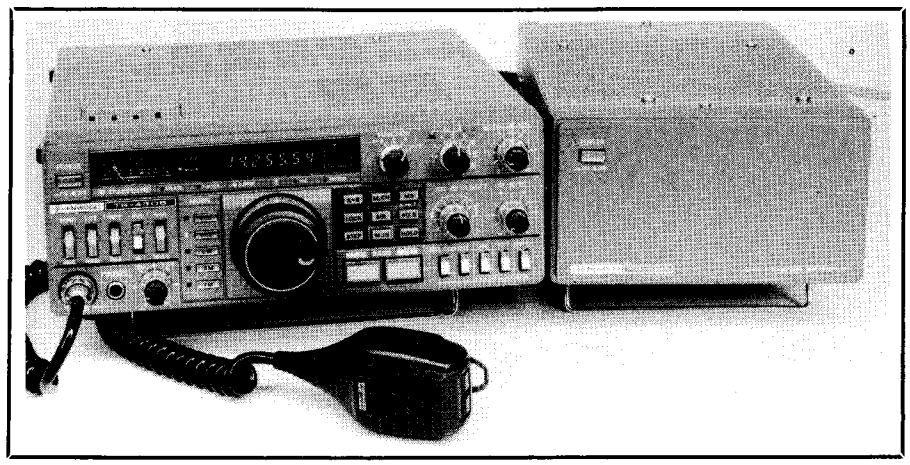
Product Review

Conducted By Paul K. Pagel,* N1FB

Trio-Kenwood TS-430S HF Transceiver

The Kenwood TS-430S is an all-mode, 160-10 meter transceiver that covers the WARC-79 amateur bands and includes a 150-kHz to 30-MHz general-coverage receiver. The rig is small, lightweight and completely solid-state, and requires 13.8-V dc. Two VFOs, eight programmable memory channels and a variety of other "bells and whistles" combine to make this radio one of the more versatile on the market.



A Tour of the Front Panel

The front panel is divided into several sections; each section has a group of controls for the various functions of the '430S. The power ON-OFF switch is located at the upper-left corner of the rig. To the right is the multifunction meter, VFO A or B indicators, the operating frequency display, a memory channel display and three knobs: the VFO FUNCTION switch, the memory channel selector (M.CH) and the concentric NOTCH and SQUELCH controls. Below these last two controls are the RIT adjust and IF SHIFT on one shaft, and ganged AF and RF gain controls.

At the bottom-right corner are five push-on/push-off switches for various subfunctions: a band STEP control, RIT, noise blanker (NB), attenuator (ATT) and notch filter (NOTCH). To the left are the two large "press-and-hold" band-change switches — one for moving to a higher band, the other for going to a lower one. The transceiver keyboard is above the band change switches. The keyboard consists of three locking and six momentary contact switches. There's a switch to set the two main VFOs equal to each other (=), one to LOCK the operating frequency and mode, and one to STEP (change) the tuning rate. The other six switches control various memory channel functions: loading (M.IN), selecting (M.CH), scanning (MS), scan HOLD, programmed scan (PG.S) between two memory frequencies, and one to recall the selected memory's frequency and mode (MR) as the main operating frequency without switching into memory channel operation.

In the center of the front panel is the 2-inch main tuning dial. Immediately above are five LEDs that reflect various operating states: whether the rig is in transmit or receive mode (ON AIR), frequency lock (F.LOCK) on/off, frequency step (F.STEP) switch engaged, and on-off indicators for the RIT and NOTCH filter.

The left column next to the main tuning dial consists of five pressure-sensitive switches with accompanying colored LEDs. These select the transmission and reception modes. From top to bottom, LSB, USB, CW, AM or FM (optional) may be selected.

Below the name plate are five rocker switches. A SEND/REC switch, VOX or MANual transmit control, speech PROCessor on or OFF, meter function selector (ALC or collector current (IC)), and receive filter, NARrow or WIDE. The bottom-left section contains the ganged MICrophone gain and CARrier level controls, and the headphone and microphone jacks. The microphone jack has connections for a frequency-controlling (UP/DOWN) microphone.

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Top and Side Panels

There are a few less-often-used controls that are placed out of the way on the top of the rig. These are the VOX GAIN, DELAY and ANTI-VOX controls, and the scanning speed control. Each has a slide potentiometer with small cloth fringes around the slides to keep out dust. One side of the rig has a carrying strap, and the other has four rubber feet for setting the rig down safely on its side.

Rear Panel

Most of the rear panel is occupied by the final amplifier heat sink. A fan is built into the heat sink. Other items here are: Ground terminal, CW key jack, external speaker jack, SO-239 antenna connector, 8-pin DIN transverter jack and a 6-pin REMOTE connector (for connection to a linear amplifier). The dc power and accessory connectors round out the rear panel.

