



# Equipment Review

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## KDK FM-240 TWO-METRE FM TRANSCEIVER

It is exactly 10-years since I reviewed a KDK FM transceiver. This was the FM-144-10SXR and was one of the first full-coverage synthesised transceivers to appear on the local market. Several updated models have appeared since, but unfortunately none have been offered for review. However, it is interesting to look at the developments that have occurred over that 10-year period. The most obvious is the size and weight. The new FM-240 is just a fraction over half the size of the original and just under half the weight.

In addition to this, it has the capability of delivering twice the power output of its predecessor.

KDK equipment has not enjoyed a good reputation for reliability over the years. The early models suffered from poor soldering and many of the original models that are still on the air have alignment problems, particularly in the frequency determining section. Let us hope that the current model has a better record in the years to come.

### FEATURES OF THE FM-240

The FM-240 is a compact two metre FM transceiver, and is, in fact, the smallest 25 watt transceiver on the market at the moment, just beating the Icom IC-27 by a small margin in both size and weight. However, it possibly achieves this by omitting an internal loudspeaker which the IC-27 has, albeit of rather poor quality. The FM-240 is supplied with a microphone/speaker unit.

A multi-purpose LCD readout keeps the operator supplied with all the information ever required. Apart from the operating frequency, it indicates VFO or memory operation, repeater offset, reverse repeater operation, receiver S-meter and transmitter output indicator plus scan and call channel operation. Other functions are also displayed during the memory set-up procedure, as we will see later.

All memory information is retained when the DC supply is removed by a lithium battery. It appears that the programming of the CPU is not dependent on the lithium battery as it is with some other brands. An optional speech synthesiser is available to announce the operating frequency but was not supplied with the review transceiver. A tone squelch facility is included to provide a selective calling function. Repeater offset can be varied from the standard 600 kHz if required. Frequency and memory selection is from either the tuning knob on the front panel or via the up/down buttons on the microphone.

Transmitter power output is rated at 25 watts with high power selected or five watts low power.

### ON-AIR

The FM-240 was used as both a fixed station and as a mobile and was found to be easy to set up and use once I understood the setting-up of the memory facility. The instruction states that the rig has *User Friendly Man Machine Interface*. I did not find this to be entirely true and the instruction book was not as clear as it could have been. I feel that most operators would use the transceiver principally in the memory mode — in other words, fill up the 16 memory channels with all normally used frequencies and only resort to the VFO for the odd unusual frequency.

To enter a memory, it is necessary to go through several steps for each. These in turn, frequency, tone selection for the CTCSS mode, scan mode required for that channel and finally the selection for simplex, duplex or cross (transmit facility on the frequency in the next memory). Once each of the above has been selected it is necessary to *hit* (their word), the enter button. The readout then displays the next command and the various alternatives are selected by turning the tuning control. When selecting frequency, two tuning



speeds are available, either 5 kHz or 50 kHz and these are selectable with the *speed* button above the tuning control.

Although stated as such, the FM-240 has two VFOs. The *QSY* button enables the operator to select any other frequency away from the one in use, be it either a VFO or memory selected. The *QSY* switch then enables selection of either the original or the new frequency.

While all of this hitting and entering is going on, the transceiver beeps when you have done the right thing. The *beep* also alerts for activity on the priority channel. I thought that the beep was a bit anaemic in character and certainly not up to the Kenwood system which is amplified through the receive audio channel.

In common with many contemporary transceivers, the FM-240 has a LCD display. While it displays an incredible number of functions, I found it to be rather dull and lacking contrast. The rear illumination is an off-white colour and the digits a rather light black. Perhaps a change of the illumination colour may help.

Overall the front panel presents a very pleasant perspective to the user. One interesting feature is the recessed microphone connector but unfortunately the standard microphone plug is rather hard to tighten up. By the time it is tight, the knured ring is flush with the front panel, so it is advisable not to cut your fingernails prior to plugging in the microphone. A connector with a longer locking ring would overcome the problem.

In use the microphone/speaker was quite handy. Memory channels could be selected by means of the up/down buttons on the top, or a lock switch at the rear could remove this facility. As is usual with microphone/speaker units, the received audio quality left quite a bit to be desired and then there is the problem of what to do with it when it takes two hands to drive the car! Even a small external speaker produced very superior results.

For mobile use, a handy mounting bracket is supplied as a standard feature, along with a selection of mounting hardware.

### UNDER TEST

**Frequency Stability and Accuracy:** Under hot or cold conditions, the FM-240 was within 100 Hz of the displayed frequency. The 600 kHz offset for repeater operation was also better than 100 Hz

**Power Output:** The power output was measured with exactly 13.8 volts DC applied to the transceiver. On initial switch-on and the transceiver at ambient temperature 18 watts was delivered, however, as the rig warmed up on receive only, this dropped to only 15 watts. With intermittent transmit periods, this dropped again to 13.5 watts. The results were very disappointing. Two different transceivers were tried with similar results. Low power out was checked at 2.5 watts. Again this was well below the specified power. It is suspected that the low power setting may be internally adjustable, but no information is supplied on this.

