

# EQUIPMENT REVIEW - THE KENWOOD TM-231A 2m FM TRANSCEIVER

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"GAALANUNGAH" 24 SUGARLOAF RD BEACONSFIELD UPPER

It's been quite a while since we reviewed a full-featured two-metre mobile transceiver, and it seems that there is always something of a shock when they arrive. The first impression is that they just cannot put out the amount of power that they do for the amount of space they take up. The 50-Watt output transceivers are now smaller than the 25-Watt rigs of only a few years ago.

Having said that, let's look more closely at the transceiver in question. The TM231A is an FM only transceiver, which covers the two-metre band from 144 to 148 MHz. Maximum power output is rated at 50 Watts, with selectable lower power of either 10 or 5 Watts. The overall size is 140mm wide, 40mm high and 160mm deep. Overall weight is just 1.2kg. The transceiver is supplied with a mobile mounting bracket, a DC power cable a little over two metres in length, and fitted with a two-pin automotive connector and three fuses. Yes, you did read that correctly, there are two in the positive lead and one in the negative lead. The supplied microphone has, in addition to the now usual up/down buttons, four buttons on the front to select the call channel, VFO operation, memory operation and a programmable function key which I cover later in the review. There is also the usual PTT button on the side and a lock switch on the rear. All in all, the microphone is a rather unusual looking device; however, it does perform its primary function very well.

The rather small front panel contains a total of 14 controls, many of which have two selectable functions, but most of the area is taken up with a very clear LCD multi-purpose display. This shows fre-

quency, memory channel, offset, relative power output, receive "S" meter, on-air indicator, control lock, reverse operation, priority alert function, low or medium power selection, plus several other status indications. Most of these are of reasonable size for fixed station operation, but you might have trouble picking them up while mobile. The display is well illuminated in a cream colour, as are the three control knobs and the three buttons above the VFO/memory selector knob. The six small buttons under the main display have a tiny illuminated dot on them to give you a better chance of hitting them at night. The whole effect is quite attractive.

As the photos show, most of the overall size is taken up with the heat sink, and, as we will later see, this is all needed. In order to provide more heat sink area, the SO-239 RF output connector is on a flying lead about 20cm long. Apart from the DC power cord, the only other connector on the back panel is for an external speaker. The built-in speaker is mounted inside the top cover of the transceiver, which might be either good or bad depending on how you wish to mount the rig in the car. Perhaps it might have been better if Kenwood had stuck to the earlier idea of not putting a speaker into the rig, but providing an external unit instead. I would suggest that in most mobile situations an external speaker would be very worthwhile.

The mobile mounting bracket is of a new simplified design and allows for three different mounting angles. Special screws clamp the transceiver to the bracket, and a wrench is supplied to tighten them.

As might be expected, memory and

scanning facilities are included. There are 20 memory channels.

When in the VFO mode, tuning steps are selectable. You can set up 5, 10, 12.5, 15, 20 or 25 kHz steps, and, of course, the 25kHz is ideal for our band plan, and allows easy stepping up and down the FM portion of the band.

## The TM231A on the Air

At the outset, I would suggest that if the transceiver is to be used primarily for mobile operation, you will save a lot of time and confusion by programming up the memories you need and sticking to them. A quick glance at the display to determine the operating frequency is probably about all the time you can safely take your eyes off the road. However, for base station use, you can let your head go and push the buttons to your heart's content.

Right, back to the beginning. First thing I did was to program the VFO for 25kHz steps. This makes it easy to zip up and down the band and also saves the embarrassment of landing on a non-standard channel and perhaps causing interference. But again, I am getting ahead of things. One of the nice features is the power on/off switch. No more turning up and down the audio volume control, there is a separate push button right in the top right-hand corner — very easy to find. This is one of the best I have seen and, of course, allows the audio to be preset at the right volume.

Talking about the volume, audio output appeared to be reasonable using the internal speaker, but again I would like

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to make a point. If it's easy to provide 50 Watts of RF output, why is it so hard to provide more than a couple of Watts audio output? I think the time has come when we should have at least 10 Watts of UNDISTORTED output. WHY NOT! By the way, this also applies to base station transceivers. Received audio quality was also acceptable, but a good sized external speaker is really required to make the most of the very good audio that the rig can produce.

I set the transceiver up on the desk alongside my old Kenwood TR-7950, both coupled to my antenna through a two-position coax switch. Both of these transceivers have roughly the same specifications, but are about six years apart in manufacture. The most noticeable difference is that the TM231A is about half the overall size. One wonders what might happen over the next six years. Actually, I couldn't pick much difference between the two. The sensitivity of the new TM231A measured just one dB better.

Transmitted audio from the TM231A was rated as excellent with the supplied microphone and broadcast quality when I connected my MC-60A desk mic.

Getting on top of the operating procedures might take you a while, but the instruction book describes everything very well. Let's go through some of the excellent facilities.

