

# HEATHKIT®

New kit-gift ideas for Christmas '74



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Coming in December...  
the new all solid-state  
Heathkit SB-series  
Amateur Radio  
System



## More than three years ago, Heath engineers accepted the challenge to develop a completely new approach to amateur radio design. The results soon will be heard around the world.

### Charting New Paths

Reaching for new horizons is exciting. It also is exacting, demanding high discipline to achieve realistic results. It was in such an atmosphere — free thinking balanced by realism — that the Heath amateur radio engineers created this new series of equipment.

That they reached their horizons is evidenced in the following pages. You'll find a level of technological sophistication new to amateur radio, significant advances in the state-of-the-art destined to be of consequence for years to come, combined in a knowledgeable mix of new performance, convenience, and simplicity, with exceptional value.

### Tough Design Goals

When product plans for this new series were being outlined in 1971, there were 10 basic features requested: 1. All solid-state design, including the final amplifiers. 2. Digital frequency display with 100 Hz resolution. 3. Receiver section to cover all bands without prescaler tuning. 4. Superior receiver cross mod./intermod. performance. 5. Transmitter section to deliver rated power 80-100 meters without tuning. 6. Power output to be 100 watts plus a QRP level, on all bands. 7. Improved operating convenience. 8. Modularized circuitry. 9. Improved "buildability" and serviceability. 10. A system of solid-state accessories, including noise-blanker, remote VFO, station console with digital clock, timer, wattmeter, SSB bridge, and phone patch; monitor scope; and a conduction-cooled 1 KW linear amplifier.

### Heath's Most Extensive Engineering Project

With the above list of desired features and all their implications, it was apparent at the outset that this project was to be the largest in Heath's history. Each man in the advanced engineering group was assigned a specific design task of the total system, each contributed to the many brainstorming idea sessions necessary to solidify the free thoughts into practicalities. In total, thousands of man hours, more than three years of calendar time.

### Receiver Design Philosophy

When an engineer sets out to design the world's best no-tuning broadband amateur radio receiver, he knows his task is not simple. The circuitry will involve many other elements of the receiver design established by the product plan requests and will overturn many traditional techniques of receiver design.

The first tradition to be overturned was via elimination of the usual receiver RF amplifier stage. With it went much of the usual intermod. and cross-mod. problems, highly important in view of today's crowded band conditions. The first thing an incoming signal sees in this new transceiver is a bandpass filter. Signal quality is maintained by the use of a low-noise dual-gate MOSFET device in the first mixer stage, but stage gain is held to a minimum consistent with requirements for overload capability, operational needs and low internal noise.

Bandpass filter design necessitated computer simulation techniques. Several design generations later, the accepted configuration consisted of six filters. The 80, 40, 20 and 15 meter bands each use 5-pole filters; the 10 meter band uses two 3-pole filters. Numerous physical formats were considered. In keeping with Heath traditions of value, the final design is a kit... the builder mounts all filter components on a circuit board and aligns them without need of special instruments. The end result is a minimum of active devices between the antenna and the i.f. crystal filter for the superior distortion characteristics it exhibits, together with ease of operation. No prescaler "peaking," just select the band and dial in the frequency.

The AGC circuits complement the strong signal handling capabilities of the "front end," effective over an extremely wide range of input strengths with selection of fast and slow decay times for maximum flexibility.

### Digital Frequency Display Design

An important part of the convenience of this new SB series is the digital displays. For this reason, a great deal of effort was made in evaluating the various types such as incandescents, fluorescents, gas-discharge, LED, and liquid crystals on the basis of brightness and contrast (visibility), interface, power consumption, and esthetics. The winner was the Beckman planar gas-discharge display (the type

used in Heath digital clocks, thermometers, and desk calculators). Aside from their other advantages, they can be read in direct sunlight in portable and mobile environments.

The display is driven by a frequency counter of the common decade type with one major difference... it is programmable. Early directions considered generating an on-channel signal for the display, a scheme abandoned due to filtering and shielding problems. Another early direction used the SB-650 synthesis scheme, later abandoned due to complexity and cost. The programmable counter counts the premix injection frequency and is programmed to start below zero by the amount of the VFO frequency. The programming of the three frequencies (USB, LSB, CW/TUNE) is done by a diode matrix. Interface is standard BCD logic.

### VFO Design

With digital readout, stringent requirements for VFO linearity are no longer necessary. This permits the use of a kit design rather than a prebuilt LMO. Aside from obvious cost advantages, equally important is the absence of any "black box" mysteries... this is a VFO you can service yourself just like the rest of the circuits. The accepted solid-state VFO design underwent rigorous testing of specifications for load, power, packaging, frequency, and a computer program was used to tailor its environmental performance.

### Transmitter Design

Being entirely solid-state, this new transceiver has some interesting devices in it, like a DC-controlled grid op. amp. IC that is the entire transmitter audio circuitry, and a 2 watt PEP driver device for the QRP mode. But the most interesting design, and the longest in development, was the solid-state final amplifier.

Heath engineers have been experimenting with solid-state finals since 1965, often contributing information to the device manufacturers who appear in application bulletins. Heath judged early devices simply too fragile or too expensive for use in final amplifiers. As each new device became available from manufacturers, Heath always was one of the first to test it. Technology continued to improve and prices continued to decline. In June, 1972, the right transistors appeared. We made some recommendations to the manufacturer and are flattered that others in the industry have adopted our techniques. The transistors are rugged, emitter-balasted devices specifically designed for SSB applications. These new devices combined with careful attention to linearity throughout the entire transmitter design, result in an output that is extremely clean. The devices are protected against antenna shorts and opens or other high VSWR situations by a directional coupler in the antenna circuit which generates an ALC voltage. The design of the final amplifier dictates very conservative operating parameters; this fact coupled with efficient protection circuitry indicates the final devices should have almost unlimited life.

### Modularity Improves "Buildability", Maintenance, Service

The modular design of this new transceiver not only makes it easier to build, it also minimizes the chance of building error and greatly improves maintenance and service procedures. Nearly all circuit components mount on plug-in circuit modules or cards. Each card performs a specific function. This separation of functions allows rapid troubleshooting to the card level; an extender card facilitates repair while the unit is operational. This technique also eliminates the necessity of returning the entire unit for repairs... just return the card if necessary. However, we believe the techniques used in design plus the extensive instructions will permit most owners to easily do their own servicing and maintenance.

While we haven't mentioned it before, it is interesting to note that all transmit/receive switching is done by solid-state devices, except for the high power antenna and linear amp. switching which is done by relay. The diode switching technique also facilitates the mounting of the components on circuit cards of uniform size and does away with most of the previously necessary multiple shafts from the front panel (there are just 3 shafts in the entire transceiver).

Mechanically, the transceiver is uncomplicated and rugged, with metalwork that is easily assembled. Separate top and bottom shells give easy access to circuit cards and harness connections. All circuit cards are glass epoxy to provide the greater rigidity necessary for plug-in types and the greater adhesion of circuit foils which makes soldering less critical.

The styling speaks for itself. An evolution of many ideas with inputs from those who know the meaning of operating convenience and beautiful functionality.

### In Total

No effort has been spared, no compromise made in designing this new system. It is modern, timeless equipment. We believe it to be the best available today, ready to serve you for all of tomorrow, with levels of performance previously unattainable.

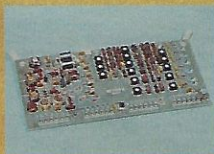
# The new Heathkit SB-104 Transceiver



Completely solid-state design...including the finals. Over 275 solid-state devices, including 31 integrated circuits. The SB-104 output board and final transistors are warranted for one full year.



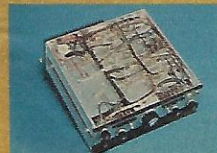
True digital readout. Six 1/2" gas-discharge displays deliver resolution down to 100 Hz with across-the-room visibility.



Completely broadband. Neither the transmitter nor receiver sections require tuning from 3 to 30 MHz...instant QWY from 80 to 10 meters is a reality.



Circuit board construction. Most components mount on 15 circuit boards for easy assembly. The seven major boards can be extended out of the chassis for adjustment or troubleshooting while rig is operating.



Virtually no point-to-point wiring. Two large wiring harnesses comprise about 95% of the SB-104's wiring.



Complete back-panel connections: Phone patch in & out; auxiliary audio input; speaker; key; AFC; VFO in & out; driver out; IF out; accessory plug; power plug; two spare jacks; separate transmit & receive antenna jacks.



New digital noise blanker plugs into SB-104 & solves the ignition noise problem. Provides up to 50 dB of effective blanking. Rep rate 10 to 2000 pulses/sec; pulse widths 1 to 250  $\mu$ sec.