On the bright side, it was found that the supply voltage could be dropped to 11 volts with very little drop in transmitter power output. Current drain at 18 watts output was 4.9 amps and at 2.5 watts output 2.6 amps. With the transceiver hot and at the lower output power this had dropped to 4.5 and 2.3 amps respectively.

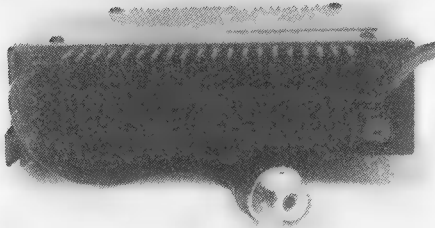
Transmit audio quality was rated as fair. Reports indicated that the speech was rather thin and edgy. Deviation setting appeared to be satisfactory.

**Receiver Tests:** Receiver current drain was checked with 13.8 volts applied. With the receiver squelched 480 mA. With 250 milli-watts, audio output was 520 mA. The receiver extension speaker output was terminated with an 8 ohm load. Maximum power output was 1.75 watts with one watt at the onset of audible distortion (about five percent). At .5 watts output, distortion was measured at 1.5 percent.

With a four ohm load, the maximum power output increased to 2.5 watts. Receiver noise was measured with a 100 micro-volts input signal with no deviation. This was -28 dBm unweighted and -32 dBm weighted.

Receiver sensitivity was next checked. At one micro-volts input with 1 kHz modulation and 3 kHz deviation, SINAD was 28 dB and S/N ratio 31 dB. A 12 dB SINAD figure was obtained at .6 micro-volts. The mute opened at .15 micro-volts. The S-meter on the FM-240 consists of seven segments on the LCD display calibrated at S 1; 3; 5; 7; 9; +10 and +20. The following results were recorded:

S1 — 2 micro-volts; S3 — 6.3 micro-volts 4 dB; S5 — 10 micro-volts 4dB; S7 — 16.6 micro-volts 2 dB; S9 — 20 micro-volts 2 dB; +10 — 25 micro-volts 6 dB; +20 — 50 micro-volts.



This gives a total range of only 18 dB from S3 to +20. S units on two metres are apparently only 1 or 2 dB. It was also noted that the S1 segment would indicate when the squelch opened even when no signal was present.

As mentioned earlier, the FM-240 has no internal speaker. Instead, a microphone/speaker is supplied. The received audio quality is therefore rather thin due to the size of the speaker. It also limits the actual audio power output because of its inefficiency. In most applications, a reasonable quality external speaker does a far better job. It is a pity that KDK did not supply an external speaker as standard equipment as Kenwood do with some of their current model FM transceivers.

Perhaps the most disturbing aspect of the receiver performance is the spurious and cross-modulation responses. These appear to be a combination of both internally generated and those produced by external strong signals. To leave the transceiver scanning either the memories or a band scan produces a variety of peculiar noises which in many cases wipe out wanted signals. It also brought up the alarm for the priority channel when there was no signal present.

Just to prove the point on this, the transceiver was taken to a quiet country area, but much the same thing happened and, in fact, made it unusable for our requirements.

**Instruction Manual:** The instruction book has a total of six pages, of which the first is the introduction and index. It is purely an operations book. The text covers all aspects of using the transceiver, but there are no drawings or illustrations with the exception of a front panel photograph on the front cover. A series of display representations, say with the memory entry sequence, would be of enormous help. Apart from a circuit diagram, there is no technical information at all.

### CONCLUSIONS

With so much in its favour, it is a pity that the FM-240 falls short in several important aspects. However, at the current price it represents good value. The review transceivers were supplied by Emtronics Melbourne.

*The following test equipment was used to produce the test figures stated in this article. A Yaesu YP-150 and Marconi TF-957/1 Terminating RF Watt Meters; AWA F242A Noise and Distortion Meter; Davern Terminating Audio Output Meter; Ramsay CT-70 Frequency Counter.*

### EVALUATION AND ON-AIR TEST OF KDK-240 TWO-METRE FM TRANSCEIVER — Serial Number 000411

#### Appearance

##### Packaging

- \*\*\* Strong carton with foam inner section.

##### Size

- \*\*\* At this time, the smallest FM transceiver on the market.

##### Weight

- \*\*\* At only one kilogram, the lightest full feature FM rig.

##### External Finish

- \*\*\* Very clean attractive finish.

