the complete answer for all types of industries, government agencies, and forward-thinking schools who want to teach technical subjects with maximum efficiency at a minimum cost.

Courses start at the entry level of electronics with the Basic Electronics Series. After completing these courses the student can move into new state-of-the-art technology, branch into the use of instruments or learn about computers from hardware to programming. All of these multimedia courses employ the latest learning enhancement techniques. Text material is presented in concise, fast-paced units of study, with major topic areas highlighted in modular subsections. "Hands-on" experiments provide positive reinforcement through interactivity. Illustrations are used profusely for fast, thorough mastery by students of all ages and different levels of technical experience.

Courses are organized in three separate publications: text, workbook and instructor's

Choose a single course or a series to fit your educational need

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DC LECTRONICS (61) + [1] → AC ELECTRONICS (61) + [1] → SEMI-CONDUCTOR OEVICES (61) + [1] → ELECTRONIC CIRCUITS (63) + [1] → TEST EQUIPMENT (63) + [1] → ELECTRONIC COMMUNICATIONS (63) [1] → DIGITAL TECHNIQUES (63) + [2] → CMOS DIGITAL TECHNIQUES (62) [2]

Microprocessor Technology

- MICRO-PROCESSOR (65) + [4]
- MICRO-PROCESSOR INTERFACING (67) [4]
- VOICE SYNTHESIS (67) [4]
- MICRO-PROCESSOR APPLICATIONS (67) [4]
- 16-BIT MICRO-PROCESSORS (69) [5]

Advanced Electronics

- OPERATIONAL AMPLIFIERS (73) [3]
- ACTIVE FILTERS (73) [3]
- IC TIMERS (73) [3]
- PHASE-LOCKED LOOPS (73) [3]
- OPTO-ELECTRONICS (73) [3]
- FIBER OPTICS (71) [2]
- LASER TECHNOLOGY (72) [7]

Robotics Automation

- ROBOTICS & INDUSTRIAL ELECTRONICS (59) [6]
- ROBOT APPLICATIONS (59) [6]

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- PRINTED CIRCUIT BOARDS (75)
- CONCEPTS OF ELECTRONICS (61)
- HAM RADIO NOVICE (36)
- HAM RADIO GENERAL (36)
- HAM RADIO ADVANCED (36)

Computer Servicing

- COMPUTER FUNDAMENTALS (71) [5]
- COMPUTER PERIPHERALS (71) [5]
- COMPUTER MAINTENANCE (71) [5]

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- CP/M OPERATING SYSTEM (103)
- MS-DDS OPERATING SYSTEM (102)
- ASSEMBLY LANGUAGE (103)
- BASIC LANGUAGE (103) +
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- MACRO-86 ASSEMBLY LANGUAGE (103)
- MACRO-86 ALGORITHMS (102)
- AUTOCAO TECHNOLOGY (101)

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- PASSIVE CIRCUIT DESIGN (75) [8]
- TRANSISTOR CIRCUIT OESIGN (75) [8]
- ANALOG CIRCUIT DESIGN (75) [8]

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- DIGITAL TECHNIQUES (63)
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- SOLDERING (73)

Key to Course Symbols

[1] Analog Trainer
[2] Digital Trainer
[3] Breadboard Trainer
[4] Microprocessor Trainer
[5] Learning Computer
[6] HERO 1 Robot
[7] Laser Trainer
[8] Design Trainer

* The American Council on Education recommends that member colleges grant credit for this course.

(73) See this page number for detailed course information

– Linking line indicates a suggested sequence for taking the courses

economy in either self-paced personal study or classroom and industrial training programs

guide. The student text is the core of the learning material, written in a logical learning sequence that first explains concepts and then builds upon them for a thorough understanding of each topic. Texts are supported by a workbook with exams and experiments keyed to the text presentation. The instructor's guide includes suggestions for making the course more effective but is versatile enough to allow the teacher to add his or her own parameters for challenge and guidance—providing each student with a fully rounded learning experience. At a fraction of the cost of institutional options.

Course trainers offer exciting experience with concepts students have just studied in either classroom or self-study situations. Hands-on learning is provided on well-designed quality experimenters. Course trainers utilize the latest technology and include such innovative equipment as a laser, robot and a learning computer which can be upgraded to a powerful 16-bit machine. See the list on this page of assembled Heathkit/Zenith trainers which are used to complete the full range of experiments integrated within each program.

Quality components and parts are provided in separate parts packs for each student or group of students. These contain all the electrical and accessory components necessary for implementing the workbook experiments.

Continuing Education Units, (CEU's) a nationally-used method of recognizing achievement in non-credit adult education, may be earned in self-study courses by passing the included optional final examination with a 70% or higher score. Students and employees may earn CEU's for classroom courses by passing a CEU final examination (ordered separately) with a score of 70% or higher.

CEU Exams for Classroom Courses:

EB-6101-80, DC Electronics, 2 lbs. **100.00**
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If rapid advances in technology are leaving your employees or students behind, they can catch up quickly and comprehensively. Review the extensive list of courses below, and contact us for more information regarding your needs.

Easier learning through new Video Training

Video Courses from Heathkit's Video Training Series provide a complete, convenient, effective and economical approach to learning. Through video animation techniques, students actually see how electronic processes work for better understanding and a higher retention factor. Get across complicated concepts and principles more quickly, vividly and economically than any other method of communication. Courses available include: Microprocessors, Digital Techniques and Soldering.

Complete details are available in colorful brochures. See your local Heath/Zenith Computers & Electronic Center.

Classroom Course Ordering Information

	Course	Text Shpg. wt. 2 lbs.	Price	Workbook Shpg. wt. 2 lbs.	Price	Instructor's Guide Shpg. wt. 1 lb.	Price	Assembled Trainer Wt. 6 lbs.	Price	Parts Shpg. wt. 1 lb.	Price	Cassettes Shpg. wt. 2 lbs.	Price
Introductory	Concepts of Electronics	EB-6140 (3 lbs.)	24 95	EB-6140-40 (1 lb.)	10 95	EB-6140-50	9 95	ETW-3100B	179 95	EB-6140-30	29 95	NOT USED	
Basic Electronics	DC Electronics	EB-6101	19 95	EB-6101-40	10 95	EB-6101-50	9 95	ETW-3100B	179 95	EB-6101-30	24 95	EEA-3101A	19 95
	AC Electronics	EB-6102	19 95	EB-6102-40	10 95	EB-6102-50	9 95	ETW-3100B	179 95	EB-6102-30	19 95	EEA-3102A	19 95
	Semiconductor Devices	EB-6103	19 95	EB-6103-40	10 95	EB-6103-50	9 95	ETW-3100B	179 95	EB-6103-30	19 95	EEA-3103A	19 95
	Electronic Circuits	EB-6104	19 95	EB-6104-40	10 95	EB-6104-50	9 95	ETW-3100B	179 95	EB-6104-30	34 95	EEA-3104A	19 95
	Test Instruments	EB-6105 (4 lbs.)	19 95	EB-6105-40	10 95	EB-6105-50	9 95	ETW-3100B	179 95	EB-6105-30	29 95	EEA-3105A	19 95
	Electronic Communications	EB-6106	19 95	EB-6106-40 (1 lb.)	10 95	EB-6106-50	9 95	ETW-3100B	179 95	EB-6106-30	34 95	EEA-3106A	19 95
	Digital Techniques	EB-6201 (3 lbs.)	24 95	EB-6201-40	11 95	EB-6201-50	9 95	ETW-3200B	179 95	EB-6201-30	34 95	EEA-3201A	19 95
Microprocessor Technology	Microprocessors	EB-6401 (4 lbs.)	24 95	EB-6401-40 (1 lb.)	11 95	EB-6401-50	9 95	ETW-3400A	359 95	EB-6401-30	64 95	NOT USED	
	Microprocessor Interfacing	EB-6402 (5 lbs.)	24 95	EB-6402-40 (1 lb.)	10 95	EB-6402-50	9 95	ETW-3400A	359 95	EB-6402-30	64 95	NOT USED	
	Microprocessor Applications	EB-6405 (3 lbs.)	24 95	EB-6405-40	10 95	EB-6405-50	9 95	ETW-3400A	359 95	EB-6405-30 (2 lbs.)	54 95	NOT USED	
	Advanced 16-bit Microprocessors	EB-8088 (5 lbs.)	24 95	EB-8088-40	11 95	EB-8088-50	9 95	ETW-100 (33 lbs.)	1095 00	EB-8088-30	59 95	NOT USED	
Advanced Electronics	Operational Amplifiers	EB-601	19 95	EXPERIMENTS IN TEXT		EB-601-50	9 95	ETW-3300B	189 95	EB-601-30	24 95	NOT USED	
	Active Filters	EB-602	19 95	EXPERIMENTS IN TEXT		EB-602-50	9 95	ETW-3300B	189 95	EB-602-30	14 95	NOT USED	
	IC Timers	EB-603	19 95	EXPERIMENTS IN TEXT		EB-603-50	9 95	ETW-3300B	189 95	EB-603-30	29 95	NOT USED	
	Phase-Locked Loops	EB-604	19 95	EXPERIMENTS IN TEXT		EB-604-50	9 95	ETW-3300B	189 95	EB-604-30	29 95	NOT USED	
	Optoelectronics	EB-605	17 95	EB-605-40 (1 lb.)	9 95	EB-605-50	9 95	ETW-3300B	189 95	EB-605-30	29 95	NOT USED	
	Laser Technology	EB-610	19 95	EB-610-40	10 95	EB-610-50	9 95	ET-4200 (4 lbs.) ETA-4200 (2 lbs.)	239 95 44 95	EB-610-30	39 95	NOT USED	
Robotics and Automation	Robotics & Ind Electronics	EB-1801 (4 lbs.)	29 95	EB-1801-40	14 95	EB-1801-50	9 95	ETW-18 (70 lbs.)	2199 95	EB-1801-30 (2 lbs.)	44 95	NOT USED	
	Robot Applications	EB-1812 (2 lbs.)	19 95	EB-1812-40 (1 lb.)	10 95	EB-1812-50	9 95	ETW-18 (70 lbs.)	2199 95	EB-1812-30 (2 lbs.)	49 95	NOT USED	
	Hero 1 Advanced Experiments	EB-1802 (1 lb.)	24 95	NOT USED				ETW-18 (70 lbs.)	2199 95	NOT USED			
Computer Servicing	Computer Fundamentals	EB-2001	19 95	EB-2001-40	10 95	EB-2001-50	9 95	ETW-100 (33 lbs.)	1095 00	EB-2001-30	39 95	NOT USED	
Circuit Design	Passive Circuit Design	EB-6001 (3 lbs.)	17 95	EB-6001-40	10 95	EB-6001-50	9 95	ETW-1000 (13 lbs.)	369 95	EB-6001-30	10 95	NOT USED	
	Transistor Circuit Design	EB-6002 (3 lbs.)	19 95	EB-6002-40	10 95	EB-6002-50	9 95	ETW-1000 (13 lbs.)	369 95	EB-6002-30	19 95	NOT USED	
	Analog Circuit Design	EB-6003 (4 lbs.)	19 95	EB-6003-40	10 95	EB-6003-50	9 95	ETW-1000 (13 lbs.)	369 95	EB-6003-30	19 95	NOT USED	
Computer Programming	BASIC Programming	EB-6100 (4 lbs.)	21 95	EB-6100-40	10 95	EB-6100-50	9 95	NOT USED		PARTS CASSETTES NOT USED			

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Move into the world of robotics with HERO® 1

1 HERO 1 is the ideal robotics training tool

Bring the concepts of high-technology robotics to life with practical hands-on training using the teaching robot, HERO 1. This computer-controlled, electro-mechanical device allows you to explore and work with all the fundamental components and circuitry associated with robot technology. Completely self-contained, HERO 1 is capable of interacting with you and its environment. It detects light, sound, motion and obstacles in its path; and it can travel over a predetermined course. When using its optional arm, the robot can be programmed to pick up small objects with its manipulator. And with its optional voice synthesizer, HERO 1 can even speak in complete sentences.

An intelligent robot, HERO 1 has a computer brain consisting of an on-board 8-bit 6808 microprocessor. Following programmed instructions, the microprocessor can guide HERO 1 through complex maneuvers, activate and monitor sensors, and modify the robot's actions as a result of sensor or real-time clock inputs. Memory consists of 8K of ROM and 4K bytes of RAM. This can be increased up to 56K with the addition of an optional memory expansion board. Preprogrammed ROMs are also available for installation on this board that allow HERO 1 to demonstrate its many capabilities.

Program HERO 1 using any one of several methods. From the top-mounted 17-key keyboard you can easily enter, verify and modify programs as well as select any of the seven operating modes. Also access any of the microprocessor's registers through the keyboard. An attachable Teaching Pendant lets you manually control all motor and arm movements or store them in memory for later duplication. A rear-panel serial port allows programs stored in memory to be transferred to a cassette tape for later reloading and use.

Two other methods to control HERO 1 are available. One is a remote, radio frequency-controlled transmitter available in 3 models, each operating at a different frequency. It controls all keyboard and Teaching Pendant operations from up to 100 feet away. An RS-232 connector on this accessory also permits a computer to remotely operate the robot. The Remote has a self-contained rechargeable battery that provides operating power for up to five hours. Control is also provided through an optional RS-232 Interface that plugs onto the top breadboard providing a direct link between a host computer and HERO 1.

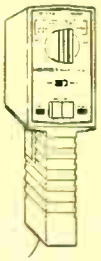
Light, sound and motion detectors plus a sonar ranging system gives HERO 1 the ability to see and hear. The sound detector hears over a 300 to 5000 Hz frequency range while the light detector sees over the entire visible spectrum and into the infrared spectrum. The motion detector senses movement up to a distance of 15 feet and the sonar system determines the range between objects and the robot.

An experimental breadboard, mounted on the top of HERO 1, provides a means of experimenting with and interfacing user-designed circuits to the robot's CPU. Direct access is available to an I/O port, a user-defined interrupt, CPU control lines, and +12 and +5 VDC power terminals.

HERO 1 is completely equipped to demonstrate every major robotic concept

1

Hexadecimal keypad and LED display



Teaching Pendant controller

NEW optional RF Remote Control Accessory enables direct and computer control of HERO 1 from up to 100 feet away

2

3

The optional Arm and Gripper Mechanism enables HERO 1 to grasp and manipulate objects. Arm movements through five axes of motion are provided by five stepper motors. The arm assembly is capable of lifting 16 ounces when retracted and 8 ounces when fully extended.

The optional Speech Synthesizer gives HERO 1 a voice. It uses a phoneme-based synthesizer system that generates 64 phonemes or speech sounds. You link the phonemes together in your computer programming to simulate human speech, several different languages are possible, and various sound effects.

Kit ET-18, Basic HERO 1 Robot (less arm, voice), 69 lbs. **799.95**

Kit ET-18-1, HERO 1's Arm (Arm and Gripper Mechanism), 6 lbs. **349.95**

ETW-18-1, Assembled HERO 1 Arm, Shpg. wt. 5 lbs. **549.95**

Kit ET-18-2, HERO 1's Voice (Phoneme Speech Synthesizer) 1 lb. **99.95**

Kit ET-18-35, Remote Control Accessory for HERO 1, operates at 75.43 MHz, Shpg. wt. 5 lbs. **249.95**

ETW-18-35, Assembled ET-18-35 Accessory, 5 lbs. **399.95**

Kit ET-18-36, Remote Control Accessory for HERO 1, operates at 75.67 MHz, Shpg. wt. 5 lbs. **249.95**

ETW-18-36, Assembled ET-18-36 Accessory, 5 lbs. **399.95**

Kit ET-18-37, Remote Control Accessory for HERO 1, operates at 75.87 MHz, Shpg. wt. 5 lbs. **249.95**

ETW-18-37, Assembled ET-18-37 Accessory, 5 lbs. **399.95**

Special $100.00 Discount Offer!

Save $100.00 when you purchase a kit or fully assembled HERO 1 Robot along with any kit or fully assembled Remote Control Accessory. On your order, specify the model number of the remote which operates at the frequency you desire and then deduct $100.00 from your order.

ET-18-4, Demo ROM, a plug-in ROM containing several routines demonstrating all of HERO 1's motor and sense circuits including voice, 1 lb. **49.95**

ET-18-5, Monitor ROM listing, Shpg. wt. 1 lb. **39.95**

ET-18-6, Memory Expansion Board, an add-on circuit board to HERO 1's CPU board for the addition of up to six extra memory devices, 2 lbs. **49.95**

ETA-18-6, Memory Expansion RAM, an 8K x 8 random access memory chip that installs on the ET-18-6 memory board, Shpg. wt. 1 lb. **24.95**

ET-18-7, Automatic Mode ROM, a plug-in ROM that enables HERO 1 to move independently about while avoiding obstacles, 1 lb. **29.95**

ET-18-9, HERO 1 BASIC, a plug-in ROM that allows you to program HERO 1 in a simple integer BASIC with modifications that enable you to use the Robot's voice synthesizer and its various motors and sensors. To use HERO 1 BASIC you'll need: an ET/ETW-18 Robot, an ET-18-6 Memory Expansion Accessory, one or more ETA-18-6 Memory Expansion RAM, an ET-18-10 RS-232 Interface Accessory, a terminal or computer with a terminal emulation program, and a serial interface cable such as the HCA-10 or HCA-11 on page 96. Shpg. wt. 1 lb. **49.95**

$AVER! Purchase the ETS-18-9 Expansion System and get everything you need to expand HERO 1 for use with HERO 1 BASIC...plus you save $30.00. The System includes an ET-18-9 HERO 1 BASIC ROM, an ETW-18-10 RS-232 Interface, an ET-18-6 Memory Expansion Board, and one ETA-18-6 8K Memory Expansion RAM.

ETS-18-9, Shpg. wt. 6 lbs. **179.80**

ETW-18-10, RS-232 Interface, allows serial communications between HERO 1 and a terminal or host computer, requires ET-18-6 Memory Expansion Board, Shpg. wt. 2 lbs. **59.95**

ET-18-11, HERO 1 Demo Cassette, programs on cassette tape demonstrating HERO 1's sensors and voice plus arm and body movements, 1 lb. **14.95**

$AVER! EWS-18, Save $100.00 on an assembled and tested HERO 1 with arm and voice accessories installed, Shpg. wt. 68 lbs. **2149.90**

ETW-18-WA, Assembled HERO 1 without arm accessory, 65 lbs. **1699.95**

$AVE $50.00! HERO 1 Robot kit including arm with gripper mechanism and phoneme-based voice synthesizer.

Kit ETS-18, Shpg. wt. 91 lbs. **1199.85**

Companion home study courses provide training in the basic technology of robotics

Advanced Programming Experiments for HERO 1

Unlock the power of HERO 1's Robot Language Interpreter and learn about the subroutines in the Robot's monitor ROM. Sixty-one programming experiments provide a wide range of examples designed to teach general programming principles. Learn how to make HERO 1 really perform with these experiments.

EB-1802, Shpg. wt. 1 lb. **24.95**

2 Robotics and Industrial Electronics Course

$99.95

- **The entire field of robotics is covered in a two-volume set filled with informative charts and diagrams**
- **Optional experiments using HERO 1 provide hands-on experience and mechanical familiarity with robots**

A comprehensive course in robot technology, the Robotics and Industrial Electronics Course is the perfect start for your journey into the world of robotics with an A to Z look at how robots work. This course reviews elementary electronic principles used in the robotics field and introduces new concepts associated with robots and automated machines.

In this self-study course, the mechanics of robots as well as computer control is completely covered. You master each concept before proceeding to the next. An introduction to low, medium, high-technology robots begins this challenging course. Progressing at your own speed, you become acquainted with the operation of various AC and DC motors and generators, industrial hydraulic and pneumatic systems, and DC stepper motors.

Computer applications are then linked with mechanical principles for complete robotics system coverage. Microprocessors are introduced and you are shown how to write robot control programs. Sensing systems are covered along with how a robot can be made to talk using voice synthesis. Also covered are the skills needed to make a robot perform tasks.

Optional hands-on experiments using the unique teaching robot, HERO 1, are also included with this course. They provide you with a tremendous opportunity to learn, practice and apply the basic principles of: industrial electronics, computers, automated equipment, sensors, servos, stepper motors, controllers and other components of industrial robots.

Pass the optional final examination with a 70% or better score and earn 8 Continuing Education Units and receive a Certificate of Achievement.

To better understand the material in this Course, you should complete the following subjects or have a knowledge equivalent to: EE-3101A DC Electronics (p. 61), EE-3102A AC Electronics (p. 61), EE-3201A Digital Techniques (p. 63), and EE-3401 Basic Microprocessors (p. 65).

EE-1800, Shpg. wt. 12 lbs. **99.95**

3 Robot Applications Course keeps up with changes

$99.95

- **Briefly reviews robot basics, introduces new concepts and provides a knowledge base for the changing field**
- **Uses HERO 1 to perform many challenging experiments including the construction and use of an EPROM burner**

Keep pace with the rapidly expanding field of robotics. In the Robot Applications Course learn about the concepts and technologies that make advanced industrial robots a reality. See how tasks, payback, reliability, quality and other factors govern the selection of an industrial robot. Learn about the process of signal conditioning which gets the signal from a sensor to the microprocessor controller. Covered in detail are different types of vision, tactile and environmental feedback sensor systems. After finishing this course, you'll better understand the capabilities as well as the limitations of today's industrial and domestic robots.

A look into a future manufacturing plant is also presented. In this plant, "computer-aided" production is viewed. Present uses of industrial robots are then discussed with a look at possible future robot applications.

Nine experiments add to your training experience. All are performed on the versatile robotics trainer, HERO 1. These experiments provide a hands-on opportunity to become acquainted with the concepts and technology you have studied in the text. All components needed to complete the experiments (including a programmable ROM) are included. An audio cassette tape containing several programs for HERO 1 is also supplied with this course.

After completing the optional final exam and passing with a 70% or better score, you'll earn 4 Continuing Education Units. Plus, you'll also receive recognition in the form of a Certificate of Achievement.

For a fuller understanding and to better prepare yourself for the information presented in this course, completion of the Robotics and Industrial Electronics Course is highly recommended.

EE-1812, Shpg. wt. 6 lbs. **99.95**

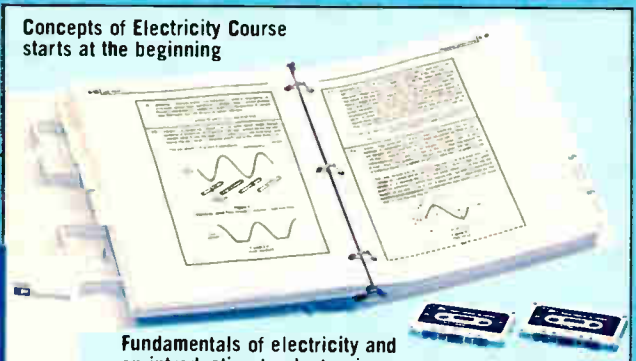
$AVER! Save $100.00 when you purchase a complete robotics training program that includes: the EE-1800 Robotics and Industrial Electronics Course, the EE-1812 Robot Applications Course, the EB-1802 Advanced Programming Experiments for HERO 1, the ET-18 Basic HERO 1 Robot, the ET-18-1 Robot Arm with Gripper and the ET-18-2 Voice Synthesizer that allows HERO 1 to talk.

EES-1800, Shpg. wt. 111 lbs. **1374.70**

Use your Visa or MasterCard credit cards to purchase your kit!

SPECIAL FALL SAVER 10% OFF all items these two pages – *This catalog only!*

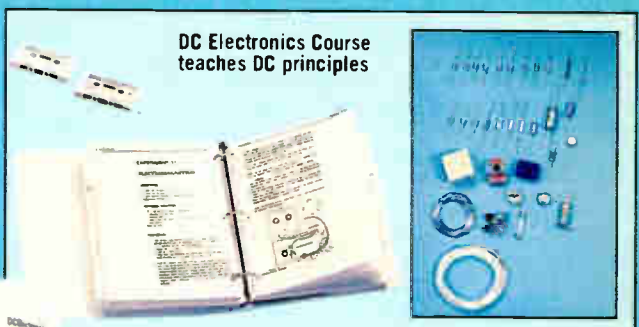
Concepts of Electricity Course starts at the beginning



Fundamentals of electricity and an introduction to electronics

1

DC Electronics Course teaches DC principles

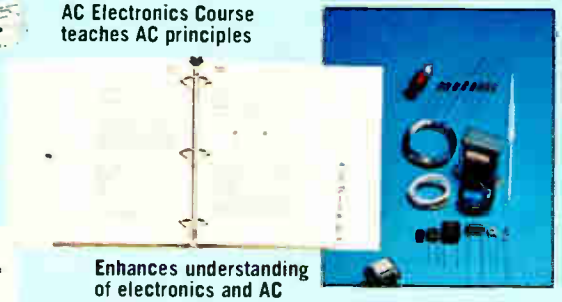


Optional audio-visual accessory available

Build and experiment with DC circuits

2

AC Electronics Course teaches AC principles



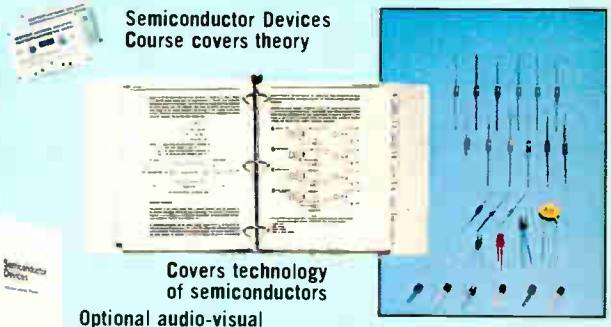
Enhances understanding of electronics and AC

Optional audio-visual accessory available

AC experiments included

3

Semiconductor Devices Course covers theory



Covers technology of semiconductors

Optional audio-visual package available

Includes parts for experiments

4

5 Increase your learning success with hands-on experiments

cut $11

ET-3100B Experimenter and Trainer

Solderless breadboard sockets for circuit building

Compact, rugged, reliable and versatile, experimental and circuit design tool

Center-tapped transformer supplies 30 V RMS and 60 Hz signal

Variable power supplies and 200 Hz to 200 kHz frequency generator

Built-in 1 kilohm and 100 kilohm variable resistors

Tutorial Electronics Dictionary

This Tutorial Dictionary does more than clearly define electronics technical terms in 832 pages. This Dictionary also contains a summary of 16 electronics-related topics. These outlines allow this informative and well-illustrated Dictionary to become a low-cost self-instructional course in electronics. Each topic outline lists related terms making it an effective learning tool. Approximately 20,000 terms are covered in a clear and concise manner. Make this Learning Dictionary part of your professional library.

EB-1010, 3 lbs. ..... **NOW 15.25**

1 Concepts of Electricity Course for the beginner

cut $3

- **Provides a working knowledge in the fundamentals and concepts of both AC and DC electricity**
- **Expands into circuit theory and electromechanical systems**

From the very beginning: For those without previous knowledge or experience in the field of electronics, this programmed Course is designed to examine the subject at a beginner's level. And, at the same time, act as an introduction to other electronics courses. Begin by learning about the fundamental concepts of both direct and alternating current. Then you expand into the areas of circuit theory and associated electromechanical systems such as motors, generators and meters.

Reviews: Each audio/visual section is followed by a programmed instruction section designed to reinforce what you have just covered. And, a review at the end of each unit tests your understanding of the material.

Course Goals: When you complete this Course, you'll be able to explain the difference between AC and DC, and be able to explain the operation of DC and AC generators and motors. After completing the Course in your own step-at-a-time pace, you'll know the difference between resistors, capacitors, diodes and other electronic components. Besides being able to solve basic problems involving current, voltage, and resistance, you'll know how to measure them.

Final Examination: Besides being an excellent learning activity, it provides a comprehensive review of the material you've covered. With a passing grade on the Exam, you are awarded an attractive certificate and 1.0 Continuing Education Unit.

EE-3100, Shpg. wt. 5 lbs. ..... **Regularly $29.95 THIS CATALOG ONLY 26.95**

MONEY-BACK GUARANTEE

If you are dissatisfied with any self-instruction course for any reason, return all course materials (except trainer) and your receipt for a full refund of purchase price (excluding trainer).

3 AC Electronics Course teaches principles of AC

cut $6

- **Gives a firm foundation in the principles of AC electronics**
- **Shows how various components react in AC circuits**
- **Demonstrates the application and use of AC components**

Advance your knowledge with a comprehensive coverage of the principles of alternating current. Presented are AC theory, measurement and circuit behavior. Programmed reviews and experiments reinforce text material. Uses the ET-3100B Trainer. Recommend using multimeter and scope for experiments. Earn 1.5 CEUs after passing final exam.

EE-3102A, Shpg. wt. 7 lbs. ..... **Regularly $59.95 THIS CATALOG 53.95**

EEA-3102A, Optional Audio-Visual Accessory Package, 2 lbs. ..... **NOW 17.95**

$AVER! Buy both the AC Course and the ET-3100B Trainer and save.

EES-3102B, EE-3102A and ET-3100B Kit Trainer, Shpg. wt. 19 lbs. **NOW 125.90**

Spanish Language AC Electronics Course: Spanish translation of this course, less EB-6102-30 Parts for the experiments (see page 57).

EE-3102S, Shpg. wt. 7 lbs. ..... **Regularly $59.95 THIS CATALOG ONLY 53.95**

5 Versatile ET-3100B Electronic Design Experimenter

Allows you to construct, modify and test circuits. Designed for hands-on use with experiments from the DC, AC, Semiconductor, Electronics Circuits, Electronic Communications, Electronics for Hobbyists and Test Equipment Courses.