New mobile mount features hinged rear brackets and telescoping front support...accommodates different transmission hump widths and insures proper front panel height above seat.





## New SB-230 1kW Linear ... strong and silent

The new value in linears. The lowest cost conduction-cooled linear on the market with a modern high efficiency tube that just loafs along at 60 watts idling — the rest of the 1200 watts is all talk power.

**Strong and silent.** The new "230" uses a husky Eimac 8873 triode in proven, stable, grounded grid circuitry to deliver up to 1200 watts PEP SSB, 1000 watts CW input from less than 100 watts drive. And the "230" is also rated at 400 watts input for slow-scan TV and RTTY. Low 3rd order distortion products, too... 30 dB down. A massive heat sink eliminates the need for a fan... the "230" is the quiet one. And the final is completely enclosed in a double-shielded compartment to reduce stray RF.

**Complete operating convenience.** On the front panel of the new SB-series low profile cabinet you'll find all controls at your finger tips for easy operating. Bandswitching is done with a single knob... Load and Tune controls are clearly marked so you can return to a favorite operating frequency just by noting the control positions. Full metering facilities are built-in... there's never a doubt about important operating parameters. A five-position switch, coupled with the back-lighted meter, indicates Relative Power, Plate current, Grid current and plate High Voltage at a glance. Relative Power sensitivity is adjustable with the front panel knob.

**A full complement of built-in safety features** — to respect the high power inside the new "230"... and its 8873 tube. The cabinet features microswitch interlocks on both the top and bottom to shut down the primary power when the cabinet shells are removed. Front panel status lights indicate Hi Temp, Exciter and Delay. The heat sink for the 8873 is temperature monitored; if the temperature rises too high, a thermal circuit breaker opens, the linear shuts down and the Hi Temp light goes on. The Exciter light indicates that the linear is running straight through, without amplification. To allow the tube sufficient time to warm up, a delay circuit is built-in. When warm-up is completed, the Delay light goes out. The On-Off switch also includes a built-in circuit breaker for the primary side of the power transformer. And the cathode of the tube is fused for additional protection.

**Easy assembly.** The new SB-230 goes together in 15 to 20 hours with the famous Heathkit manual. Most components are chassis mounted, and point-to-point wiring is held to a minimum. Just a few preliminary checks with an ohmmeter are required... no alignment is necessary.

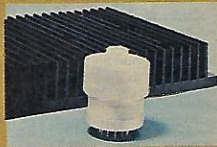
The new SB-230, styled to match the SB-104 transceiver, delivers all the features and performance you've come to expect from Heath... and at a price you can afford. Check the specs and price, and make the comparison yourself. We think you will agree it's the greatest value in modern linears.

**Kit SB-230, 40 lbs. .... \$319.95**

**SB-230 SPECIFICATIONS:** Band Coverage: 80, 40, 20, 15 and 10 meter amateur bands. Maximum Power Input: 1200 W PEP SSB; 1600 W CW; 400 watts RTTY/SSV, Duty Cycle: SSB: continuous voice modulation; CW: continuous (max. key-down time 30 seconds); RTTY/SSV: 50% (max. transmit time 10 minutes at 400 watts). Driving Power Required: less than 100 W. Third Order Distortion: -30 dB or better. Output Impedance: 50 ohms at 2:1 SWR max. Input Impedance: 52 ohms at 1.5:1 SWR max. Meter Switch: Exciter only. Relative Power, Plate Current, Grid Current; High Voltage. Front Panel: Load, Tune, Band, Relative Power sensitivity, Power switch, Meter switch, Rear Panel: I/O output; Exciter relay; RF input; RF output; Ground lug; Fuse; Line cord; Tube: Type 8873, Zero signal plate current: 25 mA. Power Requirements: 120 VAC, 50/60 Hz, 3.4 A max. 240 VAC, 50/60 Hz, 7 A max. Dimensions: 14 5/8" W x 16" D x 7 1/4" H. Net Weight: 33 1/2 lbs.

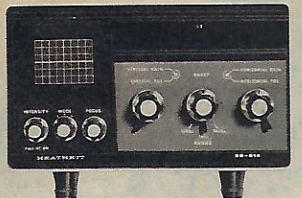


Chassis of the SB-230. Note massive built-in power supply, completely shielded final, cage, and safety interlock.



The business end of the new SB-230: a conduction-cooled 8873 triode final and a highly efficient heat sink. No blower needed.

# The New SB-series System Mates



## New SB-614 Station Monitor

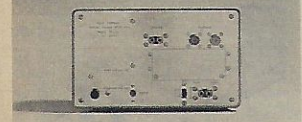
How clean is your signal? With the SB-614, you'll know. It monitors transmitted SSB, CW, and AM signals up to 1 kW from 80–6 meters. The highly visible  $1\frac{1}{2} \times 2$  CRT, with push-pull drive for a keystone-free, sharp, clean trace, indicates a wide variety of common operating problems: non-linearity, insufficient or excessive drive, poor carrier or sideband suppression, regeneration, parasitics and CW key clicks. The manual includes 40 CRT display illustrations and explanations.

**Complete controls.** All standard scope control functions are available in the "614" — Vertical Gain & Position, Horizontal Gain & Position, Focus Mode (SSB, Horizontal & Cross for RTTY Mark/Space adjustments). The improved recurrent, automatic sweep-type sweep generator is adjustable in three ranges from 10 Hz to 10 KHz. Front panel control gives 11 steps of attenuation. For limited test applications the "614" can be used as a normal scope, and provides 10 Hz to 50 KHz bandwidth, good sync and high input sensitivity. A rear panel 10:1 vertical attenuator provides extra convenience.

**Additional features include** all solid-state design; rear panel Astigmatism control; standard horizontal and vertical inputs for use as a scope; exciter and linear inputs/outputs. Circuit board/wiring harness design makes assembly fast and easy. What kind of signal do you have? Order your new SB-614 today and know.

**Kit SB-614, 16 lbs. .... \$139.95**

**SB-614 SPECIFICATIONS — RF SAMPLING SECTION:** Frequency Coverage: 80 through 6 meters (3.5–54 MHz). RF Power Limits: Exciter input (50–75 ohm) 10 to 300 watts; Antenna input (50–75 ohm) 10 to 1000 watts (up to 1500W PEP). Insertion Loss: Negligible. **VERTICAL AMPLIFIER:** Input Impedance: 1 Megohm shunted by 75 pF. Sensitivity: 63 mV rms/42° vertical deflection. X-Attenuator: 2 position; x1, 2 volts rms max. input; x10, 20 volts rms max. input. Frequency Response: 10 Hz to 50 KHz  $\pm 3$  db. **HORIZONTAL AMPLIFIER:** Input Impedance: 1 Megohm shunted by 50 pF. Sensitivity: 50 mV rms/1/4° horizontal deflection. Frequency Response: 10 Hz to 3 KHz  $\pm 3$  db. **SWEEP GENERATOR:** Type: Recurrent, automatic sweep. Frequency Range: 10 Hz to 10 KHz in three ranges. **GENERAL CRT:** 3RP1/A flat face, green, medium persistence phosphor. Arealities: 250 inch squares  $6 \times 8$  (1.5  $\times$  2.0 inches total viewing area). Power Supplies: All solid-state rectifiers. All amplifier supplies regulated. **Power Requirements:** 110/130 or 220/260 VAC, 50/60 Hz, 35 watts. **Front Panel Controls:** Intensity — Off-On; Mode — SSB, TRAP, CROSS; Focus; Vertical Gain; Vertical Position; Horizontal Gain; Horizontal Position; Sweep — Variable; Range — 100 Hz, 1 kHz, 10 kHz. **Rear Panel Controls:** Astigmatism; Vertical attenuator — X1, X10. **Rear Panel Connectors:** Antennas: 50 ohm; Exciter & Phone: Input; Phone; Horizontal input; Phone; DIMENSIONS: 7 1/4" H  $\times$  10 1/4" W  $\times$  1 1/2" D. Net Weight: 12 lbs.



SB-614 rear panel: Horizontal & Vertical inputs; exciter and linear inputs/outputs; x1/x10 vertical attenuator; astigmatism control.



## New SB-634 Station Console

Five station accessories in one! The new "634" provides five necessary functions that every amateur can use.

**24-hour digital clock:** six half-inch gas discharge digits indicate hours, minute and seconds visible from across the room. And the clock runs continuously, as long as the console is plugged in, completely independent of all other functions.

**Ten-minute 10 timer:** Three gas discharge digits indicate minutes and seconds up to 9:59. At ten minutes, the timer releases and provides either a visual alarm or both visual and audible alarms ... the selection is yours at the front panel switch. Pushbutton zero reset.

**RF wattmeter:** The big meter delivers measuring capability of either 200 watts or 2000 watts full scale. Provides  $\pm 10\%$  accuracy from 160 through 10 meters.

