

NEW Heath's latest generation of amateur radio equipment brings the accuracy and convenience



The Heathkit HW-5400 Synthesized HF SSB Transceiver builds on advanced concepts

IT'S ONLY
\$699⁹⁵
without options

- Without a doubt — higher performance features at a lower price than any comparable transceiver
- Fully synthesized with crystal stability and accuracy
- Unique dual-speed tuning knob with 50 Hz resolution
- Digital display with direct keypad frequency entry, two memories per band, and status symbols

We've just designed the dream Transceiver: You're looking at a bold new venture into the world of high value, high-tech ham gear. A system of powerful flexibility and far-reaching capability. Precisely what you've asked from us; half a century of combined technological expertise in amateur radio kit creation went into its development. We proudly present the HW-5400 Series SSB Transceiver and everything new it has to offer.

Improved technology, at a never-before-seen low price: Our first goal was to halt the price spiral created by rigs overloaded with front panel gimmickry that did very little to increase their measurable performance value. Following that, the most important considerations were high quality in a low-profile unit, maximum enjoyment from the kitbuilding experience, cost cutting self-serviceability, quick operating convenience, a synthesized high-resolution frequency display, and time-tested controls that had a record of achieving great results in unison. Thus far a herculean task of ideals, but the list also included several extremely useful 'improvements' which no other manufacturer had yet been able to offer license-holders. *Heath succeeded.*

Three modes, eight bands and plenty of power for HF excitement: The HW-5400 operates in USB, LSB and CW on the 80 through 10 meter bands, including 10, 18 and 24 MHz. Completely solid-state and totally broadbanded. Beyond the essentials, this perfection-packed kit is a long overdue example of American value engineering, with uncommon additions like automatic sideband selection. Full break-in (QSK) for avid CW operators. Power supply activation at the Transceiver. Defeatable amplifier relay. Over- and reverse

voltage protection. Heavy shielding on the internal power amplifier. High VSWR cutback protection with forward power limiting. The first microprocessor-controlled masterpiece of PLL frequency synthesis designed to match the level of professional caliber in every radio amateur.

One control, twice the convenience: The HW-5400's high-resolution tuning system employs a dual-speed technique so uniquely practical and efficient, Heath has applied for patent rights. Depending on which hole your finger selects for rotation you can fly through any band, or extract new QSOs by screening a narrow frequency range. Utilizing an infrared optical shaft encoder, the standard dial-hole affords an incremental tuning rate of 50 Hz per step, displayed directly with unerring PLL accuracy. The high-speed hole uses a metallic insert and capacitive-touch circuit to blank out the 10 and 100 Hz display digits and lets you rapidly scan a band in 1 kHz increments, or leap ahead at 25 kHz per revolution.

Total Transceiver status at a glance: Special-function symbols to the left of the frequency display will instantly inform you of current mode, transmit/receive status, split operation, split-access memory handling and whether the tuned frequency is outside the band edge. These status characters can be set at full brightness, made dimmer than the frequency display for better contrast, or darkened completely by pivoting a small jumper wire.

Beats the QRM every time: A tremendously versatile *Split-Memory Access* function lets you bring the transmitter frequency from memory and into the display for review or alteration while in receive, without missing a single word or fragment of code from the station in contact. The status display clearly indicates this mode with a letter M (see inset, next page).

At this price, second best can't compare with second-to-none: The HW-5400 benefits from some miraculous new microprocessor ingenuity, made possible only by Heath. Three phase-locked loops (HFO, BFO and VFO) are used to ultimately produce a single injection frequency, maintaining unexcelled stability and repeatability under even the most severe operating conditions. An 'intelligent' controller circuit manages all logically-encoded functions such as the synthesizer IC programming, PLL monitoring and unlock detection, band-frequency storage, coordination of the display, and it performs a self-diagnostic sequence upon power-up. The microprocessor's programming



of high technology to kit-form transceivers in this price class

includes routines which protect the Transceiver from damage, such as forcing a return to receive mode should one of the synthesizer loops become unlocked or if the band switch is inadvertently turned while transmitting.

Able to leap large differences in a single bound: What's even faster than scanning at kHz-per-second rates through the bands to reach a desired frequency? That's right...*instantly synthesized direct entry by pushbutton touch control*, with 50 Hz resolution! It allows for no mistakes, no overtuning and no time lost in capturing new QSOs. With the inexpensive HWA-5400-3 Keypad option installed, your operating convenience increases tenfold. Press ENTER. The first digit disappears and a cursor appears at the bottom of the segment. Pressing a digit button causes that number to enter the display at the cursor location, which then jumps one position to the right. Continue typing one number after another. When the last digit is entered into display, this new frequency is selected for immediate use. Want to change just a digit or two? Pressing the ENTER Button will advance the cursor past those digits you wish to leave unchanged. Sound incredible? It is!