Kit ET-3100B, Trainer, Shpg. wt. 6 lbs. ..... **THIS CATALOG ONLY 98.95**

ETW-3100B, Assembled and tested, 6 lbs. ..... **THIS CATALOG ONLY 161.95**

2 DC Electronics Course for essential principles

cut $5

- **Complete background coverage of basic DC electronics**
- **Positive reinforcement provided through experiments**
- **Optional audio-visual package enhances learning process**

DC electronics coverage: An ideal point at which to begin your electronics training, the EE-3101A Course explains the necessary principles required for understanding DC electronics. Subjects covered include: current, voltage, resistance, Ohm's Law, magnetism, electrical measurements, DC circuits, inductance and capacitance. The use of a multimeter is also covered.

Self-instructional learning: Heathkit/Zenith's programmed learning allows you to work at your own pace. Review tests are provides so that you can check your progress while reinforcing what you learned. An optional audio/visual package contains two audio tapes and a 123-page illustration booklet with over 230 illustrations to enhance your learning experience. Also included are experiments to help you see concepts as they are put into use. These experiments use the ET-3100B Experimenter/Trainer and a multimeter, like the IM-2260 (p. 40). By taking the final exam and passing with a score of 70% or better, you can earn 2.0 Continuing Education Units and be awarded a handsome certificate.

EE-3101A, Shpg. wt. 6 lbs. ..... **Regularly $49.95 THIS CATALOG ONLY 44.95**

EEA-3101A, Optional Audio-Visual Accessory, 2 lbs. ..... **NOW 17.95**

$AVER! Save with the purchase of both the DC Electronics Course and the ET-3100B Kit Experimenter/Trainer.

EES-3101B, Includes EE-3101A and ET-3100B, Shpg. wt. 17 lbs. . **NOW 121.40**

4 Semiconductor Devices Course covers solid-state

cut $6

- **Examines semiconductor materials and their electrical properties to form a basic foundation of study**
- **Completely covers diodes, transistors, and integrated circuits and how they are used in circuits.**

A self-instructed semiconductor education: Step-by-step you learn about the micro-sized world of diodes, transistors and integrated circuits. You examine zeners, bipolar transistors, FETs, thyristors, and UJTs. See how they are made, how they operate and how they are used. Programmed reviews check your progress while optional experiments illustrate and reinforce your understanding of important concepts with hands-on training.

Trainer and final exam: To perform the experiments in this Course you'll need the ET-3100B Trainer. A multimeter is also recommended to make measurements. Pass the optional final exam with a 70% or better score and earn 3.0 CEUs.

EE-3103A, Shpg. wt. 6 lbs. ..... **Regularly $59.95 THIS CATALOG ONLY 53.95**

EEA-3103A, Optional Audio-Visual Accessory Package, 2 lbs. ..... **NOW 17.95**

$AVER! Save when you purchase both the EE-3103A Semiconductor Course and ET3100B Trainer at the same time.

EES-3103B, EE-3103A and ET-3100B Kit Trainer, Shpg. wt. 18 lbs. **NOW 125.90**

Spanish Language Semiconductor Devices Course: Spanish translation of this course, less EB-6103-30 Parts Package for experiments (see page 57).

EE-3103S, Semiconductor Devices Course in Spanish, 6 lbs. ..... **NOW 53.95**

Save on the entire Fundamental Electronic Series

Purchase the DC and AC Electronics, Semiconductor Devices, Electronic Circuits and Test Equipment Courses along with the ET-3100B Kit Trainer.

$AVER! EES-3115B, 66 lbs. ..... **Regularly $344.70 THIS CATALOG ONLY 310.20**

Accredited by the NHSC

Licensed school – State of Michigan

Approved by nationally recognized organizations

Heathkit/Zenith Continuing Education is accredited by the National Home Study Council and licensed as a school by the State of Michigan. These acknowledgements are your assurance that all Heathkit Self-Instruction Programs are quality self-study programs.

Earn College credit for many Heathkit/Zenith courses

The American Council on Education recommends that member colleges grant credit for several of our courses. Consult "The National Guide" for course recommendations. If you have taken and passed the examinations on pages 61 and 64 (EE-3101A, -3102A, -3103A, -3104A, -3105A, 3201A, -3401) or EC-1100 on page 103, you may be eligible for college credit.

If your college participates in this program, and you have taken the course and passed the final exam, order the Heathkit/Zenith College Credit Program Exam. To order, simply take the course number (for example EE-3101A) and change the prefix to ECC. In our example, you would specify ECC-3101 to order the exam.

ECC-3101, ECC-3102, ECC-3103, ECC-3104, ECC-3105, ECC-3201, ECC-3401, ECC-1100, 1 lb. each .... **Was $25.00 NOW 22.50 Each**

Credit Card Orders Call TOLL-FREE: 800-253-0570. Alaska and Michigan Residents Call: 616-982-3411.

Continue your education in the fundamentals of electronics with these challenging courses

Electronics Circuits Course explains circuits

Optional audio-visual package

Parts for experiments

1

Test Equipment Course shows operation and use of equipment

Uses optional audio-visual package

Includes all parts for experiments

2

Electronic Communications Course covers wide area

All parts included for experiments

3

Digital Techniques Course begins with the fundamentals and theory of digital circuitry

All electronic parts needed for 24 experiments

Optional audio tapes

4

ET-3200B Trainer with test lab features

$109.95 Kit

- Provides many facilities for experimentation
- Used for experiments and circuit prototyping

Four LED logic indicators

Three-frequency generator

Logic and data switches

Three power supply outputs

Large solderless breadboard

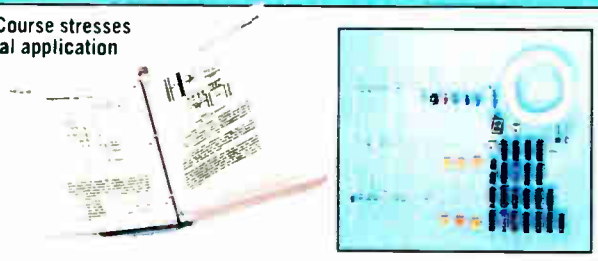
Put your digital knowledge to work with the ET-3200B Electronic Trainer. Designed for the experiments in both the Digital Techniques and CMOS Digital Techniques Courses, the ET-3200B is a useful tool that helps to speed comprehension by allowing practical application of Course material. This versatile Trainer also allows you to build and test prototypes, confirm circuit operation and test digital ICs.

Built-in regulated power supplies furnish ±12 VDC and +5 VDC. Solderless breadboard sockets accept 14- or 16-pin dual in-line ICs; and 24-, 28- or 40-pin DIPs. Has four binary data switches, two no-bounce logic switches, three-frequency pulse clock generator, and more.

Kit ET-3200B, Shpg. wt. 6 lbs. **109.95**

ETW-3200B, Assembled and tested, Shpg. wt. 6 lbs. **179.95**

CMOS Course stresses practical application



Reduced $30

CMOS Digital Techniques Course

$59.95

- Stresses practical applications and advantages
- Shows interfacing with other logic families

Learn about CMOS (complementary metal-oxide semiconductor) and why these devices are so desirable in a circuit. This self-instruction Course covers the basic concepts of CMOS technology to complex CMOS circuits designed to acquire and process information. Seven units cover such topics as: an introduction to CMOS, interfacing, logic blocks, multivibrators, counters and registers, and analog applications.

Learn by doing with practical experiments that illustrate topics from each unit. All components are included with the Course for the experiments that are performed on the ET-3200B Trainer. Also recommended for the experiments is the use of an oscilloscope and a multimeter. The EE-3201A Course or equivalent knowledge is a prerequisite. Earn 3.0 CEUs.

EE-3202A, Shpg. wt. 6 lbs. ..... **Was $89.95 NOW ONLY 59.95**

[1] Electronics Circuits Course shows how electronic theories work together to make a circuit operate

$69.95

- **Put your knowledge to work and build more skills**
- **Hands-on experiments add to your enjoyment and help to explain technical concepts presented in the Course**
- **Optional audio-visual accessory package available**

Go directly from theory to practice with the Heathkit/Zenith Electronics Circuits Course. Seven carefully designed units cover electronic circuits from basic amplifiers through modulation and demodulation. The easy-to-understand text carefully explains a concept before moving on to the next. In this way, you completely master the Course without missing any vital information. Many informative illustrations help explain difficult ideas and add to your understanding of the material presented.

The Heathkit/Zenith Electronic Circuits Course exposes you to the circuits you'll find in everyday electronics – and explains them fully.

The proven self-instruction format lets you learn at your own pace: Professionally-prepared text, backed up by easy-to-understand visuals, let you learn more now – and retain more knowledge for years to come.

The Electronic Circuits Course will teach you how to identify power supply rectifiers, filters and regulation circuits – and explain how they work. You'll develop an understanding of amplitude and frequency modulation along with the heterodyne principle and modulation and detection circuits. You will be able to construct transistor and integrated circuit amplifiers, oscillators, active filters and pulse-shaping circuits, power supplies and power supply regulation circuits – even a basic amplitude modulation and demodulation system.

Like all Heathkit/Zenith Courses, the Electronic Circuits Course leads you step by step through this challenging subject. Contained within the clear and easy to understand text are sections on basic amplifiers; including the importance of amplifiers, amplifier configurations, biasing and coupling. The next section brings you a discussion of typical amplifiers. Details are provided on audio amplifiers and push-pull, power, video, RF and IF amplifiers. Then on to operational amplifiers, power supplies, oscillators, pulse circuits and various types of modulation.

Included with your Electronic Circuits Course is a well-illustrated and concise text, complete with an attractive and durable vinyl binder. You are also supplied with over 100 electronic components for use in the 18 experiments outlined in the text. The optional Audio-Visual Accessory Package aids your understanding of text material. You should complete DC and AC Electronics and Semiconductor Devices Courses (EE-3101A-3103A) or have equivalent knowledge. We suggest a dual-trace oscilloscope, a VOM and the ET-3100B Trainer to complete the experiments in this challenging Course.

Pass the optional final exam with a 70% or better score and receive 4 Continuing Education Units (CEUs). You'll also receive a Certificate of Achievement from Heathkit/Zenith Educational Systems that's suitable for framing.

EE-3104A, Shpg. wt. 7 lbs. **69.95**

$AVER! EES-3104B, EE-3104A and ET-3100B Kit Trainer, 19 lbs. **ONLY 154.90**

EEA-3104A, Audio-Visual Accessory Package, Shpg. wt. 2 lbs. **19.95**

[3] Learn Electronic Communications quickly, easily

$64.95

- **Includes a comprehensive 400-page text and all electronic components for conducting experiments**
- **Hands-on learning provided by detailed experiments**

Learn all about the fascinating variety of new technologies involved in electronics communication, in your spare time and at your own pace. With this clearly written Electronics Communications Course, you can develop a full understanding of broadcast and data communications fundamentals.

It covers a wide variety of information: amplitude, frequency, phase and angle modulation; through a study of transmitters and antennas; and an analysis of a communications receiver and specific circuits; to an understanding of state-of-the-art broadcasting and data communications. Seven units in all.

In seven hands-on experiments you'll build an AM transmitter, balanced modulator, AM detector, FM transmitter, receiver, pulse modulator, time division multiplex transmitter and data communications modem. All necessary parts are included. The ET-3100B Trainer (page 61) or equivalent is required.

This specialized Course is suggested as a follow-up to the EE-3101A through EE-3104A Courses. Successful passage of the final exam earns you 2.0 Continuing Education Units and a personalized Certificate of Achievement.

EE-3106A, Shpg. wt. 7 lbs. **64.95**

EEA-3106A, Audio-Visual Accessory Package, Shpg. wt. 2 lbs. **19.95**

Kit ET-3100B, Trainer, Shpg. wt. 6 lbs. **109.95**

[2] Practical Electronic Test Equipment Course

$69.95

- **Learn to use a wide variety of test equipment including oscilloscopes, meters, counters and other instruments**
- **Includes experiments that allow a look into the operation and practical applications of test equipment**

This Electronics Test Equipment Course offers the knowledge you need to make measurements with digital and analog meters; explain the operation of, and use of the oscilloscope in electronic testing and servicing. From this Course you'll also learn to use frequency generators and frequency counters. A unit on special measuring instruments covers bridge circuits, transistor testers, curve tracers, spectrum analyzers and logic probes. The optional Audio-Visual Accessory Package enhances your learning process in these areas.

Fifteen interactive experiments give you the chance to actually use many different types of test equipment. All components for the experiments are included with the Course. You should have access to the following equipment to obtain the full benefit from the experiments: a digital multimeter, an analog meter, oscilloscope, frequency generator and frequency counter. Uses the ET-3100B Trainer.

Pass the optional final examination with a 70% or higher score and earn 6.0 Continuing Education Units (CEUs). Also receive a Certificate of Achievement from Heathkit/Zenith Educational Systems. A previous knowledge of material in the EE-3101A thru EE-3104A and EE-3201A is required for this Course.

EE-3105A, Shpg. wt. 9 lbs. **69.95**

$AVER! EES-3105B, EE-3105A and ET-3100B Kit Trainer 21 lbs. **ONLY 154.90**

EEA-3105A, Audio-Visual Accessory package, Shpg. wt. 2 lbs. **19.95**

[4] Comprehensive Digital Techniques Course provides a thorough training in logic circuits

$99.95

- **Learn to design and apply modern digital circuitry**
- **Loaded with practical, hands-on experiments**
- **Learn in your spare time, at your own speed at a fraction of college or technical school costs**

Gain a working knowledge of Digital Techniques the fast Heathkit/Zenith way. Begin with the fundamentals and theory of digital logic including number systems. Become familiar with Boolean algebra, flip-flops and registers, sequential logic circuits, combinational logic circuitry and digital design. Learn at your own pace and when you have the time. After you've completed the Course, you'll know how to design digital circuitry for virtually any modern application. All this knowledge at an invitingly low price.

Many explanatory illustrations, audio aids and experiments speed your comprehension of concepts and practical applications presented in the text. Learn using three methods – by reading, listening and doing – a proven method that helps you understand complex subject matter more easily and naturally. Self-test reviews, included with each unit of the Digital Techniques Course, aid retention of important points and help you check yourself before moving on to the next concept. Unit exams further summarize material and test your understanding of the material presented in the Course.

Included with the Course are all of the electronic components for performing all of 24 experiments. This expertly-organized Course is contained in two heavy-duty vinyl binders. They'll keep your text material together and ready for use as a reference long after you've completed the Course. A pair of optional audio cassettes are available which contain supplemental verbal text that can be used to help you with your study of digital circuitry.

This Course is designed for those with a basic electronics background. Such a background is obtainable by completing Heathkit/Zenith DC, AC, Semiconductors and Electronic Circuits Courses on this and the preceding page. The ET-3200B Trainer is required for performing the 24 experiments in the Course. To obtain the full benefit from the experiments in this Course, a multimeter and a dual-trace oscilloscope are recommended.

Earn 4.0 Continuing Education Units (CEUs) by passing the optional final examination with a 70% or better score. And, receive a personalized Certificate of Achievement from Heathkit/Zenith Educational Systems.

A money back guarantee ensures your satisfaction with this and all the Heathkit/Zenith Self-Instruction Courses. We're that sure we've put together the information you need in a clear and comprehensive format. If it doesn't, simply return all course materials (excluding Trainer) and your receipt.

EE-3201A, Shpg. wt. 7 lbs. **99.95**

$AVER! Buy the Digital Techniques Course and the ET-3200B Trainer Kit together and save.

EES-3201B, Shpg. wt. 14 lbs. ..... **ONLY 184.90**

EEA-3201A, Optional Learning Cassettes, Shpg. wt. 2 lbs. **19.95**

Discover the fun of kitbuilding at your Heath/Zenith Computers & Electronics Center.

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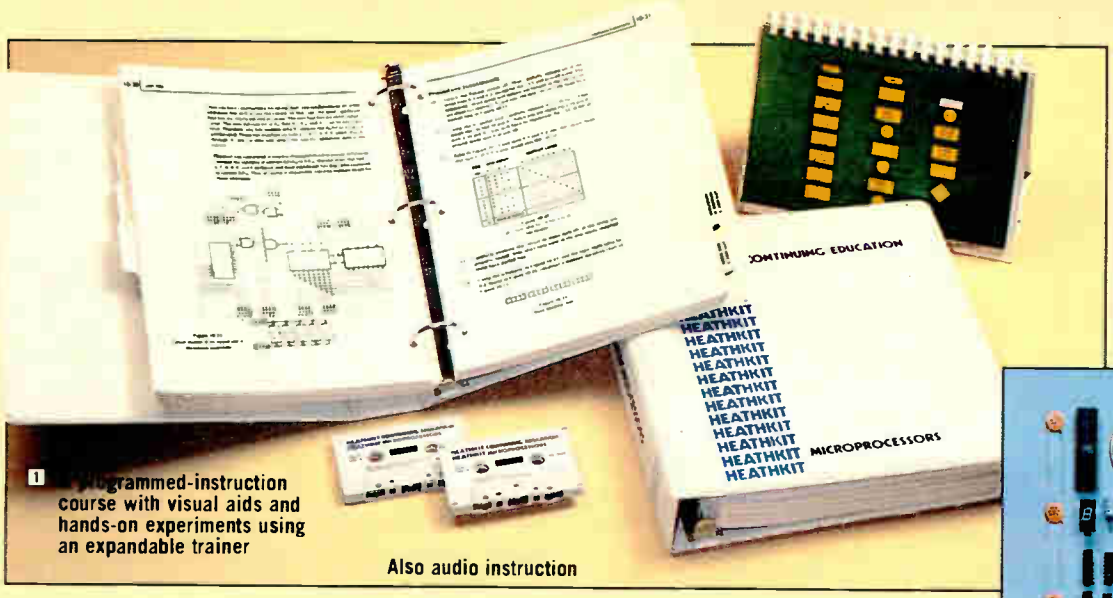
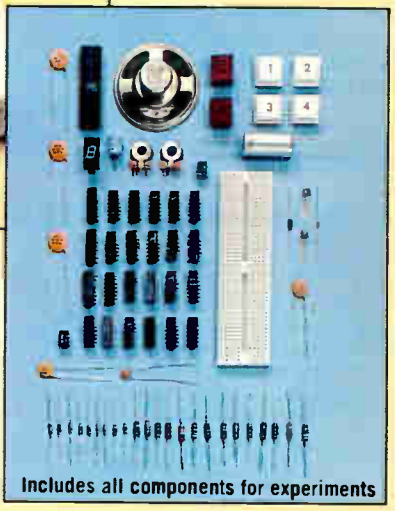


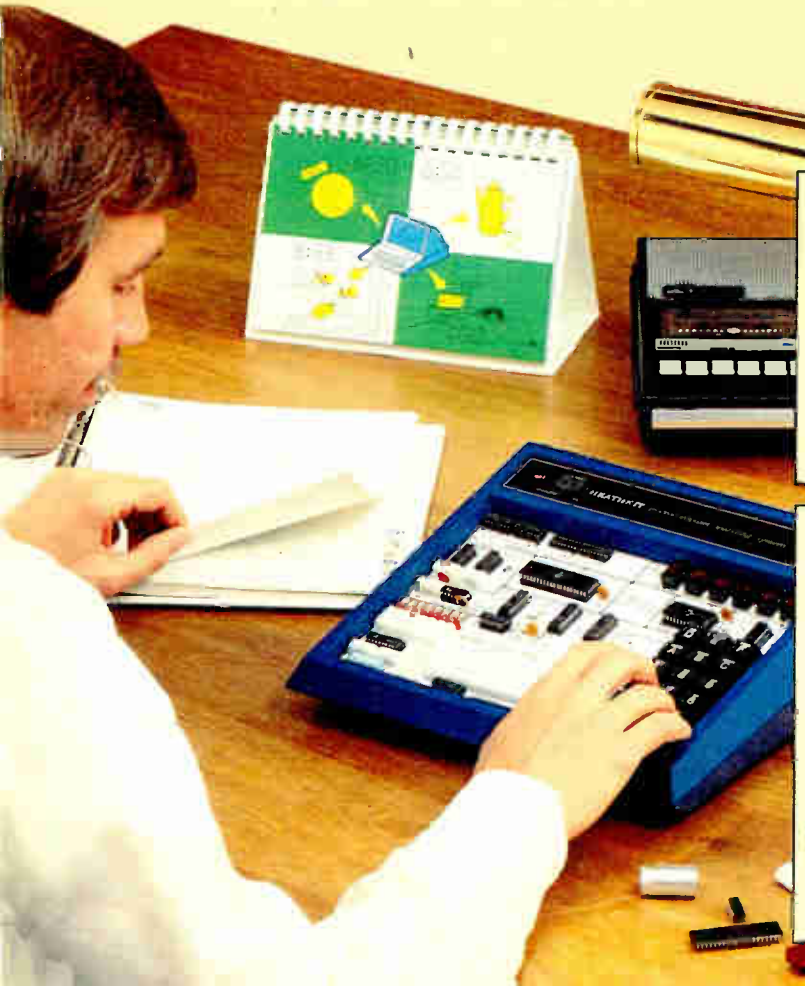
1 Programmed-instruction course with visual aids and hands-on experiments using an expandable trainer

Also audio instruction

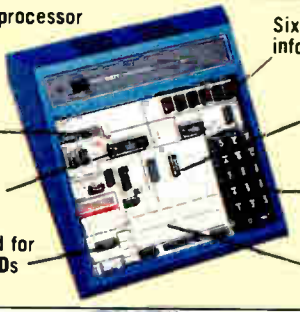


Includes all components for experiments

Learn all about microprocessors, microcomputers, interfacing and programming

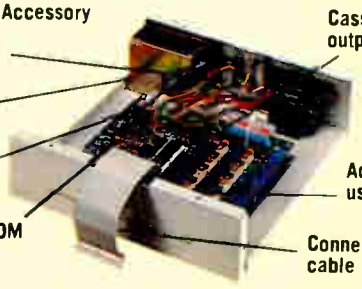


2 ET-3400A Microprocessor Trainer



- Six 7-segment LED information display
- 512 bytes of random access memory (RAM)
- 1K monitor ROM program
- MC6808 Central Processing Unit
- Hexadecimal keyboard
- Connectors supplied for power, switches, LEDs
- Solderless breadboarding sockets

3 ETA-3400 Trainer Accessory



- RS-232 connector for terminal
- Cassette input/output port
- Shielded 120 VAC power supply
- Heath/Pittman Tiny BASIC ROM
- Add up to 4K user RAM
- Terminal monitor ROM
- Connector cable

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

Learn all about 8-bit microprocessing with this Microprocessor Course and Trainer

1 Award-winning EE-3401 Microprocessor Course

- **Covers all the basics of microprocessors, microcomputers and machine level programming**
- **Includes hands-on hardware, memory interfacing and programming experiments**
- **Learn about microprocessors faster and more efficiently through programmed instruction with audio and illustrative visual aids**
- **Includes reviews for self-check of progress**
- **Self-instruction course provides an economical and self-paced study-at-home method of training in 8-bit microcomputer technology**

You'll start learning about microprocessors, microcomputers and computer programming as soon as you begin this complete microprocessor self-instruction course from Heathkit/Zenith Educational Systems. Microprocessor basics, computer arithmetic, programming and interfacing...everything you need to know to get a start in the exciting and fascinating world of computers is presented in an efficient and well-organized manner.

Preliminary training begins with a review of the basics of computer number systems and codes. Then you apply that knowledge as our prize-winning Microprocessor Course takes you step-by-step through computer arithmetic, programming, examination of popular microprocessors, interfacing and input/output operations that you can put to use immediately.

Concepts are carefully integrated into ten learning units for a thorough training in microprocessors. Starting off is Unit 1 on number systems and codes. It covers decimal, binary, octal and hexadecimal numbering systems. It also includes conversions between number systems, binary codes and positional notation. Unit 2 on microcomputer basics teaches terms and convention, and introduces you to several programming instructions plus how programs are written and executed. In Unit 3 you learn about binary addition, subtraction, multiplication and division, and two's complement arithmetic. You'll also see how to use Boolean logic operators like NOT, AND, OR, Exclusive OR and INVERT.

Progressing at your own speed you are introduced to programming in Unit 4. Here you find out about branching, conditional branching, algorithms and programming instructions. In the next two units, 5 and 6, the 6800/6808 microprocessor is studied. Covered in detail is its architecture, instruction set, addressing modes, stack operations, subroutines, input/output operations and interrupts. Units 7 and 8 continue your education of the 6800/6808 microprocessor with interfacing and its fundamentals. Included is interfacing with random access memory (RAM), displays, switches, and the Peripheral Interface Adapter (PIA).

Programming experiments are the subject of Unit 9. In this unit, you'll write and experiment with a wide variety of increasingly complex programs. At the beginning you'll actually turn the ET-3400A Trainer (used in all the experiments) into a teaching machine that'll give you drills and practice in computer numbering systems. In later experiments, you'll use all instructions and addressing modes including subroutines, stack operations and more.

The final unit of this microprocessor Course involves interfacing experiments. Here you put into practice everything you've learned about programming and interfacing. Using the electronic components supplied with this Course you convert the ET-3400A Trainer into a digital clock, a musical instrument and a digital voltmeter. You experiment with address decoding, PIAs, input and output of data, parallel-to-serial conversion techniques, digital-to-analog and analog-to-digital conversion techniques, and interrupts.

Units 1 through 6 and Unit 9 assume no prior knowledge of electronics. Units 7, 8 and 10 assume knowledge equivalent to the Heathkit/Zenith EE-3201A Digital Techniques Course described on page 63.

Everything is included with this thorough course. Text is clearly written in the time-proven step-by-step self-instruction format. Colorful visual presentations and reinforcing audio cassette tapes of text material help you to understand concepts more completely. Nineteen hardware experiments provide a hands-on opportunity to apply microprocessor theory in practical applications. All components are included: RAMs, a Peripheral Interface Adapter integrated circuit, a digital to analog converter, op-amps and a variety of other microprocessor-oriented devices. All experiments are performed on the ET-3400A Microprocessor Trainer which was designed for this award-winning course.

Pass the optional final exam with a 70% or better and earn 8.0 Continuing Education Units. In addition, you'll receive a Certificate of Achievement.

EE-3401, Shpg. wt. 12 lbs. **99.95**

2 ET-3400A Microprocessor Trainer doubles as a learning tool and a low-cost 8-bit computer

Functioning as a miniature digital computer, the ET-3400A Trainer is used with the experiments in the EE-3401 through EE-3405 microprocessor related courses. It features the popular 6808 microprocessor as the central processing unit (CPU) and a built-in 1K ROM monitor program for controlling the unit's operation. Also built in is 512 bytes of random access memory (RAM).

A 17-key hexadecimal keyboard enables you to access memory locations and to examine their contents on a six-digit hexadecimal 7-segment LED display. Through the keyboard you can step backward or forward to examine or alter other memory locations, examine or change any of the microprocessor's internal registers, set break points for program debugging, or reset the CPU. The flexible instruction set of the 6808 permits use of five addressing modes, two accumulators, an index register and a stack pointer.

A microprocessor breadboard, the ET-3400A features solderless sockets for rapid assembly of IC circuitry. All microprocessor address, control and data busses are buffered and terminated on the front panel for easy connection to experimental memory and interface circuits. There's also a 40-pin external connector for expanding memory and the Trainer's I/O capacity.

Other experimental features include: eight individual and independent buffered LEDs for monitoring logic states, eight SPST binary data switches for logic level switching, built-in +5 and ±12 VDC power supply connections and a clock output. The ET-3400A requires 120 VAC at 50/60 Hz and uses 30 watts.

As a general-purpose training tool and a design aid, the ET-3400A offers flexibility and low cost in a microprocessor breadboard. Team it up with the ETA-3400 Microprocessor Trainer Accessory for increased personal microcomputing power.

Kit ET-3400A, Shpg. wt. 7 lbs. **259.95**

ETW-3400A, Assembled and tested, Shpg. wt. 6 lbs. **359.95**

3 ETA-3400 Microprocessor Trainer Accessory

Add this accessory to your ET-3400 or ET-3400A Microprocessor Trainer and turn it into an 8-bit cassette-based microcomputer system. It increases the computing power of the Trainer so that you can run more sophisticated programs. The Accessory's memory expands to 4K bytes of RAM with optional memory.

A serial interface with EIA and 20 mA loop formats enables hook-up to a smart video terminal or a 20 mA ASCII teletypewriter machine. The Accessory also provides a cassette interface which allows you to store programs on convenient cassette tapes. The ROM monitor/debugging program lets you implement the standard trainer monitor functions through the external terminal. Memory locations can be examined or changed, break points initiated and program debugging can be accomplished with a single-instruction step feature. A tiny BASIC Interpreter in ROM lets you program in easy-to-learn BASIC language. User function lets you run machine code routines from BASIC – the same machine code routines you learned in the EE-3401 Microprocessor Course.

The ETA-3400 easily connects to the ET-3400 or ET-3400A Trainer through a 40-pin connector supplied with the Accessory. Parts required to modify the trainer are included. Since modifying the trainer changes the clock frequency, experiments in the EE-3401 through EE-3405 Courses which use timing loops will be changed. It is recommended that all experiments in these courses be completed before adding the Accessory. An H-29 or Z-49 Video Terminal is required to use BASIC and monitor features of the ETA-3400 Microprocessor Accessory.