Operation

Kenwood has managed to pack maximum versatility and flexibility into a radio that operates with a minimum of difficulty. Despite the apparent complexity of the front panel, one hardly needs to read the manual to operate the rig. With the optional PS-430S power supply, two switches are needed to turn on the rig: one on the supply, another on the transceiver.

Receive Frequency Tuning

Received-signal strength is displayed on the multifunction meter and the operating frequency is displayed to 100- or 10-Hz resolution on the fluorescent-blue digital display. A 10- or 100-Hz tuning rate is available, depending on whether or not the STEP function is selected. For fast frequency changes, the main tuning knob has an indentation for fingertip control, or the UP/DOWN buttons on the microphone can initiate a frequency scan.

When the 1-MHz STEP button is pressed, the tuning range spans 150 kHz to 30 MHz. When it is pressed again, the UP/DOWN switches select the ham bands only. For large frequency changes, the BAND UP/DOWN switches cause the operating frequency to jump exactly 1 megahertz higher or lower than the previously displayed frequency, or to the next higher or lower ham band (operator selectable). Two VFOs, A or B, may be selected, or A can be used for transmit with reception on B, or vice versa. Two LEDs indicate which VFO is in use. Since the VFOs recall mode and frequency, switching from VFO A to VFO B also changes the mode to the one entered, if it is different. A keyboard button, (A=B), sets the standby VFO to the same frequency and mode as the operating VFO.

Other Reception Pointers

FM reception from 150 kHz to 30 MHz is also possible, if the optional FM unit is installed. The squelch operates in all modes. RIT varies the receive frequency by about ±1.3 kHz. A tremendously sharp AF NOTCH filter is available and, when used in conjunction with the IF SHIFT control, can eliminate bothersome heterodynes. The IF SHIFT does not operate in the AM or FM modes, but enhances CW and SSB reception when used in combination with the RIT. Standard passband width is 2.4 kHz, but with optional filters, different IF passbands may be selected for CW or SSB; down to 270 Hz or 1.8 kHz respectively, or as wide as 2.4 kHz. Without an optional filter, the AM passband is 2.4 kHz wide; with the filter, 6 kHz. A pulse-type noise blanker is standard, and is designed for mobile operation. Signals are attenuated approximately 20 dB when the RF ATT switch is depressed.

Keyboard Notes

Eight programmable memory channels are selectable from the front panel. The memories are loaded easily by selecting the desired memory channel and pressing the M.IN button on the keyboard. Memory number eight can be programmed with different receive *AND* transmit frequencies. This is ideal for use with 10-meter FM repeaters. In this case, the two frequencies are loaded by pressing the M.IN switch twice —

Trio-Kenwood Communications TS-430S Transceiver, Serial No. 4010753

Manufacturer's Claimed Specifications	*Measured in ARRL Lab*
Frequency coverage: Receive, 150 kHz-30 MHz; transmit, 160, 80, 40, 30, 20 17, 15, 12, 10 m (17- and 12-m band transmit inhibited by factory-installed lockout, removable by user).	Receive: As specified. Transmit: 1.601-2, 3-4, 6.999-7.5, 10-10.5, 13.9-15, 20.9-22, 27.9-29.999 MHz.
Operating modes: CW, SSB and AM (FM optional).	As specified.
Frequency display: 7-digit fluorescent blue.	As specified; ¼-in digits.
Frequency resolution: 10 Hz.	As specified.
kHz/turn of knob: 10-Hz steps, 10; 100-Hz steps, 100.	††*With 10-Hz Resolution* 10-Hz steps: min. 4.33 max. 7.21 100-Hz steps: min. 45.5 max. 73.1 *With 100-Hz Resolution* 10-Hz steps: min. 2.2 max. 8.5 100-Hz steps: min. 15.3 max. 73.9
Backlash: Not specified.	Nil.
S-meter sensitivity (μV for S9 reading): Not specified.	160 m, 40; 80 m, 40; 40 m 60; 30 m, 37; 20 m, 40; 17 m, 44; 15 m, 44; 12 m, 69; 10 m, 52.
Transmitter RF power output (W): Not specified.	160 m, 95; 80 m, 110; 40 m, 110; 30 m, 115; 20 m, 115; 15 m, 110; 10 m, 100.
Spurious suppression: Better than 50 dB.	−51 dB. (see photo).
Third-order IMD: Not specified.	−31 dB (see photo).
Receiver sensitivity:	Receiver dynamics measured with optional 270-Hz filter installed.

