TRIO TM2550E 2m FM mobile transceiver

This rig is designed with a very different concept to the average FM mobile that has been marketed so far, with very few exceptions. Frequency entry is either with direct entry of four numbers on a 4 × 4 keyboard matrix from 23 memories, or by using up/down scanning controls, as available on the supplied mic (only with 5kHz steps, unfortunately).

The rig is rated at 40W output, but there is a low power button which reduces this to just over 4W. Rather uniquely, repeater shift comes in automatically if you tune or enter between 145.6 and 145.845MHz, a negative shift being built in here. A reverse repeater button is provided, however, together with a 1750Hz toneburst on/off facility.

Memories

Four of the memories can have split frequencies put in them for Tx/Rx. Scanning can either be achieved via the mic or by pushing a button on the rig itself, and you can scan up or down the whole band or between pre-determined limits in special memories. Priority channel monitoring is provided, and you can select any of the memories to become the priority channel. The new Trio digitial channel link (DCL) system is incorporated, allowing identification of your station callsign at the beginning and end of each transmission, when enabled. This system also offers many other facilities, including semi-automatic QSY and automatic operation with appropriate additional options.

Front panel facilities

Other front panel facilities include: frequency lock; memory/direct entry for frequency; offset variations, including user change of auto-repeater shift frequencies; a click step rotary knob for selecting memory channel (not a VFO though); optional speech frequency read-out enable; and a lamp dim/bright adjustment button.

The front panel digital read-out includes all the basic status indications, and the S-meter display is in the form of vertical double bars indicating between S1 and S9, although there are three unlabled levels above the latter. The S-meter, however, only had 9dB between S1 and 9, the higher levels only requiring a dB or two more RF to light them up.

Mic socket

The mic socket has eight pins wired to the standard Trio convention, but only the audio, PTT and up/down facilities are connected to the socket, as well as an HT line for operating mics such as the Trio MC85. As well as a large heatsink on the back panel there is an SO239 socket for the antenna, and a 3.5mm jack socket for use with an external speaker. Captive 13V dc leads are terminated in a special dc socket, the positive line being fused and an extension lead with the appropriate dc plug also being provided, together with a mobile mounting bracket. The loudspeaker is mounted in the top of the case, but this position could be slightly awkward in some mobile applications, although it is fine for us in the shack.

Subjective tests

As supplied the rig was very slightly off the correct received frequency, and the sensitivity was thus slightly poorer than that of other modern sets (see lab tests). Unfortunately, there is no provision for using the set for 12.5kHz channelling, but when I tuned to a main 25kHz channel, no breakthrough was audible from an adjacent 12.5kHz channel QSO. The received quality was good, and the transmission quality was up to the usual high Trio standard.

I personally found that the absence of a tuning knob was irritating, especially when I only wanted to QSY up and down one simplex or duplex channel and the only practical method for this was to use five button pushes per channel on the mic. You can, of course, rapidly enter a new frequency by punching in four digits, but surely this is not so simple when you are driving your car!

You will find the large number of memory channels very useful, so you could use these for storing all the repeaters and a few of the more usual simplex channels. The high power of 40W is extremely useful, for it means that you should easily be able to access any repeater that you can hear, and it will also give you that extra bit of help when you are mobile. However, band usage being somewhat intense in the larger urban areas, you should go to lower power whenever you can, enabling others to use the same channel some distance away from you.

Laboratory tests

The RF sensitivity was just adequate when originally measured, but after we had offset the signal generator by 1.4kHz, there was an improvement of some 2dB in the sinad rating, showing that potentially the rig was quite good.

Lowe Electronics informed me that an internal preset, L17, was obviously misset and its adjustment would have been comparatively simple and would have allowed the optimum performance to be right on channel. At the very top end of the band, the sensitivity was around 1dB poorer.

The RF input intercept point measured quite well for an FM mobile but there have been a few rigs that have measured better, although this rig's performance should be quite adequate. Selectivity was excellent, and quite a lot tighter than that of many other rigs. The S-meter

range was so limited that many signals will be either at the bottom, or over the top, although it was quite easy to see at a glance. The received audio response plot showed a very steep roll-off below 400Hz, and frequencies above 2.5kHz rolled off quite rapidly.

Distortion measurements

The distortion measurements were not particularly good, but I am sure they would have been better if the rig had been on channel; a quick shift of the signal generator by 1.4kHz showing a clear audible improvement at 3kHz deviation. There was plenty of audio power available, both from the internal speaker and into an external one, especially into 4 ohms, and this could be useful if you have a noisy car.

Even though the receive dc current drawn was fairly low, the Tx maximum current is, of course, very high for a mobile VHF rig. The transmitted frequency accuracy proved to be only 90Hz low, which is one of the most accurately set rigs that I have noted recently. Transmitted maximum deviation was also very accurately set at 5kHz, but this may be too high if and when we all change over to 12.5kHz channelling and we have more channels.

The transmitted response was quite normal; I noted just about the right amount of mic amp gain. This allowed quite heavy deviation, but it was not badly clipped when I was talking into the mic from around 5cm back. The toneburst frequency was within 1Hz accuracy and its deviation was about right.