Kit ETA-3400, Shpg. wt. 8 lbs. **179.95**

EWA-3400, Assembled and tested, Shpg. wt. 8 lbs. **279.95**

ETA-3400-1, Optional 3K Chip Set, Shpg. wt. 1 lb. **54.95**

$AVER! Order the EE-3401 Microprocessor Course and the ET-3400A Trainer together and save $30.00. If purchased separately, they would total $359.90.

ETS-3400A, Shpg. wt. 25 lbs. ..... **ONLY 329.90**

$AVER! Order the EE-3401, ET-3400A, ETA-3400 and ETA-3400-1 together and save $70.00. If purchased separately, they would total $594.80.

ETS-3401A, Shpg. wt. 46 lbs. ..... **ONLY 524.80**

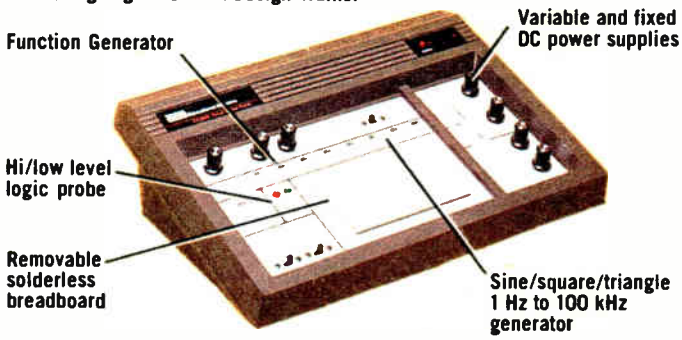
Credit Card Orders Call TOLL-FREE: 800-253-0570. Alaska and Michigan Residents Call: 616-982-3411.

computer-synthesized speech. You also learn about the programming and interfacing needed for both digitized and phoneme voice synthesis. In addition, this

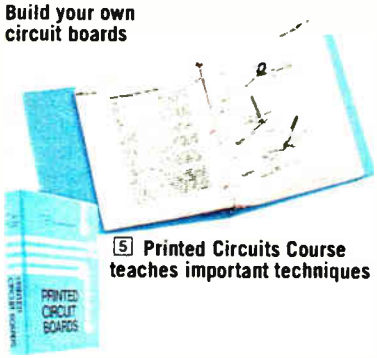
EE-3405, Shpg. wt. 10 lbs. **99.95**

Use your Visa or MasterCard credit cards to purchase your kit!

4 Analog/Digital Circuit Design Trainer

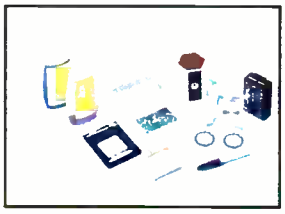


Build your own circuit boards



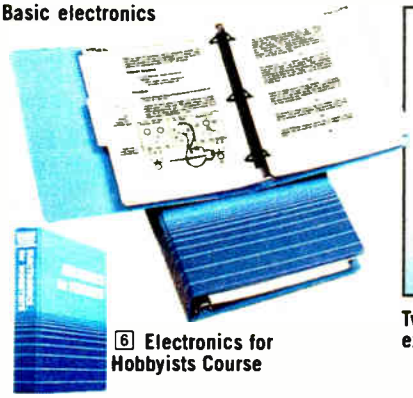
5 Printed Circuits Course teaches important techniques

Includes everything you need to make printed circuit boards



Actually build two kits that can control lamps and appliances

Basic electronics



6 Electronics for Hobbyists Course

Two textbooks and parts for experiments are included

Engineering Series teaches design fundamentals

You can learn to analyze and design practical circuits from these three comprehensive courses: Analog Circuit Design, Passive Circuit Design and Transistor Circuit Design from Heathkit/Zenith Educational Systems.

1 Analog Circuit Design Course shows basic design techniques using linear-integrated circuits

$69.95

- **Learn how to design circuits that have a reliability and quality of performance unobtainable in circuits using discrete-components**

Third in the Heathkit/Zenith Engineering Design Series, the Analog Circuit Design Course shows you how linear-integrated circuits may be used in the design of circuits and instruments that would be impractical with discrete-components. At the start of this Course, you learn to analyze and design several amplifier and comparator circuits using the versatile operational amplifier. Both op amps and comparators are discussed as specific illustrative examples. They are also used in designing several instruments such as an electronic ohmmeter and a logic probe.

Learn to analyze and design linear regulators, oscillators, waveform generators and other circuits that serve as basic building blocks in modern electronic systems. In addition, numerous applications of multipliers and phase-locked loops to electronic communications are provided. Twelve accompanying experiments using the ET-1000 Engineering Design Trainer illustrate the design and operation of circuits discussed in the text.

Perform the experiments on the ETW-1000 Analog/Digital Circuit Design Trainer shown on this page. You will also need a dual-trace oscilloscope and VOM.

Earn 4.0 Continuing Education Units and receive a personalized Certificate of Achievement from Heathkit/Zenith Educational Systems by passing the optional final examination with a 70% or higher score.

To prepare yourself for the material in this engineering course, we recommend the completion of the Passive (EE-1001) and Transistor (EE-1002) Circuit Design courses on these pages or the equivalent education.

EE-1003, Shpg. wt. 9 lbs. **69.95**

2 Passive Circuit Design Course teaches circuit analysis and design using passive components

$54.95

- **First in the Engineering Design Series teaches successful passive-component circuit design**
- **Step-by-step programmed learning begins with how to analyze circuits and the needed mathematical skills**
- **Real components and their properties are discussed**

Learn to analyze and design practical circuits using components that do not provide a power gain, such as: resistors, capacitors, inductors, voltage and current sources, transformers and diodes. And, establish a foundation for other design courses in the continuing Engineering Design Series like the EE-1002 Transistor Circuit Design Course on the next page.

Before you can design circuits, you must be able to analyze them. For this reason the first three units provide a thorough review of the techniques and associated mathematical concepts. Unit 1 is devoted to DC Circuit Analysis, Unit 2 teaches you Mathematics for Circuit Design and Unit 3 follows with AC Circuit Analysis. But a circuit that "works" on paper may not do what you want it to once built. Consequently, Unit 4, Real Circuit Components, is devoted exclusively to the nonideal properties of real components and various guides to help you select an appropriate-type component for a given application.

Variable Speed Recorder and Player

Get a full range of pitch-corrected speeds, from normal to 2 times faster, to cut your listening time in half and still be able to understand every word that you hear. This speed-listening tape recorder features slow-down to 90% of normal speech, built-in electret microphone and 3-digit tape counter. Multiple external connectors include DC input, earphone/external speaker, remote and microphone. Take this player/recorder in the car, to meetings or classes. Measures 8¾" x 5¼" x ¾" and weighs 2 lbs. Operates on batteries, +9 VDC and 120 VAC.

ECP-3804, Assembled, Shpg. wt. 3 lbs. **139.95**

The remaining units concentrate on using these techniques to design circuits. Unit 5, Unregulated Power Supplies, discusses the design of numerous rectifier circuits and smoothing filters. Unit 6, Additional Passive Circuits, examines how clippers, clampers, peak detectors, multipliers, RC and other waveshaping circuits are designed. Unit 7, Selected Applications, illustrates seven general and nine measurement applications for passive circuits. In addition, Unit 8 contains ten hands-on experiments which reinforce the text material by giving you direct experience in prototype design. Requires the ET-1000 Circuit Design Trainer.

Two appendices with a resistor color code chart plus circuits, equations and parameters related to passive circuit design conclude the material.

Earn 4.0 Continuing Education Units and receive a Certificate of Achievement by passing the optional final examination with a 70% or higher score.

Prerequisites for the Passive Circuit Design Course are a basic knowledge of DC and AC electronics, algebra and trigonometry and a *desire to learn.*

EE-1001, Shpg. wt. 9 lbs. **54.95**

[3] Transistor Circuit Design Course teaches how to design a multitude of useful circuits

$64.95

- **Second in the Educational Engineering Design Series**
- **Focuses on the fundamental techniques of successful transistor circuit design using programmed learning**
- **Includes experiments that integrate theory with practical hands-on experience in transistor circuit design**

Continuing with the development of the skills necessary for successful circuit design is the Transistor Circuit Design Course. This clearly written course presents basic techniques used in designing circuits using transistors. It begins by describing transistor characteristics and defining their relevant parameters. Using simplified models, you are shown how to develop the appropriate AC and DC equivalent circuits needed in designing transistor circuits. It continues by having you analyze these equivalent circuits to determine how various component values affect their operation. In the final phase of the course, you move step-by-step through the actual circuit design process.

Consisting of nine units complete transistor design theory and its implementation is presented plus complementary experiments. Unit 1 through 8 covers: Bipolar Transistors, Biasing Schemes, Common-Emitter Voltage Amplifiers, Common-Base and Common-Collector Voltage Amplifiers, Power Amplifiers, Multiple-Transistor Circuits, Field Effect Transistors and Common-Emitter Frequency Effects. Unit 9 contains thirteen experiments that help you to develop the know-how and the confidence to construct various types of transistor-based application circuits. All experiments are performed on the ET-1000 Engineering Design Trainer on page 75. It contains all the functions necessary to complete all the experiments.

Completing the course is a 35-page appendix filled with summary and design guides from Units 1 through 8. Included are device data sheets, formula and conversion tables, operating modes, graphical information and notational summaries. By referring to these guides you could use them to easily design a multitude of useful transistor circuits.

After completing this course, you should be able to analyze and design many different types of voltage, power and differential amplifier circuits. You should also be able to describe their characteristics as well as predict the approximate lower and upper cutoff frequencies.

Take and pass the optional final examination with a 70% or higher score and earn 4.0 Continuing Education Units. Plus, you'll receive a Certificate of Achievement.

To better understand the information in this Design Course, some previous electronics background is needed. All needed material is thoroughly covered in the Passive Circuit Design Course.

EE-1002, Shpg. wt. 9 lbs. **64.95**

[4] ET-1000 Analog/Digital Circuit Design Trainer

Quickly build and test circuits that you've designed, or experiment with others using this flexible, all-in-one prototyping unit. The ET-1000 Design Trainer features: a built-in logic probe that can detect hi and low logic levels; two fixed (±12 VDC) and two variable (1.2 to 20 VDC) ± power supplies; two 'no-bounce' logic switches; eight LED logic indicators and more.

Kit ET-1000, Shpg. wt. 14 lbs. **219.95**

ET-1000-1, Extra Removable Breadboard Accessory, 1 lb. **29.95**

ETW-1000, Assembled and tested Trainer, Shpg. wt. 13 lbs. **369.95**

SAVER! **EES-1000,** Save $60.00 when you purchase the ET-1000 Trainer and all three Design courses (EE-1001, EE-1002, EE-1003), Shpg. wt. 58 lbs. **349.80**

Use your Visa or MasterCard credit cards to purchase your kit!

[5] Printed Circuits Course shows how to design, layout and build printed circuit boards

$69.95

- **Learn direct pattern and photographic etching techniques**
- **Copy printed circuit board layouts from electronics books and magazines or fabricate your own from schematics**
- **Includes all materials to etch your own circuit boards**
- **Make boards for and construct a photoelectric lamp switch and a touch switch for appliances**

Learn to make your own printed circuit boards in this fascinating course. Make them from scratch using either the direct pattern or the photographic transfer technique. Learn about circuit board materials, layout, preparing artwork, image transfer and assembly.

Learn about the properties of different types of printed circuit board materials and the processes used in manufacturing them. In accompanying experiments learn how to design a circuit, prepare the artwork and transfer clean art images to the circuit board. Also learn how printed circuit boards are assembled using automated insertion machines and wave soldering techniques.

For experiments you'll actually design, layout and etch circuit boards for two home electronic kits: the GD-600 Photoelectric Lamp Switch and GD-1287 Touch Switch. All necessary materials, components and hardware to complete the kits and experiments are included. An etch-resist pen, rub-on transfers, art tape, etchant, solvent and plastic bags are provided to make printed circuit boards by the direct pattern method. A positive pattern, clear acetate, photographic developer and sensitized printed circuit boards are also provided for making boards using the photographic method.

No previous training is needed as you proceed to an in-depth knowledge of circuit board manufacturing and the completion of two useful Heathkit products. The GD-600 can turn lamps up to 150 watts on at dusk and off at dawn. The GD-1287 turns appliances on and off with just a slight touch.

Pass the optional final exam with a 70% or better score and earn 2.0 Continuing Education Units and receive a Certificate of Achievement. Course is available only within the continental United States.

EI-3134, Shpg. wt. 7 lbs. **69.95**

[6] Electronics for Hobbyists Course presents a basic knowledge that is applicable in many fields

$69.95

- **Gain an overview of electronics that can apply to hobbies and many other areas of interest**
- **Be able to understand do-it-yourself electronics magazine projects and other basic electronics articles**
- **Optional 26 experiments that offer an insight into the world of electronics and its broad range of applications**

Understand those articles about interesting projects in popular electronics magazines. You can, after you complete the easy-to-understand Electronics for Hobbyists Course from Heathkit/Zenith.

In seven well-written and illustrated units, you are taken step-by-step through an excellent course on an introduction to the various aspects of the electronics world.

You will learn about subjects such as: voltage, current, resistance, power, fundamental mathematics of electronics, and magnetism. Direct and alternating current are introduced along with the operation of transformers, diodes, transistors and ICs.

The use of the voltmeter, ammeter and ohmmeter for measurement is discussed as well. Different analog and digital circuit operations are presented, as is the complex world of computers including programming and software. The last unit surveys electronics hobbies: experimentation, radio controlled models, computers, audio and amateur radio.

You don't need any previous knowledge of electronics to understand the material presented in the Electronics for Hobbyists Course. It is arranged in a logical manner and all electronics concepts and terms are explained in a way which makes learning easier.

To perform the experiments included with the course you'll need the use of the ET-3100B Trainer on page 63. A multimeter and oscilloscope are also needed to make measurements and to observe waveforms.

Complete the optional final exam with a 70% or better score to earn 4.0 Continuing Education Units and receive a personalized Certificate of Achievement from Heathkit/Zenith Educational Systems.

EE-3140, Shpg. wt. 11 lbs. **69.95**

FREE MICROSOFT SOFTWARE WORTH $575.00

Get Multiplan (MS-5063-7) and Word (MS-5063-9) FREE when you buy any kit or assembled 151 to 161 Computer.

HS-161 Portable Computer with built-in 9" display

HS-151 Personal Computer with optional ZVM-136 Monitor

Features and enhancements plus IBM compatibility in a sleek high-performance computer

As low as

$1599.00

kit price

Heath Company presents a quality personal computer system with IBM compatibility that enables you to access the wealth of software and peripherals developed for the IBM-PC. It is packed with features, easy to operate and offers a significant price savings over comparable computers. Both kit and assembled computers are available.

A total performer, the HS-151 Personal Computer offers IBM compatibility with enhanced features that you want and demand. This quality computer challenges the theme that all IBM-compatible computers must look and act the same. It is better built and it out-performs all others in its class. And for those who want that capability wherever they go there's the HS-161 Portable Computer.

The 16-bit 8088 microprocessor, the same as used in the IBM-PC, resides on the CPU board of both the desktop and portable computers. This allows the Heath IBM-compatibles to run 99% of all IBM-PC software. This compatibility accesses users to a huge and growing amount of applications software for the IBM-PC. Also on the CPU board is an open socket for the addition of an optional 8087 math co-processor, when heavy-duty number crunching is required.

A standard 128 kilobytes of RAM, with internal parity checking, is available on all models. For larger programs where additional memory is needed or desired, 64K byte increments (Z-205-1) can be added to the main memory board for up to a total of 320K of RAM. Memory can be expanded even further, up to 640K, with the addition of optional kit or assembled (H-305 or Z-305) Memory Expansion Boards.

Optional single or dual 5.25-inch floppy disk drives supply both Personal and Portable computers with high-capacity auxiliary storage. These double-sided, double-density disk drives are IBM formatted and each stores up to 360K bytes of data. In the HS-161 Portable Computer, the disk drives fold down and nestle safely inside the cabinet whenever the computer is being transported. An optional Winchester hard disk drive, available only with the HS-151 Personal Computer, provides an extensive 10.6 megabytes of storage.

Eight IBM-compatible slots are situated on a busboard for user configuration. Four slots are used for plug-in CPU, memory, video, and floppy disk controller boards. This leaves four open slots that can accept most any off-the-shelf accessory boards designed for the IBM-PC (see pages 94-95).

Two video outputs are available at the rear panel of both the Personal and the Portable computer. One output is a standard nine-pin D connector for connecting an external RGB color monitor and the other is a phono plug for a composite video monochrome monitor. In the character mode, you have a 25 line by 80 character display with a selectable 8 background colors and 16 foreground colors. In the graphics mode, each pixel (dot) of a 320 x 200 pixel area can be painted in one of four colors selected from one or two-color palettes. Color displays on a monochrome monitor are represented by a corresponding gray level.

A 9-inch monochrome video monitor is built into the HS-161 Portable Personal Computer and offers excellent contrast and sharpness. A front panel control allows you to adjust the screen's brightness for varying viewing conditions. The high resolution glare-free monitor is available in a green display or a "Chroma-Gold" amber display, preferred by many during periods of prolonged usage.

Increased video resolution is made possible for both Personal and Portable computers with the addition of a Z-319 Video Card with 192 kilobytes of usable video RAM. This optional card enables these computers to produce high resolution 8-color bit-mapped graphics on a 640 x 225 pixel area. More colors are possible by mixing the eight available colors. With the Z-319 card installed, and using MS-DOS Enhancement (OS-63-51), HS-151 and HS-161 Computers can reproduce any graphics of the advanced H-100 Computer.

Improved video is one of the most obvious advantages of the HS-151 Personal and HS-161 Portable Computers. A complete absence of video flickering during scrolling and a substantial improvement in the speed at which text is displayed is a very big plus for users. The display is also much clearer, achieved by special circuitry that removes video interference. In addition, both computer versions offer ROM or software selected smooth and jump scrolling, and four different character fonts in the text mode.

Serial and parallel communication ports provide these computers with the flexibility to use dot matrix and letter quality printers, modems, and other peripheral devices. The serial I/O port has a standard EIA RS-232 DTE connector and is capable of baud rates between 110 and 9600 while operating in asynchronous full or half duplex. The parallel interface is a Centronics compatible port using a 25-pin D connector. The ports are configured to peripherals using a simple menu-driven program supplied with all computers. Selections are made from on-screen choices and many pre-defined configurations are available for many popular printers and modems.

A detached low-profile keyboard adds to the ease of use for both Personal and Portable Computers. It is an electronic keyboard with 84 keys and 57 alpha-numeric keys laid out like Selectric-style keyboards. LED status lights indicate CAPS LOCK and NUM LOCK conditions. The keyboard has an L-shaped return key and double-wide shift key for easier word processing. All keys have a positive tactile feedback for faster typing and a switchable electronic key click. Each key, as well as the keyboard, is sculpted and repeats itself when held down with the rate increasing as the key is held down longer. The keyboard on the HS-161 Portable doubles as a cover when transporting the computer.

Special function keys and a numeric keypad are also contained on the keyboard. Ten function keys line up to the left of the keyboard and a 17-key keypad is clustered at the right. An additional ENTER key is located at the keypad. This key becomes very useful when large amounts of numbers must be entered when using accounting programs and large spreadsheets.

A heavy-duty power supply provides Personal and Portable Computers with tha ability to handle any form of internal expansion options. This reliable switching-regulator power supply is preassembled for easy installation. It is lightweight, efficient and cool running. Internal fan noise is totally absent.

An extensive and easy-to-use set of diagnostics allow you to check the computer's hardware accuracy which adds to your data entry protection. When first turned on, a set of power-up diagnostics tests the computer so that you can be confident it is working properly for boot-up. Internal LEDs help to identify any failures, even if an error message cannot be displayed on the video monitor. A set of menu-driven diagnostics are also available in ROM, accessible from the keyboard. These func-

tions permit booting from different disk drives or partitions, examining and manipulating memory and registers, controlling input/output functions, setting video scrolling, and tracing program execution.

Further diagnostics are contained in a disk package included with all kit computers. These tests enable you to identify system operations and malfunctions down to the level of IC chips. An alarm sounds when a defect is detected.

One especially powerful feature of the Personal and Portable Computer is a debugger in its monitor ROM. It is an extremely flexible tool for use in a programming environment. The built-in commands are identical to Microsoft's DEBUG and allow disassembling user programs, executing user programs (with optional breaks), searching memory, moving blocks of memory, performing hex arithmetic, and other operations. Other major advantages included in the ROM are single-stepping through a program without locking up and much faster operation. Plus the debugger is always available from the keyboard.

Many editing capabilities are provided with the HS-151 and HS-161 Computer to aid you in program writing. You can insert and delete characters and lines; erase a line; erase to the beginning of a line, to the end of a line, or to the end of a page. While editing control the cursor with up, down, left, right, and home functions.

The MS-DOS operating system is included free with both kit and assembled Personal and Portable Computers. More information about this operating system is found on page 81. See our full line of applications software for these two computers on pages 78-81 and pages 100 and 101. To learn more about this operating system and other programming software turn to pages 102 and 103.

FREE with the kit Transportable PC is the DG Analog Game Port that includes a clock/calendar, battery, and software for its use.

Heathkit **Kit HS-151-21,** Low-Profile Personal Computer with monochrome and color capability, 128K RAM, one 5.25" disk drive with 360K total storage, and the MS-DOS operating system, 73 lbs. **1599.00**

Heathkit **Kit HS-151-22,** Low-Profile Personal Computer with monochrome and color capability, 128K RAM, two 5.25" disk drives with 720K total storage, and the MS-DOS operating system, 78 lbs. **1899.00**

Zenith data systems **ZF-151-21,** Assembled Low-Profile Personal Computer with monochrome and color capability, 128K RAM, one 5.25" disk drive with 360K total storage, and MS-DOS, Shpg. wt. 38 lbs. **2199.00**

Zenith data systems **ZF-151-52,** Assembled Low-Profile Personal Computer with monochrome and color capability, 320K RAM, two 5.25" disk drives with 720K total storage, and MS-DOS, 41 lbs. ..... **NOW ONLY 2699.00**

Zenith data systems **ZW-151-52,** Assembled Low-Profile Personal Computer with monochrome and color capability, 320K RAM, 10.6MB Winchester hard disk drive, one 5.25" disk drive with 360K storage, and the MS-DOS operating system, 42 lbs. ..... **Was $4499.00 NOW 3899.00**

Heathkit **Kit HSA-1161-21,** Portable Personal Computer with non-glare 9-inch amber CRT, color capability, 128K RAM, one 5.25" disk drive with 360K total storage, MS-DOS, and the DG Analog Game Port, Shpg. wt. 101 lbs. ..... **Was $1699.00 NOW ONLY 1495.00**

Heathkit **Kit HSA-1161-22,** Portable Personal Computer with non-glare 9-inch amber CRT, color capability, 128K RAM, two 5.25" disk drives with 720K total storage, MS-DOS, and the DG Analog Game Port, Shpg. wt. 113 lbs. ..... **Was $1999.00 NOW ONLY 1695.00**

Heathkit **Kit HSG-1161-21,** Portable Personal Computer with non-glare 9-inch green CRT, color capability, 128K RAM, one 5.25" disk drive with 360K total storage, MS-DOS, and the DG Analog Game Port, Shpg. wt. 101 lbs. ..... **Was $1699.00 NOW ONLY 1495.00**

Heathkit **Kit HSG-1161-22,** Portable Personal Computer with non-glare 9-inch green CRT, color capability, 128K RAM, two 5.25" disk drives with 720K total storage, MS-DOS, and the DG Analog Game Port, Shpg. wt. 113 lbs. ..... **Was $1999.00 NOW ONLY 1695.00**

Zenith data systems **ZFA-161-21,** Assembled Portable Personal Computer with non-glare 9-inch amber CRT, color capability, 128K RAM, one 5.25" disk drive with 360K total storage, and MS-DOS, 55 lbs. .... **ONLY 2150.00**

Zenith data systems **ZFA-161-52,** Assembled Portable Personal Computer with non-glare 9-inch amber CRT, color capability, 320K RAM, two 5.25" disk drives with 720K total storage, and MS-DOS, 61 lbs. ..... **ONLY 2599.00**

HS-151 Personal and HS-161 Portable Computer Accessories:

Second 5.25" Floppy Disk Drives for both the Personal and Portable Computers are available by visiting your local Heath/Zenith Computers & Electronics Center or calling TOLL-FREE 800-253-7057 from 8 AM to 4:30 PM ET, Monday-Friday.

NEW! HS-317-10, 10 MB Winchester Upgrade Kit for HS-151, 16 lbs. . **995.00**

NEW! HS-317-20, 20 MB Winchester Upgrade Kit for HS-151, 10 lbs. **1195.00**

Z-205-1, Ram Upgrade package, a nine chip set that installs onto the main board of a kit or assembled HS-151 Personal or HS-161 Portable Computer for increased memory capability. Three sets are required to fully populate (320K of RAM) the main board. Shpg. wt. 1 lb. ..... **Each set 79.99**

Kit H-305, System RAM Board, an accessory board for kit and assembled HS-151 Personal and HS-161 Portable Computers. The H-305 Board comes with 128K of RAM and can be increased with additional Z-205-1 Upgrade packages up to a total complement of 320K. Requires a fully populated (320K) main board for a total RAM capacity of 640K. Shpg. wt. 2 lbs. **149.95**

NEW! Z-305, Assembled and tested System RAM Board, 2 lbs. **199.00**

Z-316, 8087 Numeric Co-Processor significantly improves the performance of HS-151 Personal Computers and HS-161 Portable PCs in arithmetic-intensive activities, Shpg. wt. 1 lb. **225.00**

Z-319, Assembled Bit-Mapped Video Graphics Card provides a high-resolution, 8-color, 640 x 225 pixel display (640 x 512 interlaced) of both alphanumeric characters and graphics. The Z-319 Card enables the HS-151 or HS-161 to emulate H-100 Computer video attributes and uses mapping to functionally emulate the keys of an H-100 keyboard. Requires use of the MS-DOS operating system (OS-63-50) and the MS-DOS Enhancement (OS-63-51). 1 lb. **549.00**

Purchase both the Z-319 Video Card and the MS-DOS Enhancement (OS-63-51) operating system together and save over separate costs.

NEW! ZSS-100-27, Shpg. wt. 6 lbs. **449.00**

NEW! HCA-150-4, Second Serial Port, all the required hardware to install a serial port into the HS-151 or HS-161 Computer, 1 lb. **39.95**

NEW! Kit H-329, Monochrome Video Card provides a video output compatible with the output from an IBM monochrome video card. Displays 25 lines of 80 characters and stores one page in 8K of RAM. Shpg. wt 3 lbs. **159.95**

NEW! Z-329, Assembled H-329, Shpg. wt. 2 lbs. **200.00**

TM-150, Programmer's Reference Manual provides information about the features of the HS-151 Personal and HS-161 Portable Computer as related to programming and interfacing, Shpg. wt. 5 lbs. **25.00**

SAVE 50%

Purchase any or all of the following items within 90 days of any kit HS-151 Personal or kit HS-161 Portable Computer purchase and save 50% off the listed price. Copy of Computer purchase required.

Save 50% on any three individual Heath/Zenith software packages. This also applies to PeachText 5000, Multiplan and WordStar software.

Z-205-1, RAM Upgrade package for increased main board memory.
Regularly $79.99 ..... **Discount Price 39.99**

Z-316, 8087 Numeric Co-Processor.
Regularly $225.00 ..... **Discount Price 112.50**

Z-319, Assembled Bit-Mapped Video Graphics Card for high resolution.
Regularly $549.00 ..... **Discount Price 274.50**

Kit H-305, System RAM Accessory Board adds 128K RAM.
Regularly $149.95 ..... **Discount Price 74.97**

NEW! Z-305, Assembled and tested H-305 System RAM Board.
Regularly $199.00 ..... **Discount Price 99.50**

TM-150, Programmer's Reference Manual.
Regularly $25.00 ..... **Discount Price 12.50**

HS-151 and HS-161 SPECIFICATIONS: Processor: Intel 16-bit 8088. **Clock:** 4.77 MHz. **On-Board Memory:** 128 KB standard expandable to 320 KB on main board, up to 640 KB total memory via expansion slot. **VIDEO DISPLAY: CRT (HS-161 only):** Non-glare 9-inch diagonal, amber phosphor. **Display Format:** 25 lines of 80 characters. **Display Size:** 5.0" high x 7.0" wide. **Character Size:** 0.165" high x 0.075" wide. **Character Type:** 8 x 8 dot matrix. **Dot Resolution:** 640 horizontal x 200 vertical. **Colors:** Characters: 1 of 8 background colors with 1 of 16 foreground colors. Graphics: Each pixel can be 1 of 4 colors selected from 1 of 2 color palettes. **Gray Scale:** Eight levels on a monochrome display. **Video Outputs:** RGB with intensity control and composite monochrome. **Cursor:** Blinking underline or reverse video or off. **Cursor Controls:** Up, down, left, right, home. **Cursor Addressing:** Relative and direct. **Tab:** 8 columns. **Refresh Rate:** 60 Hz, 50 Hz. **Edit Functions:** Insert and delete characters or lines. **Erase Functions:** Erase line, erase to beginning of line, erase to end of line, erase to end of page. **Bell:** Audible alarm in receipt of ASCII BEL command. **BUS STRUCTURE: Type:** IBM compatible. **Slots:** 8, 4 available for expansion. **KEYBOARD: Type:** 84 keys, 57 alphanumeric and 10 special function plus 17 keypad keys including separate numeric keypad. **Key Click:** Yes. **DISK SYSTEM: Drives:** Single or dual 5.25-inch double-sided double-density 48 TPI floppy disk drive. Capacity: IBM formatted for 360 KB each. **Winchester Drive:** Optional internal 5.25-inch rigid disk drive and single 5.25-inch floppy disk drive. Capacity: 12.76 MB unformatted, 10.68 MB formatted. **INPUT/OUTPUT: Serial I/O:** One DTE RS-232C port. Baud Rate: 110-9600. **Operation:** Asynchronous full or half duplex. **Parallel I/O** Centronics compatible. **Power Supply:** 120/240, 50/60 Hz, 300 watts (maximum). **Dimensions:** HS-151: 16" W x 6¼" H x 16½" D (40.6 x 15.9 x 42 cm). HS-161: 19½" W x 8⅜" H x 19⅛" D (20.9 x 49.5 x 48.6 cm). **Weight:** HS-151: Approximately 42 lbs. with keyboard and two disk drives. HS-161: 39 lbs.