	80 m	*20 m*
Noise floor (MDS) dBm:	−138	−137
Blocking DR (dB):	N.L.	N.L.
Two-tone 3rd-order IMD DR (dB):	94.5	89.5
Third-order intercept:	+2.25	−2.75

Receiver quieting for 10 (dBQ): <0.25 μV.	−121 dBm for 10 dBQ.
Squelch sensitivity (dBm): Not specified.	−122 min.; −116 max.
Receiver audio output power (at 10% THD): 1.5 W into an 8-ohm load.	1.8 W.
Size (HWD): 3.8 × 10.6 × 10.8 in.†	
Weight: 14.3 lb.	
Color: Gray	

†mm = in × 25.4; kg = lb × 0.454.
††The review rig has a frequency resolution anomaly. When using the tuning knob and the 10-Hz tuning rate, the display indicates changes of 20 Hz, only occasionally showing 10-Hz changes. Ten-Hz steps are taken when the UP/DOWN buttons on the microphone are used, however. The kHz-per-knob revolution varied as shown. Two other '430Ss (serial numbers 4011493 and 4050827) showed no tuning anomalies in any mode or STEP switch setting.

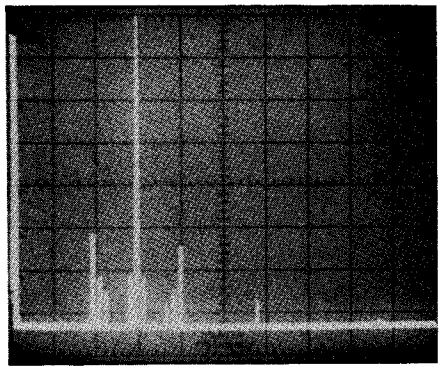

Fig. 1 — Worst-case spectral display of the TS-430S. Vertical divisions are each 10 dB; horizontal divisions are each 10 MHz. Output power is approximately 100 W at 10 meters. All spurious emissions are at least 51 dB below peak fundamental output. The TS-430S complies with current FCC specifications for spectral purity.

the first time for the receive frequency, and a second time when the desired transmit frequency is displayed on the main readout. In this mode, a string of beeps is heard until the M.IN button is pressed for the second time, reminding the operator that another entry is needed.

There are two ways to recall memory information. By pressing the MR switch, the frequency and mode in the chosen memory channel become the operating parameters, superseding the previous operating status and frequency. The second method enables you to save a VFO frequency while using the memory channels: While tuning one of the main VFOs, turn the M.CH selector switch to the desired channel and press the M.CH button.

As long as the M.CH is pressed (it is a locking switch), you can operate on any of the eight memory channels. When the M.CH is pressed again, and released, you go back to the VFO frequency and the mode you were in before entering the memory mode. This essentially gives the '430S *three* VFOs.

Scanning

To scan through the eight memories, press the memory scan (MS) switch. The scan spends approximately 1.8 seconds on each memory channel. If a memory has not been loaded with a frequency and mode, the scan skips that particular channel. Whenever a memory is addressed, the channel number is displayed to the far right of the frequency display. The HOLD button stops the scan. Memories can be selected manually by pressing the M.CH button and turning the memory channel selector switch to the desired memory channel.

Program Scan

Frequencies between memory channels six and seven are scanned with the *program scan* function. To start the scan, press the PG.S button. The scan begins with the frequency in memory six. Once the scan has reached the frequency entered in memory seven, it will jump back to the frequency in memory six. The receiver will scan every 10 or 100 Hz, depending on the position of the STEP button. The scan rate is adjusted by the slide potentiometer mounted on top of the rig at the front left. If you want to stop the scan on a particular frequency, press the HOLD button. While scanning, pressing the microphone transmit button will hold whatever frequency the scan is going through at the moment; once the button is released, the scan resumes.

Transmission

The TS-430S can transmit on any MF or HF amateur frequencies. To release the 18- and 24-MHz bands for transmission, a wire is clipped or a single diode is removed, depending on whether one or both bands are desired. Different transmission modes are selected, as in reception, by pressing the appropriate button to the direct left of the main tuning dial.

To transmit, use the PTT button on the microphone, or press the SEND switch directly under the POWER ON/OFF switch. VOX can also be used, and is turned on or off by another rocker switch. The MICrophone gain control is not active when the '430S is in the FM mode. The speech processor is turned on from the front panel. CW operation is either manual or semi-break-in; either the VOX circuitry or the SEND/REC switch may be used. On RTTY, LSB AFSK transmission is used. To operate RTTY, insert the RTTY signal into the microphone jack and turn the MIC level down. Power output should be reduced to half (about 50 W) for such operation. An optional narrow-bandwidth SSB filter is available.

