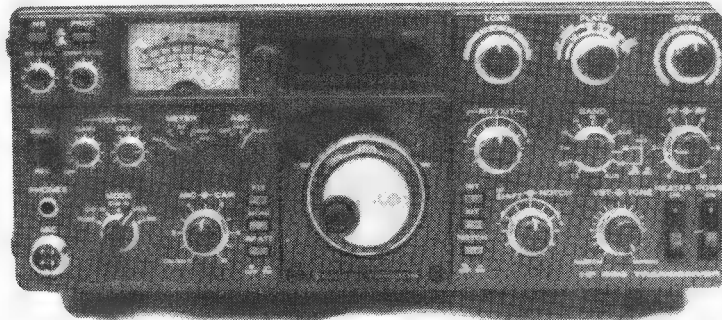


The Kenwood TS-830 S HF Transceiver



In the August 1981 issue of *Amateur Radio* we looked at the new Kenwood TS-530S transceiver. In fact the TS-830S was the first of the two to arrive in this country, however it seems that the two would probably have been developed at the same time. Therefore the opening remarks of that earlier review apply equally to the TS-830S. Lets start by looking at just what the 830S has to offer before looking at it in detail.

The TS-830S is an all band HF SSB/CW transceiver with full coverage of all amateur bands from 160 to 10 metres, including the new bands at 10, 18 and 24 MHz. Operating features include a noise blanker with adjustable level control. It has an RF transmit audio processor with compression level control and metering of the amount of compression in dB. The usual Kenwood IF shift is now supplemented with variable bandwidth tuning and a notch filter. In addition, a wide selection of optional filters takes care of any selectivity requirements. A feature that I find new on an amateur transceiver is, believe it or not, a tone control. Both transmit and receive offset tuning are included. VOX with easy to adjust front panel controls and that old TS-820 favourite, the transmit monitor facility. Like the TS-530S, it uses 6146 tubes in the final and the whole thing is packaged into an identical cabinet and front panel assembly. From the other side of the room, it would be difficult to tell the two apart.

As the TS-530 review stated, this transceiver was actually based on the TS-820 with both sharing a single conversion plus PLL set-up. The TS-830, on the other hand, has now gone to a double conversion scheme and is actually more closely related to the R-820 receiver than to the old 820 transceiver. However, the R-820 was a triple conversion circuit using a 50 kHz section which incorporated the notch filter. The TS-830 notch filter is in the 455 kHz second IF.

A 12 volt DC operation facility is offered as an optional extra with the 830 and a 12-pin connector is provided for the AC or possible DC input. This is certainly an improvement over the 530 where the A/C cord connects straight into the set, the DC option not being available.

Possibly many present TS-820 owners are considering the 830 as a replacement or update. What does it have to offer either as a replacement or as an initial purchase for a new amateur? Briefly quite a lot, but lets look at it in some detail.

TS-830S CIRCUIT FEATURES

The double conversion circuit uses frequencies 8831 kHz and 456 kHz with the RF speech processor operating at 456 kHz. Only one option is offered for an SSB filter and this is installed as standard. For the CW man there is a wide choice of narrow filters that can be installed in either or both the 8831 or 456 kHz sections. Our review transceiver had only the standard SSB filter installed, we are therefore unable to comment on the effectiveness of the CW filters. The narrow SSB (1.8 kHz) filter offered with the TS-530S is not on the optional list for the 830 as the variable bandwidth tuning and IF shift make this unnecessary, as we shall later see. It would seem that the 830 SSB filter has been upgraded compared with the old 820. Both are 2.4 kHz at -6 dB but at -60 dB the 830 is rated at 3.6 kHz against 4.4 kHz for the 820.

The receiver front end follows that of the 530 with 3SK73 dual gate Mosfet followed by an FET buffer into two balanced FETs in the first mixer. Kenwood claim that the front end operates at low gain for improved dynamic range and low noise level. The receiver noise blanker operates in the 8831 kHz section and the notch filter which works on the old "Q" multiplier principal is in the 456 kHz section.

The variable bandwidth operates by effectively shifting the 456 kHz band pass in relation to the 8831 kHz band pass. The band width control tunes the second conversion crystal oscillator at a nominal 8375 kHz with a VXO circuit. It is pleasing to see that RF negative feedback is applied across the final parallel 6146 output stage, as in the old TS-820, but as with the 530 no third order distortion figures are quoted. The nicely presented advertising folder shows a spectrum analyzer display for 3rd

and 5th order distortion but omits to mention the graph scale. At a guess it could be about -38 dB. If so, that's a very acceptable figure.