More accessory boards can be found on page 94.

Special quantity and system discounts are available on assembled computer products. See page 78.

More software for the new HS-151 Personal and HS-161 Portable Computers

On these two pages you'll find more 16-bit business software, programming languages and other software for the Heathkit Personal and Portable Computers. Still more software can be found on pages 100 and 101.

General Ledger maintains a financial picture

A simple, easy-to-operate system from Peachtree* Software that lets you maintain a complete financial picture of your business. It can be used independently or in connection with Accounts Receivable and Accounts Payable Peachtree accounting packages. Keep up-to-date with many comprehensive reports that are accurate and timely descriptions of your company's current financial condition.

General Ledger will run in an HS-151 Personal or HS-161 Portable Computer with 192K of RAM, two 5.25" disk drives, under MS-DOS and GW-BASIC.

RS-5065-1, Shpg. wt. 3 lbs. **499.00**

Prepare billings with Accounts Receivable package

Peachtree Accounts Receivable package helps you prepare bills for and obtain timely collections from customers. Used independently or together with General Ledger, this accounting package can reduce lost or delayed income because of bookkeeping errors or paperwork delays.

Accounts Receivable will run in an HS-151 Personal or HS-161 Portable Computer with 192K of RAM, two 5.25" disk drives, under MS-DOS and GW-BASIC.

RS-5065-2, Shpg. wt. 3 lbs. **499.00**

Accounts Payable business application package

Peachtree's Accounts Payable package maintains a complete file for each of your vendors. It will show which of your invoices to pay by the due date, by the specified discount date or according to certain cash requirements. Save money by claiming all the discounts available. At the same time, keep your vendor's accounts always up to date. Even print out checks and keep a check register.

The Accounts Payable package will run in both the HS-151 Personal and HS-161 Portable Computers with 192K of RAM and two 5.25" disk drives, while using the MS-DOS operating system and GW-BASIC.

RS-5065-3, Shpg. wt. 3 lbs. **499.00**

Inventory Control covers all aspects of inventory

Speed and simplify the demanding task of effective inventory control with the Peachtree Inventory Management System. Inventory Control permits the entry of four types of transactions: sales, returns, receipts and adjustments. Improve your inventory control, reduce your management costs and decrease customer response time with this straightforward method of updating your inventory records.

To run this accounting package, an HS-151 Personal and HS-161 Portable Computer needs 192K of RAM and two 5.25" disk drives, and use the MS-DOS operating system along with the GW-BASIC programming language.

RS-5065-5, Shpg. wt. 3 lbs. **499.00**

Sales Invoicing bridges accounting packages

The Peachtree Sales Invoicing System is capable of accessing and updating both Accounts Receivable and Inventory Control. In one process update customer accounts with sale or return information, update inventory with returned or sold stocked items, and then retain this information for printing invoices or credit memos. Other features include credit checking during invoice entry, automatic sales tax calculation and a check of inventory against quantity ordered.

Sales Invoicing will run under MS-DOS and GW-BASIC in an HS-151 Personal or HS-161 Portable Computer with 192K of RAM and two 5.25" disk drives. Accounts Receivable and Inventory Control packages are also required.

RS-5065-6, Shpg. wt. 3 lbs. **399.00**

Save over $1300 on this NEW comprehensive Peachtree Business Accounting System

Save on the total cost of purchasing these five linked packages individually – General Ledger, Accounts Receivable, Accounts Payable, Inventory Control, and Sales Invoicing. Used together they provide complete control over vital accounting functions and you keep up to date with orderly reports on your financial situation. This system requires an HS-151 Personal or HS-161 Portable Computer with 192K of RAM, two 5.25" disk drives, MS-DOS, and GW-BASIC.

ZSS-150-7, Shpg. wt. 17 lbs. **999.00**

Powerful Condor* Relational Data Base Management

Powerful and simple enough for all business applications, rDBMS* enables you to design and create data bases for keeping records on any subject you choose. Quickly search, sort, merge, analyze, index and print out up to 65,535 records per data base. Create a new data base in minutes. Use up to 1023 bytes for each record. Condor is so easy to use that you can achieve meaningful results within a few hours. Condor uses the relational data base concept which allows unrelated information to become dynamically related.

This version of Condor's data base package requires an HS-151 or HS-161 Computer with 128K of RAM, one 5.25" disk drive and MS-DOS.

CD-5063-1, Shpg. wt. 5 lbs. **650.00**

Fast and easy-to-use Condor File Management System

The Condor FMS* package offers basic rDBMS capability. Features include: processing of up to 32,767 records per data base, up to 1023 bytes per record, create new data bases within minutes, calculation of statistics for field values, and help menus and command files that you create. Quickly search, sort, merge, analyze and print out records with ease.

This version of Condor FMS requires an HS-151 or HS-161 Computer which has 128K of RAM, one 5.25" disk drive and uses the MS-DOS operating system.

CD-5063-2, Shpg. wt. 3 lbs. **199.00**

Valuable Pecon Peachtree to Condor Interface System

A valuable business tool, this utility program allows the transfer of data from master and transaction files in Peachtree accounting programs to data bases that can be processed using the Condor system. Each program in the system displays instructions and messages that enable even the inexperienced user to use it with minimum instruction time and reference to the manual.

Running the Pecon Interface System on an HS-151 Personal or HS-161 Portable Computer requires 192K of RAM, two 5.25" disk drives, the MS-DOS operating system, a minimum of one Peachtree accounting package, and either the Condor rDBMS or FMS software found on this page.

CB-5063-9, Shpg. wt. 1 lb. **99.00**

Microsoft Standalone Sort for sorting and merging

MS-Sort is a stand alone utility that accepts data files from many different programming languages and arranges the records in these files in any order you assign. MS-Sort can be used for many tasks including: selecting and sorting records for reports; sequencing transactions to be merged into a master file; grouping and arranging items to be displayed on-screen; and converting a data file type to another, including one language to another.

Simple, easy-to-learn, yet powerful within its scope, MS-Sort is a programming language that manipulates files on the record level. It is fast, changing files by rejecting or reordering whole records.

And MS-Sort is adaptable. When numerous reports are needed based on selections of data sorted in different orders, MS-Sort can be quickly changed and executed without any compile or link steps. MS-Sort programs can even prompt for and accept any changeable statements while loading from a disk.

MS-Sort requires an HS-151 Personal Computer or an HS-161 Portable PC using the MS-DOS operating system. Although MS-Sort can be run using one 5.25" disk drive, two are recommended so that a greater number of sort tasks can be accomplished. MS-Sort resides in approximately 37K of memory. Since MS-Sort is capable of handling files up to 4 billion bytes, it's speed and power in an application is limited only by memory and disk space.

MS-5063-12, Shpg. wt. 1 lb. **199.00**

Optimizing C86* C language Compiler

Utilize the full power of your H/Z-100 Desktop, HS-151 or HS-161 Personal Computer and benefit from the full portability of most C code with the C86 Compiler. Version 2.2 features include: increased speed with code that is 10% to 20% smaller than previous versions, produce Microsoft type object files, use the full power of the 8087 numeric co-processor, and more. To run the compiler you'll need 192K of RAM, MS-DOS, and one 5.25" disk drive although two drives are highly recommended.

CI-5063-1, Shpg. wt. 3 lbs. **395.00**

*Peachtree is a trademark of MSA, Inc. Condor is a registered trademark of Condor Computer Corp. Condor FMS and rDBMS are trademarks of Condor Computer Corp. C86 is a trademark of Computer Innovations, Inc.

3Com EtherSeries brings you computer networking

Share a hard disk drive, printers, and use electronic mail.

EtherLink circuit board provides basis of system

EtherLink is a basic prerequisite for connecting up to 300 HS-151 Personal and/or HS-161 Portable Computers into a common network that can share all the other products in the EtherSeries. It is a printed circuit board that easily installs into any unused computer expansion slot. A Thin Ethernet coaxial cable is then used to connect all computers in your network. Included with the EtherLink Card is user software. This software runs on floppy disk-equipped computers and allows access to the disk or printer of a Winchester-equipped computer.

Computers connected to the network must have: at least one 5.25" disk drive, at least 128K of RAM (192K if EtherMail is used), MS-DOS Version 2, and an EtherLink card. One of the network computers must be equipped with a Winchester hard disk drive for use as a File Server. Each end of a network must have a Terminator attached (see accessories below).

TC-5063-1, Shpg. wt. 4 lbs. **650.00**

Share both hardware and software with EtherShare

Make use of greater data storage. Share information and programs. EtherShare provides these advantages and more to all users connected to the same Ethernet Network. EtherShare allows a network to use the resources of a hard disk drive subject to network control and security.

EtherShare consists of server software for the Winchester-equipped computer, now called the network server, in a network using Ethernet products. It allows other computers in the network to use allotted portions of the hard disk. And, it also allows the server to act as a normal user computer.

The server computer must include: MS-DOS Version 2, a fixed hard disk drive, at least 256K bytes of memory, an EtherLink card, and a 5.25" disk drive for installing the software and for backing up copies of hard disk data.

TC-5063-2, Shpg. wt. 3 lbs. ..... **Was $599.00 NOW ONLY 449.00**

EtherMail adds electronic mail service to network

Compose, forward and reply to messages and send them to anyone else on the network with the EtherMail package. In addition, you can read, file and print out any messages sent to you. You can also send messages to a single individual or to an entire group by way of a distribution list.

The first part of EtherMail is the server software. It allows the computer with the hard disk drive to act as a post office where messages are held until requested by the recipient. The second part, user software, is used for composing, reading, sending and receiving messages. Server software requires 320K of RAM, the MS-DOS Version 2 operating system and EtherShare. User requires 192K of RAM.

TC-5063-3, Shpg. wt. 3 lbs. ..... **Was $749.00 NOW ONLY 649.00**

EtherPrint allows network users to share printers

Cut your printer costs by allowing many users access to a single printer. Or, offer network users a choice of a line printer or a letter-quality printer that's connected to your server computer. Program, data and text files are stored and then printed out when the printer is available in the order they are received.

EtherPrint software requires at least 128K of RAM, two disk drives, MS-DOS Version 2 and the EtherShare software that has been previously installed.

TC-5063-4, Shpg. wt. 3 lbs. ..... **Was $499.00 NOW ONLY 199.00**

Thin Ethernet Cables and Accessories:

TC-5063-5, 25 foot Thin Ethernet coaxial cable, 1 lb. **20.00**

TC-5063-6, 100 foot Thin Ethernet coaxial cable, 6 lbs. **50.00**

TC-5063-7, Ethernet Terminator Kit, Two Terminators, 1 lb. **25.00**

TC-5063-8, Ethernet (BNC/BNC) Barrel Connector, Shpg. wt. 1 lb. **6.00**

NEW! TC-5063-9, EtherStart ROM allows diskless Z-150 and Z-160 computers to boot up directly from an EtherShare network server. requires EtherShare (TC-5063-2) package, Shpg. wt. 3 lbs. **125.00**

CPS for Personal Computer communications capability

Turn your Personal or Portable Computer into an enhanced communications device with this Computerized Phone System (CPS) software. Communicate at up to 9600 baud with other computers. To run this CPS software, an HS-151 or HS-161 requires 128K of RAM, one 5.25" disk drive, MS-DOS and an external modem.

CB-5063-7, Shpg. wt. 2 lbs. **49.00**

NEW! Design with 4-Point Graphics software

Easily design artistic pictures, geometric shapes and figures, business graphs, and animated pictures or graphic presentations using two user-defined 3-color pallettes. Requires an HS-151 or HS-161 Computer equipped with two 5.25" disk drives, 320K RAM and using MS-DOS 2 or greater.

IM-5063-1, Shpg. wt. 3 lbs. **195.00**

Integrated GrafTalk produces business graphs

GrafTalk is a versatile and flexible package with a wide range of features. Further information is available on page 84. Requires an HS-151 Computer or HS-161 PC with 128K of RAM and two 5.25" disk drives under MS-DOS.

RG-5065-1, Shpg. wt. 3 lbs. **499.00**

Microstat offers extensive statistical tests

Microstat is an interactive statistics package for data manipulation and statistical testing. Developed for real-life applications. See page 87. For HS-151/161 Computers with 128K of RAM, two 5.25" disk drives and using MS-DOS.

ES-5063-1, Shpg. wt. 3 lbs. **249.00**

HS-151 and HS-161 Personal Computer Diagnostic Disk

Reduce service costs and minimize hardware downtime with the programs contained on this 5.25" floppy disk. Designed to operate with a minimum of operator interaction. Alarm sounds when a fault is found. Requires a computer with 128K of RAM and one disk drive. Included with HS-151 and HS-161 Computers.

CBT-5063-13, Shpg. wt. 3 lbs. **79.00**

Use the advanced MS-DOS Version 2 operating system

This powerful operating system has many new features including: subdirectories, input/output redirection and pipes and filters. Included with HS-151 and HS-161 Computer and requires 128K of RAM and one 5.25" disk drive.

OS-63-50, Shpg. wt. 5 lbs. **150.00**

NEW! MS-DOS Enhancement provides H-100 capability

This supplement to MS-DOS Version 2 allows your HS-151 or HS-161 Computer to emulate a high-performance H-100 Computer. Run virtually all H-100 software, get high resolution graphics capability, and get all H-100 keyboard functions. Requires an HS-151 or HS-161 Computer equipped with a Z-319 Video Graphics Card (pg. 77) and using the MS-DOS Vers. 2 (OS-63-50) operating system.

OS-63-51, Shpg. wt. 5 lbs. **150.00**

MS-DOS Version 2 Programmer's Package

This package is designed for programmers and system developers who wish to modify features of MS-DOS or develop programs which will run under the MS-DOS environment. Includes a Basic Screen Editor, Macro Assembler, cross-reference utility, and a number of filters.

CB-5063-16, Shpg. wt. 3 lbs. **149.00**

Programming languages for the HS-151 and HS-161 PC

GW-BASIC has directory support, I/O redirection, enhanced graphics capability and more. New options for graphics, paint in patterns and expand music capabilities. HS-151/161 Computers require one 5.25" disk drive and MS-DOS.

MS-5063-13, Shpg. wt. 3 lbs. **100.00**

NEW! GW-BASIC Version 2 for attaining H-100 programming and graphics capability on HS-151 and HS-161 Computers. See page 85 for software details. Computer requires Z-319 Video Graphics Card (pg. 77), and both MS-DOS and Enhancement (OS-63-51 plus OS-63-50) operating systems on this page.

MS-5163-13, Shpg. wt. 3 lbs. **100.00**

FORTRAN: Conforms to the ANSI X3.1978 standard (including most of the features of FORTRAN-77 except the COMPLEX data type). Requires 192K of RAM, one 5.25" disk drive (two are recommended) and the MS-DOS operating system.

MS-5063-2, Shpg. wt. 5 lbs. **195.00**

COBOL: Certified with the Federal Compiler Test Center to be at the low intermediate level of compliance with the ANSI X3.1978 standard. It requires 128K of RAM, one 5.25" disk drive (two are recommended) and MS-DOS.

MS-5063-3, Shpg. wt. 5 lbs. **395.00**

Pascal: Use this version of Pascal at the ISO standard level for transporting programs to and from other computers. Requires 192K of RAM, one 5.25" disk drive and the MS-DOS operating system.

MS-5063-5, Shpg. wt. 5 lbs. **295.00**

Take advantage of the H-100* Desktop's new 8 MHz operating speed and increased memory

As low as
$1595.00
Low-Profile

DOUBLE MASTER BUILDER POINTS

Now the All-In-One and Low-Profile H-100 Desktop Computer adds 8 MHz operation, a minimum of 256K RAM, and color graphics to its other high performance features that include the ability to run 16 and 8-bit software, expandable memory and data storage capability, excellent high-resolution graphics, easy-to use keyboard, industry standard S-100 expansion slots, and more.

Earn double Master Builder points for all kit H-100 computers

New to the advanced H-100 Computer is increased microprocessor operating speed, up from 5 MHz to 8 MHz. An H-100 Computer operating at the higher 8 MHz will run application programs faster, search data bases faster, and allow you to compile and assemble programs faster. With its increased operating speed you'll notice how much faster drafting software and sort programs perform. Add an 8087 numeric co-processor to a 5 MHz operating H-100 Computer and increase its operating efficiency even more.

Another advantage to the 8 MHz H-100 Computer is the amount of memory residing on the motherboard. It uses 256K RAM chips which are now standard on all models. Now you can expand your computer's memory up to 768K on the main board without using an expansion slot. This provides the capability to handle large, comprehensive spreadsheets and accounting or inventory control programs without breaking them into segments. This also serves to increase data processing speed. And you'll have more room for more expansion boards.

All-In-One and Low-Profile H-100 Computers are equipped with dual microprocessors to run both 16 and 8-bit software. For performing sophisticated tasks a 16-bit 8088 microprocessor is used to run higher-speed higher-performance 16-bit software. It significantly accelerates performance – up to 10 times the speed of 8-bit software – for running programs faster or manipulating more information, or both. With the 8-bit 8085 microprocessor you can run existing 8-bit software programs, including many current Heath/Zenith CP/M* programs.

Choice of MS-DOS or CP/M operating systems. The H-100 is a powerful and reliable computer that runs both MS-DOS and CP/M. These operating systems offer varying performance capabilities. However, both work with a wide variety of applications programs providing you with a wide range of software from accounting to word processing packages.

Designed for easy expansion, the H-100 Computer features four open card slots. These are industry standard IEEE-696 S-100 slots that can be filled with accessory boards and peripheral devices to meet your changing requirements. This add-on capability protects your computer investment by being able to take advantage of advancing future technology and reducing possible equipment obsolescence.

Optional high capacity disk drive configurations add speed and efficiency. Both H-100 models are available with one or two 5.25" double-sided double-density disk drives. Each has a storage capacity of 320K and a total of 640K for computers with two drives. Dual drives mean faster operational speed and real convenience when certain operations require the use of more than one floppy disk. Support for up to two external 8-inch floppy disk drives (IBM 3740 format) comes standard.

A Winchester disk drive is available in assembled Low-Profile H-100 Computers. This 11 megabyte hard disk drive allows you to conveniently store data that would otherwise need several dozen floppy disks. Easily handle large amounts of data encountered in accounting, inventory and technical jobs that used to require an expensive minicomputer system. And a Winchester drive dramatically decreases seek time to access information ten to twenty times faster than a system using 5.25" disk drives. Each Winchester-equipped H-100 Computer has a single 5.25" disk drive for transferring or backing up your files.

A built-in high-resolution 12" monochrome video display, in the All-In-One H-100 Computer, presents an easy-to-read 25 line by 80 character display. Crisp, clean characters are formed from a 5 x 9 dot matrix and letters g, j, q, and y have true descenders. Screen colors are available in non-glare green, amber or white. Screen brightness is adjustable. The Low-Profile H-100 Computer offers the same video output for use with compatible video display monitors of your choice.

Excellent high-resolution color graphics are possible on both H-100 8 MHz models through bit-mapping to create extensive charts, graphs, art, symbols for reports, etc. Control 144,000 individual dots (pixels) on an area of 640 x 225 pixels for highly detailed drawings and graphs. Get eight levels of intensity or eight-color capability by connecting a separate color video monitor. Add two optional Z-219-1 Color Video RAM Chip Sets to 5 MHz H/Z-100s to get the same color graphics.

Three communication ports, one parallel and two serial, offer total communications flexibility without using a single expansion slot. The parallel port with its 25-pin D connector enables the use of a wide range of industry standard printers. The two RS-232 serial ports, with one a DTE and the other a DCE connector, allows use of modems, printers, speech synthesizers, and plotters.

An easy-to-use sculptured typewriter-style keyboard allows you to work faster and more accurately than ever before. Ninety-five feather-touch keys reduce fatigue, even after hours of operation. Twelve special function keys are software definable to save time and reduce work. A software controlled HELP key also adds to the users ease of operation. Cursor control keys are located on a separate professional 18-key numeric keypad. Special insert and delete keys for both characters and lines simplify insert and editing of text and data.

A high-efficiency power supply within the H-100 Computer saves energy and provides more than enough power to supply the requirements of a fully populated computer. This power supply won't let you down and won't slow your drives down when you fill all the expansion slots.

Free software is included with all H-100 Computers. Both kit and assembled H-100s come with the powerful MS-DOS operating system (see page 82). Fully assembled Z-100s include the integrated spreadsheet, graphics, and information management program LOTUS 1-2-3 on page 86.

Designed for easy maintenance and strength, the H-100 Computer features a modular construction enclosed in an exceptionally structurally strong case. Modular components snap in and out in minutes for quick construction and easy circuit board installation. Expansion boards are just as easy to install when added peripherals are desired or needed.

Excellent documentation, one of the most important parts of any computer system, is included with each computer. They are complete and easy to use. Economical computer kits include a step-by-step assembly manual. And both kit and assembled models have fully detailed operating manuals. The User's Manual includes many pictures identifying the parts of the system and step-by-step instructions showing the novice how to get the system up and running.

Quality engineering and high quality control standards ensure that a truly exceptional and dependable computer is yours whether in kit or fully assembled form. Many components in kit versions are preassembled and tested for faster kit building. All assembled computers are tested for years of high performance, trouble-free operation.

Heathkit **NEW! Kit HSA-1128-41,** All-In-One with monochrome graphics, non-glare amber CRT, 256K RAM, one 5.25" disk drive, color capability, 8 MHz operation, and MS-DOS, Shpg. wt. 112 lbs. **1695.00**

Heathkit **NEW! Kit HSA-1128-42,** All-In-One with monochrome graphics, non-glare amber CRT, 256K RAM, two 5.25" disk drives, color capability, 8 MHz operation, and MS-DOS, Shpg. wt. 122 lbs. **1895.00**

Heathkit **NEW! Kit HSG-1128-41,** All-In-One with monochrome graphics, non-glare green CRT, 256K RAM, one 5.25" disk drive, color capability, 8 MHz operation, and MS-DOS. Shpg. wt. 112 lbs. **1695.00**

Heathkit **NEW! Kit HSG-1128-42,** All-In-One with monochrome graphics, non-glare green CRT, 256K RAM, two 5.25" disk drives, color capability, 8 MHz operation, and MS-DOS, Shpg. wt. 122 lbs. **1895.00**

Heathkit **NEW! Kit HSW-1128-41,** All-In-One with monochrome graphics, non-glare white CRT, 256K RAM, one 5.25" disk drive, color capability, 8 MHz operation, and MS-DOS, Shpg. wt. 112 lbs. **1675.00**

Heathkit **NEW! Kit HSW-1128-42,** All-In-One with monochrome graphics, non-glare white CRT, 256K RAM, two 5.25" disk drives, color capability, 8 MHz operation, and MS-DOS, Shpg. wt. 122 lbs. **1875.00**

Heathkit **NEW! Kit HS-1108-41,** Low-Profile with monochrome and color graphics capability, 256K RAM, one 5.25" disk drive, 8 MHz operation and MS-DOS, Shpg. wt. 89 lbs. **1595.00**

Heathkit **NEW! Kit HS-1108-42,** Low-Profile with monochrome and color graphics capability, 256K RAM, two 5.25" disk drives, 8 MHz operation and MS-DOS. Shpg. wt. 100 lbs. **1795.00**

Zenith data systems **NEW ZF-118-42,** Assembled Low-Profile with monochrome and color graphics capability, 256K RAM, two 5.25" drive, 8 MHz operation, and MS-DOS and LOTUS 1-2-3, 54 lbs. **3099.00**

Zenith data systems **ZFG-121-32,** Assembled H-100 with monochrome graphics, non-glare green CRT, 192K RAM, two 5.25" drives for 640K bytes of storage, 5 MHz operation, and MS-DOS and LOTUS 1-2-3, 68 lbs. Mtr. Frt **3729.00**

Zenith data systems **NEW! ZW-118-42,** Assembled Low-Profile with internal 11 MB Winchester rigid 5.25" disk drive, one 5.25" drive with 320K bytes of storage, 256K RAM, 8 MHz operation, plus the MS-DOS operating system and LOTUS 1-2-3 software, Shpg. wt. 55 lbs. **4675.00**

Zenith data systems **ZWG-121-32,** Assembled All-In-One with internal 11 MB Winchester rigid 5.25" disk drive, one 5.25" drive with 320K bytes of storage, 192K RAM, 5 MHz operation, plus MS-DOS and LOTUS 1-2-3 software, Shpg. wt. 68 lbs. Mtr. Frt. **5599.00**

H/Z-100 Desktop Computer Accessories:

For additional second 5.25" disk drives for H/Z-100 Computers with one drive, visit your nearest Heath/Zenith Computers & Electronics Center (consult telephone white pages) or call TOLL-FREE 800-253-7057 from 8 AM to 4:30 PM ET, Monday thru Friday. Alaska and Michigan residents call 616-982-3411.

Winchester Upgrade Kit allows you to replace an existing 5.25" floppy drive in H-100 Computer with a 5.25" Winchester rigid disk drive. The Kit contains the controller and data separator boards, and an assembled and tested Winchester drive. The hard disk controller board installs into an H-100 S-100 expansion slot and the Winchester drive fits into a 5.25" disk drive location. The Winchester Upgrade Kit is for use with H-100 Computers only. For use in assembled Z-100 Computers, contact your nearest Heath/Zenith Computers & Electronics Center.

HS-217, For models with full height drives, Shpg. wt. 33 lbs. **1799.00**

HS-217A, For models with half height drives, Shpg. wt. 30 lbs. **1799.00**

NEW! HA-108, 8 MHz Conversion Kit for H-100 kit computers equipped with half-height drives. Converts these kits from 5 MHz operation to 8 MHz operation. Also adds 256K RAM chip capability (one set included) and enables RAM expansion on the main board up to 768K. Expands video memory to full color capability. For remaining kit and assembled H-100 Computers visit your nearest Heath/Zenith Computers and Electronics Center.
Shpg. wt. 2 lbs. **249.95**

NEW! Z-205-4, 256K RAM chip set for use in extending the RAM capability of 8 MHz H-100 Computers, Shpg. wt. 1 lb. **199.00**

Z-204, Assembled H/Z-100 Multiport Input/Output Card provides four additional serial I/O ports, one 8-bit parallel input port and one 8-bit parallel output port. It is jumper-configurable to several RS-232 or S-100 configurations, and may be installed in any vacant card slot. Includes three cables for connecting the card to the computer backplate. Two cables are used for synchronous/asynchronous DTE communication; the other cable, is for DCE communication.
Shpg. wt. 3 lbs. **395.00**

Z-216, 8087 Numeric Co-Processor, installs on the main board of H/Z-100 Computers that operate at 5 MHz and adds extensive high speed numeric processing capabilities, Shpg. wt. 2 lbs. **299.00**

Z-205-1, RAM Upgrade Package for use only with 5 MHz operation H/Z-100 Computers and provides 64K of RAM for increasing the amount of memory on the motherboard from 128K to 192K, Shpg. wt. 1 lbs. **79.99**

Z-205, Expansion RAM Card gives you H/Z-100 Computer an additional 256K of memory (requires 192K or RAM on main computer board). For use only in 5 MHZ operation H/Z-100 Computers. Card is fully populated and may be placed in any vacant card slot, Shpg. wt. 2 lbs. **599.00**

Z-219-1, One Color Video RAM Chip Set, two sets are required to upgrade 5 MHz H-100 Computers with monochrome outputs to color capability, 1 lb. ... **74.99**

ZA-100-4, S-100 Extender Board, Shpg. wt. 1 lb. **59.00**

HDC-100, Dust Cover for Low-Profile Computer, Shpg. wt. 1 lb. **16.00**

HDC-120, Dust Cover for All-In-One Computer, Shpg. wt. 1 lb. **16.00**

TM-100, H/Z-100 Technical Manuals, Shpg. wt. 22 lbs. **110.00**

$AVER! Save 50% on any or all of the items below

Get a big 50% discount on any or all of the following items when you buy them within 90 days of any kit H-100 Computer purchase.

Any three individual Heath/Zenith software packages. This also applies to PeachText 5000, LOTUS 1-2-3, dBase II and WordStar software.