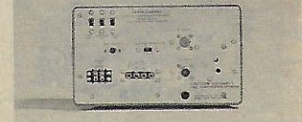
**SWR bridge:** Push a button to measure SWR. Separate front panel SWR sensitivity control.

**Phone patch:** The hybrid patch can be used either manually or with VOX control without switching connections. Push a button to select VU capability on the meter and use the separate front panel controls to adjust transmitter and receiver gain independently. Line isolation is at least 30 dB, and can be adjusted with a rear panel control.

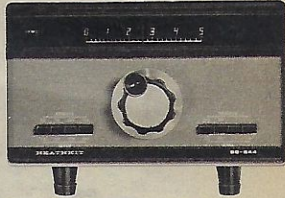
**Get five useful accessories at the same time...** get the new, solid-state SB-634 Station Console.

**Kit SB-634, 14 lbs. .... \$179.95**

**SB-634 SPECIFICATIONS — CLOCK —** Display Six full digits. Time Base: 24 hours. Accuracy: Determined by accuracy of power line frequency. **TIMER —** Display: Three full digits. Time Interval: 10 minutes with automatic reset. Manual reset at any portion of 10-minute period. Accuracy: Determined by accuracy of power line frequency. Signal: Visual only or both visual and aural switch selected. **RF POWER/SWR METER —** Frequency Range: 1.8 to 30 MHz. Wattmeter Accuracy:  $\pm 10\%$  of full-scale reading. Power Handling Capability: 2000 watts (maximum). **SWR Sensitivity:** Less than 10 watts. Impedance: 50 ohm nominal. **SWR Bridge:** Continuous to 2000 watts. P.P. Connectors: IHF type. **PHONE PATCH —** Circuit: Telephone hybrid circuit. Allows voice control or manual operation. **TELEPHONE LINE —** Input Impedance: Approximately 600 ohm. **Null Depth:** At least 30 dB isolation between transmit and receive circuits. **Receiver Impedance:** Effective match from 3 to 16 ohm. **Transmitter Impedance:** 60 ohm or higher impedance output. **GENERAL —** Meter: 100  $\mu$ A movement. VU readings for phone patch monitoring. Null depth indication. RF power output, relative power, and SWR readings. **FRONT PANEL CONTROLS —** Timer: Off, Visual, Aural Visual. Reset: Pushbutton switch. Patch Gain: Transmitter; Receiver. SWR: Sensitivity; Meter; SWR: Forward and Reflected. 2000 W and 200 W. Phone Patch: Rear Panel Controls. Clock: Time hold, minutes set, seconds set. Null Adjust control; Null-Monitor switch; 0 adjust control; R adjust control. **Power requirements:** 120/240 VAC, 50/60 Hz, 15 watts.



SB-634 rear panel: note digital clock adjustments upper left; phone patch inputs, outputs and adjustments and antenna input/output round out the rear panel.



## New SB-644 Remote VFO

Designed exclusively for the new SB-104. The new SB-644 provides serious DXers with really useful split transmit/receive capability without having to purchase a separate transmitter and receiver. With the "104/644" combination, you aren't frequency limited in any way — the transceiver can be at one end of the band, the remote VFO at the other end.

**Multi-mode capability.** The "644" allows transceive operation on either itself or the "104"... transmit on the "104" and receive on the "644"... receive on the "104" and transmit on the "644". And you can use either of the two crystal positions in the "644" for fixed-frequency control.

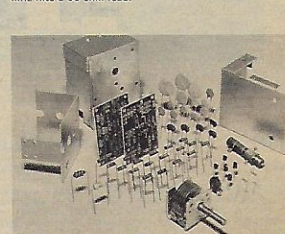
**Easy pushbutton operation.** Front panel push-buttons on the "644" control all transceive, transmit and receive modes on both the "104" and the remote VFO. No switching on the "104" is necessary. Just push a button to turn on the VFO, push another to select your VFO or crystal combination and you're ready to go. Status lamps behind the window indicate frequency-control mode.

**Digital readout in the SB-104.** Although the SB-644 includes a linear dial, its front panel get you into the right frequency area with the big spinner-type knob, actual frequency readout takes place in the "104". The display automatically changes to the correct frequency as you go from transmit to receive. There's never a doubt about where you are.

**Kit-built VFO.** The "644" uses the same kit VFO as the new SB-104. And thanks to the true digital frequency readout in the "104", concern about dial frequency problems are a thing of the past. The VFO goes together easily, quickly, and with a minimum of adjustments. And the "104" requires no modifications... just plug in the remote VFO and go. If you work serious DX with your new SB-104, you'll want the new "644" to make the job easier. Order it now.

**Kit SB-644, 10 lbs. .... \$119.95**

**SB-644 SPECIFICATIONS —** Frequency Coverage: 5.0–5.5 MHz allowing 80, 40, 20, 15, 10 meter operation in the SB-104. **Frequency Stability:** Less than 100 Hz drift per hour, after 15-minute warmup. **Modes of Operation:** Remote VFO; Main VFO; Receive Remote/Transmit Main; Receive Main/Transmit Remote; Crystal frequencies: 2 (crystals not supplied). **Dist. Backlash:** 100 cycles max. **Power Requirements:** 11V and 13.6V RMS over the SB-104. **RF Output:** 0.34 to 0.43V at 500 mA to 5.5 MHz into a 50 ohm load.



Kit VFO goes together quickly and easily on two circuit boards. Only two simple adjustments are required for alignment.

# Wish yourself a merry Christmas



A)



B)



C)

top view of the SB-102



mobile mount for SB-102 and HW-101



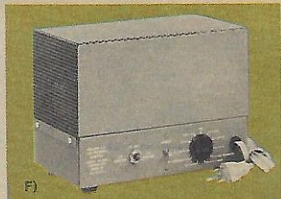
D)



E)



F)



G)



# with Heath SB series gear

## A) The SB-303 Receiver ... 359.95

If you can't hear 'em on the 803, pull the switch. Sensitivity of 0.25 microvolt... 2.1 kHz SSB selectivity... 1 kHz dial calibration... 100 Hz stability... adjustable RF attenuation... three position AGC... 25 & 100 kHz calibration markers... all solid-state design. Plus all the things that have made Heathkit gear famous: complete 80-10 meter coverage... 15 MHz WWV reception standard... factory assembled & aligned Linear Master Oscillator... SSB/CW compatibility with the 400 or 401 transmitter... easy circuit board/wiring harness construction. Don't keep going QRT when the band begins to go. Work 'em... with the SB-303.

**Kit SB-303, 22 lbs., mailable ... 359.95**

**SBA-301-1, optional 3.75 kHz AM crystal filter, ... 23.95**

**SBA-301-2, optional 400 Hz CW crystal filter, ... 27.95**

**SB-303 SPECIFICATIONS** - Frequency range: 80-10 M. amateur bands; 15 MHz WWV. Intermediate frequency (IF): 3.395 MHz. Frequency stability: <100 Hz drift/hr. after 10 min. warm-up. <100 Hz drift for <10% line voltage variation. Modes of operation: SSB, CW, AM, RTTY. Sensitivity: <0.25  $\mu$ V for 10 dB S/N for SSB operation. Overall gain: <15  $\mu$ V input for 0.5 W audio output (single tone SSB). ALC Characteristics: Blocking: <3.0 V CW/SSB RTTY. Dynamic Range: >150 dB CW/SSB. RF Attenuator - variable 0.40 dB nominal. Selectivity: SSB - 2.1 kHz @ 6 dB down, 5.0 kHz max @ 60 dB down (crystal filter supplied). CW - 400 Hz @ 6 dB down, 2.0 kHz maximum @ 60 dB down (accessory CW crystal filter). AM - 3.75 kHz @ 6 dB down, 10 kHz max. @ 60 dB down (crystal filter supplied). RTTY - 2.1 kHz @ 6 dB down, 5.0 kHz max. @ 60 dB down (uses SSB crystal filter). Image rejection: >50 dB. If rejection: 3.395 - 55 dB, 8.955 - 50 dB. Spurious response: All below 1  $\mu$ V equivalent signal input. Temperature range: 0 to 100  $^{\circ}$ F. Humidity: 20 to 95% RH after calibration at nearest 100 kHz or 25 kHz point. Visual - Within 200 Hz. Calibrations: Every 100 kHz or 25 kHz. Dial Accuracy: No more than 50 Hz. Antenna Input Impedance: 50 ohm nominal unbalanced. Antenna response: SSB - 350-2420 Hz nominal @ 6 dB. CW (with accessory filter) - 800-1200 Hz nominal @ 6 dB. AM (with accessory filter) - 200-3500 Hz nominal @ 6 dB. Phones - Low impedance. Audio Output Power: 5 W, 10% distortion. Muting: Open external ground to mut socket. Power Requirements: 120/240 VAC, 40 W max. Cabinet Dimensions: 6 5/8" H x 12 3/4" W x 13 3/4" D. Overall Dimensions (with knobs & feet installed): 7 7/8" H x 12 3/4" W x 14" D.