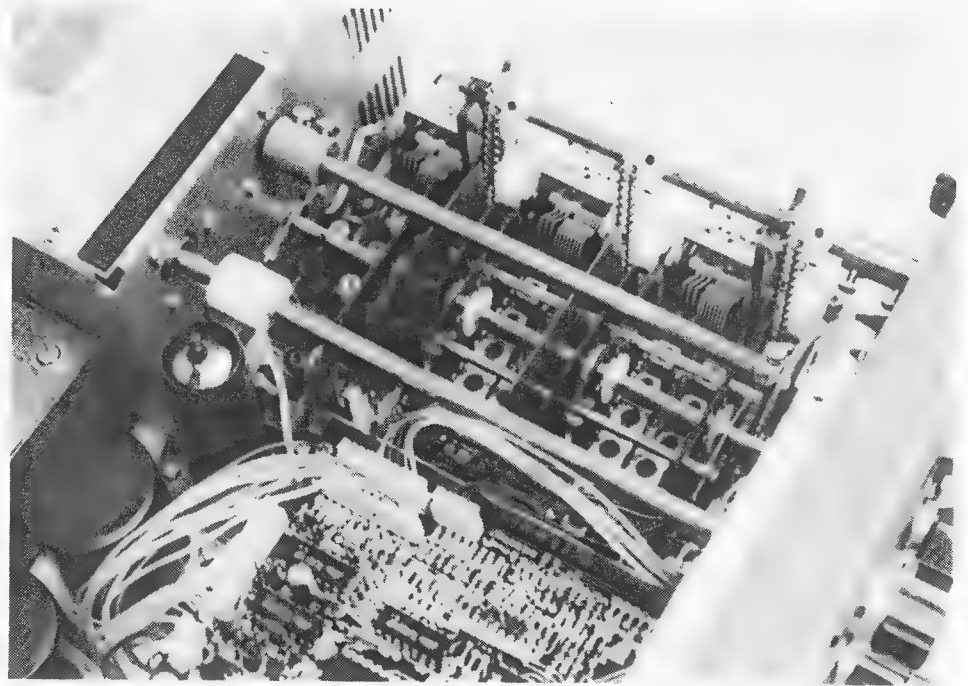
I see that the final power input rating has been increased compared with the 820S. SSB is up from 200 to 220 watts and CW from 160 to 180 watts. Output tests show, however, that the increased input specification is not matched by more output power.

THE TS-830S ON THE AIR

The transceiver was put to test in several areas, first the VFO. We carried out several drift tests, all from a cold start and using VNG on 7.5 mHz as the standard. Over several three hour periods all under different ambient temperature conditions, maximum drift measured was only 60 Hz total — a quite remarkable figure. One odd thing was noted, however. After several hours

switched off, the VFO would come back on a slightly different frequency, maybe 150 or 200 Hz away from the previous stabilized frequency. It's not an effect that would ever be noticed in normal operation however. As with the 530, dial readout is now primarily from the digital display. The unique mono-scale dial of the TS-820 has been dropped in favour of a simple dial with 10 kHz calibration points. Tuning rate is now a rather fast four turns per 100 kHz against five for the 820. The dial movement is very smooth, however, and the new digital readout is about half as large again as the 820.

No doubt most prospective users will be interested in just how well the IF shift, variable selectivity and notch filter work out in separating signals on a crowded band. Let's look at each in turn. IF shift is certainly useful to a point, but as the high frequency content of the signal is reduced let's say to reduce the effect of a heterodyne, there is a corresponding increase in the low frequency end. It's often a case of out of the fire into the frying pan. Variable selectivity on the other hand gives a reduction in either high or low response, but this does not occur in a symmetrical manner so that by the time you have eliminated the interference the wanted signal has gone as well. Now with the 830, we have both these controls and putting the two together works wonders. As the selectivity is increased you can then shift this across the signal to provide a balanced cut at both the high and low end. SSB band width can be reduced down to perhaps one kHz and yet the signal will still be readable. For the infrequent CW operator the band width can be reduced to five or six hundred Hertz and then adjusted with the IF shift to provide the desired beat note. I get the impression that Kenwood won't be selling too many CW filters to go with the 830s. The notch



Top view of preselector/driver tuning section.

filter was most effective. While one might consider that heterodynes are a thing of the past with SSB, I find that the on-air tuner-upper is one of the greatest problems on 20 metres these days. The notch filter removes these like magic. Kenwood quote 40 dB attenuation and there is no doubt that this is easily met. We found that a heterodyne running around S9 on the meter could be reduced to S0. Putting all of these adjuncts together really means that it is possible to pull through otherwise unreadable signals. Power output was checked on each band as follows: 160, 80, 40, 20, 15 and 10 metres gave 110, 140,