One Z-205-4 256K RAM Chip Set for 8 MHz H/Z-100 Computers.
Regularly $199.00 ..... **Discount Price 99.50**

One Z-205-1 RAM Upgrade package: 64K RAM motherboard memory.
Regularly $79.99 ..... **Discount Price 39.99**

One Z-205 Expansion RAM Card: Plug-in 256K memory board for 5 MHz H-100s.
Regularly $599.00 ..... **Discount Price 299.50**

One Z-216 8087 Numeric Co-Processor: Installs on the 5 MHz H-100 CPU Card.
Regularly $299.00 ..... **Discount Price 149.50**

Two Z-219-1 Color Chip Sets: Adds color video capability to the 5 MHz H-100.
Regularly $74.99 each ..... **Discount Price 37.49 Each**

One Set of TM-100 Technical Manuals: Details the inner workings of the H-100 Desktop Computer. Regularly $110.00 ..... **Discount Price 55.00**

H-100 SPECIFICATIONS: PROCESSORS: 16-Bit: Intel 8088. **8-Bit:** Intel 8085. **Clock:** 8 MHz (some assembled models – 5 MHz). **DATA STORAGE: Disk Controller;** Standard Z-207 controller, supporting both 5.25" and 8" drives simultaneously. One and two soft-sectored, double-sided double-density, 48 TPI 320K byte floppy disk drive standard in kits; two drives standard in assembled models. **Disk Drive Expansion:** Built-in 11 megabyte 5.25" Winchester rigid disk drive, installs in second internal drive slot of H/Z-100; optional on-line of up to 2.5 megabytes with external 8" floppy disk drive (HS-207-42 on page 89). **EXPANSION:** Five IEEE-696 (S-100) standard card slots; disk controller occupies one slot. **DISPLAY: Display Format:** 24 lines x 80 characters plus 25th user information line. 225 lines of 640 dots in graphics mode. **Character Set:** 128-character ASCII set, upper and lower case. **Character Type:** 8 x 9 character block (0.2" H x 0.1" W), definable to other values using software. **Colors:** Red, green, blue, white, black, cyan, magenta and yellow. Color memory RAM standard in Z-110 and 8 MHz kits, optional in 5 MHz kits and Z-120. **Cursor:** Blinking, underline or reverse. **Cursor Addressing:** Relative and direct. **Tab:** Eight columns, software addressable. **Video:** Normal or reverse video by character. **KEYBOARD: General:** Sculptured, type-writer-styled keyboard with 77 alphanumeric keys. **Numeric Keypad:** 18 keys (including cursor control keys). **Special Function Keys:** 13. **INPUT/OUTPUT PORTS: Serial I/O:** Two EIA RS-232C at 110 to 38,400 baud. Accessible from rear of unit. **Modes:** Asynchronous full- or half-duplex; synchronous. **Parallel I/O:** Centronics-compatible printer port with a 25-pin D connector. **DIMENSIONS: All-In-One:** 13½" H x 19½" W x 19½" D (5.3 x 7.7 x 7.7 cm). **Low-Profile:** 7¼" H x 19" W x 19¼" D (2.8 x 7.5 x 7.7 cm). **POWER: Power Supply:** Switching Type. **Requirements:** 120/240 VAC, 50/60 Hz, 400 watts maximum.

Accessory circuit boards for the H-100 Computer are located on pages 94 and 95.

Heathkit / Zenith data systems Heathkit computer products and assembled Zenith Data Systems computer products are designed and built for home and business use, and meet all FCC Class B requirements.

*H-100 is a trademark of Heath Company. CP/M is a registered trademark of Digital Research Inc. LOTUS is a trademark of Lotus Development Corp.

Special quantity and system discounts are available on assembled computer products. See page 78.

GrafTalk for easy and exciting graphics

- **An interactive business graphics package that enables the user to completely control graphic presentations**

Produce dramatic bar, pie, line and symbol charts almost instantly with this sophisticated and powerful software. An interactive program, GrafTalk immediately responds to English-like commands so that even a novice can produce complete and meaningful graphs. Includes screen editor and menu mode.

To run GrafTalk, an H/Z-100 Desktop Computer requires two 5.25" disk drives and the MS-DOS operating system. A printer is needed for screen copies.

RG-463-1, Shpg. wt. 5 lbs. **449.00**

CPS-86 Computerized Phone System

- **A 16-bit software system that simplifies and enhances the use of your H/Z-100 as a data communications device**

With this software and a modem, use your H/Z-100 Computer to access the many information services, computerized bulletin boards and other time sharing systems currently available to the public. Even communicate with other computers using this or some other CPS software. Includes many useful features.

This CPS package needs an H/Z-100 Computer equipped with 128K of RAM and one 5.25" disk drive while using MS-DOS (Vers. 1.25 or higher).

CB-463-7, Shpg. wt. 3 lbs. **40.00**

8-bit CPS computer phone system software for the H/Z-100 Computer: Requires 128K of RAM, one 5.25" disk drive and CP/M* (Version 2.2 or later).

CB-253-7, Shpg. wt. 1 lb. **40.00**

SAVE $550 on MP/M-86

- **A compact and powerful multi-user, multi-tasking operating system for use with the H/Z-100 Desktop Computer**

Designed for microcomputers using the 8086/8088 microprocessor, MP/M-86 offers multi-user support while allowing users to run different programs simultaneously. It manages up to a megabyte of memory and supports a wide range of peripheral devices. The MP/M-86 file system allows larger files than CP/M, supports password protection, and supports CP/M data file compatibility. Features include: real-time capability, record and file locking, date and time stamps, and extensive error-handling and reporting. Requires Z-205 Card.

OS-63-5, Shpg. wt. 6 lbs. ..... **Was $649 NOW ONLY 99.00**

16-bit MS-DOS Version 2 and 8-bit CP/M

- **MS-DOS and CP/M operating systems offer disk file handling efficiency and versatile peripheral support**

MS-DOS Version 2 provides a number of significant improvements over previous versions of the MS-DOS operating system. Among the enhancements that increase its functionality are new support programs, command line I/O redirection and a hierarchial file system.

OS-61-8, Version 2, Shpg. wt. 5 lbs. **150.00**

CP/M operating system offers flexibility and a logical structure. It supports many different disk drive systems and peripherals, and includes fast and easy-to-use software development tools. See EC-1120 CP/M Course on page 103.

OS-53-2, Version 2, Shpg. wt. 5 lbs. **150.00**

A wide variety of software for your H/Z-100

Heathkit offers a wide range of quality software from operating systems, to programming languages, to utility and applications software. On the following pages you'll find 16-bit software that'll run on the Desktop Computer. For even more software options, see pages 100 and 101 and the H/Z-100 Software Directory on page 85.

Benefit from multi-tasking with Concurrent CP/M-86*

NEW

- **Works in a multiple- or single-user environment and allows several terminals to be used simultaneously**

Run MS-DOS and CP/M applications programs at the same time. Concurrent CP/M-86 is designed to run a number of popular MS-DOS software applications, read MS-DOS data files, run 16-bit CP/M software applications, and read CP/M files. This operating system also features multitasking and virtual consoles. Also has windows and password protection. Computer requires a minimum of 448K of RAM obtainable with a Z-205 256K RAM Card (512K highly recommended using two Z-205 Cards), a hard disk drive, and one or more 5.25" disk drives. A Z-204 Multiport Serial I/O Card is required when more than two serial ports are needed for remote terminals and/or printers.

OS-61-12, Shpg. wt. 3 lbs. **299.00**

SAVE $150 on efficient and powerful CP/M-86*

- **Manages the full 768 kilobytes of the H/Z-100 Computer's memory**

CP/M-86 is an efficient and powerful operating system that supports small to complex applications programs. Its file structure is compatible with that of 8-bit CP/M (OS-53-2 on this page). Includes 8-bit Emulator for 8-bit software.

CP/M-86 manages up to 768K of memory which allows software programs to take full advantage of the 8088's address space. All 5.25-inch, 8-inch and Winchester disk drives used with the H/Z-100 are supported under this disk operating system. And all necessary utility programs for creating and editing text and data files are included with full documentation manual.

OS-63-2, Version 1.2, Shpg. wt. 3 lbs. ..... **Was $250 NOW ONLY 99.00**

SAVE $300 on UCSD p-System

- **Lets you use a variety of hardware and languages plus a full library of p-System application programs that are already available.**

With the UCSD p-System, you get a powerful screen-oriented text editor, two printing utilities, a File and a Library Manager, disk recovery tools and three configuration utilities. It also includes a Pascal and an 8086 Assembler. An H/Z-100 needs 128K of RAM and one 5.25" disk drive for this system.

OS-61-3, Shpg. wt. 14 lbs. ..... **Was $399 NOW ONLY 99.00**

SAVE $101 on Z-Chart* software package

- **Design and display bar, pie, side bar, line, multiple pie, trend line and three-dimensional bar charts**
- **Create graphs with data entered from other business programs**

Clear up business reports muddled with hard to find data and replace them with clear, concise graphic representations. See trends and relationships that might otherwise go unnoticed. Z-Chart is a series of programs written to take full advantage of the H/Z-100 Desktop Computer's keyboard, screen and versatile design.

Running Z-Chart requires an H/Z-100 Computer with 128K of RAM, at least one 5.25" disk drive, the MS-DOS operating system and Z-BASIC.

CB-463-11, Shpg. wt. 3 lbs. ..... **Was $150 NOW ONLY 49.00**

Check your H/Z-100 Computer with disk-based tests

Greatly reduce service costs and hardware down time with the tests contained in the H/Z-100 Series Disk-Based Diagnostics program. Emphasis is placed on ease of operation, consistency of screen messages, and clarity of information displayed for the user. Resolve faults to the subassembly, microprocessor or support ICs, and to individual ROMs or RAMs. Once a fault is detected all information required to correct the error is given on-screen. All tests can be run continuously.

Checking out an H/Z-100 Computer using this diagnostic program requires a computer with 128K of RAM and one 5.25" disk drive.

CB-463-13, Shpg. wt. 4 lbs. **79.00**

Z-Chart is a trademark of Zenith Data Systems Corp. CP/M and Concurrent CP/M-86 are trademarks, and CP/M-86 is a registered trademark of Digital Research, Inc. Condor is a registered trademark of Condor Computer Corp. SuperCalc is a registered trademark of Computer Associates Intl, Inc. WordStar is a registered trademark of MicroPro International Corporation

SAVE $250 on Pascal/MT + programming language

- **A full implementation of the standard Pascal programming language**

This 8-bit software system is useful for both data processing applications and for real-time control applications. With its added enhancements, Pascal/MT+ becomes more suitable for commercial programming by increasing its power to develop high-quality, efficiently maintainable software. The Pascal/MT+ system includes a compiler, linker and programming tools.

DR-253, Shpg. wt., 5 lbs. ..... **Was $349 NOW ONLY 99.00**

Zenith Local Area Network connects H/Z-100s

Create a fast and efficient communication network between H/Z-100 Computers equipped with 5.25" disk drives and one or more H/Z-100s with a Winchester drive. In this network, each computer functions as if it had all the capacity of its own hard disk without conflict and almost transparently to one another. ZLAN simplifies the use of commonly shared information and data by eliminating the need to keep multiples of disk copies. It also provides for batch processing.

To establish a ZLAN network you'll need at least two H/Z-100 Desktop Computers and a ZSS-100-22 Two-Computer ZLAN System package. One of the Computers must be equipped with a version 2.5 Monitor ROM, a Winchester hard disk drive, and a 256K Memory Upgrade Board (Z-205 on page 83). The other H/Z-100 Computer must be equipped with at least one 5.25-inch disk drive. The ZLAN System package that enables these computers to become a network consists of two Interface Cards, one for each computer, plus Server and Node software. The Interface Cards are assembled and tested, and install easily. The Server software is installed into the H/Z-100 with the Winchester drive and permits access by other computers to information and data residing on the hard disk. Node software (using MS-DOS 1.25) is installed into the floppy disk H/Z-100 and enables users to call up files or send files to the Server hard disk drive. Coaxial cables available in two lengths, connect the computers.

Up to 255 H/Z-100 Desktop Computers can benefit from ZLAN. Each H/Z-100 connected into the network must have the ZSS-100-23 Add-On System package installed. It consists of an Interface Card and Node software.

ZSS-100-22, Two-Computer ZLAN System that includes Server and Node software plus two Interface Cards, Shpg. wt. 21 lbs. **1499.00**

ZSS-100-23, ZLAN Add-On System for expanding a ZLAN network and includes Node software and one Interface card, Shpg. wt. 12 lbs. **599.00**

HCA-60, 25 foot cable, Shpg. wt. 1 lb. **20.00**

HCA-61, 100 foot cable. Shpg. wt. 4 lbs. **40.00**

Multiplan a sophisticated electronic spreadsheet

Make better, faster business decisions and explore alternatives faster with Multiplan. Its 255 row by 63 column worksheet provides a giant financial ledger sheet which can be set up with titles and numbers. Make number, word or formula entries and change the screen display around by widening or shrinking columns to suit your needs. Use upper or lower case for titles and left or right justify them, or align text left and numbers right, as you see fit. Easily move and insert text and data anywhere on the worksheet and then, just as easily, remove it. Use any arithmetic operation plus: Boolean algebra, trigonometric functions, scientific notation, rounding off, and dollar and percent formats.

Multiplan's real power lies in its ability to automatically perform calculations. Because this program remembers the relationship between entries, "what if" questions can be easily answered to test out plans and prepare forecasts. When you make a change on the worksheet you immediately see the results of that change throughout the sheet and any related worksheets.

Running Multiplan on an H/Z-100 Computer requires one 5.25" disk drive and the MS-DOS operating system. Multiplan accesses 64K of RAM for data.

MS-463-7, Shpg. wt. 6 lbs. **195.00**

Microsoft BASIC-80, an excellent 8-bit interpreter

An extensive application of 8-bit BASIC, Microsoft BASIC-80 has many enhancements including sequential and random file manipulation. Plus, this programming language has direct access to CPU ports and memory locations. Commands and statements include an IF-THEN-ELSE control structure which allows execution of conditional statements. String and numeric variables can be used while a full range of logical and mathematical operators are available for additional user convenience. Extensive editing and output capabilities are also available with this interpreter. BASIC comes with a simply organized Reference Manual for easy referrals and includes a handy reference card.

To run BASIC-80, an H/Z-100 Computer requires one 5.25" disk drive and the CP/M operating system (Version 2.2).

MS-253-1, Version 5.22, Shpg. wt. 3 lbs. **175.00**

Languages and compilers for all programming situations

For home, hobby, mathematical or business related needs, you'll find a programming language or compiler below to fit your specific requirements.

NEW

Powerful and exciting GW-BASIC

Version 2 of GW-BASIC offers many more commands and features than previous versions. Besides features like TRON/TROFF, error trapping, PEEK/POKE and others, this version adds CHDIR and ENVIRON commands plus VIEW and WINDOW statements. New tree-structure management commands provide easier programming while draw and paint statements have been expanded. Create useful and interesting programs with easy-to-use editing commands. An H-100 Computer must have at least one 5.25" disk drive and be using the MS-DOS operating system.

MS-5163-13, Shpg. wt. 3 lbs. **100.00**

FORTRAN for scientists, mathematicians and engineers

FORTRAN-86 Compiler accepts programs written according to the ANSI X3.1978 standard (including most of the features of FORTRAN-77 except the COMPLEX data type). Rigorous syntax rules permit the user to fully define the characteristics of the solution to a problem in a series of precise statements. Therefore, a general understanding of FORTRAN is recommended. To run the FORTRAN Compiler, an H/Z-100 requires one 5.25" disk drive (two are recommended), 192K of RAM and the MS-DOS operating system.

MS-5063-2, Shpg. wt. 5 lbs. **195.00**

Powerful COBOL business programming language

Certified to be in compliance with the ANSI X3.23-1974 standard, this COBOL-86 Compiler has many standard features plus extensions designed to make it more useful for your business data processing tasks. Built-in utilities also extend the versatility of this programming language. An H/Z-100 Computer requires one 5.25" disk drive (two are recommended) and the MS-DOS operating system to run this programming language.

MS-5063-3, Shpg. wt. 5 lbs. **395.00**

Z-BASIC Compiler increases program execution speed

Use the Z-BASIC Compiler to provide yourself with an extremely powerful BASIC programming environment. Compile your programs with the Z-BASIC Compiler to increase their execution speed (your software will run three to ten times faster than the same interpreted programs) and reduce the amount of memory space required to store the programs. This compiler requires an H/Z-100 Computer with one 5.25" disk drive and the MS-DOS operating system to run properly. Does not support all of the new features found in GW-BASIC (MS-5163-13).

MS-463-4, Shpg. wt. 3 lbs. **250.00**

High-level Pascal Compiler programming language

This highly extended version of the Pascal language makes system programming and applications programming a lot easier for you. Some of the valuable extensions found in the Pascal Compiler include structured constants, super arrays, variable length strings, string reads, separate compilation and more. The hardware required to run this Compiler on an H/Z-100 is one 5.25" disk drive (although two are recommended for user convenience) and 192K of RAM. Software requirements include the MS-DOS operating system.

MS-5063-5, Shpg. wt. 5 lbs. **295.00**

Software Directory for the H/Z-100 Desktop Computer

This second edition lists more than 475 programs that have been reported as available and operable on the H/Z-100 Computer. Divided into 21 chapters from accounting to word processing with alphabetically listed products. Listing contains vendor product description, memory required, language required (if any), disk format, documentation, summary of program, and vendor information.

CB-463-15, Shpg. wt. 3 lbs. **25.00**

More versatile and powerful software to take advantage of the H/Z-100's capability

Software that includes: accounting and integrated accounting packages, word processing with spelling editor, data base management, computer-assisted instruction, a sorter, terminal emulators, spreadsheets and more on pages 100 and 101.

PeachText 5000* integrated software package

- **A powerful applications package with menu-driven features**

A complete system that includes the PeachText* Word Processor, Spelling Proofreader, Random House Electronic Thesaurus, PeachCalc,* and a List Manager. All modules are fully integrated using a central menu.

For an H/Z-100 Computer to run PeachText 5000, 128K of RAM, two 5.25" disk drives and the MS-DOS operating system are needed.

RS-463-75, Shpg. wt. 3 lbs. ..... **Was $395.00 NOW ONLY 295.00**

$AVER! Verifiable H-100 Computer owners...save $120 ..... **ONLY 175.00**

LOTUS 1-2-3 combines popular decision-making tools

- **Combination of spreadsheet, graphics and data base functions**
- **Menu-driven with an extended series of help screens**

Three important electronic aids to decision making are combined in one fast, easy-to-use business package. And, they perform interactively and instantly at the press of a key. LOTUS 1-2-3 provides you with information management, spreadsheet analysis, and a business graphics program all in one.

An H/Z-100 Computer needs two 5.25" disk drives, 192K of RAM and MS-DOS to run this integrated software package.

LS-463-1, Shpg. wt. 4 lbs. **299.00**

WordStar* 3.3 offers performance and flexibility

- **User-friendly features like simple commands and instant response**

Upgraded WordStar 3.3 is a powerful word processing system that adds a number of new capabilities to its many well-known word processing advantages. Increased support is given to the H/Z-100 Computer's function and numeric keypad keys.

To use WordStar, an H/Z-100 requires one 5.25" disk drive and MS-DOS.

MP-463-10, Version 3.3, Shpg. wt. 4 lbs. **299.00**

MailMerge* combines files with WordStar documents

- **Allows you to turn form letters into personalized letters**

Combine files containing names and addresses with WordStar letter text files. Requires WordStar 3.3 and the MS-DOS operating system when used with the H/Z-100 Computer. Includes many versatile printing features.

MP-463-11, Version 3.3, Shpg. wt. 3 lbs. **249.00**

SpellStar* checks WordStar files for spelling errors

- **Original dictionary consists of approximately 20,000 words that can be added to at any time or create your own specialized word list**

SpellStar 3.3 rapidly checks WordStar files and labels or adds words to dictionary as desired. Create specialized dictionaries. Requires MS-DOS operating system and WordStar 3.3 for use in an H/Z-100 Computer.

MP-463-6, Version 3.3, Shpg. wt. 5 lbs. **149.00**

WordStar Professional* for language processing

- **WordStar plus three programs for efficient word processing**

WordStar Professional provides everything you need to handle all your text management and printing needs. Included are CorrectStar,* an automatic proofreader; StarIndex,* for generating an index and table of contents; and MailMerge for customizing all your mailings. This package requires an H/Z-100 (and added memory board) with two 5.25" disk drives, 256K RAM and using MS-DOS.

MP-463-17, Shpg. wt. 5 lbs. ..... **Was $695.00 NOW ONLY 399.00**

*PeachText 5000, and PeachCalc are trademarks of MSA, Inc. WordStar, WordStar Professional, CorrectStar and StarIndex are trademarks of MicroPro International Corp. MailMerge and SpellStar are registered trademarks of Micropro International Corp.

Sorting and merging with Microsoft Sort program

- **A stand alone utility used with many programming languages**

For full details on this simple and powerful utility, see page 78. It requires an H/Z-100 Computer 128K of RAM under MS-DOS 2. Two 5.25" disk drives.

MS-5063-12, Shpg. wt. 1 lb. **199.00**

SuperSort* for powerful, yet easy-to-use sorting

Make your work go faster by being able to sort and merge up to 32 files into a single file at a rate of 560 records per minute. Perform all functions on data files compatible with BASIC, FORTRAN, COBOL and Assembler applications programs. Use fixed or variable length records and fields.

To use SuperSort on an H/Z-DOS Computer, one 5.25" disk drive (two are recommended) and at least 128K of RAM are needed along with MS-DOS.

MP-463-1, Shpg. wt. 3. lbs. **199.00**

SuperCalc* for solving everyday financial problems

A powerful 16-bit electronic spreadsheet, SuperCalc provides a simple and straightforward tool for solving financial problems. It contains a worksheet 254 rows by 63 columns large where numbers and text can be easily entered. Use with an H/Z-100 Computer equipped with a 5.25" drive and MS-DOS.

SC-463-1, Shpg. wt. 4 lbs. **195.00**

dBASE II management system from Ashton-Tate

- **Relational data base management system that handles your most complicated inventory control problems**

Quickly and easily create a full information system that does exactly what you need and lets you expand in the future. Simple English-like commands let you add, delete, edit, display, print and handle your information. Features 64,000 records per file, 1000 characters per record and 32 fields per record.

To run this data base system on an H/Z-100 Computer, one 5.25" disk drive and 128K of RAM are needed with the MS-DOS operating system.

AT-5065-1, Shpg. wt. 3 lbs. **495.00**

Condor* Relational Data Base Management

- **Design and create data files with this powerful filing system**

Quickly and economically search, sort, merge, analyze, index and print out your data base records. Process up to 32,767 records per data base with up to 1023 bytes in a record. Create your own help menus. Produce sophisticated reports.

An H/Z-100 Computer requires two 5.25" disk drives, a minimum of 128K RAM and the MS-DOS operating system to run this data base system.

CD-463-1, Shpg. wt. 4 lbs. **650.00**

Fast and easy File Management System from Condor

Sort, merge files, analyze and print out information using plain and simple English commands. Process up to 32,767 records per data base with this fast, easy-to-use and powerful data base management system.

To use this File Management System, an H/Z-100 Computer requires two 5.25" disk drives and a minimum of 128K of RAM while using MS-DOS.

CD-463-2, Shpg. wt. 4 lbs. **199.00**

NEW! ZSS-100-28, Both Condor FMS and Pecon Interface, 7 lbs. **249.00**

Pecon Peachtree* to Condor Interface System

Transfer data from master and transaction files in Peachtree accounting files to data bases processed under either Condor file management systems.

An H/Z-100 Computer with 192K of RAM and two 5.25" disk drives operating under MS-DOS are needed to run this software. Also required are either Condor package and a minimum of one Peachtree accounting package.

CB-463-9, Shpg. wt. 3 lbs. **99.00**

NEW! ZSS-100-28, Both Condor FMS and Pecon Interface, 7 lbs. **249.00**

SuperSort is a registered trademark of MicroPro International Corp. SuperCalc is a registered trademark of Computer Associates Intl. Inc. Condor is a registered trademark of Condor Computer Corp. Pecon is a trademark of Zenith Data Systems Corp. Peachtree is a trademark of MSA Inc.

Peachtree software accounting packages

Maintain a complete financial picture of your business. On an H/Z-100 Computer, you'll need two 5.25" disk drives, 192K of RAM, the MS-DOS operating system and the Z-BASIC programming language.

General Ledger System keeps your financial records

Financial transaction record: The General Ledger System allows you to record the financial transactions of your company during a specified accounting period. Included are accurate and timely statements describing your company's current financial status as well as comparative data of a year ago to date. Can be used with Accounts Receivable, Accounts Payable, and Sales Invoicing programs.

RS-463-1, Shpg. wt. 5 lbs. **399.00**

Accounts Receivable System helps in your collections

A complete invoicing system, the Accounts Receivable package maintains a record for each of your customers including: name, address, phone number, current balance, sales tax, credit limit, and other pertinent information. It is easy to operate and produces comprehensive, up-to-date reports.

RS-463-2, Shpg. wt. 4 lbs. **399.00**

Accounts Payable System helps control your cash flow

Payable information: Accounts Payable package maintains current and aged accounts. It keeps a complete file for each of your vendors, determines whether invoices should be paid by the due date or by the specified discount date, and automatically prints checks and a check register. Security measures are provided to protect the privacy of your data. Can also be used with General Ledger.

RS-463-3, Shpg. wt. 4 lbs. **399.00**

Inventory Control for all aspects of inventory operations

Improve your inventory control, reduce your dollar investment in inventory management, and decrease the response time to your customers with this effective and straightforward program. Keep your inventory records current and print out comprehensive reports that completely cover the inventory operation. Use independently or in conjunction with Accounts Receivable and Sales Invoicing.

RS-463-5, Shpg. wt. 4 lbs. **499.00**

Sales Invoicing System bridges accounts packages

Systems bridge: Actually a subsystem of the Accounts Receivable and Inventory Management systems. Provides the capability to access and update the data files of both systems. Update customer accounts with sale or return information. Update inventory with the stocked items returned or sold.

RS-463-6, Shpg. wt. 4 lbs. **299.00**

Save over $900 on five linked accounting packages with the Peachtree Business Accounting System

Five linked packages – General Ledger, Accounts Receivable, Accounts Payable, Inventory Control, and Sales Invoicing that, used together, provide complete control over vital accounting functions.Save over individual purchase costs and keep up to date with orderly reports on your financial situation.

$AVER! ZSS-100-24, Shpg. wt. 46 lbs. **999.00**

Write courses and tests using ZDS* Teacher program

- **Design and create an entire course of study including tests**
- **Create your courses without any previous programming experience**

One-half of a two-part educational programming package, ZDS Teacher can be used for any instructional purpose that requires written text. You select the topic, decide how the course is to be structured, write the text, and create test and quiz questions. Then the second package, ZDS Student, is used to take the individualized course and exam questions.

To use ZDS Teacher, an H/Z-100 Computer needs a minimum of 128K of RAM and one 5.25" disk drive while using the MS-DOS operating system.

TA-463-1, Shpg. wt. 3 lbs. **299.00**

Use ZDS Student program to take courses and exams

- **Run customized instructional courses and exams created by your instructor developed with the ZDS Teacher program**

The second part of an educational package that includes the ZDS Teacher program. Take courses or programs written by your instructor. On-disk instructions show how to use the program. Run the program on an H/Z-100 Computer with one 5.25" disk drive and using the MS-DOS operating system.

TA-463-2, Shpg. wt. 2 lbs. **100.00**

Emulate an IBM 3274/3276 with SNA/SDLC

- **Enables an H/Z-100 to emulate a terminal and also be used for personal computing and interactive program development**

Emulate such remote devices as IBM S/360, S/370, 4300 and 3000 series of central processing units in addition to other IBM-like devices equipped with SNA/SDLC communications capability. This emulator software runs on an H/Z-100 Computer equipped with a minimum of 192K of RAM, at least one 5.25" disk drive, a Z-204 Multiport I/O Card (page 83), an RS-232C Cable, and using the MS-DOS Version 2 operating system.

IE-463-2, Shpg. wt. 4 lbs. **649.00**

ZSTEM allows H/Z-100 to emulate VT100

- **An asynchronous terminal emulator that allows any H/Z-100 Computer to operate in a DEC mainframe environment**

Add the capability of the popular DEC VT100 and VT102 terminals to the power and performance of your H/Z-100 Computer. ZSTEM uses XMODEM and XON/XOFF protocols with baud rates between 45.5 and 19,200. This software offers programmable softkeys, local printing, and VT100 graphics and keyboard layout.

ZSTEM requires an H/Z-100 Computer equipped with 128K of RAM and one 5.25" disk drive while using the MS-DOS operating system.

KE-463-1, Shpg. wt. 3 lbs. **149.00**

H/Z-100 Remote Batch Terminal Emulator

- **For distributed processing, remote job entry, and more**

Batch processing: Add terminal capability to your microcomputer with this versatile software package. It allows the H/Z-100 Computer to emulate several IBM mainframe terminals including the 2770, 2780, 3780, 2968, and the 3741. Capabilities include baud rate of 2000, 2400 and 4800; Bell 201A3, 201C, 208A and B compatible; EIA RS-232C communications; and more.

What you need: 128K of RAM, one 5.25" disk drive and MS-DOS.

WI-463-1, Shpg. wt. 4 lbs. **899.00**

3270 Emulator emulates IBM 3270 display station

- **Runs on either leased line or dial-up configurations**

Dual operation: With the 3270 Emulator program, your H/Z-100 Computer can do microprocessing as well as teleprocessing that results in a substantial savings for you. The emulator is also compatible with a variety of IBM or similar host computers using display attributes such as structured fields. Special key labels are provided to show you the relationship between emulator keys and the IBM display station keys. A unique 25th line displays the status of certain system functions.

Hardware and software requirements: On an H/Z-100 Computer, one 5.25" disk drive and 128K of RAM are needed. MS-DOS is also required.

