

EQUIPMENT REVIEW

The Kenwood TS-530 S HF Transceiver

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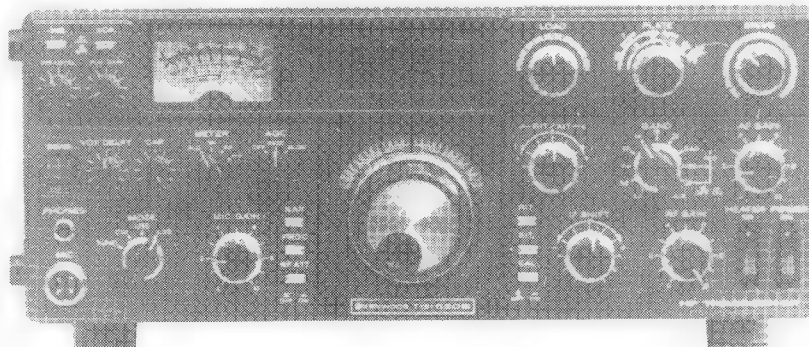
Several months ago when TRIO-KENWOOD COMMUNICATIONS announced their new TS-830S transceiver, they surprised many amateurs by reverting to a tube type final amplifier. They had after all brought out the TS-180S just a few months earlier and apart from the older TS-520S which was by now barely several years old, had made an almost complete change-over to fully solid state HF transceivers. Why then change back to tube finals? Perhaps the 180 did not achieve the popularity that KENWOOD expected and certainly it did have quite a few bugs. We did, in fact, obtain a TS-180 to review for AR but found that it had several problems. It was returned to the distributor and we were never offered another to complete our review. However, to contradict this, there is no denying the popularity of the TS-120/130 series. Their compact size appeals to many for both portable/mobile and base station use.

No doubt many amateurs are somewhat doubtful about solid state finals for normal home station use and perhaps many of them have had unfortunate experiences with them. Whatever the reason, Kenwood have seen fit to bring back the valve.

Before getting back to the TS-530S, a quick look at the TS-830S is in order to put the two transceivers into perspective. The 830 was hailed as a replacement for the successful TS-820S. Apart from the obvious additions to the front panel control functions, the circuit was changed from a single conversion design to a double conversion system with a 455 kHz second IF. The new TS-530S on the other hand has reverted to the 820 system of single conversion with a PLL system supplying the required heterodyning frequencies. We can therefore say that perhaps the new TS-530S is more closely related to the 820 than is the 830.

Before looking more closely at the 530 perhaps it should be pointed out that these transceivers are apparently in short supply, with most dealers being unable to supply. We were therefore pleased to receive the review sample from **Andrews Communications Systems** of Sydney, who assure us that they have plenty in stock.

Let's look at the main features of the TS-530S. In appearance it bears quite a similarity to all of the current Kenwood HF transceivers. It is the same size and general appearance as the 830 and both are slightly smaller than the earlier 820/520 series. The panel height has been reduced by 2.5 cm and the width by 1.5 cm.



A digital frequency readout is now fitted as standard as is the excellent IF shift system. The transceiver covers all bands from 160m to 10m, including all the new WARC bands. There is also an auxiliary band position to allow for any future expansion. The noise blanker now has a front panel level control and VOX gain and delay are also brought out to the front.

A new feature is the front panel selection of a narrow selectivity receive option. Four filters are offered. The 2.4 kHz SSB filter is fitted as standard. A 500 Hz or 270 Hz filter can be fitted to the CW filter position which is selected on switching to the CW mode. Then a third filter can be installed and selected with the "Narrow" button. This can be either a 1.8 kHz SSB or your choice of the two CW filters. This is indeed a very neat idea. Unfortunately the optional filters were not available for testing.

Some of the other features are:

A speech processor for the transmit audio.