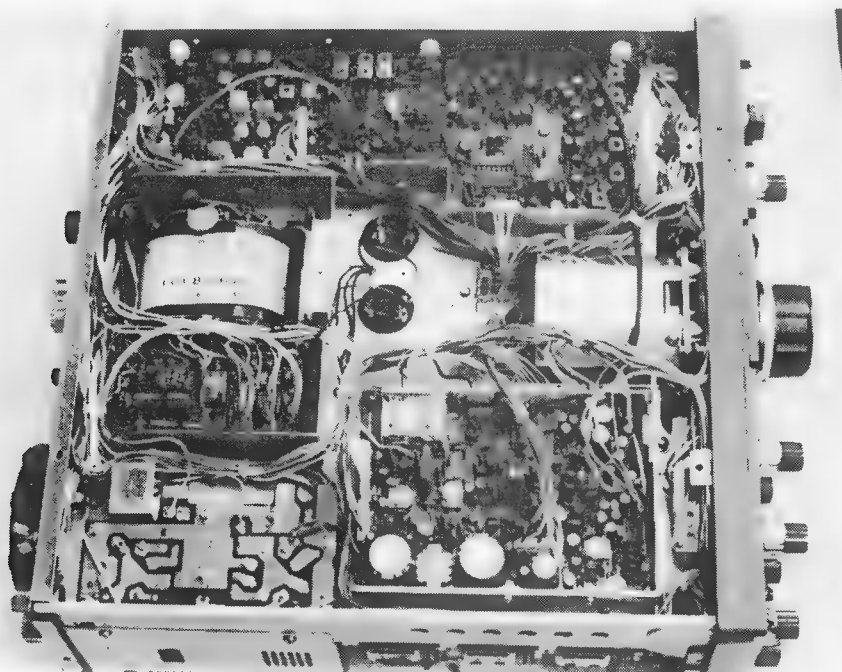
130, 115, 110 and 90 watts carrier. PEP output on each band was essentially the same when viewed on the scope. We were unable to check output on the new WARC bands as diodes have been installed to stop transmission, but a simple modification fully described in the manual allows this to be changed.

The speech processor worked well. In this test we had to rely on reports received from worked stations, but all were unanimous in their reports. There was no distortion or change in quality but a decided increase in audio level. Back to the receive side, the new adjustable noise blanker did not come up to expectations. It was quite effective on car ignition noise but had little effect on other forms of noise. Increasing the blanking level did not distort the signals to any great extent but it did introduce some cross modulation on busy and crowded bands. Cross modulation and overloading under normal conditions were totally absent. Even listening to another transmitter in the same shack did not cause any noticeable overload. VOX operation was smooth and easy, although I felt a little extra delay would be worth while. Relays are reasonably quiet. CW operation with VOX was good. With a short delay time set it was possible to approach full break in operation.

The tone control is a simple top cut type, and a useful amount of high frequency attenuation is provided. With all the other bandpass shaping circuits in the receiver many might question its inclusion. However it works — its use I leave to you.

OPTIONAL ACCESSORIES

All of the accessories offered for use with the 830 are common with the 530, with the exception of the DC power inverter. There is a digital VFO type VFO-230, antenna



Under chassis view.