I had a deep look on the analyser for RF harmonics but could not spot any trace of them, the noise floor having been set at −65dBc. I then spent some time searching for sprogs either side of the 2m band, looking ± up to 25MHz for them, but despite the fact that we got down to a noise floor of around −80dB, we could not detect a trace of any.

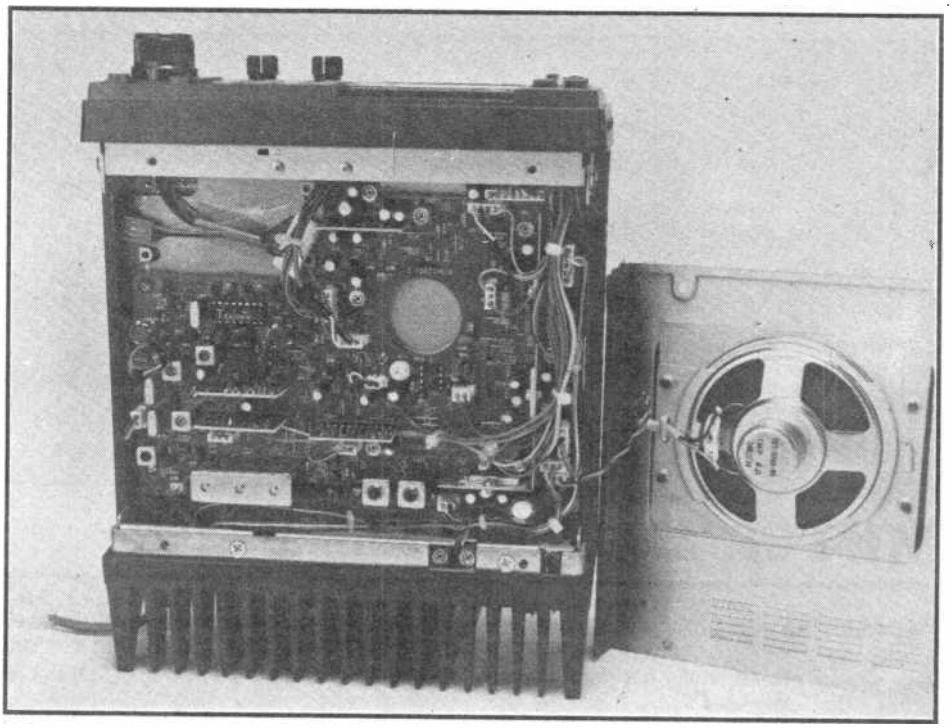
Conclusion

Although this rig performed very well in general, apart from the slight received frequency error, I do not think it is likely to become all that popular in the UK as quite a number of its potential facilities are quite obviously primarily designed for use in the United States. I found it awkward to use at times, and quite frankly I prefer other Trio models and alternatives from both Yaesu and Icom. Nevertheless, it may be of interest to quite a few readers who like to access a required frequency very quickly. Not really a recommended rig, unfortunately, but nevertheless an interesting one.

I would like to thank Lowe Electronics for the loan of the review sample, and Jeff Ginn for helping with all the measurements.

Reference

Lowe Electronics
Chesterfield Road, Mattock,
Derbyshire DE4 5LE.
Tel: (0629) 2817, 2430, 4057.



TRIO TM2550E Laboratory Test Results

Receiver tests

Rx sensitivity RF level for 12dB sinad		
144 – 145MHz	−122dBm	
145.975MHz	−121dBm	
Sensitivity improvement with generator offset by 1.2kHz		145.95MHz
RF input intercept point		−13.5dBm
Selectivity 12.5kHz channels, wanted and unwanted channels modulated		+19dB average
Selectivity 25kHz channels, wanted and unwanted channels modulated		+75dB average
S-meter		
S1	−110dBm (0.7μV)	
S5	−105dBm (1.25μV)	
S9	−101dBm (2μV)	
Capture ratio	4.7dB	
3dB limiting point	−126dBm	
Quieting at 12dB sinad point		20dB (nb slight frequency error)
Discriminator distortion		
1kHz deviation	2.1%	
3kHz deviation	3.6%	
5kHz deviation	2.9%	
Audio output power for 10% THD		
8 ohms	2.7W	
4 ohms	4.5W	