Protection Circuitry

When SWR is too high, the final-output-transistor protection circuitry reduces power. When long transmissions or high-power levels cause the heat sink temperature to rise above 50° C (such as with FM or RTTY operation), the built-in fan turns on until the temperature falls below 40° C. If for any reason the temperature does not drop (when the air flow is blocked, for example), input power remains reduced.

Miscellaneous

The bottom of the rig has a bail that can be used to raise the front of the rig. The power supply also has a bail and an external 12-V dc

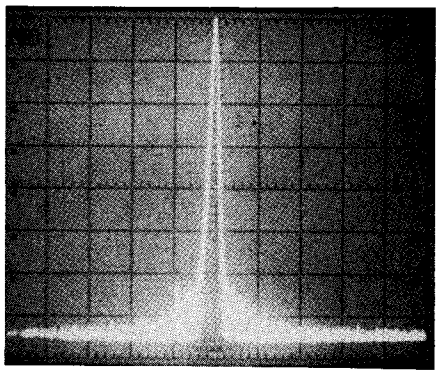

Fig. 2 — Spectral display of the TS-430S showing phase noise about the carrier. Vertical divisions are each 10 dB; horizontal divisions are each 10 kHz.

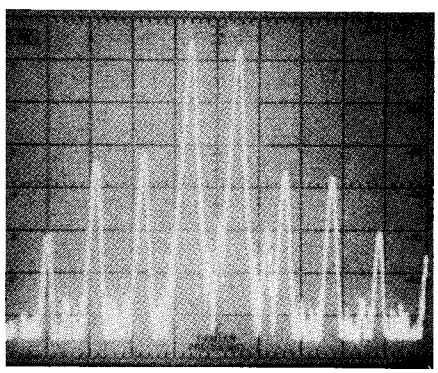

Fig. 3 — Spectral display of the TS-430S output during transmitter two-tone IMD test. Third-order products are 31 dB below PEP, and fifth-order products are 34 dB down. Vertical divisions are each 10 dB; horizontal divisions are each 1 kHz. The transceiver was being operated at rated input power on the 10-meter band.

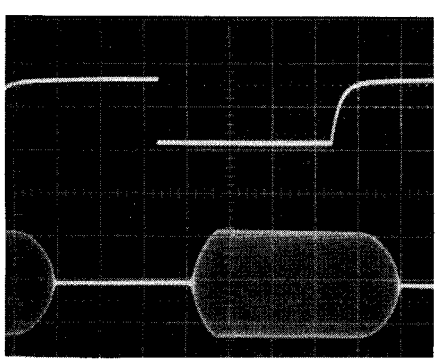

Fig. 4 — CW keying waveform of the TS-430S. The upper trace is the actual key closure; lower trace is the RF envelope. Each horizontal division is 5 ms. This RF waveform has good shaping.

terminal. A lithium-battery backup is provided to retain the memory frequencies. Estimated battery life is five years. Whenever a critical function is changed, a beep sound occurs, alerting the operator to the change in operating status. The CW monitor note is pleasant, and the volume can be adjusted after removing the top cover of the rig. The main tuning dial drag is also adjustable after removing the top cover.

Front panel styling is attractive, making use of three colors in various places. Combined with the various colored LEDs, the overall effect is quite pleasant.

The Book

Like the rig, the manual provides full coverage. Thirty-five pages long, it is almost redundant; it explains every control thoroughly. Two sections in particular are remarkable in their explanations: RF gain control and CW operation. There is even a page on radio frequency allocations that helps the user find the international BC bands. Two and one-half pages are devoted to mobile installation and operation, explaining antennas, good grounding principles and other useful information in a clear-cut manner, with excellent graphics.

Under the heading "Additional Information," topics covered include installing the various optional filters, transmission on the WARC bands, phone patch operation, transverter connections, 10-Hz frequency readout modifications and operation of the '430S as or with a separate receiver. The manual has a block diagram of the rig and schematic diagrams of the various subcircuits. A separate factory service manual is available.

Impressions

Receiver audio is crisp and sufficient from the built-in speaker. Performance with stereo headphones is also good; I didn't have to short out one of the connections in order to hear with both ears — Kenwood has provided a three-conductor jack for that purpose. Tuning-knob movement is smooth and satisfactory; I didn't have to take advantage of the variable dial drag.

I soon learned how to manipulate the multitude of frequency controls and was flitting around the spectrum, listening to ham and international broadcast (BC) stations around the world. I programmed a few frequencies into the memories, and had some fun with the Hartford 10-meter FM group. My signal quality and strength (barefoot) were praised in this mode, particularly, and there were no criticisms of my SSB or CW signal quality.

Radioteletype (RTTY) operation with the '430S is a pleasure. The 10-Hz dial accuracy allows precise tuning to bulletin-board systems on 20 meters. I kept things cool under the 100% duty cycle by turning the mic gain control down. The cooling fan did turn on after a long RTTY or FM transmission, but it was whisper quiet and soon shut down.