PO-463-1, Shpg. wt. 2 lbs. **650.00**

Microstat performs statistical tests and procedures

- **Developed for real life applications using large data sets**

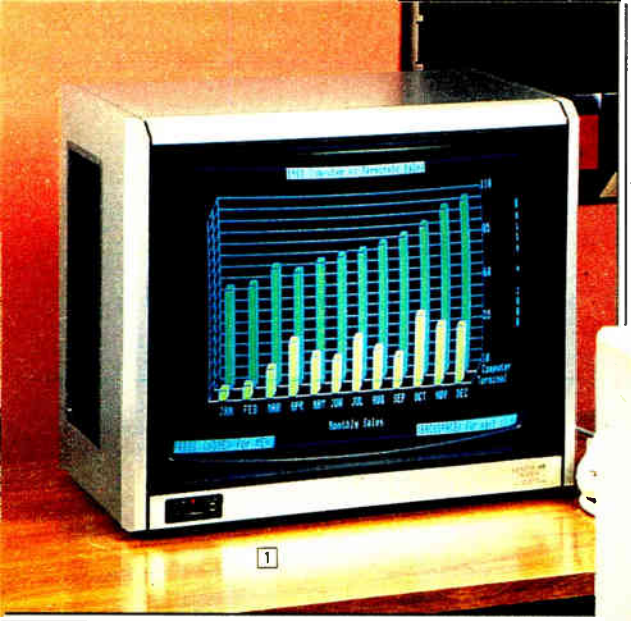
Human engineered: Microstat is designed to be flexible and fail-safe in operation and use. All algorithms have been selected with great care to ensure your complete confidence in analysis results. A wide range of statistical tests and a complete set of programs for data manipulations are offered. Most tests use data files for easy changing, sorting, merging and printing. Many tests have a number of variations of the basic test. All analysis programs offer screen and printer output.

Hardware and software requirements: To run Microstat on an H/Z-100 Computer, a minimum of 128K of RAM and two 5.25" disk drives are required. The MS-DOS operating system is also required. Z-BASIC is also needed.

ES-463-1, Version 2.3, Shpg. wt. 2 lbs. **249.00**

ZDS is a trademark of Zenith Data Systems Corp.

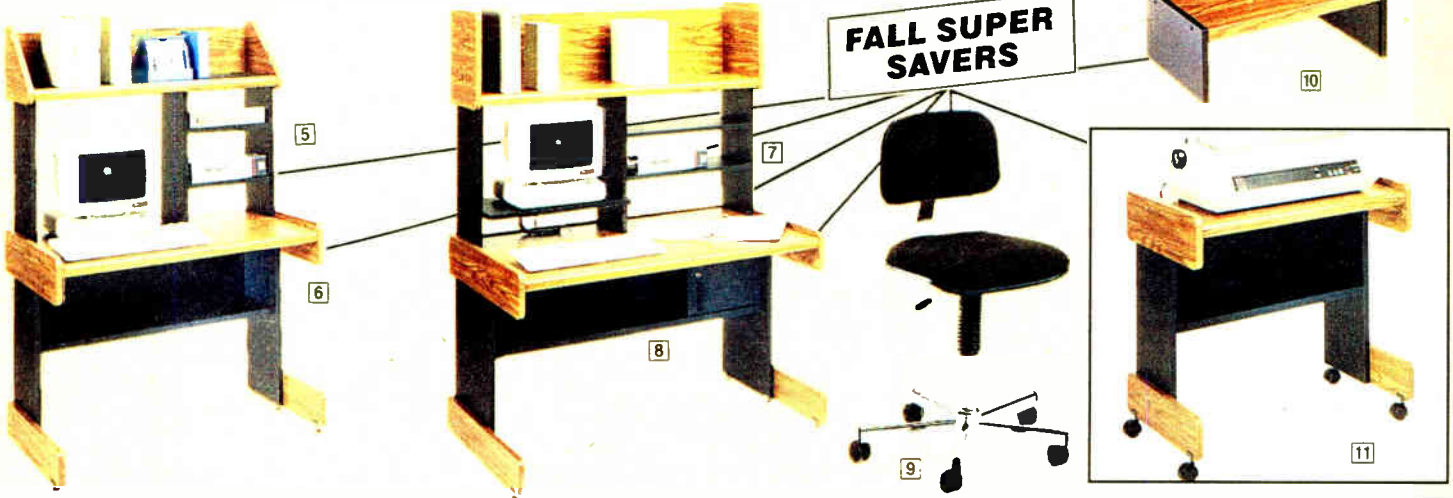
Discover the fun of kitbuilding at your Heath/Zenith Computers & Electronics Center.



SPECIAL FALL SUPER $AVERS!

DOUBLE MASTER BUILDER POINTS

Beautiful computer workcenter furniture for your home or private office



FALL SUPER SAVERS

[5] Hutch for Computer Desk

Companion hutch to PF-125 Desk stands 28" high and 35¾" wide. It has a 9" deep full-length bookshelf with an electrical plug opening. An adjustable 20¾" wide by 10¾" deep monitor shelf can be positioned left or right of the desk. Also has two adjustable storage shelves.

PF-126, Shpg. wt. 33 lbs . . . **THIS CATALOG 71.95**

[6] Computer System Desk

Computer Desk offers a 35¾" W by 21" D work area, a back opening for printer paper, storage shelf, floor levelers and stands 28" high.

PF-125, Shpg. wt. 51 lbs. . . **THIS CATALOG 107.95**

[7] Hutch for Large Desk

Add-on Hutch is 33" x 45½" W x 11¾" D and securely fastens onto Large Desk. Its adjustable monitor shelf holds up to a 13" monitor. Has 11½" deep bookshelf and adjustable shelves.

PF-131, Shpg. wt. 46 lbs. . . . **THIS CATALOG 89.95**

[8] Large Computer Desk

Spacious Desk measures 28" H x 45½" W x 29" D and features a lockable security cabinet for software. Has storage shelf beneath work surface, safety retainer on desk top, wire harness clip on back of desk, and floor levelers.

PF-130, Mtr. Frt. 85 lbs. . . . **THIS CATALOG 152.95**

[9] NEW! Comfortable desk chair

Pneumatic chair has seat height adjustment.

PF-103, Shpg. wt. 20 lbs. . . **THIS CATALOG 49.95**

[10] Add-On Monitor Platform

Use with either Computer Desk or Printer Stand to hold 13" monitor. 6¾" H x 19" W x 11¾" D.

PF-132, Shpg. wt. 6 lbs. . . . **THIS CATALOG 16.15**

[11] Roll-Around Printer Stand

Versatile Stand has storage shelf and back opening for printer paper. Measures 28" H x 28¼" W x 19" D and has dual-wheel casters.

PF-120, Shpg. wt. 35 lbs. . . . **THIS CATALOG 71.95**

FALL SUPER $AVINGS | 10% OFF every product on these two pages – *This catalog only!*

1 Sharp pictures on 25″-diagonal color video monitor

SAVE $73

- **High-resolution display of up to 450 lines**
- **Direct RGB and TV inputs plus VCR video/audio inputs**

The CV-2562 is a versatile monitor that can be used with your personal computer or enjoyed with your component television system, video cassette recorder/disc player, or video game. Advanced circuitry, developed for use with computer monitors provides improved picture performance with a maximum horizontal picture resolution capacity of up to 450 lines using either RGB or Composite Video inputs. A three-in-one tri-focus system of red, green and blue color guns improves picture sharpness and enhances details.

A unique green-only switch eliminates all other colors so that monochrome text material can be easily displayed. This is expecially helpful when using the CV-2562 to view computer accounting programs or other text intensive programs that require a lot of reading. Flip the switch back to color and enjoy true color reproduction from other video sources.

Other quality features include: automatic light sensor; automatic monitoring and control of picture, color, tint and black level; audio/video multiple monitor loop-through; and an audio amplifier with a 2″ x 6″ speaker. Monitor has dimensions of 22¾″ H x 25½″ W x 20¼″ D and uses 120 VAC 60 Hz.

CV-2562, Assembled, 108 lbs. Mtr. Frt. **Was $729.95 THIS CATALOG ONLY 656.95**
ZVM-134-1, H/Z-100 Cable, 2 lbs. ..... **Was $20.00 THIS CATALOG ONLY 18.00**
ZVM-134-21, HS-151/IBM-PC Cable, 1 lb. **Was $20.00 THIS CATALOG ONLY 18.00**

2 Build your own 12″ diagonal monochrome monitor

SAVE 10%

- **Compatible with most personal computer systems**
- **Excellent character definition and intensity**
- **Displays either 40 or 80 characters per line**

Performance comparable with monitors costing much more and in a kit that you build. A wide 15 MHz bandwidth and a fast 30 ns rise time produce a noticeably improved character definition. Special DC-coupled circuits provide high screen brightness even with a full screen. Special switchable 40-80 character switch accommodates computers whose video formats have a 40-column display output. Choice of non-glare amber or green screen. NTSC composite video input. Front panel power, black level, contrast, horizontal and vertical hold, and vertical height controls. Dimensions: 12″ H x 12⅞″ W x 12″ D. *The HVM-122A is worth double Master Builder Points.*

Kit HVM-122A, Shpg. wt. 22 lbs. ..... **Was $89.95 THIS CATALOG ONLY 80.95**
ZVM-122A, Assembled, amber screen **Was $139.95 THIS CATALOG ONLY 125.95**
ZVM-123A, Assembled. green screen **Was $139.95 THIS CATALOG ONLY 125.95**
ZVM-124, Assembled monitor for IBM-PC and PC compatible computers, amber CRT, needs IBM monochrome printer adapter card, **THIS CATALOG ONLY 179.00**
ZVM-123-2, Tilt Base, 2 lbs. ..... **Was $15.00 THIS CATALOG ONLY 13.50**
ZVM-121-1, IBM-PC Cable, 1 lb. ..... **Was $5.00 THIS CATALOG ONLY 4.50**
ZVM-121-2, Atari 800 and 1200 Cable, 1 lb. **Was $15.00 THIS CATALOG ONLY 13.50**

3 Compact 13″ diagonal color video monitors

Save up to $80

- **Four models with true color reproduction for use with personal computers, VCRs, video games, TV tuners, etc.**
- **All have "green screen only" switch for text displays**

ZVM-130: Medium resolution monitor, composite video input, audio capability, 25 line display by 40 characters, composite video "loop-thru" feature, and front access controls. 38 lbs. ..... **Regularly $329.00 THIS CATALOG ONLY 296.00**

NEW! ZVM-135: High resolution monitor, composite video and RGB inputs, 25 line x 80 column display, composite video "loop-thru," audio capable, front panel controls. 39 lbs. ..... **Regularly $599.00 THIS CATALOG ONLY 539.00**

ZVM-133: A high resolution RGB-only monitor with a 25 line x 80 column display. Features 640 pixels horizontally and supports the IBM brown. Has IBM intensity input, LED power indicator, plus a contrast level and a brightness control. Includes IBM-PC/HS-151 PC cable. 39 lbs. **Regularly $559.00 THIS CATALOG ONLY 503.00**

ZVM-136: All the features of the ZVM-133 with the added advantage of a long-persistence phosphor CRT. 39 lbs. **Regularly $799.00 THIS CATALOG ONLY 719.00**

Cables for use with ZVM-130/135/133/136 Color Video Monitors:

ZVM-135-1, For the H/Z-100 Desktop Computer, 1 lb.
ZVM-135-2, For the HS-151/161 and IBM-PC, 1 lb.
ZVM-135-3, For the Apple III Computer, 1 lb.
ZVM-135-4, For Texas Instruments and Atari Computers, 1 lb.
ZVM-135-5, For IBM-PC jr with audio, 1 lb.

Regularly $25.00 For this catalog only 22.50 each

4 Massive 2.5 megabyte storage for H/Z-100 Computer

Save up to $230

- **Expand the storage capabilities of H/Z-100 Computer Systems with optional one or two 8-inch disk drives**
- **Compact low-profile unit uses slim half-height drives**

Add extra data storage capacity to your H/Z-100 Computer with either one or two drive versions of the HS-207 8-Inch Disk System. Each drive uses soft-sectoring to store up to 1.26 MB on a single double-sided double-density disk for a total of 2.52 MB of unformatted data storage. Disks are formatted in the industry-standard IBM 3740 style. Uses 110/220 VAC.

KT HS-207-41, Disk System with one 8″ drive for a total of 1.25 MB of data storage, Shpg. wt. 57 lbs. ..... **Regularly $999.00 THIS CATALOG ONLY 899.00**
Kit HS-207-42, Disk System with two 8″ drives for a total of 2.5 MB of data storage, Shpg. wt. 69 lbs. ... **Regularly $1599.00 THIS CATALOG ONLY 1439.00**
Z-207-41, Assembled Disk System with one 8″ drive for a total of 1.25 MB of data storage, Shpg. wt. 53 lbs. ... **Regularly $1599.00 THIS CATALOG ONLY 1439.00**
Z-207-42, Assembled Disk System with two 8″ drives for a total of 2.5 MB of data storage, Shpg. wt. 60 lbs. .. **Regularly $2299.00 THIS CATALOG ONLY 2069.00**
Z-207-6, Assembled and tested second Half-Height Disk Drive, 1.25 MB storage capacity, Shpg. wt. 8 lbs. ..... **Regularly $699.00 THIS CATALOG ONLY 629.00**
HOC-207, Dust Cover for HS/Z-207, 1 lb. **Was $16.00 THIS CATALOG ONLY 14.40**

Join the Heath/Zenith User's Group community*

With a HUG membership, you join thousands of other Heath/Zenith computer owners who are kept informed of new products and of more uses for your computer. You gain access to over 700 low-cost programs. You receive a one-year subscription to the monthly REMark magazine. You're able to participate in REMark's interactive forum with other members and use an on-line bulletin board via CompuServe.

Keep up with the latest happenings and the newest Heath/Zenith computer products in the REMark magazine which you receive every month as a HUG member. Keep in touch with other members as you share hardware modifications, software improvements and ideas on computer topics through REMark's open forum. Also receive a software catalog of HUG programs. You can even purchase Heath/Zenith computer products at a discount. Get the latest on Heath/Zenith computer developments and HUG activities with a HUG membership, modem and a CompuServe time-sharing membership on the HUG Bulletin Board. You'll find a HUG application enclosed with each Heath/Zenith computer.

*Sorry. 10% savings does not apply to HUG membership fees.

Send to: HUG Membership, Hilltop Road, St. Joseph, MI 49085.

Yes, I want to become a member of HUG and keep up to date on the latest Heath/Zenith computer developments, while I expand my software library.

I've enclosed $_____(U.S. Funds only) to cover the cost of my membership. NOTE: No charge orders or billings are accepted.

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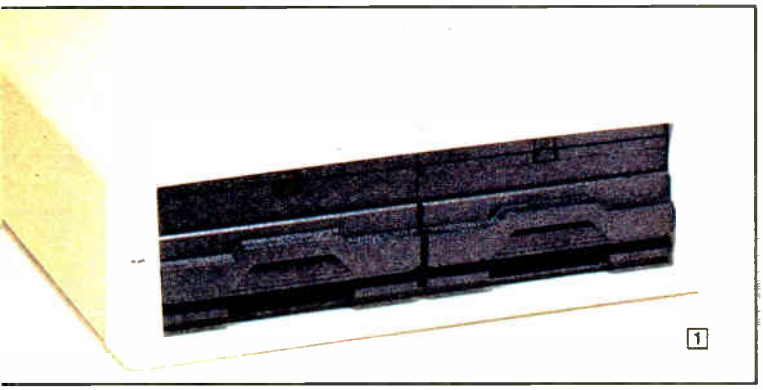


1

1 Ten megabyte disk storage from IOMEGA

Picked as an outstanding product of 1984 by PC Magazine, the Bernoulli Box from IOMEGA Corp. may well put the Winchester drive on the back shelf. Offering the hard disk capacity and speed of a Winchester plus the economy and convenience of flexible disks, the Bernoulli Box is the answer to more reliable, versatile and economical data storage. Each 8½" by 11" removable cartridge houses a flexible disk that stores ten megabytes of data.

Available in two versions, single and dual drive models, the unique Bernoulli Box combines a number of technological breakthroughs that result in a storage system of amazing simplicity. Data and mechanical reliability is unmatched and the cost per megabyte of storage is dramatically low. The Bernoulli Box complements the HS-151 Personal Computer and the HS-161 PC, as well as, the IBM-PC and all its compatibles. Exceed the capacity of hard disk drives and get transfer and access time that are faster than most Winchester drives. And, it features full support of the MS-DOS operating system. Includes interface card, software, cable and one high-capacity cartridge per drive.

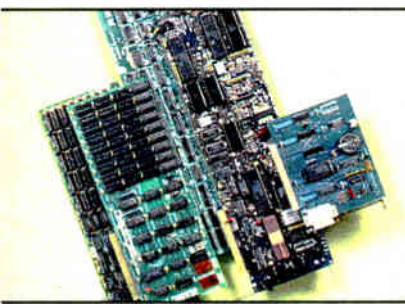
SAVE UP TO $299.50 on a two-drive model and 10% on accessories

PP-500-1, Single drive 10M storage, Shpg. wt. 57 lbs.
Regularly $2195.00 ..... **THIS CATALOG ONLY 1975.50**

PP-500-2, Dual drive 20M storage, Shpg. wt. 63 lbs.
Regularly $2995.00 ..... **THIS CATALOG ONLY 2695.00**

PPA-500-2, Tri-Pak blank 8" cartridges, Shpg. wt. 5 lbs.
Regularly $199.95 ..... **THIS CATALOG ONLY 179.95**

PPA-500-3, Head Cleaner Kit, Shpg. wt. 3 lbs.
Regularly $79.95 ..... **THIS CATALOG ONLY 71.95**



2

At its one-stop shopping center, Heath Company strives to maintain competitive prices on all accessories along with careful selection and testing of products, free installation and/or hook-up information, full service and support, and a 90-day money-back guarantee. For up-to-the-minute prices contact your nearest Heath/Zenith Computers & Electronics Center (page 101).

2 Expand the capabilities of your Heath/Zenith or IBM-PC Computer with these "best-of-breed" plug-in accessory boards. All are Heath checked for quality and high reliability. Take advantage of all that Heath offers.

NEW! Budget priced plug-in 300/1200 baud modem

An auto dial/answer modem from U.S. Robotics Inc. for use in HS-151 Personal Computer, HS-161 Portable PC and IBM-PC. Features manual originate/answer, auto mode, auto speed, full and half-duplex operation, direct connection to phone lines through RJ11C modular phone jack, audio line monitor, and programmable commands. Includes TELPAC communications software and phone cord.

SAVE $35

PC-131, Assembled U.S. Robotics Modem, Shpg. wt. 4 lbs.
Regularly $349.95 ..... **THIS CATALOG ONLY 314.95**

NEW! Multifunction Board adds many features

The Captain Multifunction Board from Tecmar fits into an open slot of an HS-151 Personal or HS-161 Portable PC. It is fully socketed for the easy addition of up to 384K of RAM. It features a serial port with a standard RS-232C connector and an internally mounted parallel port with its own cable. A clock/calendar with a back-up battery keeps perfect time. A large collection of utility programs is included besides helpful RAMdisk, spooler, and timer software. Captain board does not include RAM.

SAVE UP TO $40

PC-121, Assembled Captain Board, Shpg. wt. 2 lbs.
Regularly $199.95 ..... **THIS CATALOG ONLY 179.95**

PC-121-50, Captain Board populated with 320K RAM, 3 lbs. **Regularly $399.00** .. **THIS CATALOG ONLY 359.00**

$AVER! Get a big 50% discount on extra 64K of RAM

Purchase extra Z-205-1 64K RAM Chip Sets within 90 days of buying a PC-121 or PC-310 accessory board and receive half off the regular price. Sorry, at this price the special Fall 10% discount does not apply.

Z-205-1, Shpg. wt. 2 lbs. ..... **Regularly $79.99 Discount Price 39.99**

NEW! High resolution monochrome/color multi board

The Graphics Master Board from Tecmar supplies HS-151 Personal, HS-161 Portable and IBM-PC computers with high resolution color (640 x 400 in 16 colors) and monochrome (720 x 700) graphics capability. Provide yourself with a wider choice of monitors including RGB, NTSC composite and IBM monochrome compatibles. External sync is provided for use with a video mixer to allow overlaying of characters or other computer-generated images on a video picture. Has 128K of on-board memory. Is compatible with LOTUS 1-2-3, GrafTalk and other software. Requires ZCA-6 ROM in HS-151 Personal and HS-161 Portable Computers.

SAVE $54.50

PC-185, Assembled Graphics Master Board, Shpg. wt. 3 lbs.
Regularly $545.00 ..... **THIS CATALOG ONLY 490.50**

on these pages – *This catalog only!*

Add joystick capability with DG Analog Game Port

Plug-in Analog Game Port allows the addition and use of joysticks and graphic pads (such as WICO and KOALAPAD) and other analog devices. Supported by GW-BASIC. For use with the HS-151, HS-161 and IBM-PC Computers.

SAVE UP TO $10

PC-110, Assembled DG Analog Game Port, Shpg. wt. 2 lbs.
Regularly $49.95 ..... **THIS CATALOG ONLY 44.95**

PCS-110, Assembled PC-110 with clock/calendar chip installed, battery, software (included with HS-161 PC), 2 lbs.
Regularly $99.95 ..... **THIS CATALOG ONLY 89.95**

NEW! On-line time and date for the HZ/100 Computer

An add-in circuit card for the H/Z-100 Desktop Computer, ZCLK from FBE Research Company, Inc. that provides the time in a 24-hour format to the second and a calendar in a numerical month, date, year format. This circuit card installs very simply on the motherboard and doesn't require an S-100 expansion slot. A long-life lithium battery maintains the time and date during power off periods. MS-DOS software is included to set and read the time and date and to automatically set the operating system time and date at bootup. This software also makes Daylight Savings Time adjustments on command.

SAVE $10

PC-240, ZCLK Board, Shpg. wt. 2 lbs.
Regularly $99.95 ..... **THIS CATALOG ONLY 89.95**

U.S. Robotics Auto Dial Modem Card for H/Z-100s

This modem fits into an H/Z-100 expansion slot and connects directly to a phone line through a standard RJ11C modular phone jack. It can transmit and receive data at a rate of 1200 baud or at a slower 300 baud rate. It is Bell 212A/103 compatible. This auto dial modem also features auto answer, manual answer and manual originate modes of operation. All modem functions are controlled by commands (Hayes type programming commands) sent to the modem through the same channel as the data is transmitted and therefore doesn't require extensive software support. Comes with a phone cord.

SAVE UP TO $45

PC-200, Assembled U.S. Robotics Modem Card, 2 lbs.
Regularly $449.00 ..... **THIS CATALOG ONLY 404.00**

PA-100-1, US Robotics TELPAK Software, uses MS-DOS, 2 lbs. **Regularly $99.00** ..... **THIS CATALOG ONLY 89.00**

Programmable Sound/Speech/Time (P-SST) Card

From Software Wizardry, a plug-in multifunction circuit board for the H/Z-100 Computer. It may be installed in any available IEEE-696 S-100 expansion slot to provide time, sound and speech capabilities for the Desktop Computer. It features a real-time clock/calendar with battery backup, a three channel sound synthesizer for generating both music and complex sound effects, and a phoneme speech synthesizer with unlimited vocabulary and an adjustable voice pitch. An on-board audio amplifier with adjustable volume control produces a one watt output for an external 8 ohm speaker. An unamplified audio out at 1.5 volts maximum is also available for connection to external audio equipment. The P-SST card also has two general purpose parallel input ports (cables not included) which can be used for joysticks and compatible printers.

SAVE $39.50

PC-220, Assembled P-SST Card, Shpg. wt. 3 lbs.
Regularly $395.00 ..... **THIS CATALOG ONLY 355.50**

NEW! 16K Add-On Memory Board for the H/Z-89

Increase your H/Z-89 Computer RAM memory from 48K to 64K with this 16K byte Add-On RAM Card from Magnolia Microsystems, Inc.

SAVE $7.50

PC-311, Assembled 64K Memory Board, Shpg. wt. 1 lb.
Regularly $74.95 ..... **THIS CATALOG ONLY 67.45**

Powerful DG Super 89 enhanced processor board

Replaces central processor board in H/Z-89 and Z-90 Computers and features: 128K RAM, fully compatible with all Heath/Zenith products, full CP/M* and H-DOS* compatibility, standard 128K memory** that can be expanded to 256K using Z-205-1 64K RAM Chip Sets (see $AVER box on page 94), two serial ports, on-board real time clock, 4 MHz operation, six expansion slots, multi-user capability, parity checking for RAM, and provision for an arithmetic processor. Take just a few minutes to easily install this enhanced processor board and multiply the capabilities of your H/Z-89 or Z-90 computer.

SAVE $70

PC-310, Assembled Super 89 Board, Shpg. wt. 3 lbs.
Regularly $699.00 ..... **THIS CATALOG ONLY 629.00**

*CP/M is a registered trademark of Digital Research Inc. H-DOS is a trademark of Heath Company.

MAGNOLIA MICROSYSTEMS CP/M–Plus and RAM Board

Add new system commands and an additional 128K of RAM** to your fully populated H/Z-89 or Z-90 Computer. You get a total memory capacity of 176K which can be used in several different memory maps under program control and your computer still retains full compatibility with existing operating systems. CP/M-Plus adds new utilities and features including a HELP command, optional password protection, time and date stamping of files, console redirection to or from disk files, and many more. The source code for BIOS is included to allow you to make any changes necesssary for your particular application. The CP/M BIOS module furnished with this RAM board treats the additional RAM (112K) as a disk drive. It creates an invisible disk with 98K (or 110K) of usable space, 64 directories, and an average access time of only 3 ms.

SAVE $39.50

PC-300, Assembled CP/M-Plus and RAM Board, 10 lbs.
Regularly $395.00 ..... **THIS CATALOG ONLY 355.50**

New tools for computer and electronics hobbyists

Move into the growing field of programming and reusing EPROMs. Heathkit helps you start with inexpensive tools like the ID-4801 EPROM Programmer and the ID-4803 EPROM Eraser. These tools can be used to program, duplicate, verify, simulate and erase EPROMS. See page 48 for further details.

3 NEW! Turn a knob instead of switching cables

A real convenience and it can save on additional costly equipment. This two position RS-232 switch allows you to share printers, modems, computers, terminals, or any RS-232 device. Instead of changing cables just turn the knob and the common line is switched from one female connector to another. All 25 signal lines on the interface are switched when the knob is turned and all are transparent to data speeds and code types. This unit can also be used with IBM-type parallel cables. Make shared equipment a lot easier to use.

SAVE $8

PM-120, Assembled RS-232 Switch, Shpg. wt. 1 lb.
Regularly $79.95 ..... **THIS CATALOG ONLY 71.95**

4 Smart Outlet Box powers up all your peripherals

Plug the AC line cord of your computer into the special current-sensing socket of the outlet box and your peripherals into any of the ten switched outlets. The moment you turn the computer on, current flow in the sensing socket is detected and the Smart Box automatically switches power to the other sockets. A clearly marked unswitched outlet is provided for powering clocks or other constant AC voltage devices. An internal MOV device protects your computer from damage causing line surges and voltage transients up to 6500 amps (70 joules at one time, 35 joules repeated). Maximum control power is 250 watts at 2 amps; maximum for all other outlets is 1200 watts at 10 amps. *From this catalog only, the Smart Outlet Box earns double Master Builder Bonus Points.*

SAVE $5

Kit GD-1295, Smart Outlet Box, Shpg. wt. 4 lbs.
Regularly $49.95 ..... **THIS CATALOG ONLY 44.95**

5 Breakout Box RS-232 Terminal Interface Tester

Isolate problems within a computer system with this pocket sized, self-contained tester. Connect it between equipment and communication lines to monitor 12 different signals. LEDs signal line condition. Interface pins can be cross-patched with the tester's connection jumpers to test and correct problems. Twenty-four in-line switches allow interrupting of any interface signal.

SAVE $16

WH-15, Assembled RS-232 Breakout Box, Shpg. wt. 1 lb.
Regularly $159.00 ..... **THIS CATALOG ONLY 143.00**

6 NEW! Smart Outlet Box with increased protection

Faster response and better suppression of power line surges and voltage spikes. The GDW-1495 adds these features to the handy Smart Outlet Box. It has eight AC (3-prong type) outlets, one of which is unswitched for devices such as clocks that you do not wish to turn off. A control socket senses current flow in a device plugged into this socket, and automatically turns on equipment connected to the remaining six switched sockets. This allows you to power up a number of devices using the power switch of a single conveniently located device. The control socket even allows a small amount of current to pass through it for equipment containing digital clocks. This UL approved surge suppressor has dimensions of 14¼" x 2¼" x 2¾" (36.2 x 5.7 x 6.9 cm) and weighs 2.8 lbs. (1.3 kg).