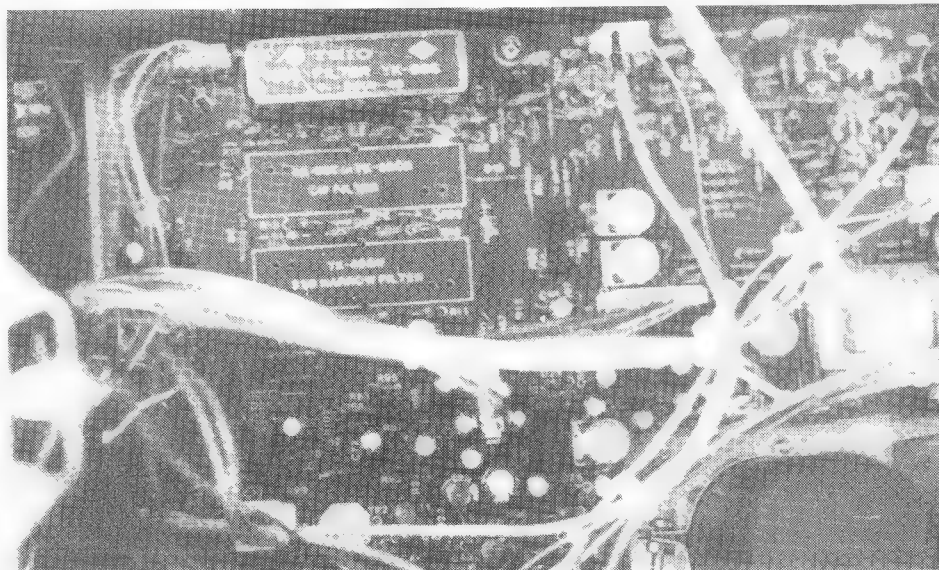
Selectable offset tuning for either transmit or receive, or both.

Selectable AGC for fast, slow or off.

A 25 kHz calibrator and an RF attenuator in the receiver front end.

The well illuminated and very legible meter can be switched for ALC, final cathode current, relative RF output, final high voltage and receiver S meter. One interesting aspect of the controls is that there are no concentric knobs, quite a boon for large fisted operators.

There is no provision for an optional DC power supply and in fact the AC line cord goes into the back of the set through a rubber grommet, the multi pin type connector for the AC cord has been eliminated. Other economy moves with the 530S are the elimination of a phone patch input and output connection. However, details on how the owner can install a patch input is described in the handbook and an audio output is provided via the remote connector socket. The main tuning dial has also been simplified and is calibrated at 10 kHz



Left hand front view, showing SSB filters and positions for optional filters.

intervals only. No doubt the inclusion of the digital readout with its accurate resolution has been the reason for this.

TS-530S CIRCUIT FEATURES

As mentioned earlier, the 530 has a single conversion circuit with the actual IF frequency centred on 8130 kHz. Looking at the receiver line up first, the RF stage is a 3SK73 dual gate Mosfet. This is followed by an FET buffer stage into the mixer, which is balanced using two FETs. The heart of the 530S is of course the PLL unit, which supplies all of the carrier and heterodyning frequencies. It is interesting that it is now possible to change modes, that is from USB to LSB, without changing frequency—a decided advantage. Likewise, changing bands does not produce any frequency change to the dial setting, only the MHz reading changes to suit the new band.

The transmit speech processor is an audio compressor which switches between the microphone preamp and the mic-gain control. At the same time as this is switched in, the ALC action is changed to give a very fast attack and decay time. I will comment on the effectiveness of this later. It seems that Kenwood designers have gone to quite a deal of trouble to reduce spurious responses on both receive and transmit. The 3SK73 Mosfet, as used in the receive RF stage, is also used throughout the IF section and all mixers are double balanced.

Unfortunately no RF negative feedback is applied across the transmitter final stage as in the TS-820 and TS-830 transceivers. It is also interesting that IM distortion does not rate a mention in the transmitter specifications. This is a pity as Kenwood certainly made much of the improved IMD in the TS-820 with their RF negative feedback. However, as we shall later see, the 530 is still a relatively clean transmitter in this regard.

THE TS-530S ON AIR

It must be said straight off that the 530 is a delightful transceiver to use. If you are used to using a fully solid state transceiver you might disagree with this, but I for one still find satisfaction in peaking up a final stage for maximum output.

