

# Professional HF Transceiver



By Mike Devereux G3SED

*Mike Devereux G3SED, is well known as being Managing Director of Nevada Communications in Portsmouth, a Kenwood dealer and a keen operator of Kenwood equipment. Mike's also known as a very keen and active h.f. operator and 'Camel Trophy' DXpeditioner extraordinary. Because of this, it seemed to me that Mike was the ideal choice to provide an unusual 'take a look over the fence' review of a Kenwood transceiver designed for professional, non-amateur radio use.*

**Editor**

**R**eviewing a transceiver intended for the commercial h.f. market in an Amateur context is not the simplest task.

Commercial radios are usually designed for use by the inexperienced operator and need to meet a different set of criteria.

Commercial use of radio communications can be split into a number of categories: marine, aeronautical, mobile, base station and point-to-point. Each category has its own requirements and in many parts of the world will require type approval.

Type approval is intended to ensure that the equipment will not cause undue interference to other radio users while meeting limits on power, frequency stability and spectral purity. From an Amateur perspective type approval is not usually a consideration, but for the commercial manufacturer meeting these approvals can add considerably to the costs.

The Kenwood TRC-80 is aimed more at the Third world countries where cost is an important factor. Equipment for this market takes into consideration type approval standards, but does not necessarily have to meet them. In this way prices can be kept low. The TRC-80 sells for around £995 (plus VAT), which is inexpensive by

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commercial standards.

When the Editor invited me to review the new Kenwood TRC-80, I was keen to see how Kenwood would address the commercial requirements. As an enthusiastic Radio Amateur I could not resist the chance to compare the TRC-80 with the h.f. amateur band transceivers that I have used for many years.

### *Exciting World*

During the past five years I have been lucky enough to install and operate radio systems from many exciting parts of the world. These have included the Jungles of Sabah Malaysia, Northern

Argentina, and Central America to the remote Atacama Desert of Northern Chile.

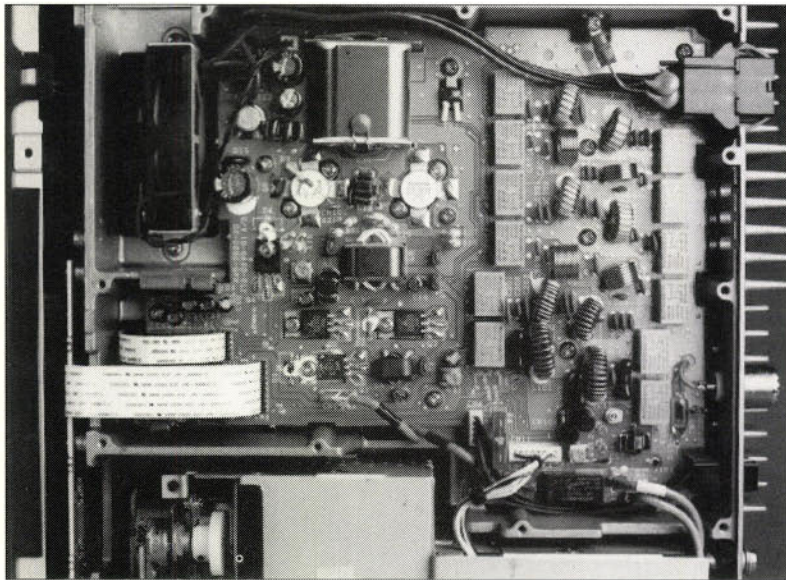
My work involved the supply of radio equipment to non-skilled operators, who used the radio for both emergency communications and long distance telephone system. It's in these situations that you appreciate the need for reliability and simplicity. If there's a knob that can be broken or pushed in error they will do it!

Taking the TRC-80 out of its box for the first time, I was struck with its uncluttered front panel and solid construction. The commercial non-professional user does not want all the 'bells and whistles' that the Radio Amateur looks for, consequently the front panel has been kept simple.

The four control knobs are unobtrusive but easy to



## TRC-80 review



Inside view of the TRC-80.

access for **Volume, Squelch, Clarifier, and Main Tuning** adjustments. The recessed front and use of push controls ensure that the risks of protruding parts being broken when used in a vehicle or out in the field is minimised.

The simple front panel layout has provided room for a relatively large forward facing speaker, which is perfect for use in a vehicle. I have always found that top facing speakers cause significant loss of intelligibility when used in a noisy environment.

### Larger Transceiver

The TRC-80 is somewhat larger in size than Kenwood's TS-50 popular mobile Amateur Band transceiver. I felt, for mobile use, the TRC-80 was more rugged and would stand a lot

more wear and tear.

