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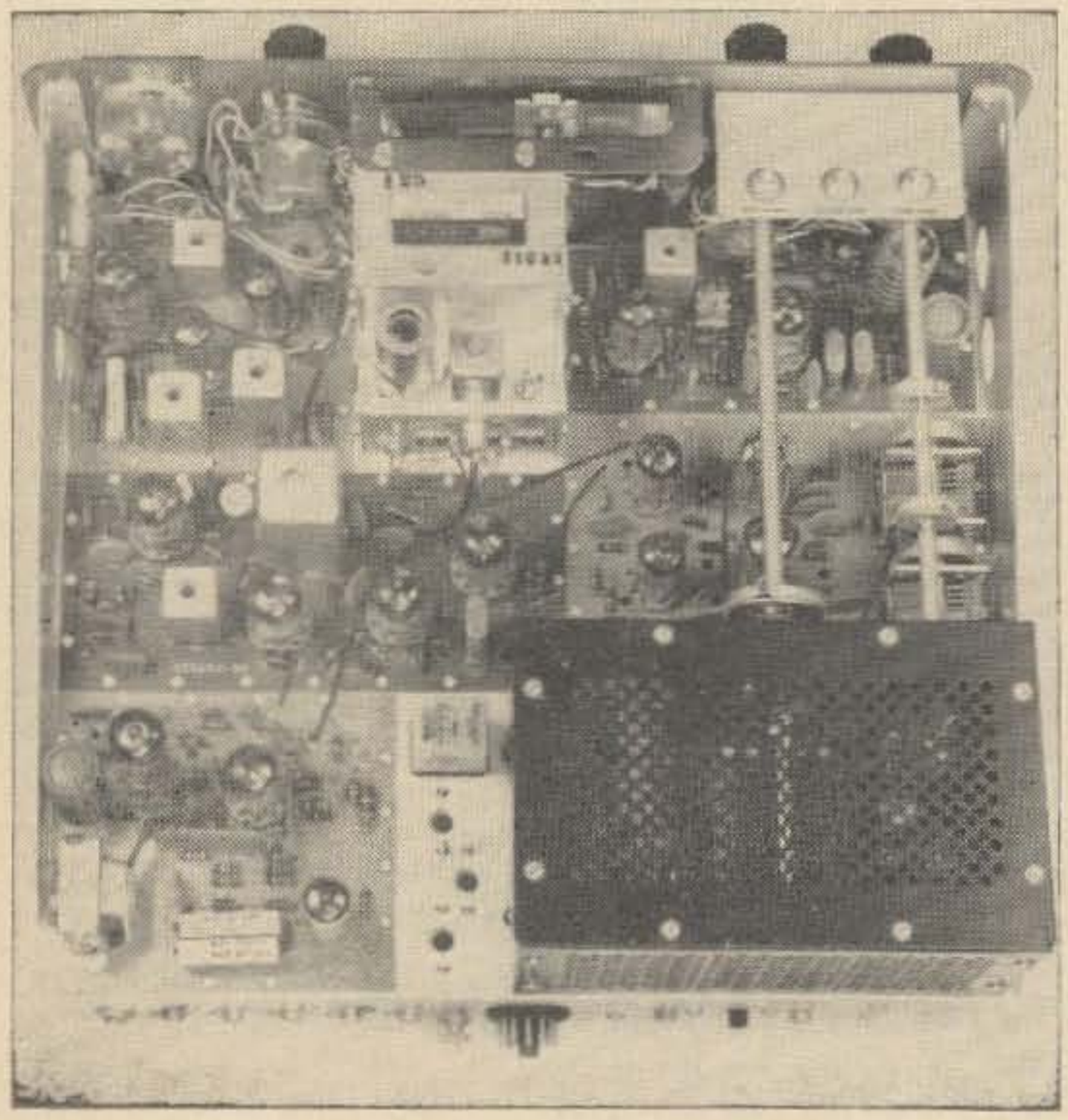
# Heathkit SB-100

Heathkit, realizing the need of the Amateur Fraternity for a quality, low cost line of SSB equipment, has marketed their "SB" line. One of the newest of the SB-Series is the SB-100 all-band transceiver, which operates on all amateur frequencies between 3.5 MHz and 30 MHz. It may be used either as a fixed-station or in a car, boat or airplane as a mobile-station, with either the AC or DC external power supply, using either A-3j (SSB) or A-1 (CW) emission.