## B) The Heathkit SB-401 Transmitter ... 349.95

A lot of guys with WAS, WAZ & DXCC certificates in the shack use the SB-401... for some pretty good reasons. It provides all the operating convenience and capability you'll ever need to get in there with the best of them... and at a reasonable price.

**Check out the important features:** complete 80-10 M coverage... USB, LSB & CW capability on all bands... transceive or independent operation with the 300-ohm antenna connectors... 400 Hz CW filter, receiver with the optional SBA-401-1 crystal pack... 180 W PEP SSB input, 170 W CW input... 1 kHz dial calibration... 100 metering... and it's easy to build. Examine the specs... compare the price... and then talk to some serious DXers about which rig to buy. We think we'll already know what they'll say.

**Kit SB-401, 36 lbs., mailable ... 349.95**

**SBA-401-1, crystal pack, 1 lb., mailable ... 29.95**

**SB-401 SPECIFICATIONS** - Emission: SSB (upper or lower sideband) and CW. Power input: 300 W CW, 180 W SSB. Power output: 100 W (80-15 meters), 80 W (10 meters). Output impedance: 50-ohm tube - less than 2.1 SWR. Frequency range: 80-10 M amateur bands. Frequency stability: <100 Hz drift/hr. after 20 min. warm-up. Carrier suppression: 55 dB below peak output. Unwanted sideband suppression: 55 dB @ 1 kHz. Intermodulation distortion: 30 dB below peak output (two-tone test). Keying characteristics: Break-in CW provided by operating VOX from a keyed tone (Grid blocking). CW sidetone: 1000 Hz. ALC characteristics: <10dB @ 0.2 mA final grid current. Noise level: 40 dB below rated carrier. Visual dial accuracy: Within 200 Hz (11 bands). Backlash: <50 Hz. Oscillator feedthrough or mixer products: 55 dB below rated output (except 3910 kHz crossover which is 45 dB). Harmonic radiation: 35 dB below rated output. High impedance microphone or phone patch. Audio frequency response: 350-2450 Hz -3 dB. Power requirements: 80 W SSB, 260 W key down @ 120/240 VAC, 50/100 Hz. Dimensions: 6 5/8" H x 14 7/8" W x 13 3/4" D.

## C) The famous SB-102 Transceiver ... 399.95

**Kit SB-102, 24 lbs., mailable ... 399.95**

see power supplies below, mobile mt. & CW filter under HW-101, station accessories on p. 83.

**SB-102 SPECIFICATIONS** - RECEIVER SECTION: Sensitivity: <0.35  $\mu$ V for 10 dB S/N for SSB operation. SSB selectivity: 2.1 kHz minimum @ 6 dB down, 5 kHz maximum @ 60 dB down. <2.1 nominal shape factor - 5 to 60 dB. CW Selectivity: (optional CW filter) 2.1 kHz minimum @ 6 dB down, 5 kHz maximum @ 60 dB down. Input Impedance: low impedance for unbalanced coaxial input. Output impedance: Unbalanced 3 & 600 ohm speaker, and high impedance headphone. Warm-up time: 45 min. 0.5% ripple: 12 volts AC/DC at 4.76 amps. (see fixed & mobile power supplies below). Cabinet dimensions: 6 5/8" H x 14 7/8" W x 13 3/4" D.

**Image-a-kit** - No money down on any kit - up to 2 years to pay - see page 46 for details.

below equivalent antenna input of 1  $\mu$ V. **TRANSMITTER SECTION:** DC power input: SSB 180 watt PEP, CW 120 watts CW, 170 watts CW, 100% duty cycle. RF power output: 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 ohm non-reactive load); Output impedance: 50 ohms to 75 ohms <2.1 SWR. Oscillator feed-through or mixer products: 55 dB below rated output. Harmonic radiation: 45 dB below rated output. Transmitter-receive operation: SSB, PTT or VOX. CW: Provided by operating VOX from a keyed tone, using grid-block keying. CW sidetone: Internally switched to speaker in CW mode. Output impedance: 50 ohms. Microphone impedance: High impedance. Carrier suppression: 55 dB down from single-tone output. Unwanted sideband suppression: 55 dB down from single-tone output at 1000 Hz reference. Third order distortion: 30 dB down from two-tone output at 1000 Hz reference. Frequency coverage: 80-10 M amateur bands. Frequency stability: <100 Hz per hour drift after 10 minutes warm-up. <100 Hz for <10% line voltage variation. Modes of operation: Selectable upper or lower sideband (suppressed carrier) and CW. Visual dial accuracy: "Resetability": Within 200 Hz on all bands. Electrical dial accuracy: Within 200 Hz after calibration at nearest 100 kHz point. Dial mechanism backlash: <50 Hz. Calibration: 100 kHz crystal. Audio frequency response: 350 to 2450 Hz -3 dB. Phone patch impedance: 8 ohm receiver output to phone patch; high impedance phone patch input to transmitter. Power requirements: 700 to 800 watts @ 250 ma; 300 watts @ 150 ma - 115 volts at 10 ma - 15% maximum ripple. 12 volts AC/DC at 4.76 amps. (see fixed & mobile power supplies below). Cabinet dimensions: 14 7/8" H x 6 5/8" W x 13 3/4" D.

## D) The HW-101:5-Band Transceiver ... 279.95

**Kit HW-101, 23 lbs., mailable ... 279.95**

**SBA-301-2, 400 Hz CW crystal filter, 1 lb., mailable ... 29.95**

**SBA-101-1, mobile mount, 6 lbs., mailable ... 17.95**

see power supplies below, accessories on page 83.

**HW-101 SPECIFICATIONS** - RECEIVER: Sensitivity: <0.35  $\mu$ V for 10 dB S/N for SSB operation. SSB selectivity: 2.1 kHz minimum @ 6 dB down, 5 kHz maximum @ 60 dB down (3.95 MHz filter). CW selectivity: (optional SBA-301-2 CW crystal filter) 400 Hz min. @ 6 dB down; 2.0 kHz max. @ 30 dB down. Input: low impedance for unbalanced coaxial input. Output impedance: 50 ohm speaker, and high impedance. Power output: 2 watts with <10% distortion. Spurious response: Image and IF rejection >50 dB. **TRANSMITTER:** DC power input: SSB 180 watt PEP (normal voice, continuous duty cycle). CW 170 watt (50% duty cycle). RF power output: 100 watts on 80 through 15 meters (50 ohm non-reactive load). Output impedance: 50 ohms to 75 ohms with <2.1 SWR. Oscillator feed-through or mixer products: 55 dB below rated output. Harmonic radiation: 45 dB below rated output. Transmitter-receive operation: SSB, PTT or VOX. CW: Provided by operating VOX from a keyed tone, using grid-block keying. CW sidetone: Internally switched to speaker or headphone in CW mode. Approx. 1000 Hz. Microphone impedance: 50 ohms. Carrier suppression: 55 dB down from single-tone output. Unwanted sideband suppression: 45 dB down from single-tone output at 1000 Hz reference. Third order distortion: 30 dB down from two-tone output. RF comb: 10 M amateur bands. Frequency stability: <100 hertz per hour drift after 45 minutes warm-up from normal ambient conditions. <100 Hz for <10% line voltage variation. Modes of operation: Selectable upper or lower sideband (suppressed carrier) and CW. Dial calibration: 5 kHz. Calibration: 100 kHz crystal. Audio frequency response: 350 to 2450 Hz. Power requirements: 700 to 850 volt @ 250 ma with 1% maximum ripple. 12 volts AC/DC at 4.76 amps. (see fixed & mobile power supplies below). Cabinet dimensions: 6 5/8" H x 14 7/8" W x 13 3/4" D.

\*Triple Action Level Control.

## E) Heathkit mobile power supply ... 79.95

**Kit HP-13B, DC power supply, 8 lbs., mailable ... 79.95**

**HP-13B SPECIFICATIONS** - Input voltage: 12 to 16 VDC (neg. ground only). Input current: 25 amp, max. full load. High voltage output: 800 VDC, no load; 750 VDC DC @ 250 mA. AC ripple: less than 1% @ 250 mA. Duty cycle: Continuous up to 150 mA; 85% up to 300 mA. Low voltage output (high top) 310 VDC, no load; 300 VDC @ 150 mA. (low top) 265 VDC, no load; 250 VDC @ 150 mA. AC ripple: Less than 0.5% @ 150 mA. Continuous duty cycle to 175 mA. Fixed bias: -130 VDC @ 100 mA. Switching frequency: 1500 Hz. All voltages refers at 13 VDC. Ambient temperature: 10 $^{\circ}$  to 125 $^{\circ}$ F. Dimensions: 7 3/4" H x 7 3/4" L x 2 3/4" D.