The front-panel meters, frequency readout and status indicators easily got their point across and are pleasant to look at. Even when I switched off the room lights, I was able to manipulate the controls with accuracy. This is a good point for mobile operation, and the TS-430S works well in such an installation. Another good feature for either mobile or home operation is the keyboard LOCK button. This locks the displayed frequency and mode, and disables most of the front-panel controls. After accidentally knocking the transceiver a couple of times and sending myself way off the net frequency, I learned to push this button as soon as I was settled somewhere on the band.

Doing It with Frequency Controls

To quickly speed scan through a band, program the desired frequency range into memories six and seven and press the PG.S button, or use the microphone UP/DOWN buttons. While using the PG.S method, I keep my index finger near the HOLD button in order to stop where I want to; although this particular scan speed can be adjusted by moving the top cover slide pot, it doesn't stop on any frequency unless manually commanded to do so.

This was my first experience with a rig having two *built-in* VFOs. I've used several rigs with outboard VFOs, and found them to be the best way to go when operating under pressure, such as during a contest or when net control tells me to go up or down a few kilohertz to send or receive traffic. Never before have I had the extreme pleasure that a second built-in VFO entails. Although I was dismayed at first not to find an XIT control on the '430S, I soon learned that the second VFO can easily accommodate the need for such fine transmitter tuning. Merely press the A=B keyboard button, and the unused VFO (be it A *or* B) assumes the frequency of the active VFO. By setting the FUNCTION switch to the appropriate A-R or B-R position, split-frequency operation results. This also takes care of cross-mode DX contacts. I soon became adept at varying these frequency controls, and it is a pleasure I will seek in other rigs.

When the main tuning dial is used, three factors affect the frequency change per knob revolution: the *mode, frequency readout resolution* (internally selectable) and *tuning rate*. The tuning rate is determined by the STEP switch (10- or 100-Hz steps). The minimum and maximum kHz-per-knob turn values for both STEP switch positions, and readout resolutions are shown in the specifications table.

Going Mobile

My "mobile" experience with the TS-430S consisted of placing the rig on the front seat of my car, collecting a premade 40-meter dipole and a heavy-duty power cord (provided with the rig), and driving up a local mountain to operate in a Field Day-like setting. I connected the power cord directly to my car battery, threw the dipole over some trees, and operated the rig from the hood of my car while the engine idled. Even in the cramped interior of my two-seater, there is sufficient room for the rig. During mobile operation, the scanner microphone and status change indicator (beep sound) is invaluable.

Shortwave Listening

This was my first experience with a sensitive general-coverage receiver, and it was a lot of fun. After 13 years of Amateur Radio operation I still enjoy the hobby quite a bit, but I have to admit that listening to the BBC or Radio Moscow is, at times, more interesting than "reading the mail" on 75-meter sideband.

A Few Criticisms

The AGC is not separately controllable on this rig. Neither is there full break-in, which is state of the art these days. The noise blanker, designed specifically for pulse-type noise found in mobile situations, is not adjustable; the noise blanker in the TS-530S is. It's true, however, that one rig cannot be everything to all people, and Kenwood definitely designed this rig with mobile use in mind.

To the discerning viewer, the main tuning knob on the review rig (and two others owned by Hq. staffers) appears slightly eccentric. This did not appear to affect performance in any way. The knob is also a bit too small for fast tuning through the bands, but this is understandable, considering the rig's size.

As noted earlier in the review, when the band UP/DOWN switches are pressed, the operating frequency jumps up or down 1 MHz. This is not always the case, however, and the instruction manual makes note of the exception: When the rig is in CW mode and is tuned from the very bottom of a band, i.e., 14.000.00 to 14.000.79,

and the band UP paddle is pressed, the operating frequency first jumps 500 kHz to 14.500, and *then* jumps up to the next highest ham band (18 MHz) at 18.500, *not* 18.000.

This is more puzzling than disturbing. Not only can it be avoided easily by simply making large band changes in any mode other than CW, it is also easy to tune down the 400 kHz or so to the CW portion of the next highest band.

The TS-430S is a fine amateur transceiver. Especially suitable in mobile applications, the '430S offers a wide variety of features for the money. If you're looking for compact size, good looks and high performance, your search is over.