Transmitter tests

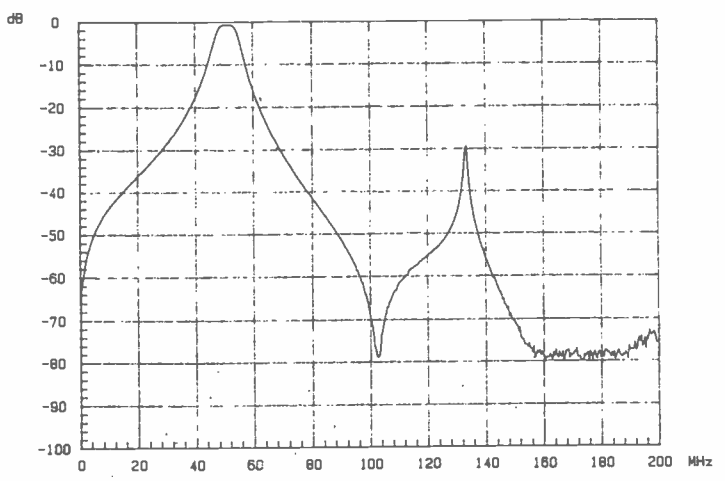
RF output power high/low	38/4.3W
Max FM deviation into clipping	5kHz
Typical speech deviation	4kHz
Toneburst frequency	1750Hz ±1Hz
Toneburst deviation	3.9kHz
Tx frequency accuracy	−90Hz
RF harmonics	below −65dBc
RF spurii	below −75dBc
Max dc current drawn on Tx	6.8A, 2.4A low power
Rx current	290mA

MUTEK LBPF50u Bandpass filter

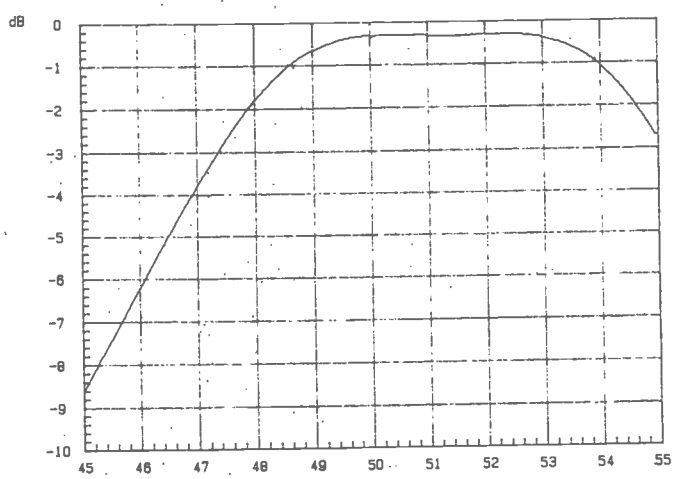
Hard on the heels of the launch of the BNOS low-pass filter, is this new muTek one which offers some distinct advantages. Not only does it attenuate the second and third harmonics of the 50MHz band at 100 and 150MHz respectively by at least 70dB, but its bandpass characteristic gives considerable attenuation to frequencies below 30MHz. The filter is supplied in a well finished diecast box, fitted with 50 ohm BNC sockets at either end, and measures 100mm wide × 50mm deep × 25mm high, excluding sockets. It is rated to take up to 100W throughput and its SWR is specified at better than 1.25:1.

I was interested to see how its filter characteristics would measure up in practice, and the two frequency response plots taken broadband to show the complete bandpass characteristics and harmonic rejections, and the closer in plot to show the passband itself, indicate a superb performance. The attenuation at 50.2MHz is just 0.4dB, but note the attenuations by the 10m amateur band, and for the second and third harmonics.

I took a return loss curve with the filter feeding into a pure 50 ohm dummy load. This curve is very good and shows the filter to be quite satisfactory in our portion of the band. This test was done with extremely low power, but I thought it advisable to check the performance at a higher power level. Consequently I drove it from a Trio TS660 turned up to give about 15W. A Bird throughline watt meter with switchable power ranges showed only a miniscule amount of reverse power coming back from the filter and dummy load; considerably below 50mW.



Wide-band response. Resolution bandwidth 3kHz



Bandpass response showing lack of ripple. Resolution bandwidth 3kHz

Personal preference

There is one particularly important reason why I prefer the muTek product and recommend it over the BNOS one: my 50MHz Tonna beam is about 15ft above my TH6 6-element HF beam, and I frequently use the HF beam at full power into it. In the past I have forgotten to disconnect a 50MHz converter and have had to replace many a front-end transistor in an ancient Microwave Modules converter! I got round the problem some years ago by using a slightly lossy Band 1 TVI protection high-pass filter, supplied around 20 years ago by the Post Office. In the last year or so I have had to be very careful to avoid blowing up equipment, which I have disconnected after use to avoid the problem.

MuTek's own transverter did actually withstand full power at HF because of its excellent front-end selectivity, but many other rigs would probably not survive. Consequently installing this filter in the antenna lead would be highly advisable if your 50MHz antenna is anywhere near your HF beam. It may well remove some sprogs and spurious receptions from the HF bands reacting with local oscillator harmonics etc in some other makes of transverter. Most importantly, it should kill any harmonic problems that you may have, and there are a few DIY transverters around that are alleged to have very poor harmonic rejections.

Highly recommended

A worthwhile and highly recommendable product which costs £29.90 including VAT (add £1.85 p&p). The BNOS filter incidentally is £24.95, including VAT.

References

MuTek Ltd, Bradworthy, Holsworthy, Devon EX22 7TU. Tel: (0409 24) 543.
BNOS Electronics Ltd, Dept AR, Mill Lane, Stebbing, Dunmow, Essex CM6 3SL. Tel: (0371 86) 681.