Although Heath claims that the SB-100 kit can be built in about 45 hours time, a ham inexperienced in building equipment may expect to add about 5 hours to the building time. As an experiment, my wife, who has never built any electronic gear, wired two of the larger circuit boards perfectly, following Heath's step-by-step directions.



A Waters wattmeter/dummy lead showed an output of approx. 110-watts at 7.2 MHz with a DC input of 170 watts. The CW input to the final amplifier may be "cranked-down" so that a novice can use it in accordance with the regulations regarding his license. But, you say, he must be crystal-controlled as well. Fine. Just figure (with a formula in the manual) the crystal that is required to control the transmitter section. The LMO Switch, or, as it is labeled "OSC. MODE," has three positions: LMO, in which the transmitter and receiver are both controlled by the Linear Master Oscillator; an XTAL position, where both the transmitter and receiver are controlled by the afore mentioned crystal; and AUX. T where the transmitter is controlled by the crystal and the receiver is controlled by the Linear Master Oscillator. Perfect for net control stations or novices, eh?

When operating CW a sidetone of approximately 1000 Hz is internally switched to either the speaker or headphones for monitoring your fist. Another interesting feature is that when the earphones are plugged in, the jack automatically switches the audio output from 8 ohms to 600 ohms, more closely matching the impedance of the headsets used in most ham stations.

There are no controls on the rear apron, only connectors. Some of the least used controls are mounted internally such as: VOX adjustments, headphone volume, bias, CW tone level, carrier null, neutralizing, meter zero and relative power adjustment.

On the air, I have received excellent audio reports. One of the local hams, who has a 'scope tied to his receiver said that the pattern appeared to be of the same high quality

as from the "high-priced equipment." The 'scope connected to the SB-100 produced an excellent "Christmas tree" pattern.

The dial tunes 500 kHz, so that means there is no bandswitching on 80, 40, 20, or 15 meters. The 10 meter band is divided into four sections; 28.0 to 28.5, 28.5 to 29.0, 29.0 to 29.5 and 29.5 to 30.0. There is also an additional 10 kHz at the top and bottom of the dial. Time and frequency checks can be taken from CHU at 7.335 MHz.

In the transmitter section of the SB-100, the audio from the speech amplifier and cathode follower, as well as RF from the carrier oscillator is fed into the ring-type balanced modulator. From there, the signal is impedance-matched to the 3.395 MHz crystal filter. The filter has a usable bandwidth of 2.1 kHz (3393.95 to 3396.05 kHz at the 6 dB points). The audio frequency range is held between 350 and 2450 Hz. An optional 400 Hz CW filter may be used instead of the SSB filter, but then operation is limited to CW only.