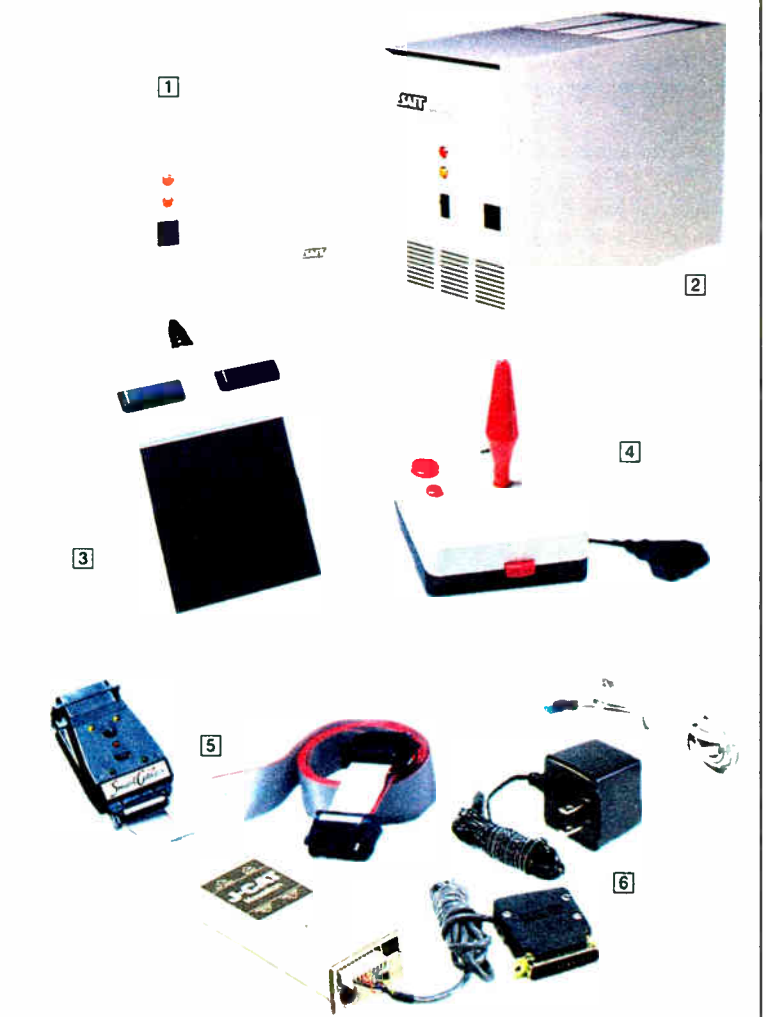
SAVE $10

GDW-1495, Assembled Smart Outlet Box, Shpg. wt. 4 lbs.
Regularly $99.95 ..... **THIS CATALOG ONLY 89.95**

**Standard H-DOS and Heath CP/M will only address 64K of memory regardless of total amount installed.

Discover the fun of kitbuilding at your Heath/Zenith Computers & Electronics Center.

Peripherals and accessories for Heathkit/Zenith,



1 NEW! Protect your computer's data and memory

Provide emergency power for your personal or business computer with the 400 VA Standby Power System from Saft Electronics Systems. Eliminate the headaches, lost time, and the expense of lost data caused by an unexpected loss of power or a brownout. As soon as the power drops, this power protection system turns on in less than one-half cycle to protect data stored within your computer. Up to ten minutes of standby power is provided with a full load (24 minutes under half load) to give an operator plenty of time to save data and files and then shut down the computer safely. During normal operation this standby power supply acts as a line filter to protect against harmful power line spikes. This power protection system has dimensions of 12⅝" L x 10¾" W x 6" H, has four AC power outlets and operates from 110 VAC at 60 Hz.

PP-115, Assembled, Shpg. wt. 39 lbs. **549.95**

2 NEW! Fastest-switching backup power for computers

1000 VA Standby Power System from Saft uses all-new detection and a solid state transfer switch to make it the fastest power switching supply at one millisecond or less. This backup power system provides a clean sine wave output (required for IBM XT and AT computers) that is both voltage regulated and current limited. And it is synchronized to the line for proper operation of all phase controlled devices. Switchover takes place anytime the AC voltage drops below 108 volts. Run time at half load is over 18 minutes. Eliminate the effects of 98% of all AC power related problems.

Further protection is added built-in surge suppressors, over-current protection, voltage regulation, and built-in EMI/RFI filters. This standby power supply will even protect itself from damage due to overloading. Its dimensions are 19" L x 8" W x 13" H and weighs 69 lbs.

PP-120, Assembled, Shpg. wt. 73 lbs. **1195.00**

NEW! 200 VA Standby Power Protection System

In less than one-half cycle this Standby Power System from Saft Electronics will switch 200 VA of power to your computer equipment whenever the AC line voltage drops below 108 volts. Power will last for a minimum of 20 minutes...time enough to save all your computer data and to safely power down.

This system will provide power during blackouts or brownouts to personal and small business computers or any device that needs up to 200 VA of emergency power. During normal operation this power system acts like a line filter to protect your equipment from harmful power line surges and voltage spikes. When the line voltage drops, the system turns on to protect data and memory in your computer until you can safely exit your software and power down your computer system.

The 200 VA Standby Power System has two outlets for equipment that you want protected. Its dimensions are 12⅝" L x 10¾" D x 6" H. Alarm features include an indicator lamp and a buzzer. Surge protection provided up to 80 joules.

PP-111, Assembled, Shpg. wt. 34 lbs. **349.95**

3 KoalaPad Touch Tablet and software

Just a touch of your finger can control a HS-151 Personal, HS-161 Portable or IBM-PC computer. Software included with pad enables you to draw and color pictures on a color monitor screen by simply moving your finger or a stylus (included) across the 4" x 4" touch-sensitive surface of the KoalaPad. Or, write your own application programs using GW-BASIC's built-in commands. GW-BASIC version 2.0 is required to use all the features of PC Design software included with the pad. Requires PC-110 Analog Game Card on page 95.

PP-400, Assembled, Shpg. wt. 3 lbs. **99.95**

NEW! PPA-400-1, SPEED KEY software turns pad into combination mouse and 37 programmable softkeys. Includes overlays for BASIC, dBASE II, LOTUS 1-2-3, Multiplan, WordStar, and others, or program your own softkeys. Rated by INFOWORLD as excellent in performance, documentation, ease of use, and error handling. Speed Key replaces multiple keystrokes required by most software with a single pushbutton command. With Speed Key, you can create your own custom overlays that take care of repetitive, day-to-day computer commands.
Shpg. wt. 2 lbs. **59.95**

NEW! PPS-400, Package KoalaPad and Speed Key software, 9 lbs. **139.95**

4 WICO Computer Command Analog Joystick

Arcade quality joystick adds to the fun of playing games on your HS-151 Personal, HS-161 Portable, IBM-PC computer or IBM-compatible computer. Arcade size and strength gives this accessory the feel and durability of professional equipment. Choose from a self-centering or free-floating non-centering mode of operation. External trim controls provide easy hand adjustment. Used with the PC-110 Analog Game Board (page 95). Put yourself in command of the toughest computer games with this ultra-responsive WICO control.

PP-401, Assembled, Shpg. wt. 2 lbs. **39.95**

5 Smart Interface Cable connects all RS-232 devices

An intelligent interface cable, Smart Cable looks at the RS-232 signals from the computer and the peripheral and uses its own logic circuitry to match up all data, handshake, and control lines automatically. All you do is plug in the cable and set two switches. The computer can be any make or model and the peripheral can be any RS-232 serial device. Any word length or code format used in transmission is acceptable and any baud rate up to 19,200 can be used. Has built-in male and female connectors and derives its power from the lines through current summing junctions. Always have the right cable at hand and be able to hook your computer to virtually any peripheral instantly and automatically.

PP-100, Assembled, Shpg. wt. 1 lb. **89.95**

6 Compact, versatile and easy-to-use modem

Novation J-CAT 300 Baud Modem is a high-performance small-sized modem that is easy to stick on or place just about anywhere you want. It is compatible with Bell 103 modems and operates in both answer and originate modes. The J-CAT is very easy to operate with an automatic mode selection and an automatic answer. A self-test feature verifies that you properly connected the cables between it and the telephone line. Two key operation allows easy control.

Other features include off-hook and carrier LED indicators, audio line status beeper, and EIA-RS232C serial interface compatibility. All this in a very small 5" x 1.9" x 1.3" package that is powered by a UL listed low-voltage 115 VAC wall mount power supply. Includes cable.

PP-310, Assembled, Shpg. wt. 2 lbs. **129.95**

IBM-PC computers and their compatibles along with support products

High-quality supplies and accessory support

Pre-wired, 10-foot RS-232 cables (connects pins 1-8, 20)

HCA-10, Male-to-Male Cable, Shpg. wt. 1 lb. **20.00**
HCA-11, Male-to-Female Cable, Shpg. wt. 1 lb. **20.00**
HCA-12, Female-to-Female Cable, Shpg. wt. 1 lb. **20.00**

Pre-wired, 6-foot Personal and Portable IBM cables

HCA-51, Male-to-Female Cable, Shpg. wt. 1 lb. **30.00**
HCA-52, Female-to-Female Cable, Shpg. wt. 1 lb. **30.00**
HCA-53, Parallel Cable, Shpg. wt. 2 lbs. **30.00**

Pre-wired 10-foot special application cables

HCA-22, WH-64 Parallel Cable, Shpg. wt. 1 lb. **35.00**
HCA-24, WH-64 Serial Cable, Shpg. wt. 1 lb. **35.00**

Protection for your floppy disks and computer system

HCA-16, Transient Surge Suppressor protects computer equipment from damaging electrical voltage spikes. It is a parallel protection device that clamps down on transients in less than 5 nanoseconds, well before destructive spikes can reach critical equipment. Handles 4.5 kilowatts of peak pulse power for 1 ms. Just plug your equipment's power cords into this protective device. 1 lb. **65.00**

High-quality, highly-reliable 5.25" and 8" floppy disks

HCS-70, 5.25" hard-sectored, single-sided floppy disks with a capacity of up to 100K bytes. Used with H-17-1 48 TPI drives and H-88-1 Controller Board. Shpg. wt. 1 lb. ..... **Package of ten, 40.00**

HCS-66, 5.25" soft-sectored, single-sided, double-density floppy disks. For use in H/Z-89 Computers equipped with 48 TPI H-17-1 or H-17-5 disk drives and Z-89-37 Controller Board for up to 160K byte storage capacity on a single disk. Shpg. wt. 1 lb. ..... **Package of ten, 45.00**

HCS-71, 5.25" soft-sectored, double-sided, double-density floppy disks. These 48 TPI disks are used with H-17-5 drives and Z-89-37 Controller Board to store up to 320K bytes of data on a single disk. 1 lb. ..... **Package of ten, 50.00**

HCS-68, 5.25" soft-sectored, double-sided, double-density floppy disks. These 96 TPI disks are used with H-17-5 drives and Z-89-37 Controller Board for storing up to 640K bytes of data. Shpg. wt. 1 lb. ..... **Package of ten, 55.00**

HCS-69, 8" soft-sectored, single-sided, single-density floppy disks. IBM 3740 formatted, 250K bytes storage. Shpg. wt. 2 lbs. ..... **Package of ten, 55.00**

HCS-64, 8" soft-sectored, single-sided, double-density floppy disks. Up to 500K bytes of data storage. Shpg. wt. 2 lbs. ..... **Package of ten, 60.00**

HCS-65, 8" soft-sectored, double-sided, double-density floppy disks. One megabyte of data storage on a single disk. 2 lbs. ..... **Package of ten, 70.00**

Quality printer paper at economical prices

HCS-1, Premium 8.5" x 11" one-part fan-fold paper, continuous 2700 sheets, Shpg. wt. 28 lbs. **32.00**

HCS-2, Standard 8.5" x 11" one-part fan-fold paper, continuous 3200 sheets, Shpg. wt. 31 lbs. **32.00**

HCS-3, Standard 14.875" x 11" one-part fan-fold paper, continuous 3200 sheets, Shpg. wt. 47 lbs. **42.00**

HCS-4, Bond form-feed 8.5" x 11" one-part fan-fold paper, continuous 1000 sheets, Shpg. wt. 13 lbs. **25.00**

Convenience accessories for your computer system

PM-100, Locking 5.25" floppy disk storage cabinet, holds 70 disks in charcoal-colored copolymer plastic case. Comes with rigid dividers, index tabs, and built-in handles, Shpg. wt. 3 lbs. **19.95**

PM-111. STAT-ATTACK Computer Cleaning System contains: inert dusting gas to spray dust and loose dirt away from computer equipment; antistatic spray to protect your computer from static discharges; monitor screen and keyboard cleaner to remove all types of dirt and grime from most surfaces; antistatic cabinet cleaner, combines cleaner and static fighter; greaseless antistatic hand lotion helps eliminate static discharges between body and sensitive equipment; and lint-free wipers and swabs to remove dirt and help keep equipment clean. Shpg. wt. 2 lbs. **24.95**

Cartridge Fonts for the WH-64 Printer

HCS-30, Prestige Elite Font with 12 cpi pitch, 1 lb. **40.00**
HCS-31, Orator 85 Font with 10 cpi pitch, Shpg. wt. 1 lb. **40.00**
HCS-32, Courier Italic Font with 12 cpi pitch, Shpg. wt. 1 lb. **40.00**
HCS-33, Modern PS Font with proportional spacing, Shpg. wt. 1 lb. **40.00**

High-quality, long-life printer ribbons

HCS-50, 3 plug-in cloth ribbons for Primage and Diablo 1640/630, 1 lb. . **18.00**
HCS-51, 3 plug-in film ribbons for Primage and Diablo 1640/630, 1 lb. . . **18.00**
HCS-52, 3 ribbons for H/WH-14 and ASR-33 Printers, Shpg. wt. 1 lb. **8.00**
HCS-55, One plug-in ribbon cartridge for MX-80 Printers, 1 lb. **14.00**
HCS-56, 2 plug-in ribbon cartridges for H/Z-25 and H/Z-125, 3 lbs. **20.00**
HCS-57, One plug-in ribbon cartridge for WH-64 Printer, 1 lb. **12.00**

Accessories for the MPI-150 Printer

MPA-10, Parallel Cable for MPI-150 and MPI-99 Printers to HS-151 Personal and HS-161 Portable Computers, Shpg. wt. 1 lb. **35.00**

MPI-150-1, Replacement ribbon, Shpg. wt. 1 lb. **20.00**

MPI-150-2, Serial adapter card for MPI-150 Printer, allows asynchronous serial data transfer up to 9600 baud. Supports X-ON/X-OFF, STX/ETX, Select/Deselect protocols and software baud rate selection. Shpg. wt. 1 lb. **110.00**

MPI-150-3, MPI-150 programmable status keypad. A front panel keypad for externally changing forms length, print density, horizontal and vertical tabs, baud rate, and character set. Shpg. wt. 2 lbs. **130.00**

MPI-150-4, 64K buffer memory expansion for MPI-150, allows application extensions for high speed interleaved printing and spooling. 1 lb. **259.00**

MPA-1, H/Z-100 AP-PAK is a graphics applications package that enables the MPI-150 Printer to print out any H/Z-100 graphics character, large displays and decorative fonts. Includes interconnecting cable; some features require GW-BASIC. Shpg. wt. 1 lb. **75.00**

MPA-3, H/Z-89 AP-PAK is a graphics applications package that enables the MPI-150 Printer to print out any H/Z-89 graphics character, large displays and decorative fonts. Includes interconnecting cable; some features require MBASIC. Shpg. wt. 1 lb. **75.00**

MPA-4, H/Z-90 AP-PAK is a graphics applications package that enables the MPI-150 Printer to print out any H/Z-90 graphics character, large displays and decorative fonts. Includes interconnecting cable; some features require MBASIC. Shpg. wt. 1 lb. **75.00**

FALL $AVER 2 for 1 SPECIALS!

Stock up on ribbons and printwheels for Primage I and DTC printers and save with this special Fall $aver Special. Get two of the same item for the price of one. While supplies last.

Printwheels for the Primage 90 daisy wheel printer

PPA-250-4, Courier 10 printwheel with 10 cpi, Shpg. wt. 1 lb. **19.95**
PPA-250-5, Prestige Elite printwheel with 12 cpi, Shpg. wt. 1 lb. . **19.95**
PPA-250-6, Versa-Tile PS printwheel and proportional spacing, 1 lb. **19.95**

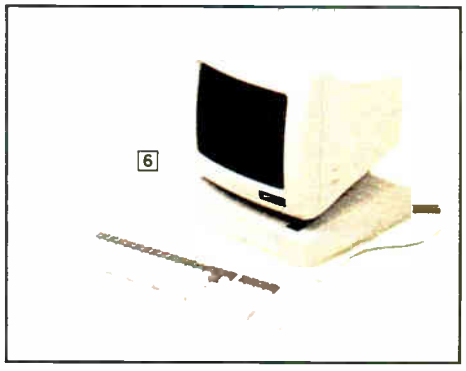
Ribbons and printwheels for the DTC 380Z Printer

PPA-260-3, Three replacement ribbons, 1 lb. ..... **LAST CALL 9.95**
PPA-260-6, Brougham printwheel with 10 cpi, Shpg. wt. 1 lb. **26.95**
PPA-260-7, Prestige printwheel with 10/12 cpi, Shpg. wt. 1 lb. **26.95**
PPA-260-8, Anelia printwheel with proportional spacing, 1 lb. ... **26.95**
PPA-260-9, Script printwheel with 10/12 cpi, Shpg. wt. 1 lb. **26.95**
PPA-260-20, Quadro printwheel with 10 cpi, Shpg. wt. 1 lb. **26.95**

Ribbons and Printwheels for DTC Style Writer Printer

PPA-270-4, Three black replacement ribbons, Shpg. wt. 1 lb. **16.95**
PPA-270-5, Two red replacement ribbons, Shpg. wt. 1 lb. **6.95**
Style Writer uses same printwheels as DTC 380Z Printer.

Top performing terminals that feature versatility, compatibility, economy, and ease of use



1 New terminal satisfies personal and business needs

NEW

- **Built-in flexibility and ease of operation make this terminal one of the most versatile available**
- **Four modes emulate popular business terminals**

The Z-39 Terminal is an ideal workstation for data or order entry, information retrieval, electronic mail, and clerical word processing. It represents a low-cost, high-performance answer to both your personal and business needs with professional features designed into a comfortable, human-engineered package.

Designed with the user in mind, the Z-39 features a professional 12-inch diagonal non-glare screen that helps increase productivity by relieving eye-strain caused by long periods of use. The green screen displays 24 lines of 80 characters each plus a 25th status line for terminal information or programmed for notes or reminders by the user. The large 8 x 10 dot matrix that makes up each character on the screen provides sharp and clear alphanumeric displays.

The low-profile keyboard is detached to let you freely move it around for maximum operator comfort. It is laid out in a standard QWERTY keyboard style for easy use by touch typists. The keyboard generates all the codes for upper and lower case letters, numbers, and punctuation plus subscripts, super-scripts, scientific notation and graphics characters. Dedicated function keys speed terminal operation while special function keys can be used for special purposes through software, or may be user-defined. A separate calculator style keypad makes rapid entry of numbers very easy for accountants and spreadsheet users.

Built-in editing commands permit fast, simple manipulation of text and data entry. Basic word processing edit and erase functions include insert or delete a character or line; erase a page, a line, to end of a line, to the beginning of a line, to the beginning of a page, and to the end of a page. In addition, select visual attributes like blinking to call attention to a certain condition, reverse video or half-intensity to distinguish between different types of data, or blanking to inhibit the display until a password is given.

All terminal features are keyboard accessible and can be stored in nonvolatile memory to remain until you change them. Among the accessible features are video attributes, status line, key click, keypad select, port assignment, tabs, test, handshaking, and others. One of these is the screen saver which increases the life of the screen by blanking it after a period of inactivity. Another is terminal emulation selection of ANSI, Lear Siegler ADM3A, Hazeltine 1500 or Zenith terminals. And you can select a baud rate for transferring data from a slow 75 baud to transferring a screenful of characters in 1 second with a baud rate of 19200, better performance at lower phone line charges.

Other features include a tilt and swivel video display with a front mounted power switch, DCE and DTE RS-232C connectors, set mode, function indicators, automatic internal self checks, and a power-on indicator.

Z-39, Assembled, Shpg. wt. 36 lbs. **749.00**

Z-39 SPECIFICATIONS: VIDEO DISPLAY: CRT: 12" diagonal, green phosphor non-glare display. **Display Format:** 25 rows of 80 characters. **Display Size:** 6.0" (15 cm) H x 8.5" (21.3 cm) W. **Character Type:** 8 x 10 character cell. **Character Size:** approx. 0.2" (5 mm) H x 0.1" (2.5 mm) W. **Character Set:** Normal: 128 characters; 95 ASCII, upper and lower case, numerics and punctuation, 33 graphic characters. Alternate: 128 characters; 95 ASCII, superscript and subscript, scientific notation, and 33 graphic characters (VT-100). **Refresh Rate:** 60 Hz. **CURSOR: Type:** Underline or reverse (solid) video block. **Attributes:** On, off, blinking. **Addressing:** Direct or relative. **KEYBOARD: Unit:** Detached 91-key with 6 foot (1.9 m) coiled cord. **Layout:** 77-key QWERTY layout with programmable special function keys and 14-key numeric keypad. **Indicators:** Visible: POWER ON, KEYBRD LOCK, OFF LINE and CAPS LOCK. Audible: Programmable key click with each key entry, power-on beep, bell sound on receipt of ASCII bell character. **COMMUNICATIONS: Mode:** Half or full duplex on the primary port, half duplex on the auxiliary port. **Code:** ASCII. **Format:** Serial asynchronous. **Word Length:** 7 data bits, one parity bit. **Stop Bits:** Two at 75 and 110 baud rates, one at all others. **Data Transmission Control:** Hardware and software (XON and XOFF) handshaking. **Parity:** Even, odd, mark, or space. **Power Requirements:** 90 – 132 VAC, 60 Hz. **DIMENSIONS: Video Unit:** 13.6" H x 12.9" W x 11" D (34.5 x 33 x 28 cm). **Keyboard:** 1.4" H x 18.3" W x 8" D (3.3 x 46.3 x 20.5 cm). **Weight:** Monitor: 18.9 lbs. (8.5 kg). Keyboard: 3.8 lbs. (1.7 kg).

2 Smart H-29 Terminal features performance

- **Built-in flexibility provides room to grow as your needs increase**

The most user-friendly kit terminal available, the H-29 allows a user to configure parameters from on-screen selections. All parameters are set through keyboard selections and stored in nonvolatile memory until reset. Even a user-setable 24-hour clock is accessible for keeping track of standard or elapsed time. A keyboard HELP key is also provided for prompts or help messages used with some software. And, a special screen saver automatically shuts off the display after 15 minutes of nonuse for those forgetful moments. In addition, built-in power-up diagnostics ensure proper operation of the terminal at all times.

The H-29 Terminal is compatible with many ANSI protocol terminals including the popular Heathkit H-19 Terminal. For greater versatility in education and business, the H-29 models the Lear-Siegler ADM3A and the Hazeltime 1500A Display Terminals. And, it is compatible with the DEC VT52 Terminal and has many

attributes of the DEC VT100 Terminal, all at a lower price than any of them.

Information is clearly displayed in 25 lines of 80 characters each on a nonglare green CRT in normal or reverse video. Select a block or underline and a blinking or nonblinking cursor. The detached keyboard of the H-29 has 91 keys and includes a separate numeric keypad. All keys are a nonglare type to provide nonslip finger contact and reduce eye-fatiguing glare. Four LED status indicators on the keyboard show power, off line, and keyboard and caps locked.

Along with a 128-character ASCII set, the H-29's keyboard can generate codes for an alternate character set of 33 special symbols in an 8 x 10 dot matrix. Besides lower and upper case letters, other characters include: superscript and subscript letters, Greek symbols, H/Z-19 graphics, VT-100 graphic and other symbols. Each entry is confirmed by an audible click and is automatically repeated when held down for over half a second, getting progressively faster as the key is held down.

Designed as an input/output device for a computer system, the H-29 Terminal can be hooked either directly or through telephone lines (using a modem) to any computer. It has two RS-232 standard connectors, a DTE type for computers or modems and a DCE type for an auxiliary device. An RS-232 serial cable is included for connecting the H-29 to computers and other peripherals.

Heathkit **Kit H-29,** Shpg. wt. 41 lbs. **449.00**

Z-29-A, Z-29 with amber CRT, 45 lbs. **799.00**

Z-29-1, Palm Rest Accessory, Shpg. wt. 1 lb. **15.00**

Z-29-2, ROM Source Listing, Shpg. wt. 4 lbs. **25.00**

H/Z-29 SPECIFICATIONS: DISPLAY: CRT: 12" P31, green, non-glare video screen. **Display Format:** 25 rows of 80 characters. **Display Size:** 6" H x 8½" W. **Character Type:** 8 x 10 character cell. **Character Size:** 0.2" H x 0.1" W (approx.). **Video Attributes:** Normal or reverse character, normal or underline character, normal or half-intensity character, normal or blinking. Can be in any or all combinations. **Refresh Rate:** 60 Hz. or 50 Hz. **CURSOR: Type:** Underline or reverse (solid) video block. **Attributes:** On, off, blinking. **Controls:** Up, Down, Left, Right, Backspace, Tab, Back Tab, Back, Home, Carriage Return and Line Feed. **Addressing:** Direct and relative. **COMMUNICATIONS: Type:** EIA RS-232C. **Baud Rates:** 75 – 19,200 baud. **Mode:** Half or full duplex. **Code:** ASCII. **Format:** Serial asynchronous. **Word Length:** 7-data bits, one parity bit. **Stop Bits:** 2 at 75 and 110 baud rates, 1 at all other baud rates. **Sync:** Auto XON and XOFF. **Parity:** Even, odd, mark or space. **Power Requirements:** 105 – 127 VAC at 60 Hz and 45 watts.

3 A low-cost entry point data terminal

- **Instant and user-friendly access to all types of computers**

Information processing terminal: The HT-10 features an integral RS-232 standard port that can function at speeds from 110 to 9600 baud for communicating with personal, business and other computers. In addition, this versatile terminal is compatible with a DEC VT-52.

Plain talk: Built-in prompts and cues in simple English make it easy to communicate with and use this friendly terminal.

Easy-to-use keyboard: The keyboard features a standard 63-key layout including the full ASCII set with CTRL, ESC, BREAK, TAB and RETURN. Four cursor control keys and a special HELP key add further convenience.

Electronic typewriter: Connect a parallel-type printer to the rear Centronics interface and take advantage of the terminal's printing features.

Heathkit **Kit HT-10,** Terminal includes ZVM-121Z video monitor without modem, Shpg. wt. 36 lbs. **399.00**

Heathkit **Kit HTX-10,** Terminal less monitor and modem, 10 lbs. **279.00**

ZT-10, Assembled and tested Terminal, includes video display monitor without modem, Shpg. wt. 32 lbs. **499.00**

ZTX-10, Assembled HT-10 less monitor and modem, 6 lbs. . **399.00**

HT-10 SPECIFICATIONS: Character Set: 95 ASCII, 33 graphics. **Keyboard:** 63 keys (26 alphabet, 10 numeric, 4 cursor/special function, 12 control, 11 punctuation). **Cursor:** Blinking or steady block, or off. **Video:** RS170 compatible. **Printer:** Parallel (Centronics-type).

4 A rapid access terminal with internal modem

- **Single button accessing with universal log-on capability**
- **System setup allows automatic answering of incoming calls**

Telecomputing system: With its internal modem, the HT-1011 can be connected anywhere there is a modular phone jack to gain complete access to computer data services. After preprogramming in a menu of up to 26 pre-selected information sources, a user simply presses one button to automatically select a desired information source or place a normal voice call.

Memory capability: Besides dialing a desired source, the terminal can transmit all required codes. A special universal log-on feature allows the user to program in log-on procedures including account numbers, escape codes and passwords into a battery-protected memory system.

Use your Visa or MasterCard credit cards to purchase your kit!

Included with some models is the ZVM-121Z monochrome monitor which features a green 12-inch CRT and excellent character definition.

Heathkit **Kit HT-1011,** Includes ZVM-121Z video display monitor, RS-232C port and 300 baud modem, Shpg. wt. 44 lbs. **449.00**

ZT-11-Z, Assembled and tested HT-1011 with video display, RS-232C port and modem, Shpg. wt. 30 lbs. **579.00**

ZTX-11-Z, Assembled and tested HT-1011 with modem RS-232C port less video display monitor, Shpg. wt. 6 lbs. **479.00**

ZT-1-UZ, Assembled and tested Terminal with monitor and modem less RS-232C serial port, Shpg. wt. 30 lbs. **549.00**

ZTX-1-UZ, Assembled and tested Terminal with modem less monitor and RS-232C serial port, 6 lbs. **449.00**

Accessories for the HT-10 and HT-1011 Terminals

ZT-1-2, Terminal Carrying Case, Shpg. wt. 2 lbs. **24.99**

ZTA-1-1, Parallel Cable, Shpg. wt. 1 lb. **25.00**

ZVM-121-Z, Optional Monochrome Video Display, for use with HTX and ZTX terminals. Features high resolution 12" green CRT that can display 25 line of 80 characters each, Shpg. wt. 18 lbs. **139.95**

HTX-10-1, Auto-dial/answer 300-baud modem, 1 lb. **69.95**

ZT-1-3, Universal ROM, one key access upgrade, 1 lb. **49.95**

5 Z-49 Terminal features increased flexibility

- **14" non-glare CRT displays 25 rows of a selectable 80/132 characters**

The very friendly Z-49 Video Display Terminal is designed to satisfy all your business and personal needs while providing the greatest degree of user convenience. All Terminal functions, even screen brightness, are easily set up by programming selections through the keyboard as plain-English menus are displayed on-screen. These selections are then stored in non-volatile memory.

The Z-49 features an advanced 92-key keyboard that has: automatic key repeat, status indicators, user-defined function keys, and full cursor control keys. Other Terminal features include: a 14" Chromogold II™ (amber) screen; DTE and DCE connectors; H/Z-29, H/Z-19, DEC VT52 and VT100 compatibility; smooth scrolling; normal and alternate character sets; and more.