The first test was the VFO. To check for drift, the 530 was placed out on the back patio for an hour or so to cool it down. Outside temperature was about 8.5 degrees C. Bringing it inside (about 18 degrees C), switching on and running for one hour, the total drift did not exceed 100 Hz. This must rate as excellent. Next the dial linearity was checked. I have yet to find a Kenwood VFO with spot on linearity, and this was no exception. Indexed at the first calibration point the dial readout varied by an estimated 2 kHz at the 100 kHz points. Of course it must be admitted that the digital readout was spot on, so perhaps this is an academic point. Incidentally, there is no way to actually set the dial scale to frequency. The tuning knob is graduated with 1 kHz marks, but I would find it hard to

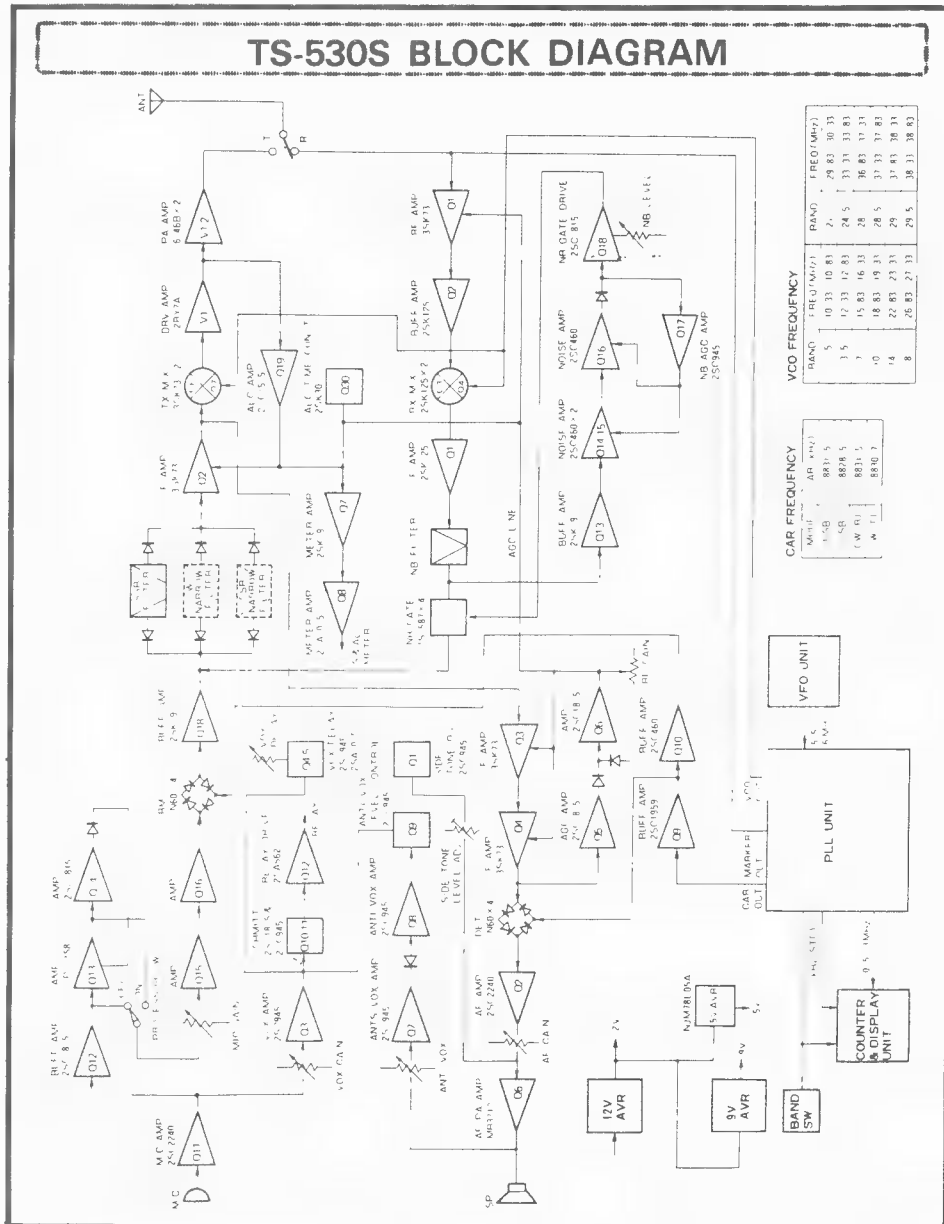
believe that anyone would use this. Tuning rate was one turn of the knob for 25 kHz, a little faster than many current transceivers. The TS-820, for instance, is one turn per 20 kHz. Illumination for the dial and S meter is in a soft cream colour. The digital display is blue and the figures are slightly larger than the TS-820 display.