However, the larger sized TRC-80 could present problems when trying to fit the unit into a vehicle. (The mobile mounting bracket for the TRC-80 is an optional accessory).

The TRC-80 can be pre-programmed by the dealer to allow either channelised operation or general coverage from the main tuning dial. This is because in most commercial situations very few channels are required (possibly two channels for daytime and two for

night time).

Operating channels need to be programmed into memory for most commercial applications. Direct frequency entry can be catastrophic where the untrained user inadvertently knocks the dial or moves off channel and then forgets the operating frequency!

### Scan Modes

Two scan modes allow either a time-operated or carrier operated scan of the memory channels. When a large number of frequencies are in the memories it is possible to lock some out of the scan using the menu mode.

The TRC-80 has a 'cloning' facility via one of the accessory ports that allow any number of radios to be quickly programmed to the same

frequencies. If you have ever been stuck in a jungle and faced with changing a large number of radios to a new frequency allocation in a hurry, you'll now just how useful this can be!

### Radio First - Handbook Second

I don't know about you, but I'm one of those awful people who after 33 years as a Radio Amateur will switch a new radio on first and read the handbook second (the TRC-80 was no exception!). I hooked it up to my large 1.8MHz inverted L antenna, connected the 12V power supply and

switched the set on.

The radio sprang into life and I was quickly able to find my way around without problems. Tuning steps of 10Hz, 1kHz and 100kHz are selected via the **Scan** button. For amateur use it would have been more convenient to have a 100Hz step included.

I tuned in to the 'Ragchewers' Net on 1.8MHz. I then found the received audio quality from the front facing speaker was excellent, almost identical to that of my Kenwood TS-930.

Plugging in the supplied hand microphone, I joined the 'Top Band' Net and found that I had to talk very close to the microphone to achieve reasonable output power. **John GOLTJ** in Solihull, commented that the audio sounded clear and very readable but it was only "communication" quality when compared to my TS-930's "outstanding" audio.

In response to John's comments I did a quick test and plugged in my Kenwood MC60 amplified desk mike to the TRC-80. Then neither John nor the other members of the Net could tell the difference between the TRC-80 or my TS-930.

Over the years I have constantly had reports of outstanding transmit audio quality from the TS-930, and obviously the TRC-80 with the MC60 microphone was an excellent combination. (But I later found that the microphone gain on the TRC-80 can be set via the menu mode - **so next time I promise I'll read the handbook first!**).

### Independent Receiver Tune

The TRC-80's Independent Receiver Tune (IRT) control allows for a  $\pm 1$ kHz shift as opposed to the typical Amateur Radio transceiver's five or ten kHz.

The 1kHz available on the TRC-80 is actually generous! Some commercial transceivers only offer 100Hz. If you have ever placed a call through Portishead radio you will know that a frequency error of just 50Hz can generate comments from the radio operator that you are 'off frequency'. (It's certainly a different world!).

The TRC-80 has a very straightforward display showing either channel number, channel number with frequency, or when in **VFO** mode, frequency alone. When the clarifier offset is used '**CLAR**' is

My thanks go to **Trio-Kenwood (UK) Ltd., Kenwood House, Dwight Road, Watford, Hertfordshire WD1 8EB, Tel: (01923) 816444, FAX: (01923) 212477** for the loan of the review model, which is available from Kenwood approved dealers for **£995 plus VAT**. Accessories for the TRC-80 include:

Accessories	Order Code	Price (ex. VAT)
External Automatic a.t.u.	KAT-1	£495
Internal Automatic a.t.u.	KAT-2	£195
Low Pass Filter	LF-30A	£39.11
Mobile Mounting Bracket	MB-430	£17.83
RS-232 Computer Control Interface	IF-232C	£75.70
SSB Filter (2.7kHz)	KIF-1	£39

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displayed on the l.c.d. panel to alert the operator.

Both signal strength and power output are displayed by means of an easy-to-see bar graph showing received strengths to S9+40dB and 0-10 for power output. This received signal strength is not the norm in the commercial world as a report of 5 by 5 signifies the same as our Amateur Radio 59 report.

In use, the TRC-80 can deliver 100W at full output. It has three power output settings: **High, Medium** and **Low**. These may be preset from the menu mode or restricted by the dealer.

### One Antenna

In commercial applications you often have only one antenna to cover all your operating frequencies. A single whip is often used on a vehicle or a broadband wire, if working from a fixed location. The TRC-80 on review had the (optional) automatic antenna tuning unit (a.a.t.u.) fitted and provision for an external auto a.t.u.

The built-in a.t.u. worked well across a wide range of impedances. On average, it took between 5 to 10 seconds to match a simple antenna on most frequencies.