## F) Heathkit fixed station supply ... 54.95

**Kit HP-23B, AC power supply, 19 lbs., mailable ... 54.95**

**HP-23B SPECIFICATIONS** - Power requirements: 120/240 VAC, 50-60 Hz, 350 watts maximum. High voltage output: 820 VDC no load; 700 VDC @ 250 mA  $\pm$ 10%. AC ripple: Less than 1% @ 250 mA. Duty cycle: 150 mA continuous to 300 mA @ 50%. Low voltage output (high top) 350 VDC, no load; 300 VDC @ 150 mA  $\pm$ 10%. Low top 275 VDC, no load; 250 VDC @ 150 mA  $\pm$ 10%. Less than 0.5% AC ripple @ 150 mA, continuous duty to 175 mA. Fixed bias: -130 VDC  $\pm$ 10%, no load; -100 VDC @ 20 mA. Filament voltage: 12.6 VAC @ 5.5 amps. Dimensions: 9 1/2" H x 4 3/4" W x 6 3/4" H.

## G) Heathkit dual frequency display ... 149.95

**Kit SB-650, 10 lbs., mailable ... 149.95**

**SB-650 SPECIFICATIONS** - Frequency range: 3-40 MHz (80-10 meters). Frequency display: 6 display tubes (kHz to 5 places, plus tenths of kHz). Maximum viewing distance: 30 ft. Maximum input signal: 5V rms. Accuracy: 100 Hz. Count rate: 20 counts per second. Bandwidth: 400 Hz. Modulation: 100% duty cycle. Audio output impedance: 2 k ohm. Internally generated spurious frequencies: Less than 0.25 V audio equivalent signal level. Crystal (clock) frequency: 1 MHz. Crystal aging rate: Approx. 10 ppm/yr. Ambient operating temperature: 50/80 Hz, 10 W. Dimensions: 3 3/8" H x 10 1/2" W x 10" D.

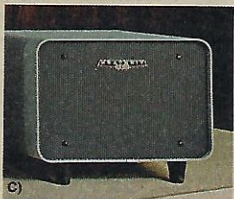
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B)



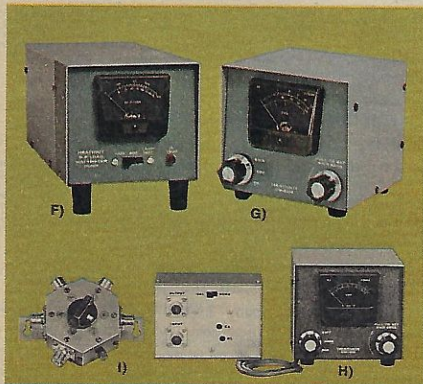
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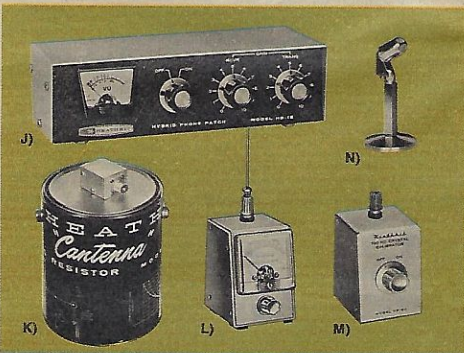


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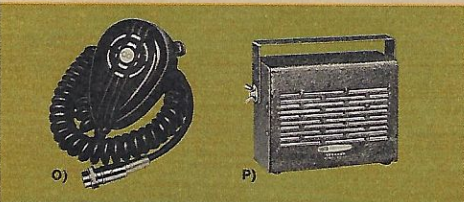
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## A) Heathkit 1 kW Amplifier...269.95

Probably the most popular linear on the market...and no wonder. Delivers a full 1200 W PEP SSB input...1 kW on CW. Features include built-in solid-state power supply with circuit breaker protection (no more searching the junk box for fuses)...all metering facilities...ALC output for your driver...shielded, fan-cooled finals...pre-tuned cathode input circuitry for maximum efficiency and low distortion...sturdy yet lightweight aluminum construction with heavy-gauge one-piece chassis. As usual, the Hams at Heath have made assembly virtually fool-proof. Add another Green Machine to your station...and get maximum watts for minimum bucks...get the SB-200.

**Kit SB-200, 50 lbs., mailable ..... 269.95**

**SB-200 SPECIFICATIONS**—Band coverage: 80, 40, 20, 15 & 10 meters. Driving power: 1200 W P.E.P. SSB, 1000 W CW. Driving power required: 100 W. Duty cycle: SSB, continuous wave modulation; CW 50% (key down time not to exceed 5 min.). Third order output: 30 dB over 1000 W P.E.P. Output impedance: 50 ohm unbalanced; matched 50 ohm balanced. SWR: not to exceed 2:1. Input impedance: 52 ohm unbalanced; variable pi-output circuit. SWR: not to exceed 2:1. Tuning: Meter functions: 0-100 mA grid broadband pre-tuned input circuit requires no tuning. Meter functions: 0-100 mA grid current, 0-100 mA plate current, 0-1000 relative power, 1:1-3:1 ±10% of full-scale. Power capability: To 250 W SSB sensitivity: Less than 10 uV. Impedance: 50 ohms nominal. SWR Bridge: Continuous to 250. Connectors: UHF type SO-239. Dimensions: 5 1/4" W, 5 1/4" H and 6 1/2" D, assembled as one unit. \*Using a 50 ohm noninductive load.

## B) Heathkit 2 kW Amplifier...399.95

This is the one that made history when we announced it...and it's easy to understand why. A pair of Eimac 3-500Z5 in grounded grid deliver up to 2 kW PEP SSB input...a full 1 kW on CW and RTTY. Requires just 100 W drive for full output. Pretuned broadband pi-input provides maximum efficiency and minimum distortion from 80-10 meters. Features include a husky built-in solid-state supply that can be wired for either 120 or 240 VAC...built-in circuit breaker protection...Zener diode regulated operating bias to reduce idle I, for cool running, longer tube life...fan cooled, well-shielded final compartment...complete metering facilities. Another example of what happens when ham products are designed by hams...the Hams at Heath. Get your 220 today.

**Kit SB-220, 70 lbs., mailable ..... 399.95**

**SB-220 SPECIFICATIONS**—Band coverage: 80, 40, 20, 15 and 10 meters. Driving power: 100 W. Max. power input: SSB, 2000 W, P.E.P.; CW, 1000 W; RTTY, 1000 W. Duty cycle: SSB, continuous wave modulation; CW, continuous (maximum key-down 10 minutes). Third order output: 30 dB over 1000 W P.E.P. SWR: not to exceed 2:1. Input impedance: 52 ohm unbalanced; variable pi-output circuit. SWR: not to exceed 2:1. Tuning: Meter functions: 0-100 mA grid current, 0-100 mA plate current, 0-1000 relative power and High Voltage. RTTY Input (50-239). Ground post. RF Output (50-239). Tubes: Two Eimac 3-500Z5. Power requirement: 120 VAC, 30/50 Hz at 20 amp. max. 240 VAC, 50/60 Hz at 10 amp. max. Cabinet size: 8 1/4" H x 14 1/2" W x 14 1/2" D.

## C) Heathkit Station Speaker...22.95

A lot of hams are still using anything they can get their hands on for a station speaker, but we think our SB-600 is a better answer. Audio response is shaped from 300-3000 Hz for optimum sideband reproduction. Eight ohm Z matches most gear. Large 6 1/2" H x 10 1/2" W x 10 1/2" D cabinet provides mounting space for any HP-23 series supply. Gray and green styling matches the SB line.

**Kit SB-600, 7 lbs., mailable ..... 22.95**

## D) Heathkit Signal Monitor...89.95

The SB-610 provides accurate display of AM, CW, SSB, and RTTY transmissions...shows envelope, AF and RF trapezoidal patterns. Displays receiver IF envelope with IFs up to 6 MHz...typically requires 0.5 V IF signal for 1" display, 1.50 thru 6 meter range, 15 W to 1 kW capability. Not recommended for receivers with IFs above 6 MHz. Gray and green to match the rest of the SB-series. 6 1/2" H x 10 1/2" W x 1 1/2" D.

**Kit SB-610, 14 lbs., mailable ..... 89.95**

## E) Heathkit Spectrum Analyzer...149.95

Provides 10 and 50 kHz sweep widths for single signal analysis...variable sweep to 500 kHz for 455 kHz IFs. Both log and linear displays. Operates with common receiver IFs up to 6 MHz. Gray and green styling to match other SB-series gear...6 1/2" H x 10 1/2" W x 10 1/2" D.