The IF shift control was quite effective. Its ability to reject interference is limited to high frequency heterodynes mainly above about 1.5 kHz, it was however possible to pull through many signals that would have otherwise been unreadable. The noise blander proved to be only fair in its operation. The blanking on household noises from cake mixers, fluorescent lamps, etc., was almost non-existent. Car ignition noise suppression was better but advancing the blanking control produced large amounts of distortion. There was no affect on the Woodpecker at all.

General receiver performance was excellent, sensitivity was as good or better than

anything I had in the shack at the time of testing. AGC action was smooth but the S meter was rather lightly damped and gave a rather odd wriggle when reaching maximum on signals of about S8 or more. Strong signal handling ability of the 530S is excellent. We were unable to find a situation where the RF attenuator was required.

The transmitter was tuned up for maximum output on each band. There is no output on the new WARC bands. As stated in the handbook, a diode has been installed to inhibit transmission on these bands, however instructions are given on how to remove this. As the transceiver had to be returned after our test, this was not done. Output on 160, 80, 40, 20, 15 and 10 in the CW mode was measured at 150, 155, 125, 115, 105 and 100 watts. PEP output on SSB was essentially the same. However, when the speech processor was switched in, the PEP output dropped by about 5 per cent. In normal use, though, the pro-



cessor was quite effective but not up to the better RF clipper units.

The next test was to determine the amount of intermodulation distortion, commonly called splatter. This was done by working a station several kilometres away, which measured the strength of the distortion in relation to the wanted signal simply by swapping to the opposite sideband on the 530S. We then repeated the test using the TS-820 and got essentially the same figure. The actual ratio was $S_9 + 20$ dB for the wanted signal and about S_3 for the distortion products. The transmitted audio quality was rated as clean and smooth and probably more dependent on the microphone in use than the transceiver itself. We used a Kenwood MC-35S and a Shure 444, both with good results. VOX operation was smooth with just a small amount of clipping on the first part of the first word. While testing the VOX with a friend on air we got into a discussion on why VOX is, in general, not used. As a wise man once said, "Anyone can push the button on PTT microphone, but it takes an expert to let it go". Well maybe, but it is unfortunate that more don't use VOX. The transmit relay operation is relatively quiet.

The RIT, which operates on both transmit or receive, covers a range of plus/minus 2 kHz. Why, you ask, do we need offset on transmit? You are operating on 20m, working a weak DX station. You have the RIT on to help pull him out of the QRM. A strong signal comes up one or two kHz of frequency and asks if the frequency is in use. A quick push of the transmit offset button puts you on his frequency for your answer—very handy. RIT and XIT operation is signalled by individual LED indicators above the offset control.

Talking about indicators, above the digital display are four LED status lights to show operation of the speech processor, VFO on, calibrator on and RF attenuator on.

OPTIONAL ACCESSORIES

In addition to the filters mentioned previously, the following equipment is available to go with your TS-530S.

Two external VFOs. VFO 230 with digital display and five memories. VFO 240 standard external VFO with analog dial. AT-230 antenna tuner, which includes an RF power/SWR meter and antenna selector switch. SP-230 external speaker with built-in audio filters.

Other Kenwood equipment, such as linear amplifier, head phones, phone patch, etc., are compatible with the 530S.

It should be noted that a microphone is not included with the transceiver, but any of the Kenwood hand or desk microphones are suitable.

INSTRUCTION BOOK

A typical Kenwood instruction book with good operating information which is well illustrated. It covers all that most operators will require. On the technical side there is no description of the transceiver apart from a block diagram. Servicing is covered with basic alignment data plus individual circuits of the main printed boards and the overall interboard wiring.

Kenwood usually produce excellent workshop manuals for their transceivers and I look forward to seeing the one for the 530S.

CONCLUSIONS

At the advertised price of \$779 from Andrews Communications and their dealers (see current advertisement in this issue), the 530S represents excellent value for money. If you take any of the current fully solid state transceivers and add a matching power supply you will finish up at a higher price. I predict the unit will be a top seller.