Half the size of some transceivers, double the performance of many: The HW-5400 front panel is clean and uncluttered, with all functions marked for easy operation. Two dual-concentric Gain knobs provide separate MIC/CW and AF/RF control. A third dual-concentric, center-detented knob provides ± 350 Hz of receiver incremental tuning and ± 600 Hz shift of the IF passband to achieve peerless rejection of adjacent signal interference. An automatically switched meter indicates signal strength in receive mode and ALC in transmit. Six pushbuttons commit a newly-tuned frequency to memory, exchange the memory with display, enable split T/R operation between memory and display, and switch between REceive/TUNE, PTT/VOX and FAST/SLOW AGC modes. Vox Gain, Anti-Vox, Vox Delay and Sidetone Level controls are located out of sight, behind the front panel nameplate, which flips up at your touch. Easy to set when needed, out of mind the rest of the time.

Companion to this Transceiver, the HWA-5400-1 Power Supply/Speaker/Digital Clock provides a well-regulated, 13.8 volt source of double-fused DC power. Two main cables supply the HW-5400 with power, speaker input, memory preservation, an essential sensor line for proper regulation and remote on-off switching at the radio. The Supply can be wired for 120 or 240 VAC, 50/60 Hz operation, and the Clock for 12 or 24-hour format.

Valuable free education: The HW-5400 is the first and ONLY microprocessor-controlled Transceiver available in kit form. By this virtue alone, it offers every builder the experience of 'interfacing' with the newest technologies that are being applied to amateur radio. You'll learn its internal engineering details with hands-on understanding. The fully-illustrated, step-by-step Heathkit manual guides you through assembly and alignment.



Frequency Entry Keypad option gives you direct access, for instant QSY.

Multi-function readout displays tuned frequency and reads 'PLL' if problems force a synthesizer loop to become unlocked.

Status characters alert you to out-of-band condition, entry into duplex operation, and use of the split-memory access function.

Mode Symbol positively indicates upper (U) or lower (L) sideband, CW-wide or narrow (C) and Transmit mode (shown).

The HW-5400 Series kits will yield an everlasting feeling of do-it-yourself satisfaction and admiration from fellow amateurs. Only a VTVM and frequency counter are required for the alignment procedure. We supply everything else, including an RF probe and as always, more than enough solder.

Heath's years of experience and constant innovation in the amateur radio field are exemplified in the HW-5400 Transceiver. In every respect the very finest of its kind, it may forever change the way you look at rigs of lesser imagination. When performance is a priority, and price is at a premium, Heath offers you the most — and the best — at the same time!

Kit HW-5400, Shpg. wt. 24 lbs.	699.95
Kit HWA-5400-1, Shpg. wt. 39 lbs.	199.95
HWA-5400-3, Frequency Entry Keypad, Shpg. wt. 1 lb.	59.95
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

Ideal for fixed, mobile and portable operation

A look inside the HW-5400:

Transceiver is controlled and monitored by a custom microprocessor, which also stores two frequencies per band

More than adequate heat-sinking on the output transistor pair cancels the need for noisy, costly fan-cooling system

Separately shielded power amplifier with full SWR protection for trouble-free operation

Plenty of shielding virtually eliminates spurious responses

Optional keypad accessory allows quick, convenient frequency selection

Automatic side-band selection with band change

Double-balanced diode mixers are used in both receiver and transmitter

Unique two-speed electronic tuning knob lets you quickly QSY around the band while providing 50 Hz resolution

Easy-to-read green vacuum fluorescent display includes special symbols to indicate mode, T/R status, split operation, out-of-band transmit frequency and memory handling

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% (10 min. on, 10 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: 5" H x 8½" W x 14" D (12.7 x 21.6 x 35.6 cm). Net Weight: 26 lbs. (57.3 kg).

HW-5400 SPECIFICATIONS - GENERAL: Overall Frequency Coverage: 80 through 10 meters, each band ± 50 kHz; 10 MHz WWV; WARC bands operational. 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: Store 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 μ V 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 μ V 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 3 μ V or greater input signal). Intermodulation Distortion: 70 dB 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 μ V. 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 down from a 100 watt, single-tone (1000 Hz) output. Unwanted Sideband Suppression: 50 dB down from a 100 watt, single-tone (1000 Hz) output. Spurious Radiation: -60 dB minimum, referenced to 100-watt output. Third Order Distortion: 30 dB down 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: S-units in Receive, ALC in Transmit. Available Accessories: HWA-5400-1 AC Power Supply with 12/24-hour clock and speaker; HWA-5400-2 2.0 kHz SSB Filter; HWA-5400-3 Frequency Entry Keypad kit. Cabinet Dimensions: 5" H x 11½" W x 14" D (12.7 x 29.2 x 35.6 cm). Net Weight: 24 lbs. (10.9 kg).