The TS-430S is available from Trio-Kenwood Corporation, 1111 West Walnut St., Compton, CA 90220. Price class: $800. — *Leo D. Kluger, WB2TRN*

HEATH ACTIVE AUDIO FILTER HD-1418

☐ An active-audio filter that offers a five-section high-pass, a five-section low-pass and a two-section peak/notch filter? Ever since becoming familiar with the variable-pass-band tuning and IF-shift features on most of the newer rigs, I have been keenly aware of the shortcomings of the IF filtering system used in my Tempo model 2020 transceiver. The new Heath audio filter sounded like just what I need to shore up the filtering in my rig. Audio filtering, no matter how sophisticated, is no match for a good IF filtering system. But for a rig that has only a fixed SSB and a fixed CW filter, a tunable audio filter can provide a definite improvement in received-signal intelligibility, by allowing you to reduce interference from a wide range of other signals and noise.

Assembly

In typical Heath fashion, the assembly manual is detailed and complete. This was my first Heathkit using their new procedure, whereby you are simply instructed to install components on the board, rather than having a detailed drawing for each step, with lines going to each component as it is to be installed. (Most hams probably ignored those drawings anyway, and just went ahead with stuffing the circuit board.) Each component location is labeled clearly on the two-sided circuit board, and large pictorial drawings are included for each group of assembly instructions. I spent about one hour, initially, doing an inventory of the parts and briefly reading through the instruction manual to familiarize myself with the procedures. I spent a total of nine hours assembling and testing the unit. I encountered no problems putting the kit together, and all check-out procedures went smoothly. Another few minutes of using the filter listening to signals off the air convinced me that I had a fine piece of equipment to complement my receiver.

Operating Controls

The unit is housed in a small aluminum box, and the front panel is uncluttered and clearly labeled. The HIGH- and LOW-pass filter cutoff frequencies can be varied from 300 Hz to 2500 Hz by means of front-panel-mounted potentiometers. The NOTCH-PEAK filter center frequency can also be varied over this tuning range by using a front-panel control. An audio-GAIN control allows adjustment of the audio output, with a maximum filter gain of 3 dB. Four push-button switches provide for the selection of one of seven modes of operation available

from the filter. A POWER switch and headPHONES jack are also located on the front panel. Two LEDs indicate when the power is on and when the input signal is overloading the filter. (An input signal of more than about 3-V P-P will cause overload.)

Rear-panel jacks include a barrel type for POWER, phono types for received-audio INPUT, filtered-audio OUTPUT and a TAPE out jack for recording signals off the air. The filter has a built-in rectifier circuit along with a transistor and Zener-diode regulator. This means that the input voltage for the filter can be from 7- to 13.5-V ac or 9- to 18-V dc at 400-mA maximum current. The Heath PS-5012 power cube or just about any wall charger can be used.

Circuit Details

The model HD-1418 uses a total of 22 ICs and associated circuitry to provide 12 sections of audio filtering (see Fig. 5). The five-section high-pass and five-section low-pass filters and the two-section notch/peak filter are each controlled by a 22-kHz triangular wave that is generated by the control-oscillator circuit. An op amp compares the oscillator signal with a dc control voltage that is set by the position of a front-panel potentiometer. The comparator output pulse goes through two inverter/buffers, and is then applied to FET switches that act as variable resistors controlling the op amps for each filter section. U20, U21 and U22 are CD4066BCN ICs, each containing four FET switches. A higher resistance setting on the front-panel control provides a lower dc control voltage, and this results in a longer control pulse to the FET switches. They offer a lower resistance as the "on time" of the pulse increases. The end result is that the cutoff frequency of each filter is raised as the control is turned clockwise.

As the push buttons are used to select the various filtering options, the operation of the three individual filters is changed to suit the requirements of each mode. For example, with the CW button depressed, the LOW-pass filter control adjusts the center frequency of the passband and the HIGH-pass control varies the width of the filter passband.

The CW filter provides a variable bandwidth and adjustable center frequency characteristic. The passband has a slightly peaked response, while the CW2 mode has a flatter top. With the SSB button depressed, the passband has a flat top with steep skirts. The upper and lower cutoff frequencies can be adjusted to provide a bandwidth and center frequency that is tailored to meet many filtering conditions. If just the SSB & PEAK button is pushed, the filter passband has a definite peak. In this mode, only the NOTCH/PEAK control is operational. This mode