The 20 memory channels are arranged so they can be programmed in a variety of ways. First, channel one can be used to store the frequency for the priority alert function.

Channels 15 and 16 can be used to store the lower and upper limit frequencies for the programmable band scan function, and channels 17 to 20 can be used to store repeater frequencies with odd splits. I don't know of any of these, mind you, but if you do come across any you won't be left out in the cold.

Scanning of the memory channels is available in several modes. Firstly, the scan may be carrier operated, or you can set up a time-operated scan. Let me explain the difference. If you just want to check for activity around either programmed memories or the whole band, the timed scan will stop for about five seconds then carry on to the next busy channel. With the carrier-operated scan, the transceiver will pause until the station you are listening to actually stops transmitting. Next, if one of the local repeaters is full of rubbish (and that's a likely situation), it's possible to lock that channel out of the scan and then quickly re-instate it later if required.

Several interesting options are offered with the TM231A. Unfortunately, none

was included with our review transceiver. However, let's run through them, and hope that one day we might be able to obtain some from Kenwood and review them separately. Unfortunately, not a lot of information is supplied about them in the instruction book.

First, three external loudspeakers are available. Two, the SP-41 and the SP-

50B, are for mobile use, and the SP-430 for base station use. The SP-430 is, of course, the matching speaker for the TS-430/440 HF transceivers. A total of six different microphones is available for either mobile or base station use, plus RC-10 remote controller. This intriguing device allows full remote control of the TM231A with the rig placed perhaps



*The Kenwood TM 231 A – Although not normally a "hand held" transceiver, this shows how compact the unit really is.*



*TM 231 A Microphone – Note remote control button and 'Mic' input hole above.*



The TM 231 A – Note the large LCD multi purpose read out.

under the seat or in the glove box.

Another option I would like to try out is the DRU-1 digital recording unit. This enables you to pre-record and then re-play up to eight short calls. It also is capable of recording incoming messages, and if used in conjunction with CTCSS (also an option), you could arrange for a friend to leave a short message even if you are not in the shack.

## The TM231A on Test

First of all, the transceiver was connected to a 13.8-Volt DC power supply, and tests for power output and current drain were carried out. The following results were obtained.

	Power Output	Current Drain	% Efficiency
High	52 (Watts)	9.1 (Amps)	41
Medium	10 (Watts)	4.3 (Amps)	16.9
Low	5 (Watts)	3.1 (Amps)	11.8

Clearly, modern high-powered transceivers show greatest efficiency at high power output. If current drain is an important consideration, then you might be better off to look at one of the older transceivers that could typically put out 10 Watts at about two Amps drain, which offers over double the efficiency at 10 Watts.

Receiver current drain was 300MA with no audio output, peaking to 500MA at full audio output. I imagine that most of this was caused by the dial lights.

With this sort of power input and output on transmit, you might imagine that the heat sink gets rather hot after a long over. It does!

Next, I checked out the receiver. First audio power output and distortion. The receiver output was terminated with both four Ohms and the specified eight Ohms. At eight Ohms, the maximum was 3.6 Watts with just on 12 per cent distortion. At 4 Ohms, the maximum output improved to 4.6 Watts with distortion at 10 per cent. The actual discriminator distortion is very good at only one per cent measured at 1kHz with 3kHz deviation.

Receiver sensitivity was next checked and found to be somewhat better than specification. SINAD was measured at 12dB for an input of .12uV, specified at 12dB for .16uV.

Lastly, the "S" meter calibration was checked. The "S" meter consists of a series of bars on the LCD display. There are 10 up to the S9 mark and four slightly larger bars for S9+. Overall, the bars are slightly larger than many current transceivers and, therefore, easier to read at a reasonable distance.

The "S" meter calibration is as follows

(in Microvolts):				
S3	S5	S7	S9	S9+
0.56	1.6	2.2	3.2	5.7

## The TM231A Instruction Manual.

Well, at least you can brush up on your Spanish, French, German, Dutch and sundry other European languages while you study the English section. Two hundred and twentyseven pages of instruction manual actually finish up with

about 43 pages of readable material. What there is, is well written, with clear instructions on how to master the operating system. As is, unfortunately, the norm these days, there is no technical information included, apart from two circuit diagrams. There is one for the TM231A/E and one for the TM531A/E, which is the 1200MHz version.

I find it unfortunate that not even basic adjustment information on, say, the microphone gain or deviation setting is included. After all, we don't all speak at the same level. Actually, as far as I can see, there is no microphone gain control, only a deviation preset.

However, I imagine that Kenwood will have a service manual available, and I would suggest that new owners might consider purchasing one.

## The TM231A Conclusions

There is no doubt that the TM231A is an excellent little transceiver. It does everything that can be expected of it and does it very well. And, of course, it has that extra that comes with all Kenwood transceivers — Kenwood audio quality on both transmit and receive. At its present price, the TM-231A is one of the best-value two-metre transceivers on the market. My thanks to Kenwood Electronics Australia for the loan of the review transceiver. **ar**

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