The remote a.a.t.u. facility is particularly useful. Most remote tuners now have memory facilities that can recall the last settings for a given frequency almost instantaneously.

Whilst working on Camel Trophy the Teams used a remote a.t.u. to tune the base of an 2.5m whip mounted on the back of their Land Rover Discoveries. We were using frequencies from 3.5 to 12MHz and achieved ranges up to 1200km with this combination.

### Selective Call

The TRC-80 has a selective call option a facility not seen on Amateur h.f. transceivers. The selective call allows for both station identification and individual calls. This is an excellent option since a Commercial user does not want to listen to all the noises that lift the squelch.

Squelch circuitry in the TRC-80 is of the traditional type that lifts on signals exceeding a pre-set level. But it's a shame Kenwood did not use some kind of voice pattern recognition squelch.

My experience has been that in a noisy environment it's not uncommon

for operators to turn down the volume to escape all the extraneous noises. And in doing so they don't hear the calls!

### Morse Facility

As a keen 'Morse Man' I was delighted to see a c.w. facility on the TRC-80, but a little bemused as to who might use it in a commercial application these days! The c.w. sidetone is selected via the menu mode with a jack socket being provided for the Morse key.

I had a few contacts on 3.5MHz c.w. and found the note to be clean and reception surprisingly good. However, for serious cw. use an optional 500Hz filter is available.

In the modern world it's much more likely that the TRC-80 would be used for data transmission. To this end provision is made for both ASK and FSK data modes via a data button on the front panel

### General Coverage

The receiver has general coverage as standard and on the review sample TRC-80 it was possible to receive from 100kHz through to 29.99999MHz. The radio transmitting coverage ranged from 1.604 to 29.99999MHz.

I used the TRC-80 on the Amateur bands for a number of days on both c.w. and s.s.b. I found the radio very easy-to-use with excellent audio quality.

The receiver was very sensitive. The TRC-80's performance compared favourably with traditional Amateur band transceivers accepting that some of the 'bells and whistles' were missing.

The TRC-80's size and front panel layout make it an ideal base station radio. For Mobile use the large front facing speaker gave good clarity.

I felt the radio was a little large for mobile mounting when compared to Kenwoods TS-50 and Icoms IC-706 Amateur equivalents. However, the TRC-80 was more ruggedly built. And I shall certainly recommend the TRC-80 next time I am involved in an overseas operation.

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## Manufacturer's Specifications

### General

Transmitter frequency range	1.8 - 2.39999MHz 3.5 - 4.49999MHz 6 - 7.99999MHz 11 - 14.49999MHz 16 - 21.49999MHz 24 - 29.99999MHz
Receiver frequency range	500kHz - 29.99999MHz
Modes	J3E(s.s.b.), A1A(c.w.), A3E(a.m.), F1D(FSK), F2D(AFSK)
Operating temperature	-20°C to +60°C
Power requirement	13.6V d.c. ±15% (negative ground)
Current consumption Receive	<1.45A
Transmit	<20.5A
Frequency stability	-10°C - +50°C, within ±10p.p.m. -20°C - +60°C, within ±15p.p.m. -10°C - +50°C, within ±0.5p.p.m. (with SO2) -20°C - +60°C, within ±1p.p.m. (with KPE-1)
Antenna impedance	50Ω
Dimensions	270 x 96 x 271mm
Weight (net)	5.2kg

### Transmitter

Power output	100W
s.s.b./c.w./FSK	25W
a.m. (unmodulated signal)	>40dB
Carrier suppression	>50dB (1kHz)
Unwanted sideband suppression	600Ω
Microphone impedance	

### Receiver

Circuitry	Double conversion superheterodyne
Intermediate frequencies	
1st i.f.	73.045MHz
2nd i.f.	10.695MHz
Sensitivity	
s.s.b./c.w./FSK (10dB S/N)	<4μV(0.5 - 1.79999MHz); <0.25μV(1.8 - 29.99999MHz)
a.m. (10dB S/N)	<3.2μV(500kHz - 1.79999MHz); <2.5μV(1.8 - 29.99999MHz)
Spurious response	
i.f. image ratio	>70dB
i.f. rejection	>80dB
Selectivity	
s.s.b./c.w./FSK	>2.2kHz (-6dB) <4.8kHz (-60dB)
a.m.	>5kHz (-6dB) <40kHz (-60dB)
c.w. (with YK-107C)	>500kHz (-6dB) Less than 2kHz (-50dB)
Clarifier variable range	±1.1kHz (10Hz step) Dealer setting: ±110Hz (1Hz steps)
Audio output	>3.5W (4Ω at 10% distortion)
Audio output impedance	4Ω