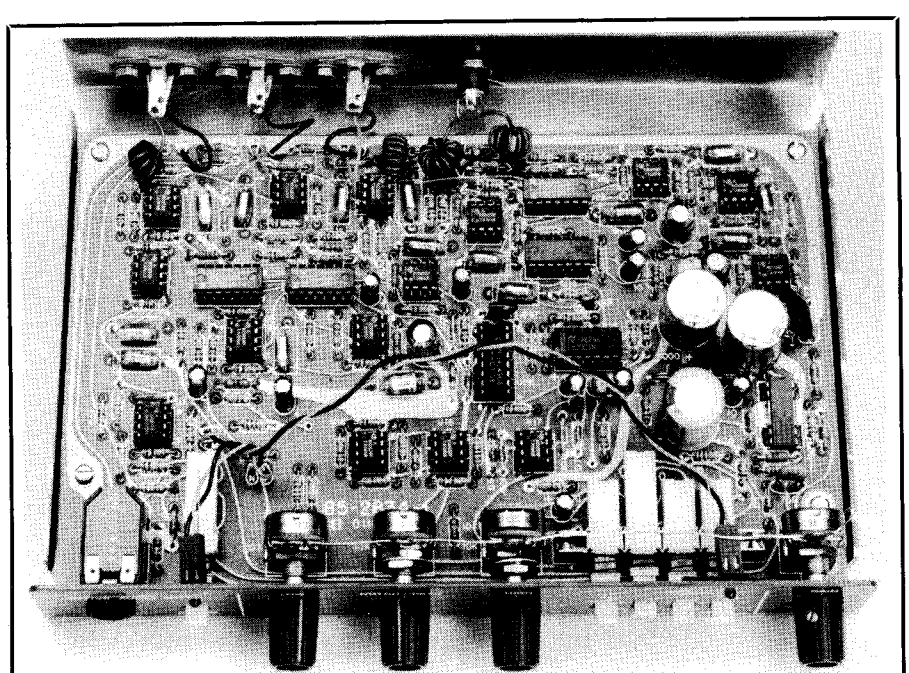

Fig. 5 — A peek inside the filter shows the large number of components used. The board layout is not too dense, however, and the board is easy to work on.

