



EQUIPMENT REVIEW

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THE KENWOOD TR-7950 TWO METRE FM TRANSCEIVER

The first two metre FM transceiver reviewed in 'Amateur Radio' was the Kenwood TR-7200 back in September 1975. I was so impressed with that transceiver that I bought one and it is still in current use as a mobile rig. I might also mention that it has given no trouble of any kind over the years. Whether or not I replace the old 7200 with this new TR-7950 remains to be seen but I am even more impressed with the performance and general capability of the new Kenwood than I was at the time with the old one.

THE TR-7950 DESIGN FEATURES

With a forty five watt output capability, the 7950 is somewhat larger than other current model FM mobile transceivers. It is however both lighter and more compact than the old original TR-7200 mentioned above. Overall measurements are 175 mm wide, 64 mm high and 220 mm deep. Weight is 1.8 kg. Output power is selectable for either 45 or 5 watts. But perhaps the most interesting part is the method of frequency selection and memory storage. Where in the past, most synthesised two metre transceivers used a tuning system with perhaps five or ten kHz steps and then a memory capability to back this up, the 7950 is perhaps the reverse of this. What appears to be the main tuning knob is, in fact, the memory selector with these frequencies being initially set up using the keyboard. If a frequency other than one chosen for memory operation is required then this can also be selected with the keyboard. In addition to this there are comprehensive scanning facilities for both the memories and general band scanning.

The twenty one memories can be programmed for either duplex with plus 600 kHz, duplex minus 600 kHz or for simplex operation. Once this has been initially selected and entered into the memory it is not necessary to select the repeater offset or simplex operation. Regardless of the offset chosen for repeater operation, a front panel button will give reverse repeater operation.

The frequency read out and memory channel indicator is a large and brightly illuminated liquid crystal display which is highly readable under all external lighting conditions. This same readout also shows if a + or - repeater offset is in operation or if simplex or scan modes have been chosen. While not applicable to Australia as yet, the keyboard will also act as a dialer for auto patch (telephone dialling through a suitable repeater). As each function is entered into the keyboard, a beeper indicates that the

processor has actually received the command.

When the 7950 is in operation, the front panel appearance is most impressive. The LCD readout is rear illuminated with a soft green glow. There is a LED strip indicator for receiver S meter and transmitter power output, with LED indicators for reverse operation, priority channel operation and centre tuning. The key board is illuminated from above with a green strip light and the memory selector knob has a green illuminated surround when the memory facility is in operation.

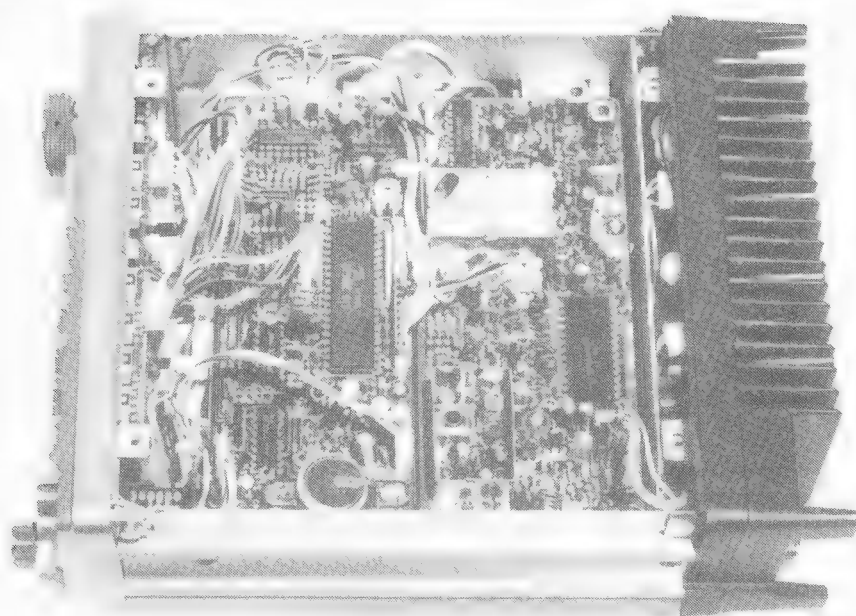
Once a memory has been entered, it is there on a permanent basis. The microprocessor is powered from a lithium battery

for which Kenwood claim a five-year life. This means that should the power supply be turned off as would normally happen with home station use, all memories are retained and the frequency last in use will reappear when switched on again.

The TR-7950 is supplied with an excellent mobile mounting bracket and a hand held microphone with up/down scan buttons incorporated.

One thing that is required if you intend to operate from home, is a good ten amp power supply. Current drain with 45 watts output is rated at 9.5 amps and, as we shall later see, is in fact a little higher than this. A matching power supply is available from Kenwood, the KPS-12 which has a rating of





Underside View

10 amps continuous and 12 amps peak output. The Kenwood PS-30 is also very suitable.