**Kit SB-620, 15 lbs., mailable ..... 149.95**

## F) Heathkit RF Load/Wattmeter...59.95

Every ham should have a dummy load and a wattmeter in the shack, and now you can have both in a single piece of gear. A husky 50 ohm non-inductive load resistor handles 175 W continuous, 1 kW inter-

mittent...less than 1.2:1 SWR from 1.8 to 30 MHz. High-temp lamp & lamp test circuit. Meter ranges of 0-200 & 0-1000 W, ±10% FS accuracy.

**Kit HM-2103, 6 lbs., mailable ..... 59.95**

**HM-2103 SPECIFICATIONS**—Frequency Range: 1.8 to 30 MHz. Wattmeter Range: 0-200 and 0-1000. Wattmeter Accuracy: ±10% of full-scale reading. Power Rating: 175 watts continuous, 1000 watts maximum. Overload Indication: Thermal switch activated (requires 9 volt battery). NEMA #1904. SWR: Less than 1.2:1. Load Type: Noninductive. Load Impedance: 50 ohms nominal. Connectors: UHF type SO-239. Dimensions: 6 7/8" H x 5 3/4" W x 1 3/4" D.

## G) Heathkit VHF Wattmeter...29.95

A VHF wattmeter at this low price? Well, that's what happens when your engineering department is populated with VHF fans. Power ranges of 1-25 & 10-250 W FS ±10%. 50 ohm nominal Z for minimum loss. Built-in SWR bridge with adjustable sensitivity.

**Kit HM-2102, 4 lbs., mailable ..... 29.95**

**HM-2102 SPECIFICATIONS**—Frequency range: 50 MHz to 160 MHz. Wattmeter accuracy: ±10% of full-scale. Power capability: To 250 W SSB sensitivity: Less than 10 uV. Impedance: 50 ohms nominal. SWR Bridge: Continuous to 250. Connectors: UHF type SO-239. Dimensions: 5 1/4" W, 5 1/4" H and 6 1/2" D, assembled as one unit. \*Using a 50 ohm noninductive load.

## H) Heathkit Wattmeter/SWR Bridge...29.95

Two switch-selected ranges: 10-200 & 100-2000 W...built-in SWR bridge with adjustable sensitivity...negligible insertion loss in 50 ohm line. Remote detector permits placement of meter in any convenient location...6 ft. of cable supplied.

**Kit HM-102, 4 lbs., mailable ..... 29.95**

**HM-102 SPECIFICATIONS**—Frequency range: 1.8 to 30 MHz. Wattmeter accuracy: ±10% of full-scale reading. Power capability: 10 to 2000 watts. Impedance: 50 ohm nominal. Connectors: UHF type SO-239. Dimensions: 5 1/4" W x 2 1/4" H x 6 1/2" D.

## I) Heathkit coax switch...9.95

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

**Kit HD-1234, 2 lbs., mailable ..... 9.95**

## J) Heathkit hybrid phone patch...29.95

Individual rcvr-line & line-rcvr gain controls; VU meter, 30 dB isolation. Matches 3-16 ohm speakers & hi-Z or 600 ohm inputs. VOX or PTT. 2 1/2" H x 9 1/4" W x 3 1/2" D.

**Kit HD-15, 3 lbs., mailable ..... 29.95**

## K) "Antenna" dummy load...12.95

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

**Kit HN-31, 3 lbs., mailable ..... 12.95**

## L) Heathkit relative power meter...14.95

100 kHz - 250 MHz range; 0.3 V rms sensitivity; magnetic base.

**Kit PM-2, 2 lbs., mailable ..... 14.95**

## M) Heathkit 100 kHz calibrator...14.95

Signals every 100 kHz to 54 MHz, 9 V battery not incl.

**Kit HD-20, 1 lb., mailable ..... 14.95**

## N) Heathkit desk mike...34.95

Hi-Z dynamic type; grip-to-talk switch. Cables included.

**HDP-21A, 4 lbs., mailable ..... 34.95**

## O) Heathkit mobile PTT mike...9.95

Rugged, hi-Z ceramic mike ideal for mobile work. With cable, less connector. Excellent for "single banders."

**GH-12A, 1 lb., mailable ..... 9.95**

## P) Heathkit mobile speaker...9.95

8 ohm speaker in rugged steel cabinet. Gimbal mount included. 6 1/2" W x 4 3/4" H x 2 1/2" D.

**Kit HS-24, 4 lbs., mailable ..... 9.95**

# Money-saving gift ideas for the novice



## A) Heathkit Phone & CW transmitter runs up to 90 watts input... 99.95

Run 75 watts CW input as a novice... up to 90 watts phone or CW when you get your General ticket. Front panel controls for Drive Tune, Drive Level, Final Loading and Final Tuning allow proper tune-up for maximum output, minimum harmonics, high quality audio. Features include grid/plate current meter... 4 crystal sockets and provision for VFO operation... front panel microphone and key jacks. Easy assembly with the famous Heathkit manual... requires only a VTVM for alignment.

Kit DX-60B, 24 lbs., less crystals, mailable ..... 99.95

**DX-60B SPECIFICATIONS** — Power input: 90 watts, peak; controlled carrier, phone, or CW. Output impedance: 50-75 ohm (coaxial). Output coupling: Pi-network. Operation: CW or AM phone — crystal or VFO control. Band coverage: 80 through 10 meters. Power requirements: 120/240 VAC, 50/60 Hz, 225 watts. Dimensions: 6 3/4" H x 13 3/4" W x 13 1/2" D.

## B) Heathkit 5-band receiver tunes AM, CW & SSB for just 99.95

Top performance at a modest price. Full 80-10 M coverage with each band accurately displayed on the calibrated slide-rule dial. Separate RF and AF gain controls... adjustable BFO for easy sideband tuning. Sensitivity of 1  $\mu$ V and 3 kHz selectivity from the crystal filter deliver performance comparable to more expensive receivers. Features include built-in "S" meter... switchable AVC... front panel head phone jack... provision for optional HRA-10-1 100 kHz crystal calibrator. Alignment requires VTVM and RF signal generator.

Kit HR-10B, less speaker, 20 lbs., mailable ..... 99.95

Kit HRA-10-1, plug-in 100 kHz crystal calibrator, 1 lb., mailable 9.95

**HR-10B SPECIFICATIONS** — Frequency coverage: 80 Meter Band, 3.5 to 4.0 MHz; 40 Meter Band, 7.0 to 7.3 MHz; 20 Meter Band, 14.0 to 14.35 MHz; 15 Meter Band, 21.0 to 21.5 MHz; 10 Meter Band, 28.0 to 29.7 MHz. Intermediate frequency (IF): 1681.0 kHz. Sensitivity: 1 microvolt for a 10 dB signal plus noise-to-noise ratio. Selectivity: 3 kHz at 6 dB down, 9 kHz at 40 dB down. Image rejection: 60 dB or better. Input impedance: 50 to 75  $\Omega$  coaxial. Audio output impedance: 8  $\Omega$ , or 500  $\Omega$ . Panel controls: AF GAIN, AC OFF-ON, RF GAIN, BFO TUNE, BAND SWITCH, MAIN TUNING, CALIBRATE, ANTENNA TRIMMER, RECEIVE/STBY SWITCH, CALIBRATE ON-OFF, BFO ON-OFF, AVC ON-OFF, ANL ON-OFF. Tube complement: 6BE6 RF Amplifier; 6EA8 Mixer Oscillator; 6BA5 1st AF Amplifier; 6EA8 2nd AF Amplifier; 6BD6 Detector-RC-ANL; 6EB9 1st Audio-Audio Output; 6X4 Rectifier. Power requirements: 120/240 VAC, 50/60 Hz, 80 watts. Cabinet size: 6 3/4" H x 13 3/4" W x 13 1/2" D.

## C) 80-2 meter VFO only 54.95

Ideal accessory for the HW-16 and DX-60B. Provides VFO control from 80 through 2 meters with separate calibrated scales for each band. Smooth 28.1 vernier tuning... temperature compensated circuitry for minimum drift. Provides 5 V rms at 3.4-4, 7-7.425 and 8-9 MHz range... compatible with virtually all grid-block keyed transmitters and most cathode-keyed transmitters. Alignment requires receiver of known accuracy covering 80-2 meter bands or 3.5 to 8.222 MHz.

Kit HG-10B, 12 lbs., mailable ..... 54.95



## ARRL Amateur's Handbook... 4.50

A classic reference work for hams, engineers and scientists. Reliable, up-to-date info on communications and electronic theory for HF, VHF, UHF, AM, CW, SSB & FM equipment.