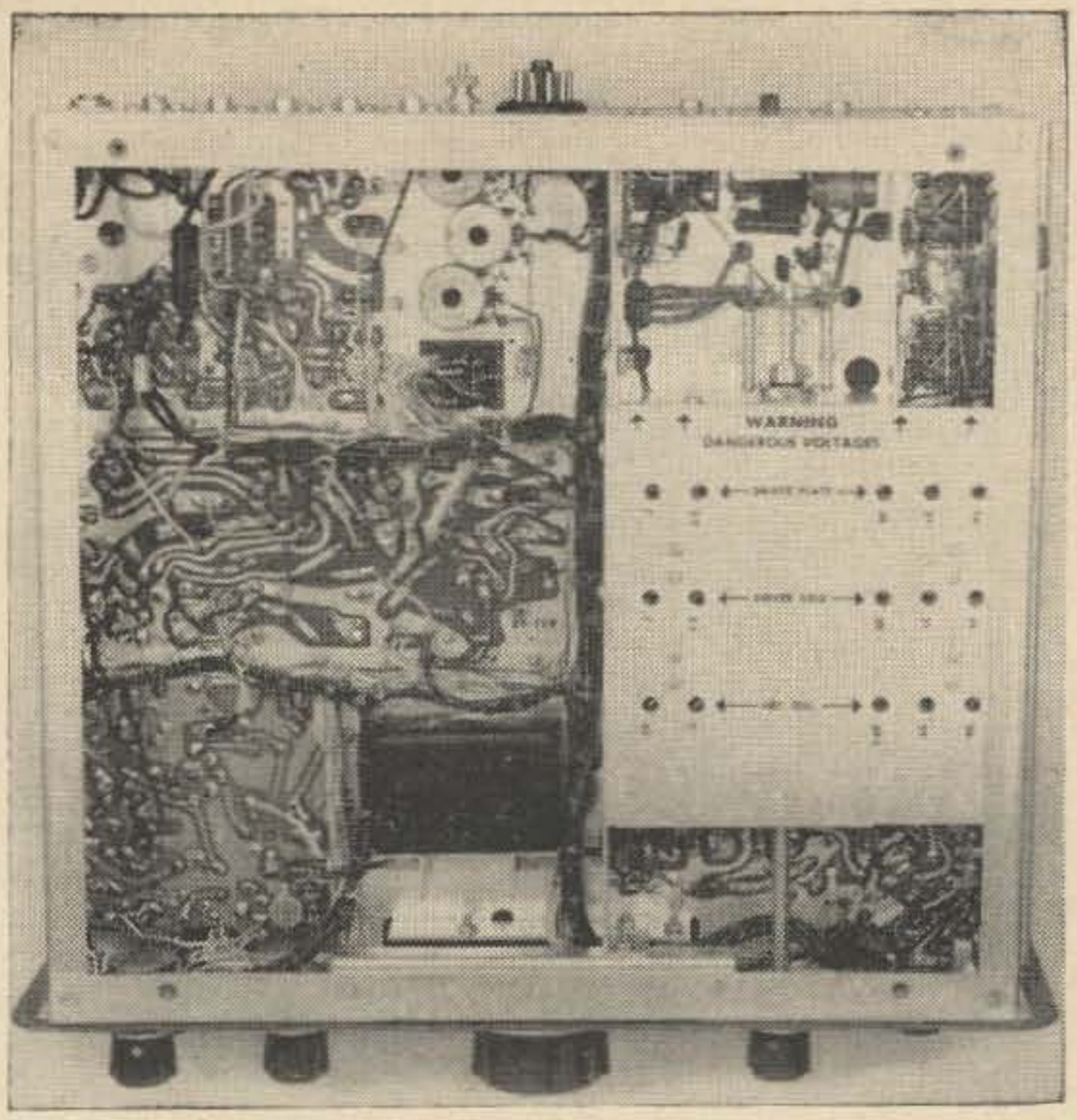
The LMO signal (between 5.0 and 5.5 MHz) is mixed with the SSB signal at the first transmitter mixer. The sum of the two signals is then fed through a bandpass filter to the second transmitter mixer, where it is then mixed with a signal from the heterodyne oscillator. The difference between these two signals produce the operating frequency.

The rest of the transmitter section is of conventional design. Two 6146's are used for the class AB1 linear amplifier. These tubes were designed for transmitter circuitry, and I'm glad to see Heath using this popular tube.

The receiver section is of conventional design, using the 2.1 kHz crystal filter to set the bandwidth. This narrow, steep-sided passband permits good selectivity in the crowded amateur bands. The audio transformer secondary is tapped to match either 600 ohms or 8 ohms.

There are five main circuit boards that are attached to the chassis, and four small boards which make up the band switch. The LMO is factory-wired and completely aligned.

The first assembly is that of the circuit boards, being careful to solder the components in their proper places. After installing some of the hardware on the chassis, the circuit boards are mated to the chassis. Two wire harnesses (one of color-coded coaxial cables) interconnect the boards, terminal points and controls. Then the chassis wiring is completed, followed by the assembly and installation of the front panel. One of the last steps in the assembly of the SB-100 is that of the Switch-Board™, which comprises of four small circuit boards, each with a switch wafer and associated components, that is used for the bandswitch.




To align the transceiver, only very basic equipment may be used, such as an 11 meg-ohm VTVM, a 50 ohm non-reactive dummy load and a receiver that tunes the standard broadcast band. An oscilloscope is recommended, but not necessary for transmitter alignment.

In mobile operation, there is not even a hint of frequency variation, even over rough roads. The circular dial has 1 kHz divisions, and the visual interpolation is approximately 200 Hz or less. I have found that linearity of the LMO is within 150 Hz after calibration at the nearest 100 kHz point. Backlash is negligible on my unit.

All "on-the-air" reports have been excellent, either barefoot or using a linear amplifier. The CW break-in keying produced an excellent wave shape on the oscilloscope used for monitoring. A sidetone provides CW monitoring either through the speaker or headphones.

Either an AC power supply (HP-23) at $39.95, or a DC power supply (HP-13) at $59.95 is available to supply the operating voltages required. The unit, weighing only 17½ pounds, is 14⅞" wide x 6⅝" high x 13⅜" deep. A separate speaker is required, such as the SB-600, which also provides space for the AC supply.

I have worked at least 30 other SB-100's in the few months that they have been on the ket, and I have yet to hear one with poor quality. Heath Company has a winning line in the "SB-Series."

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