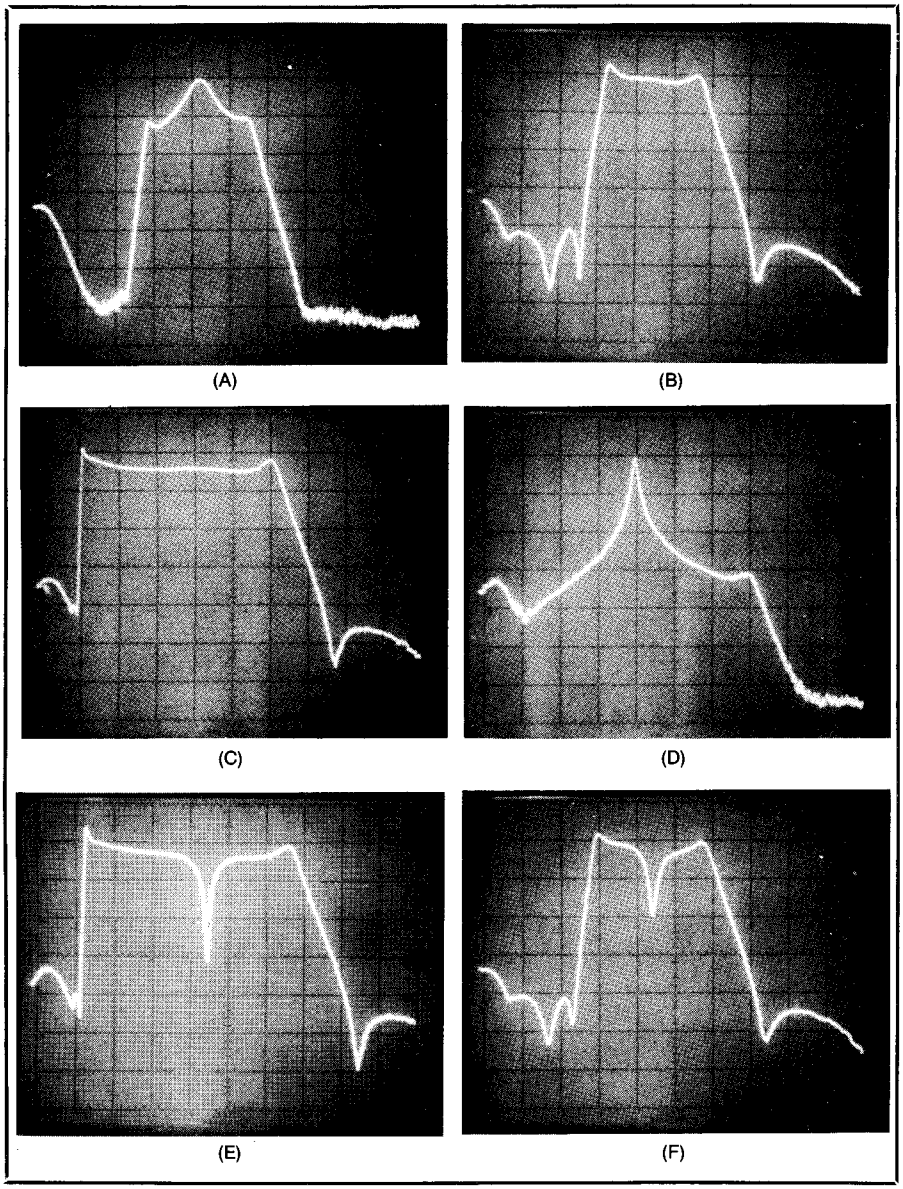

Fig. 6 — The Heath HD-1418 filter response characteristics. The horizontal scale is 500 Hz/division, and the vertical scale is 10 dB/division. The filter operating modes are shown as follows: (A) CW; (B) CW2; (C) SSB; (D) SSB & PEAK; (E) SSB & NOTCH; (F) RTTY.

Heathkit HD-1418 Active Audio Filter, Serial No. 01-4958

Manufacturer's Claimed Specifications	*Measured in ARRL Lab*
High-pass filter: 5-pole, tunable.	
Range: 300 Hz to 2500 Hz at −6 dB.	200 Hz to 3600 Hz.
Low-pass filter: 5-pole, tunable.	
Range: 300 Hz to 2500 Hz at −6 dB.	300 Hz to 3200 Hz.
Notch/peak filter: 2-pole, tunable.	
Range: 300 Hz to 2500 Hz.	300 Hz to 3500 Hz.
Width: 200 Hz at −6 dB.	Confirmed.
Depth: 30 dB.	32 dB.
Input impedance: 5 kΩ min.	
Nominal gain: Unity.	3 dB.
Audio amplifier power: 1 W into 4-Ω load.	
Power requirements: 7- to 13.5-V ac or 9- to 18-V dc, 400 mA.	Current drawn: 28 mA at 10-V dc; 33 mA at 12-V dc.
Dimensions (HWD): 1-7/8 × 8-7/8 × 6-5/8 in.†	
Weight: 1.5 lb.	
Color: Brown.	

†mm = in × 25.4; kg = lb × 0.454.

is useful to pinpoint the exact source of interference, and then the SSB & NOTCH mode can be used. In this mode, a notch of approximately 32-dB depth and 200-Hz width is inserted in the passband. If the NOTCH/PEAK control is not readjusted, the interfering station should be greatly reduced, compared to the signal you are trying to copy.

In the RTTY position, the filter provides a notch that can be moved through the passband, and adjustable high and low cutoff frequencies. In this way it is possible to tune the filter to match the mark and space tones of the station you are receiving, while rejecting any interfering signals. The final filter position selects a fixed filter, which provides a flat-top response from 300 to 2500 Hz. None of the controls have any affect on this filter combination, so there is nothing to adjust. Fig. 6 shows photographs of the filter response for each operating mode.

Operating Impressions

A first glance at the panel markings may lead you to think that operating the HD-1418 is somewhat confusing. After reading the operating instructions and spending about five minutes trying the various filter options, I decided that the controls are clearly labeled and that the unit is simple to operate. Control functions are marked in white above and red below the controls. Likewise, the filter modes are marked in white and red at the push buttons. If a filter combination identified in white is selected, the controls serve the function identified in white. If an option labeled in red is chosen, the control function is identified by the red label.

After tuning around in the phone portion of 20 meters without the audio filter, I turned it on and selected the SSB mode. By tuning to a station that was very difficult to copy, using the SSB & PEAK mode to pinpoint the interfering signal, then switching to the SSB & NOTCH position, I was able to obtain almost solid copy on most stations I tried listening to. Pretty impressive considering that I spend almost no time operating on that band because of the crowded conditions and inadequate filtering of my rig!

Next I tried the RTTY filter. I have recently been trying to use the Egbert RTTY program with my Apple® //e computer. This program uses software instead of the normal modem to demodulate the received tones. Most RTTY enthusiasts agree that while this is a neat application for a computer, it is not the best way to go. I had used the program to receive RTTY on several occasions, but copy was always far from solid. To my surprise, with the Heath audio filter in the line to my computer, I was able to achieve solid copy on most stations.

In the CW mode, I am again pleasantly impressed by the HD-1418. I leave the passband wide open for tuning around, then narrow it as needed to eliminate an interfering signal so I can copy a station. I seem better able to copy CW using the CW2 mode, with a flat-top response, but the peaked response can also offer some advantages.

Conclusion

If your rig has fixed IF filtering, the Heath Audio Filter can definitely help you. The filter is easy to build and simple to operate. The tunable filter response can be tailored to fit many operating requirements. I recommend it highly.

The HD-1418 Active Audio Filter is available from Heath Company, Benton Harbor, MI 49022. Price class: $130. — *Larry Wolfgang, WA3VIL* QST