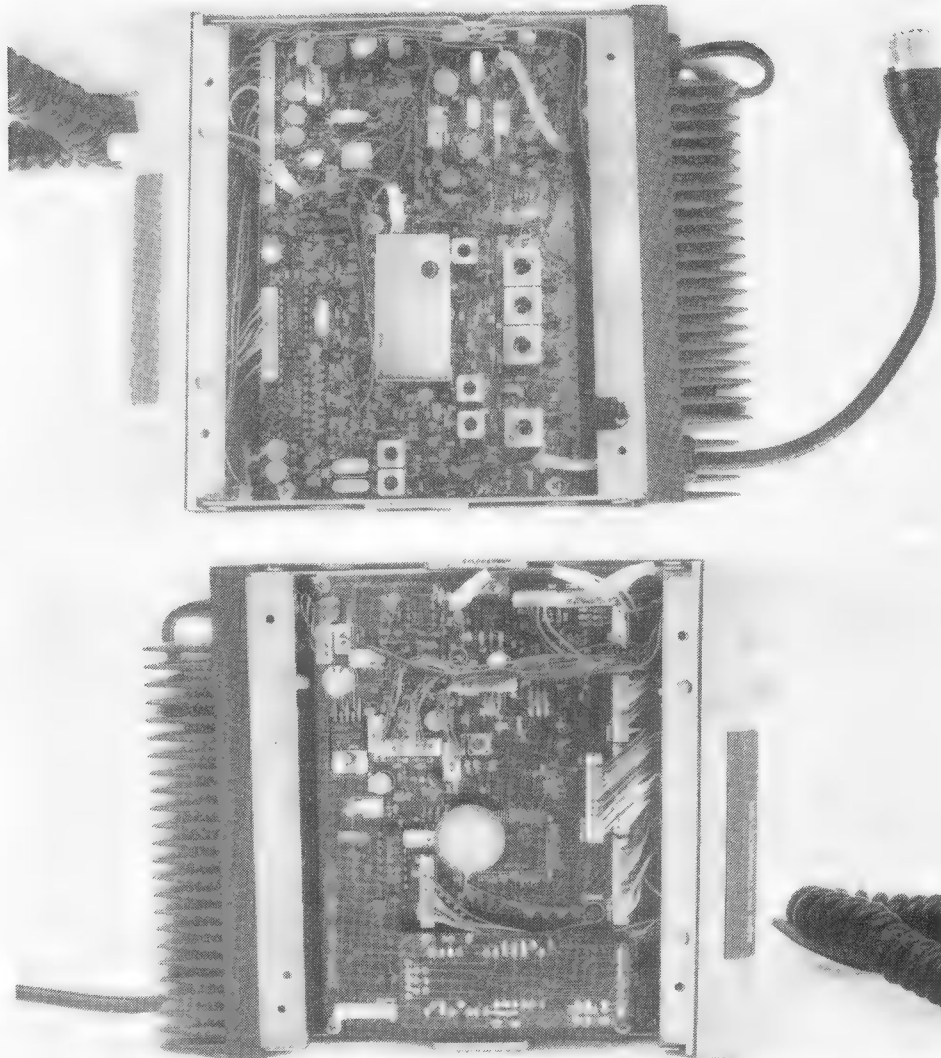
##### Construction

- \*\*\* Good quality circuit boards and neat wiring.

##### Front Panel

##### Location of controls

- \*\*\* Apart from some push-button controls, which are rather small and close



together, most frequently used controls are quite accessible.

##### Labelling

- \*\* Like some of the controls, the labelling is small.

##### LCD Readout

- \*\* Although the readout presents more information than others, its readability is only fair. More contrast needed.

##### Receiver Operation

##### Memories

- \*\*\*\* One of the best 16 memories with frequency, off-set, scanning mode and other information.

##### S-Meter

- \*\* With a total range of 18 dB, only just satisfactory.

##### Spurious Responses

- \* KDK need to look carefully at this. Not vaguely comparable with current Icom and Kenwood equipment.

##### Sensitivity

- \*\* Could be better, but over all spoiled by spurious responses.

##### Received Audio

- \* Quality and total audio output from speaker/microphone poor. Noticeably better with external speaker.

##### Transmit Operation

##### Power Output

- \* Not up to specifications, and even then drops off as the unit heats up. Should be much better.

##### Transmit Audio

- \*\* Rather peaky quality. Fairly good intelligibility though.

##### Cooling

- \*\* Heat sink runs rather hot. Location of transceiver should be carefully considered.

##### Manual

##### Owners Book

- \* Covers most operational functions in a fair way, but no technical information apart from a circuit.

##### Overall Rating

- \*\* Just satisfactory. In other words, try one before you buy. Depending on what you have used previously, you may be either happy or very unhappy!

### FIBRE OPTICS

Satellites now used for inter-continental and international communications are being challenged by fibre optic technology.

The United States Cable and Wireless Company is now laying the first of two privately owned Trans-Atlantic fibre optic cables between New York and London.

The Overseas Telecommunications Commission is involved in submarine fibre optic cable, planned to run between the US mainland and Japan via Hawaii, being funded by a consortium of countries.

Australia and New Zealand will be linked by fibre optics in the next five years.

In Australia, fibre optics are playing a major role in the development of the country's telecommunications infrastructure. This technology is being used for high capacity inter-exchange links and to meet the needs of digital communications.