THE TR-7950 TECHNICAL DESCRIPTION

Unfortunately, apart from the circuit diagram, no description of circuit operation is included in the instruction manual. However it would appear that the circuit is fairly conventional with a double conversion set up using 455 kHz and 10.695 MHz. High SWR protection is provided for the transmitter final transistors, and the output power is gradually reduced as the SWR increases. Frequency selection, memory control and all the other ingenious functions are controlled by a four bit micro-processor which in turn controls the PLL circuitry of the transceiver. Kenwood claim superior performance resulting from "The most advanced KENWOOD engineering technology". As we shall later see, they have a point.

THE TR-7950 ON THE AIR

As mentioned earlier a good solid power supply is needed to power the 7950. If you already have a fully solid state HF transceiver, then you possibly have a suitable power supply to share between the two. Otherwise you should have a supply capable of delivering 13.8 volts at 10 amps or more with good regulation. For receive only, current drain is about 600 to 700 mA. The receiver volume and squelch controls are concentrically mounted on the left hand side of the front panel. The power on/off switch is combined with the volume. My old 7200 had a push on/push off power switch which was most convenient. One could leave the audio output level set. The new Kenwood has reverted to the old style rotary on/off/volume setup. Not so good.

The first thing to do with the transceiver operating is to programme the memories.

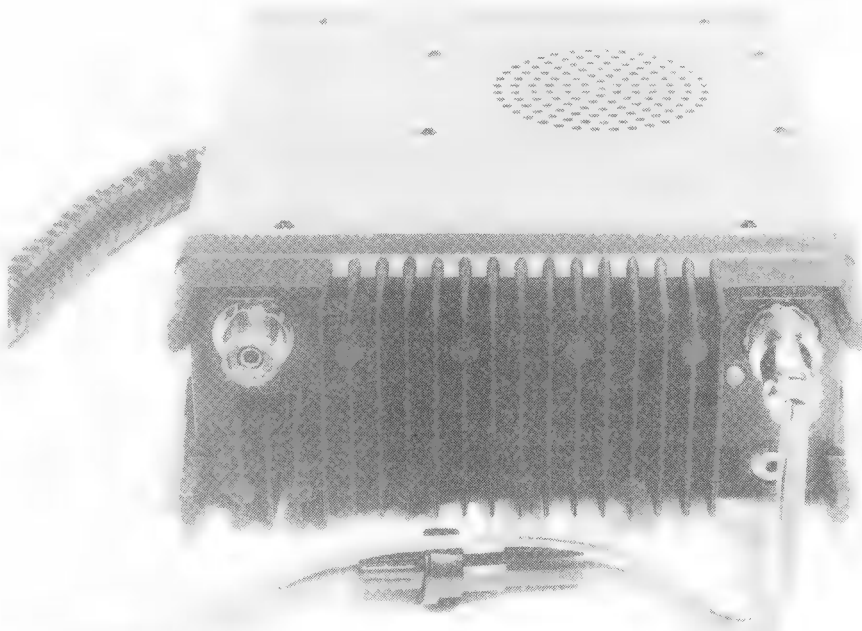
They are set up on the keyboard and then entered by selecting the required memory channel and then simply pushing the 'M' button. It should be noted that while there are twenty one memory channels, four of these are paired to use for non standard repeater offsets. In practice this means that for simplex operation, the same frequency has to be entered into each of the two channels or four repeater use, the input frequency is entered into one channel and the output into the other. In other words there are only nineteen usable memory channels.

One of the nice features of many of the

new FM transceivers is the priority channel alert. With the TR-7950 any one of the memory channels can be selected as the priority channel. The priority is then automatically checked every five seconds and if a signal appears a double 'beep' is emitted from the speaker. It is then only necessary to push the priority 'OPER' button to give immediate operation on the priority channel.

With around 140 watts going into the transceiver (13.8 V at nearly 10 amps) it's not surprising that things get hot. After a two minute over (some people talk even longer) the heat sink at the rear for the final amplifier gets rather hot. I did not use the transceiver mobile but used in a hot car during some of the days we have had in Melbourne over the last few months, you would need to be careful in positioning the transceiver. Sitting it on a vinyl seat, for instance, could be dangerous. As I do not have a suitable signal generator to check actual receiver sensitivity, I always do a side by side comparison with my normal shack two metre transceiver. I have yet to find a transceiver that displays any noticeable improvement in receiving ability — until now. The TR-7950 was able to produce intelligible copy from signals that were not copyable on my transceiver. Noise limiting also appeared to be first rate and well ahead of most. Perhaps the only criticism on the receive side is that the 'S' meter (LED type) is so generous as to be quite useless in giving meaningful reports. So long as the signal was audible the indicator showed S9 or more. It looks pretty, but give me a proper meter any day.