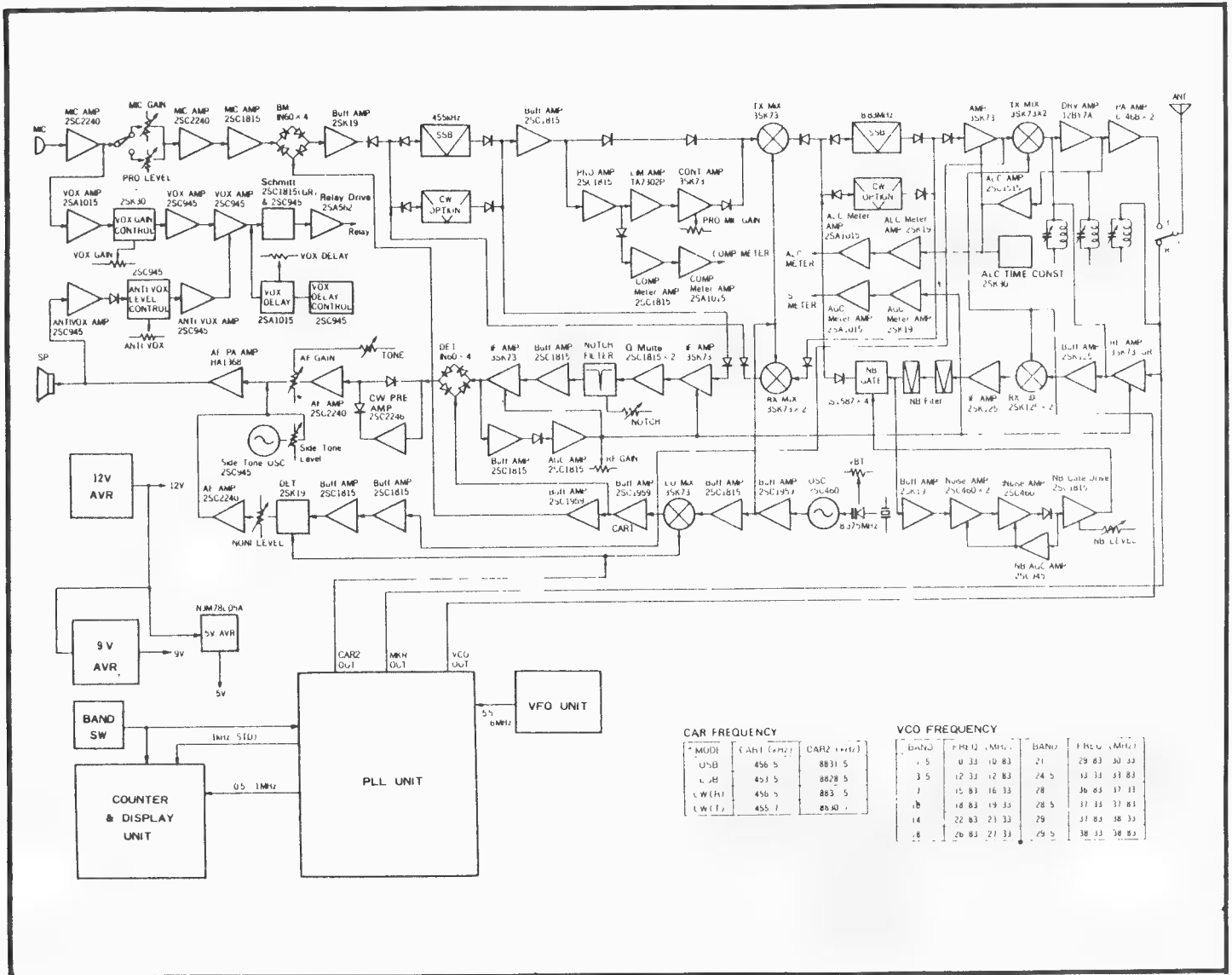
tuner type AT-230, and external speaker SP-230, which includes switchable audio filters. A linear amplifier, a range of hand- or desk microphones and matching headphones are also offered. As with the 530S, a microphone is not included in the purchase price, but either high or low impedance types can be used.

INSTRUCTION BOOK

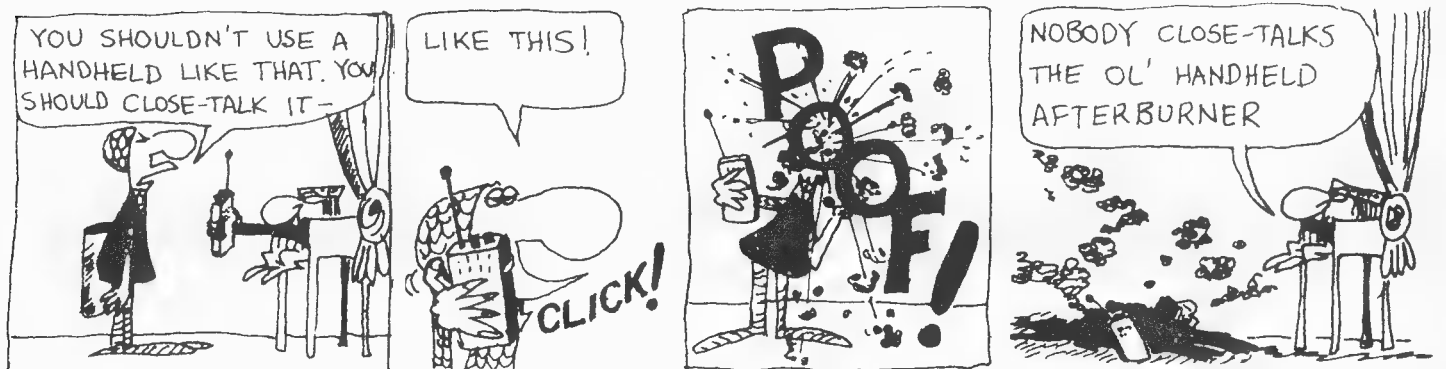
In my review of the TS-530 I noted that the instruction book was typical Kenwood. So is the one for the 830. I feel that it should not be too hard to include a circuit description section at least. Perhaps today's breed of amateurs aren't interested in how their set works just so long as it

does. But if it is considered necessary to print basic alignment details surely it's necessary to know how the set works. Having said that, the basic operating instructions are well covered with easy to understand text and clear illustrations.

Transceiver supplied by Vicom International P/L, 57 City Rd., S. Melbourne. ■



TS 830 S block diagram.



From "The Propagator", October 1981