Z-49, Assembled and tested, Shpg. wt. 37 lbs. **1099.00**

Z-49 SPECIFICATIONS: DISPLAY: CRT: 14" diagonal, enhanced contrast, video screen. **Display Format:** 25 rows of 80 characters or 25 rows of 132 characters. **Display Size:** 6.75" H x 9.25" W. **Character Type:** 80-column display, 10 x 12 character cell. 132-column display, 8 x 12 character cell. **Video Attributes:** Normal or reverse character, normal or underlined character, half intensity character and background normal or blinking display. **Refresh Rate:** 50 or 60 Hz. **CURSOR: Type:** Underline or reverse (solid) video block. **Attributes:** On, off, blinking. **Addressing:** Direct or relative. **COMMUNICATIONS: Type:** EIA RS-232C. **Baud Rates:** 50 – 19,200 baud. **Mode:** Half or full duplex. **Code:** ASCII. **Format:** Serial asynchronous. **Sync:** Auto XON and XOFF. **Power:** 105 – 127/210 – 254 VAC, 50/60 Hz, 73 watts.

6 Economical and user-friendly Z-22 Terminal

- **Compatible with Lear Siegler ADM11 and TeleVideo 914 Terminals**

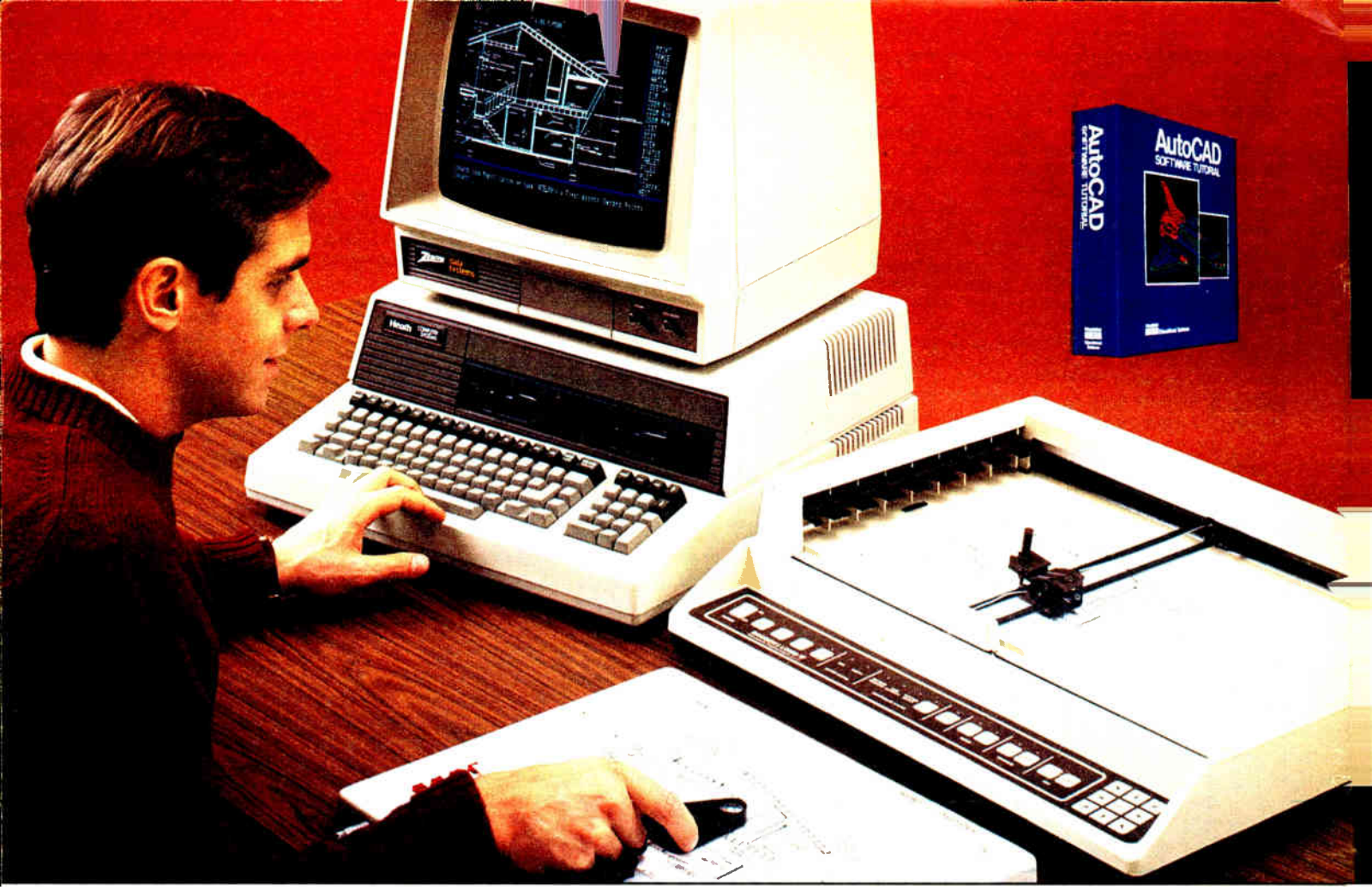
Featuring parameter selection like the smart H-29 Terminal, the Z-22 also offers user programming of automatic logons to information services and programmable function keys. Ergonomic features include a low profile detachable keyboard with a 75-key standard QWERTY-type layout and an 18-key auxiliary keypad. The 12-inch monitor with Zenith's special Chromogold II phosphor tilts and rotates for easy and comfortable viewing.

The easy-on-the-eyes CRT displays 25 rows of 80 characters, 24 rows of regular data plus a 25th status row which is user selectable between terminal status and defined through user selection. The Terminal displays a 96 character set including upper and lower case, numbers and punctuation. Three sets of graphics are also displayed which includes 33 graphics characters, 33 Zenith graphic characters and 33 foreign characters. The cursor can be set for blinking or nonblinking character, or blinking or nonblinking underline.

Also features compatibility with the popular Lear Siegler ADM11 and the TeleVideo 914 terminals which are found on many of today's systems.

Z-22, Shpg. wt. 37 lbs. **649.00**

Z-22 SPECIFICATIONS: DISPLAY: CRT: 12" diagonal, Chromogold II. **Display Format:** 25 rows x 80 characters. **Character Size:** 5 x 7 dot matrix with descenders. **Refresh Rate:** 60 Hz or 50 Hz. **CURSOR: Type:** Blinking or nonblinking block character or underline. **COMMUNICATIONS: Type:** EIA RS-232C. **Baud Rates:** 300 – 19,200 baud. **Format:** Serial Asynchronous. **Data Transmission Control:** Hardware and software (XON and XOFF) handshaking. **Power:** 120/220 VAC, 50/60 Hz. **DIMENSIONS: Monitor:** 13.6" H x 12.9" W x 11" D. **Keyboard:** 1.4" H x 18.3" W x 8" D. **WEIGHT: Monitor:** 18.9 lbs. **Keyboard:** 3.8 lbs.



A Microcomputer-Aided Drafting and Design Program

NEW

- **The power of large-scale computer-aided design software with low-cost, precision graphics on a personal computer**
- **Produces high quality drawings and schematics at a fraction of the cost of large-scale systems**

AutoCAD* brings the benefits of a high-performance drafting software program within the range of most budgets. It is a general-purpose system suitable for a wide variety of applications including: architectural drawings; drafting for mechanical, electrical, structural and civil engineering, printed circuit design, flow charts and organizational charts.

AutoCAD is easy to use and to learn, and it requires no computer knowledge. Interactively create and edit drawings of any size and to any scale using basic entities such as lines of any width, circles, arcs, and solid filled areas. Also use previously created drawings or parts of drawings. A well-designed menu structure enables the unskilled user to quickly realize professional results and the veteran user to speed through the program.

Like a word processor handling text, AutoCAD easily handles drawings. Move, copy, rotate, and scale drawings to your specifications. And just as quickly and easily make modifications or complete revisions. Work on a drawing at any level of detail using a full bi-directional zoom with a ratio of over a trillion to one. Selectively view or plot drawings as if on transparent overlays using an unlimited number of layers with a layer being assigned any one of eight colors. AutoCAD also uses a number of drawing aids like ruler lines, status reports, and an alignment grid to reduce drafting and design time while increasing and improving your drawing productivity.

Easy to adapt to specialized requirements, AutoCAD features user-defined menus, component and shape libraries, and multiple text fonts and styles. This drafting package also includes powerful facilities for manipulating drawing data and exchanging it with other programs.

More features are added through Advanced Drafting Extensions packages. ADE-1 adds: angular dimensioning; arc/circle diameter and radius, dimension lines at any angle; angles in degrees, minutes, and seconds; length and display of rubber band in status line; and hatch parameters are remembered and can be repeated. ADE-2 includes: dragging; snapping to reference points; named views; making slides for shows; and transferring of attributes to a data base program.

AutoCAD is available in two versions, one for the H/Z-100 Computer and the other for use in the HS-151 Personal Computer, the HS-161 Portable PC, the IBM-PC and IBM-compatible computers. Both versions require a computer to be equipped with a minimum of 256K RAM, two 5.25" disk drives, and be using the MS-DOS Vers. 2 operating system or other compatible operating system.

EC-1305, AutoCAD with Advanced Drafting Extensions package ADE-1 for use with the H/Z-100 Computer, Shpg. wt. 3 lbs. **1500.00**

EC-1305PC, AutoCAD with Advanced Drafting Extensions package ADE-1 for use with the HS-151 Personal Computer, HS-161 Portable PC, IBM-PC, and IBM-compatible computers, Shpg. wt. 3 lbs. **1500.00**

EC-1306, AutoCAD package includes Advanced Drafting Extensions ADE-1 and ADE-2 for use with the H/Z-100 Computer, Shpg. wt. 3 lbs. **2000.00**

EC-1306PC, AutoCAD package includes Advanced Drafting Extensions ADE-1 and ADE-2 for use with the HS-151 Personal Computer, HS-161 Portable PC, IBM-PC, and IBM-compatible computers, Shpg. wt. 3 lbs. **2000.00**

EC-1301, Architectural Sections Library, contains masonry and steel components for use in generating wall sections and details, 3 lbs. **450.00**

EC-1302, Architectural Plans Library, contains typical elements used in architecture floor plans, Shpg. wt. 3 lbs. **350.00**

EC-1303, Mechanical Engineering Library, contains components used in mechanical and plumbing design, Shpg. wt. 3 lbs. **450.00**

EC-1304, Electrical Symbols Library, contains symbols for use in electrical power and lighting plans, Shpg. wt. 3 lbs. **450.00**

*AutoCAD is a trademark of Autodesk, Inc.

Master computer-aided design and drafting

- **Learn to use the important features of a full-sized industrial CAD system with an easy-to-learn and easy-to-use drafting package**
- **An ideal learning tool for high performance drafting training**

Enter the world of computer graphics and see how to put CAD capability at your fingertips with this tutorial package using AutoCAD drafting and design software. Begin with a general introduction to computer graphics, find out about the equipment that makes up a work station, and then delve into the production of drawings using an incredibly powerful drafting software tool.

Divided into eight major subject areas the AutoCAD Tutorial course introduces and guides you in the use of this computer-aided drafting system. It begins with an introduction to computer graphics and helps you get ready to run the drafting software. Next, all the commands necessary to produce drawings accurately and quickly are covered including the use of: points, lines, arcs, circles, text, panning, zooming, layering, blocks, and arrays. Plotters and digitizers are discussed to familiarize you with the wide range of input/output devices that are available. One unit is dedicated to the advanced features of AutoCAD for those who desire a broader and deeper exposure to the power of AutoCAD. All areas are sequential in nature and build on previously presented material.

The final unit contains experiments that reinforce the lessons learned in the course and enable you to use your newly acquired skills. You learn by actually working with real CAD software. Disks included with the tutorial allow you to create and modify drawings using virtually all of the commands of AutoCAD.

Two versions of this tutorial are available. One is for use with the H/Z-100 Computer while the other can be used with the HS-151 Personal Computer, HS-161 Portable PC, IBM-PC, and IBM-compatible computers. Whichever computer is used it must be equipped with a minimum 256K of RAM, two 5.25" disk drives, and have color capability. To benefit fully from this tutorial a color monitor should be used to take advantage of AutoCAD's layering function. A digitizer and plotter can be used but are not required. AutoCAD supports many different models of input and output devices. This drafting software program uses the MS-DOS operating system.

EBS-609, For use with H/Z-100 Computers, Shpg. wt. 2 lbs. **59.95**

EBS-609PC, For use with the HS-151 Personal Computer, HS-161 Portable PC, IBM-PC, and IBM-compatible computers, Shpg. wt. 2 lbs. **59.95**

Learn to use the potential of Microstat

- **Tutorial provides a general understanding of almost all of the functions and capabilities of the Microstat program**
- **Learn to use statistical tests and procedures for data manipulation**

ZDS Microstat Tutorial is a series of interconnected programs designed to acquaint you with most of the functions and capabilities of the Microstat program. Since Microstat is such a comprehensive library of statistical programs, it is impossible to include all information about this system. However, this totorial does present most subprograms and their most frequently used options. The tutorial can be used as a learning tool for those who are not familiar with Microstat or as a refresher for those who would like to review particular programs in the wide range offered by Microstat.

Screens and prompts displayed by the tutorial coincide with those found in Microstat programs. As a result of working with the tutorial you'll know what to expect when executing any of the statistical programs. Like Microstat, ZDS Microstat Tutorial is designed as an interactive program using menus and prompts. From the main tutorial menu you can select any of the subprograms and functions that make up Microstat including: Data Management Subsystem, Descriptive Statistics, Frequency Distributions, Hypothesis Tests: Mean, Analysis of Variance, Scatterplot, Correlation Matrix. Regression Analysis, Time Series Analysis, Non-parametric Statistics, Crosstabs/Chi-Square Tests, Factorials/Permutations/Combinations, Probability Distributions, and Hypothesis Tests: Proportions.

A tutorial text, sample screen displays, and prompts follow all subprogram and function selections from the main menu. Simply follow the on-screen instructions and prompts as the tutorial shows you how to use the selected subprogram or function. Single key entries let you proceed to the next screen of information or return to the previous menu when completed. So that you'll always know where you're at in the tutorial you are automatically returned to the menu from which you made your last selection whenever a phase is completed.

To operate this tutorial you'll need an HS-151 Personal Computer, an HS-161 Portable PC, an IBM-PC, or IBM-compatible computer. You must use the MS-DOS Version 2 operating system and the GW-BASIC programming language.

CB-5063-22, Shpg. wt. 2 lbs. **80.00**

Become a proficient user of Condor* 3

- **Learn to simplify information management**
- **Discover how to use the power and memory of a computer to access and manipulate information you have entered**

The Condor 3 Tutor is a series of lessons designed to help you become skillful in the use of this data base management system as soon as possible. Divided into ten lessons, you can study only selected features if you wish or complete each lesson if you are a first time user of Condor. Each lesson consists of instruction, practice exercises on-disk, and practice lessons in the accompanying handbook that let you directly interact with the Condor 3 program.

Topics covered on the four education disks include: the basic concepts and terminology of data base systems, and how to define a Condor 3 file; how to enter information in the records of a previously defined data set and how to examine the data you have entered; how to revise and delete records within your data set and how to organize records in a logical order; and how to create data sets from existing ones. Also covered is how to: perform mathematical operations in Condor 3, use relational operators, transfer updated information and records from one data set to another, and how to use some utility commands to maintain your Condor data sets more effectively. You will further develop skills in order to create a master data set and an entry data set. In the final lessons you'll learn how to use Transaction and change data sets to perform updates on your master set, plus you'll further develop your skills in order to print simple reports from a data set.

Requirements for this tutorial includes use of an HS-151 Personal Computer, HS-161 Portable PC, IBM-PC, or IBM-compatible computer equipped with one or two 5.25" disk drives. Exercises in the tutorial require the use of the Condor 3 software package and the use of two disk drives. A printer is optional. You also need the MS-DOS Version 2 operating system and GW-BASIC.

CD-5063-5, Shpg. wt. 1 lb. **99.00**

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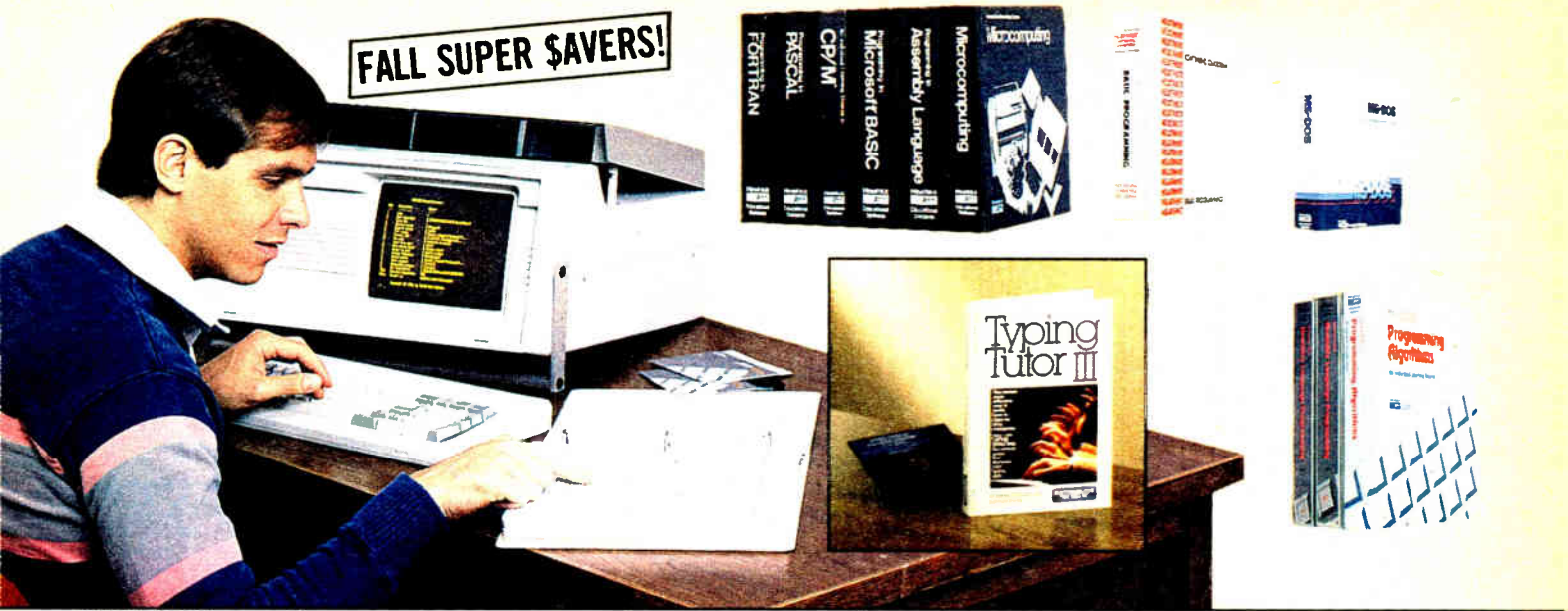

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- **Learn to program virtually any computer using the Intel 88/86 series of microprocessors**
- **Designed for use with Heathkit/Zenith Computers and the IBM Personal Computer**

A new addition to Heathkit/Zenith Educational Systems' computer programming series is the MACRO-86 Assembly Language Programming Course. With it, you'll learn the fundamentals of Assembly Language programming using MACRO-86. Setting this Course apart from any other on this subject is the "laboratory" method of instruction. Rather than just tell you, we will describe and then demonstrate all of the features of MACRO-86. These demonstrations will use programs supplied with the Course and programs that you will write.

After completing this nine-unit Course, you'll be able to describe the internal structure of the Intel 8088 microprocessor and trace instruction and data flow. You'll know how to write COM- and EXE-type programs, develop flow charts, and design program arrays, structures and records. You'll also be able to input and output data, develop interrupt service routines and design macro instructions.

For this programming Course, you should have access to a Heath/Zenith 100-series Desktop or 150-series Personal microcomputer, an upgraded ET-100 Trainer or an IBM-PC and the appropriate operating system: MS-DOS, Z-DOS* or PC-DOS. You should also be familiar with the basic operation of the operating system (and supporting files) and have access to system programs. In addition, you should be familiar with binary and hexadecimal number systems, and computer math (a brief overview is provided in the Appendix).

Pass the final examination with a 70% or higher score and earn 5.0 Continuing Education Units. In addition, you'll also receive a Certificate of Achievement from nationally recognized and accredited Heathkit/Zenith Educational Systems.

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MACRO-86 Programming Algorithms Course

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- **Run experiments on a Heathkit/Zenith or PC Computer**

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In addition to writing algorithms, you'll learn to translate them into MACRO-86/Intel 8088 mnemonics. Control structures, an extended example of translating an algorithm and conventions are also discussed. When finished, you'll know how to clearly define a problem and solve it with an algorithm.

Experiments at the end of each unit are written for a computer system using the Intel 8088 microprocessor, such as the: H/Z-100 Desktop Computer, HS-151 Personal Computer, the HS-161 Portable PC, the upgraded ET-100 Trainer or the IBM Personal Computer. The MS-DOS operating system is used in all experiments. A 5.25" floppy disk supplied with the Course contains experiments, programs and demonstrations for use in the Programming Algorithms Course.

Before you begin this Course, you should be familiar with the instruction set for the 8088 microprocessor and its various addressing modes. You should also know the commands to your operating system that manipulate files and the basic programming techniques including loops, tests and subroutines.

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Included is an arcade-style game called LETTER INVADERS than enables you to sharpen your speed skills while having some fun at the same time. TYPING TUTOR III is easy to use with one-key on-screen help messages. It requires an HS/Z-151/161 or IBM PC computer with one 5.25" disk drive.

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Fifteen computer exercises, included on a 5.25" floppy disk, provide an opportunity to use MS-DOS features/commands on an H/Z-100 Desktop, HS-151 or HS-161 Personal, an upgraded ET-100 Trainer or an IBM PC. Requires MACRO-86 Assembler.

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Learn to program in the low-level language your computer understands best, Assembly Language. It uses labels, operands, comments and assembler directives that enable you to create a source code that's both easily read and adapated to your computer system. Symbolic notation and easy-to-carry-out documentation methods make program listings easy to understand.

Workbook contains experiments for use on the H/Z-89 computer.

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Cover every aspect of programming using Microsoft BASIC, one of the most versatile programming languages for microcomputers. Learn how to get the most from this programming language and improve your programming skills whether you're using an H/Z-89, TRS-80, APPLE or other computer.

A comprehensive text and programming experiments combine to give you complete coverage of MBASIC programming fundamentals. You'll learn about: computer arithmetic, program structures, sequences, branching, and more.

To obtain the full benefit from this Course, you'll need access to a computer that uses the Microsoft BASIC language. Pass the optional final examination with a 70% or better score and earn 5.0 Continuing Education Units plus receive a Certificate of Achievement from Heathkit/Zenith Educational systems.

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A clearly written text and five audio cassette tapes combine to form an integrated and effective learning program. You are shown how to identify and write simple Pascal programs. Then you learn to identify and write self-contained procedures. Other areas covered include: the decision making part of programming; how and when to incorporate IF, THEN, ELSE and CASE statements; Boolean variables; and how to use REPEAT, UNTIL, WHILE, DO and FOR loops.

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A powerful program, FORTRAN simplifies complicated scientific and mathematical problem solving. Learn its fundamentals and how to use its power with the economical and effective Programming in FORTRAN Course.

This 11-Unit Course begins with a special introduction to computers and then introduces FORTRAN programming. Subjects covered in this Course include: program analysis, variables, expressions, input and output, identify and write self-contained procedures, making decisions, loops, data types, and more.

Hands-on experiments provided with this Course enable you to actually write FORTRAN programs. Coding forms are included. To get the most from the experiments, as welll as the Course, we recommend that you perform the experiments on a computer such as the H/Z-89, H/Z-100, HS-151 Personal or HS-161 Portable Computer. With these computers, you'll need the appropriate CP/M* or MS-DOS operating system and the Microsoft FORTRAN programming language.

Pass the optional final examination with a 70% or better score and earn 5.0 Continuing Education Units. Plus, receive a Certificate of Achievement.

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BASIC Course teaches you to program in one of the most popular languages

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- **Learn to write and make corrections to programs**

Learn to write BASIC programs that instruct a computer to perform specific tasks. In fourteen programmed instruction units, you proceed at your own speed and learn the standard words and commands of BASIC. In this Course, many BASIC versions, formats, commands, statements and procedures are covered. You'll learn about the tools of the language, and learn to define and plan a program. Then you'll format and write a program as well as adapt programs to suit your needs.

The BASIC Programming Course includes a self-instructional textbook and a workbook filled with exercises in writing and running BASIC programs. Access to a computer is recommended to obtain the maximum benefit from this Course. In addition, handy reference cards with Benton Harbor BASIC statements, ASCII number codes, BASIC direct command statements and a reference chart with math and Boolean algebra operations are included.

After completing the Course and passing the optional final examination with a 70% or higher score, you'll be awarded 3.0 Continuing Education Units and receive a Certificate of Achievement from Heath/Zenith Educational Systems.

EC-1100, Shpg. wt. 7 lbs. ..... **Regularly $49.95 THIS CATALOG 44.95**

College Level Examination: Earn valuable college credit for successfully completing this course. For more information see page 61.

ECC-1100, Shpg. wt. 1 lb. ..... **Regularly $25.00 THIS CATALOG 22.50**

Learn how to use CP/M* and how to get the most from this industry-standard operating system

cut $6

- **Covers all aspects of the CP/M operating system**
- **Use with many 8080/Z-80/8085 computer systems**
- **Uses proven audio-visual tutorial method**

A beginner-oriented Course, the EC-1120 CP/M Course makes it possible for even first-time computer users to easily learn about the operating system that has become an industry standard. It begins with the basics, so elementary that a previous background in CP/M or Assembly Language isn't necessary.

A thorough 500-page text and five audio cassette tapes make it very easy for you to learn about CP/M. This Course begins with an introduction to the operating system and how to use basic CP/M commands. This includes the operating system's major control functions and diagnosing problems from error messages. Built-in commands of the command control processor are discussed along with a coverage of transient programs. You also learn to use the STAT and CONFIGUR commands. In addition, you'll learn to use the system's resident text editor, ED, to edit files plus how to submit command files.

This Course is designed for use with computers having 48K bytes of RAM and able to use the CP/M operating system, such as an H/Z-89 or H/Z-100 Computer.

Pass the optional final exam with a 70% or higher score and earn 2.5 Continuing Education Units, plus receive a personalized Certificate of Achievement.

EC-1120, Shpg. wt. 6 lbs. ..... **Regularly $59.95 THIS CATALOG 53.95**

Microcomputing Course teaches you the basics of computers and what they can do for you

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- **See how a computer can solve everyday problems**
- **Make intelligent decisions when purchasing**

For those who want to know what a computer can do for them, this Microcomputing Course is an ideal place to start. In easy and simple terms, you are shown what a computer can do for you. The self-instruction text fully explains the different parts of a computer and shows you how to apply its capabilities to your specific needs. With the text and two accompanying audio cassette tapes, you'll learn about computer hardware and how it works to better evaluate what extras you'll need along with your computer. And, you'll also learn about software and how to choose the best programs for your use.

The main objective of this Course is to make personal computing understandable to you. It puts the various types of computer systems into perspective so that you can make informed decisions about a computer purchase.

Earn 1.0 Continuing Education Unit and receive a Certificate of Achievement by passing the optional final exam with a 70% or higher score.

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*CP/M is a registered trademark of Digital Research, Inc. Z-DOS is a trademark of Zenith Electronics Corporation.

The President's Letter:

Dear Friends:

It is my great pleasure to announce the first Heathkit Master Builder. He is John Lee, a customer of our Woodland Hills, California store. You can read more about our first Master Builder here, and on page 52 of this catalog.

And we **have more important news** for our Master Builder Club Members. We are starting Double Master Builder points on a wide range of products. Look for our special symbol within this catalog. This means that when you purchase one of these products you will receive **Double Master Builder Bonus Points.** This is our way of helping you move up the Master Builder ladder to higher levels and their benefits.

We're also planning exciting news for Master Builder Club members in the months to come, so watch this catalog and the mail for future announcements on the Master Builder Club. If you haven't already joined the Master Builder Club, I urge you to do so now and join the thousands of members who are already enjoying all the special benefits and recognition that it offers. For complete information, turn to Page 52 of this catalog.

And be sure to check out the new Heathkit Laptop portable computer on pages 90 and 91. It weighs under 8 lbs. and is a super value.

Finally, you'll notice that our name has been changed from Heathkit Electronics Centers to Heath/Zenith Computers & Electronics. This was done not only to reflect the change in our current business but also to express our determination to be **your strong partner** for electronics, computers, software and product support.

Joseph M. Schulte
President
Veritechnology Electronics Corporation

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Retail Catalog No. 870R Fall 1985

Congratulations to Mr. John Lee of Burbank, California on becoming the first Master Builder. In his advancement to the highest level in the Master Builder Club, John has assembled an HS-151 Personal Computer System and an entire ham radio station built around an HW-5400 Synthesized Transceiver. As a member of the Master Builder Club, John and over 12,000 kit builders receive special "for members only" offers and other discounts. For those interested in becoming a member call TOLL-FREE 800-253-0570 (Alaska and Michigan residents call 626-982-3411), no purchase necessary. Or, see your local Heath/Zenith Computers & Electronics Center. Club members, see page 52 for a special Fall double bonus point offer in *this catalog only.*

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