HDP-293, 3 lbs., mailable ..... 4.50

## Ham starter group... 19.95

Includes 4 ARRL handbooks, HD-16 practice oscillator, 3 code-teaching records.

HDP-22, all above, 6 lbs., mailable ..... 19.95

HDP-32, records only, 3 lbs., mailable ..... 9.95

HDP-42, books only, 2 lbs., mailable ..... 2.50

Kit HD-16, oscillator & key, 3 lbs., mailable ..... 9.95

# & CW fans on your list.



A)



B)

## A) An easy, inexpensive way to say "Merry Christmas" to the CW Op in your family... the Heathkit 3-band CW transceiver... 79.95

Work the world on one or two watts? That's the challenge of QRP... and the HW-7 is ready to help you meet it. And whether you're an avid QRP'er, an experienced OM looking for a portable emergency/vacation rig, you'll appreciate the Heathkit HW-7. The all solid-state circuitry features both built-in high stability VFO and crystal-controlled transmit capability. Direct conversion receiver circuitry delivers solid-copy with as little as 1 microvolt input. The transmitter has 3 watts input on 40 meters... 2 1/2 watts on 20 meters... and 2 watts on 15. Band-changing and tune-up are quick and simple: pushbutton band selection... large main tuning dial with 6 to 1 vernier drive that's virtually backlash-free... receiver preselector marked for 40, 20 and 15 M bands... single-knob final tuning. Pushbutton crystal transmit provision is ideal for roundtables and nets.

**Top-value features include:** built-in sidetone... front panel relative power meter... break-in keying with adjustable T/R delay... head-phone jack... and small size and light weight. The HW-7 can be operated from the accessory AC power supply, an equivalent low impedance supply, or 12 VDC lantern or auto batteries... draws only 35 mA on receive, 450 mA on transmit. As usual for gear from the Hams at Heath, assembly is easy, quick (about 3 evenings) and fun. All circuitry mounts on a single circuit board. Get an excellent QRP rig... and a portable rig... and a low cost Novice rig... get your HW-7 now.

**Kit HW-7, Transceiver, less batteries, 6 lbs., mailable ..... 79.95**

**Kit HWA-7-1, low voltage power supply provides 13 VDC to power the HW-7 Transceiver from an AC power source. 120/240 VAC operation. 4 lbs., mailable ..... 14.95**

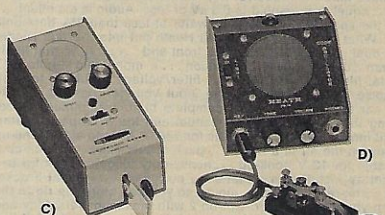
**HW-7 SPECIFICATIONS - TRANSMITTER SECTION:** RF Power Input: 3 watts on 40 meters, 2.5 watts on 20 meters, 2 watts on 15 meters. Frequency Control: 40 meter crystal, or built-in VFO on 40 meters, 20 meter crystal or built-in VFO on 20 meters, 15 meter crystal, or built-in VFO on 15 meters. Output Impedance: 50  $\Omega$  unbalanced. Sidetone: Built-in. Spurious and Harmonic Levels: At least 25 dB down. RECEIVER: Sensitivity: Less than 1 microvolt provides a readable signal. Selectivity: 1 kHz at 6 dB down. Type of Reception: CW. Audio Output Impedance: 1000  $\Omega$  nominal. GENERAL: Frequency Coverage: 40 meters 7.0 to 7.2 MHz, 20 meters, 14.0 to 14.2 MHz, 15 meters, 21.0 to 21.3 MHz. Frequency Stability: Less than 100 Hz drift after 10 minutes warmup. Power Required: 13 volts DC, 35 mA receive and 450 mA transmit. Dimensions: 4 1/2" H x 9 1/2" W x 8 1/2" D, including knobs and feet.

## B) One of the world's most popular CW rigs... the Heathkit HW-16... 114.95

We've sold thousands of these fine little rigs... it's a rare ham that hasn't at least operated the HW-16. Why so popular? The features speak for themselves: delivers optimum CW operation on the first 250 kHz of the 80, 40 and 15 meter bands... true break-in capability with solid-state T/R switching... 75 watt input for Novices, up to 90 watts for General and above... crystal-controlled transmit with VFO receive... provision for VFO transmit with Heathkit HG-10B VFO (opposite page)... 500 Hz CW selectivity with high quality crystal filter... receiver sensitivity better than 1 microvolt... built-in sidetone... front panel Rel Pwr/Plate Current meter... easy, enjoyable assembly with the famous Heathkit manual... final assembly and checkout only requires a VTVM, dummy load, a key and appropriate crystals. Get a good start in amateur radio... get your HW-16 today.

**Kit HW-16, 25 lbs., mailable ..... 114.95**

**HW-16 SPECIFICATIONS - TRANSMITTER SECTION:** RF power input: 50-90 W (adjustable). Frequency control: 80 meter crystal or VFO on 80-meter band, 80- or 40-meter crystal or VFO on 40-meter band, 40-meter crystal or VFO on 15-meter band. Keying: Grid-block. Break-in with automatic antenna switching and receiver muting. Output Impedance: 50  $\Omega$  unbalanced. SWR: less than 2:1. Sidetone: Neon lamp relaxation oscillator. RECEIVER SECTION: Sensitivity: Less than 1  $\mu$ V for 10 dB signal-plus-noise to noise ratio. Selectivity: 500 Hz 6 dB down. Intermediate Frequency: 3390 kHz. Antenna Impedance: 50  $\Omega$  unbalanced. External speaker impedance: 5  $\Omega$ . GENERAL: Frequency coverage: 3.5 to 3.75 MHz, 7.0 to 7.25 MHz, 21.0 to 21.25 MHz. Power: 120 VAC, 50-60 Hz. Dimensions: 6 1/2" H x 13 3/4" W x 11 3/4" D.



C)

D)

## C) Heathkit electronic keyer... 39.95

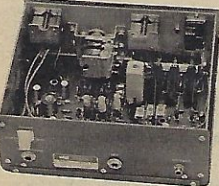
15-60 wpm; 10-20 wpm slow-speed option; self-completing dashes; adjustable paddle feel; right or left hand operation; variable dot-space ratio; built-in sidetone speaker; adapts to semi-automatic operation. Grid-block keyed transmitters only... 105V, 35 mA max.

**Kit HD-10, 6 lbs., mailable ..... 39.95**

## D) Code practice oscillator... 9.95

For beginning CW ops. Separate controls for tone and volume. Built-in speaker; headphone jack; blinker light; includes key, phone plug; cord. Uses 2-9V and 1 "C" batteries, not included.

**Kit HD-16, 3 lbs., mailable ..... 9.95**



All circuitry mounts on single PCB board for easy 2 evening assembly.



Actual Log Sheet entries & QSL cards from contacts by Heath Hams using the HW-7

**charg-a-kit** - No money down on any kit - up to 2 years to pay - see page 46 for details.

# Heathkit two-meter FM



## A) Heathkit HW-202 puts you on 2 for only... 179.95

If you still haven't discovered the wonderful world of two meters... or are already into 2 FM and are looking for a second rig... the Ham at Heath have what you need at the price you want to pay. The HW-202 provides independent selection of 6 transmit and 6 receive channels. And all 12 crystals can be netted for optimum performance. The transmitter delivers a solid 10 watts minimum... more than enough to bring up most repeaters. Standard narrow band deviation adjustable up to 7.5 kHz with instantaneous limiting.

**Will operate into an infinite VSWR without failure.** As usual, the Hams at Heath have made the receiver hot: 0.5  $\mu$ V signal provides 20 dB of quieting... squelch threshold is 0.3  $\mu$ V or less. Audio is excellent... total harmonic distortion (THD) typically 2 watts at less than 3% harmonic output to the speaker is the Hams at Heath put into the rig? Diode-protected dual gate MOSFETS in the front end... an IC IF that limits at less than 10  $\mu$ V... dual conversion... a monolithic 4-pole 10.7 MHz crystal filter... a built-in hash filter/voltage regulator to keep ignition noise out and maintain the input voltage constant despite changing car system demand... complete built-in alignment procedures using the famous Heathkit manual and the front panel meter. And the kit includes a set of crystals for 146.94 MHz to aid in tune-up and get you on the air in a hurry... push-to-talk mike... quick-connecting cable for 12 V hook-up... heavy-duty alligator clips for use in a temporary installation... antenna coax jack... gimbal bracket... and a quick-release mobile mount so you can store the rig in the trunk when you leave the car. Get on 2 with maximum versatility and lowest cost... order your HW-202 now! And check out the full line of accessories at right.