The operation of the scanning system is quite remarkable. One could spend hours just playing with this function alone. You have several choices. A band of frequencies can be scanned, the upper and lower limits



Rear View

can be chosen and entered via the keyboard. When the transceiver senses a busy channel, scanning will stop and hold on that signal for either five seconds or until such time as the channel becomes vacant. Normal pauses between overs will not allow scanning to resume. These two scan methods are selectable with a front panel control. Memories can be scanned in a similar manner but now with the addition of the priority system mentioned earlier.

On air reports of transmitted audio were all satisfactory. I listened to the rig when operated by a friend and found the quality to be clean but with a slight high frequency peak that caused known voices to sound slightly unnatural. As quality is a subjective thing, others may not agree with this.

Received audio quality was rated better than average for home station use, however the top mounted speaker is unsuitable for under dash mobile installation and an external speaker would be an essential mobile operation. Audio output power is rated at two watts and although not actually checked, sounded loud and clear during our subjective tests.

Transmitter power output was checked on our YP-150 dummy load watt meter and

with exactly 13.8 volts applied to the transceiver, 48 watts was measured in the high power setting and the rated 5 watts in the low power position. As reported earlier the current drain with full power output was 10 amps.

Finally a comment on the scanning system. One of the problems with most scanning transceivers is that the scanning tends to stop as soon as a signal opens the squelch. In the case of a strong signal this might be five or ten kilohertz off turn with resulting noise and distortion. Not so with the TR-7950. The scanner will not stop until the discriminator senses centre signal. A nice touch. At this same point the centre tune LED will light.

THE TR-7950 INSTRUCTION MANUAL

It seems that as the quality and performance of equipment improves, the instruction manuals that accompany them go in the opposite direction. There are a few notable exceptions to this but unfortunately the Kenwood TR-7950 is not one of them. A total of only sixteen pages plus block and schematic diagrams cover the whole thing. There is not a word of alignment, circuit description and main-

tenance of any time. Having said that, the actual operating instructions are well covered and in general easy to follow.

However, I do believe that a \$500 (approx) transceiver deserves something better than this. How about it Kenwood?

CONCLUSION

If you are in the market for an FM only two metre transceiver with better than normal performance on both transmit and receive then the Kenwood TR-7950 must rate top consideration. I guess it's the old story, pay a little more and get a little more. As far as I can see it out performs the opposition by a very noticeable margin. On the other side, it is also larger than most of its opponents and along with the top mounted speaker, could pose some problems mounting it in a car.

General quality of construction is very good and all the controls operate in a smooth and satisfying manner. The Kenwood TR-7950 is highly recommended.

Our review transceiver was supplied by KENWOOD (AUSTRALIA) through their Melbourne agents, Eastern Communications.

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EVALUATION AND ON AIR TEST OF THE KENWOOD TR-7950

CATEGORY	RATING	COMMENTS
APPEARANCE		
Packaging	**	Carton with foam inserts.
Size	***	Relative to output capability, very good.
Weight	****	Only 1.9 kg.
External Finish	***	Good quality paint. No rough edges.
Construction quality	***	Very hard to fault.
FRONT PANEL		
Location of controls	***	Simplified controls well laid out.
Size of knobs	***	All knobs and buttons easy to use.
Labelling	**	Quite satisfactory.
Meter	**	LED type. Colourful but not accurate.
VFO knob	NA	No actual VFO.
Memory knob	****	Large with smooth click stop action.
Keyboard	***	With practice easy to use.
Dial readout		
Digital	****	Very readable under all conditions.
Status indicators	***	On air, priority, reverse and centre tuning.
REAR PANEL	**	Limited facilities easy to get at.
Receiver Operation		
VFO stability	***	
Memories	****	Number and selection best yet.
Sensitivity	****	On comparative test, the best yet found.
Noise rejection	****	High noise rejection.
Squelch action	***	Progressive action.
'S' meter	**	Of limited use. All signals S9.
Signal handling	****	No problems with adjacent channel signals.
Spurious responses	****	None heard.
QUALITY OF RECEIVED AUDIO		
Internal speaker	**	Quality of audio good. But placement poor for mobile operation.
External speaker	NA	External mobile speaker offered as option but not tested.
Headphone output	NA	No provision for headphones.
TRANSMIT OPERATION		
Power output	****	48 watts. Enough for all occasions.
Audio response	***	Clean with slightly peaky HF response.
Metering	***	LED meter gives clear output indication.
Cooling	***	Would need watching while mobile in hot weather.

Rating code: Poor * Satisfactory ** Very Good *** Excellent ****