## Kit HW-202, 11 lbs., available... 179.95

**HW-202 SPECIFICATIONS - RECEIVER** - Sensitivity: 12 dB SINAD\* (20 dB of quieting) at 5  $\mu$ V or less. Squelch threshold: 0.3  $\mu$ V or less. Audio output: 3 W at less than 10% total harmonic distortion (THD). Operating frequency stability: Better than  $\pm$ 0.015%. Image rejection: Greater than 45 dB. Spurious rejection: Greater than 60 dB. IF rejection: Greater than 80 dB. First IF frequency: 10.7 MHz  $\pm$ 2 kHz. Second IF frequency: 455 kHz (adjustable). Receiver bandwidth: 22 kHz nominal, 0 dB-emphasis; -6 dB per octave from 300 to 3000 Hz nominal. Modulation acceptance: 7.5 MHz minimum. **TRANSMITTER** - Power output: 10 watts minimum. Spurious output: Below -45 dB from carrier. Stability: Better than  $\pm$ 0.015%. Oscillator frequency: 6 MHz, approximately. Multiplier factory X 24. Modulation: Phase, adjustable 0-7.5 kHz, with instantaneous limiting, duty cycle: 100%. **High VSWR shutdown:** None. **GENERAL** - Speaker impedance: 4 ohms. Operating frequency range: 143.9 to 148.3 MHz (will meet specifications  $\pm$ 3 MHz of alignment frequency within this range). Current consumption: Receiver (squelch on): Less than 200 mA. Transmitter: Less than 2.2 amperes. Operating temperature range: -12° to 122° F (-25° to +40° C). Operating voltage range: 12.6 to 16.0 VDC (3.3-3.8 VDC nominal). Dimensions: 23 1/4" H x 8 1/4" W x 3 3/4" D.

\*SINAD = Signal + noise + distortion  
Signal + distortion

## Order Crystal Certificates with your HW-202

Crystal certificates are available directly from Heath Co., entitling you to the crystal or crystals of your choice. Your certificate will be sent to you postpaid. You mail the certificate to the crystal manufacturer, who in turn will mail the crystals to you postpaid. All crystals meet rigid Heath quality standards to maximize performance from your HW-202. Be sure to include both Transmit and Receive Crystal Certificate orders along with your HW-202 order.

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

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

## B) HA-202 40 watt amplifier... ideal accessory for your HW-202... 69.95

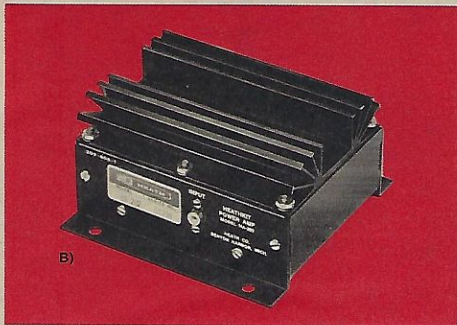
If you regularly have problems bringing up the repeater from the fringe, don't blame it on the machine... you probably aren't putting out enough signal. The Heathkit HA-202 is the answer... delivers a solid 40 W minimum for 10 W in. Hauls only 7 A maximum from your car battery, and it's so compact it can be mounted just about anywhere... trunk, under the dash, etc.

**Fully automatic operation**... an internal antenna changeover relay and sensing circuitry provide completely automatic T/R switching. The all solid-state design features husky 2N5591 output devices in a highly efficient heat sink. Emitter-ballasted configuration enables the HA-202 to withstand VSWRs up to 3:1, yet remain cool and continue to run, without the need for exotic sensing circuitry. Tuned input/output circuits provide low spurious radiation and allow coverage of any 1.5 MHz portion of the band. Assembly is an easy 4 hours, and final alignment requires only a VTVM, wattmeter or SWR bridge. Get your HA-202 today... and be working through the repeater tomorrow.

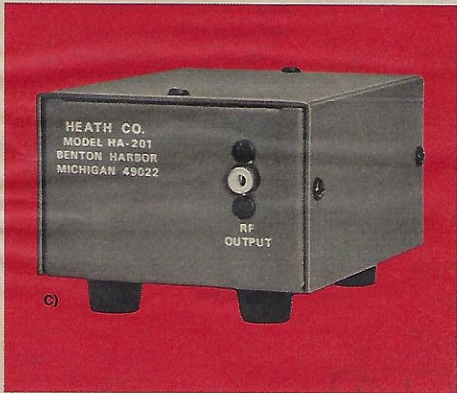
## Kit HA-202, 4 lbs., available... 69.95

**HA-202 SPECIFICATIONS** - Frequency range: 143-149 MHz. Power output: 20 W @ 5 W in. 30 W @ 7.5 W in. 40 W @ 10 W in. 50 W @ 15 W in. Power input (rf drive): 5 to 15 MHz. Output impedance: 50 ohms nominal. Input VSWR: 1.5:1 max. Load VSWR: 3:1 max. Power supply requirements: 12 to 16 VDC, 7 amps max. Operating temperature range: -30° F. to +140° F. Dimensions: 3" H x 4 1/4" W x 5 1/2" D.

# gear for the mobile ham on your list



B)



C)

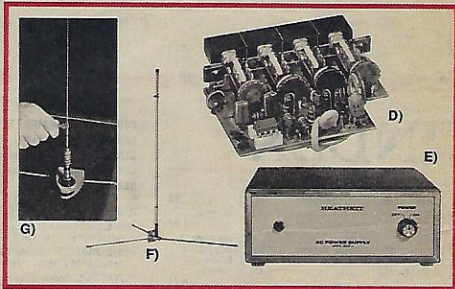
## C) New HA-201 2-meter amplifier delivers up to 10 watts for only \$25.95

Now there's some help from the Hams at Heath for everyone who owns a one or two watt transceiver and wants to get some extra output for very little money. The new HA-201 delivers up to 10 watts for a 1 1/2 watt input... 8 watts for 1 watt input... ideal for handheld, portable and mobile rigs.

**Completely automatic operation...** all solid-state transmit-receive switching eliminates relays. Will withstand an infinite VSWR load without failure. Tuned input and output maximize efficiency and reduce spurious emissions. Assembly is a quick 1-2 hours, and we've included both a dummy load and a handy RF detector to eliminate the need for additional equipment other than a VTVM for tune-up. Operates from any 12-16 VDC supply, such as the HWA-202-1 or automobile battery. Order your HA-201 today... and give your peanut-whistle some help.

Kit HA-201, 3 lbs., available ..... **\$25.95**

**HA-201 SPECIFICATIONS:** Frequency Range: 143-149 MHz. Power Output: (at 13.6 VDC input): 8 W @ 1 W in; 10 W @ 1.5 W in. Power Input (rf drive): 1-3 W. Input/Output Impedance: 50 ohms. Input VSWR: 1.5:1 maximum. Maximum Load VSWR: Infinite. Power Supply Requirements: 12-16 VDC, 2.2 A maximum. Dimensions: 5 1/8" L x 3 3/8" W x 2 3/8" H. Net Weight: 1 lb.



## D) Tone burst encoder for HW-202... \$24.95

If you're going to be traveling and want to work into many of the repeaters, you'll probably need this accessory. Each of the four tone select buttons can be preset for any desired tone between 1800 Hz and 2500 Hz. Burst duration is adjustable from 0.25 second to continuous. Frequency stability is  $\pm 1\%$  from  $-30$  to  $+50^\circ\text{C}$ . The encoder can be electrically disconnected from the rig by placing all selector buttons in the out position. Goes together in just a couple of hours... all components mount on a single glass epoxy board. Mounts behind a removable bezel on the front panel of the HW-202. If your whistle isn't what it ought to be, order your encoder now.

Kit HWA-202-2, 1 lb., available ..... **\$24.95**

## E) AC supply for fixed-station HW-202s... \$29.95

Here's a neat, low cost way to transform your HW-202 from mobile to fixed installation... the HWA-202-1 AC supply. Delivers 13.8 VDC at 2.2 A, and integrated circuitry provides better than 1% regulation. Can be wired for 120 or 240 VAC operation. Circuit breaker protected against overload. Includes 3-wire line cord and transceiver cables.

Kit HWA-202-1, 7 lbs., available ..... **\$29.95**

## F) Fixed-station 2-M antenna only \$17.95

Mount 3/8-wave vertical provides 3 dB gain over 1/4-wave vertical. Includes mounting clamps and antenna adjustment instructions. Coax not included.

Kit HWA-202-4, 4 lbs., available ..... **\$17.95**

## G) Mobile 2-M antenna just \$19.95

Here's a very popular 3/8-wave rear deck mount whip that doesn't require any hole drilling... just clips on the trunk lid edge. Delivers 3-dB gain over a 1/4-wave vertical. Includes 17 ft. of coax and tuning instructions.

Kit HWA-202-3, 2 lbs., available ..... **\$19.95**