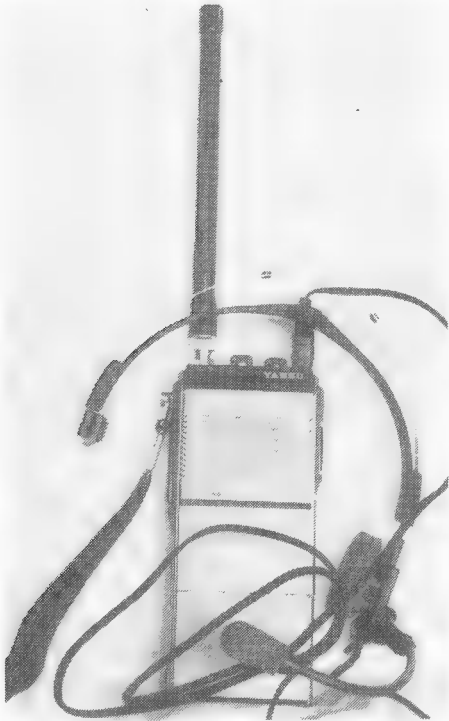




EQUIPMENT REVIEW

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THE YAESU FT-203R Two Metre Hand Held Transceiver



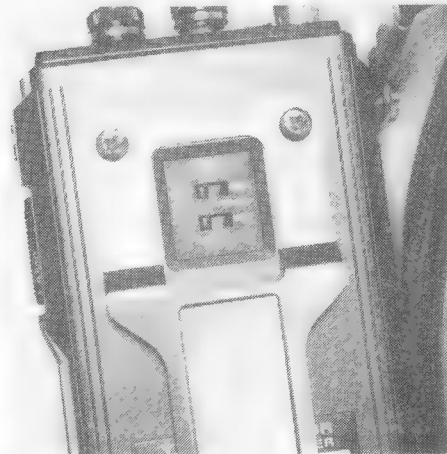
I can just hear you saying, "Surely not another 2 metre hand held transceiver". Well yes, but read on, I am sure you will find this interesting and perhaps a little different to most of the hand held FM transceivers on the market at the moment.

But first as usual let's look at the history of Yaesu 2 metre hand helds. The first, several years ago was the FT-202. This in common with its contemporaries was crystal controlled with six channels. Also, as was usual, you were lucky to get a couple of channels supplied. Soon of course the hunt was on to find those elusive new repeater channels. I guess most have been through the same situation. Then towards the end of 1979, Yaesu released the fully synthesised FT-207. It did all sorts of wonderful things, had a digital readout, memories etc etc. One thing though, if the memory was left switched on the batteries were always flat when you needed to use the thing. But better things were to come. The FT-208 released a couple of years later overcame all the earlier problems. By this time most of the 2 metre hand held transceivers had more facilities than their higher powered mobile counterparts. There were of course exceptions like the IC-2 and the earlier but somewhat similar AR-240.

Of the two, the IC-2 proved very popular with amateurs who wanted full 2 metre coverage but with no frills. Rumour has it that Icom intend to drop the IC-2; perhaps they might reconsider! But even if they do, all is not lost for those who still require a simple 2 metre hand held. The new Yaesu FT-203 will certainly fill the bill.

So now let's have a close look at the FT-203 and see just what makes it tick. It is a compact (almost identical in size to the IC-2) transceiver with thumb wheel frequency selection for MHz, tens of kHz and a five kHz selector button. High (three watts) and low (300 mW) power output is selectable and for the first time in years, an "S" meter. I cannot remember seeing one of these on a hand held since the old Ken KP-202.

Other controls include a combined volume and on/off switch, squelch control and a BNC antenna connector. A push-to-talk bar is on the left hand side and on models with a tone burst facility a separate button above the PTT bar for its operation. On the right hand side is a button to actuate a lamp to illuminate the meter but unfortunately not the thumb wheel frequency selector. At the rear are two slide switches for simplex or repeater ± 600 kHz. The second switch selects the VOX sensitivity.



Rear panel.

Now before you think I have run off the rails and started talking about an entirely different rig, let me explain. VOX on a 2 metre hand held is certainly unusual to say the least, but is available on the FT-203 provided the optional YH-2 headset/boom microphone is used. We will talk about the operation of this later.

The FT-203 is supplied with a 10.8 volt, 425 mA/H Ni-Cad battery pack and a battery case to take six AA dry cells as an option. A rubber helical flexi antenna and a soft protective case are both included as standard equipment as is a plug in battery charger.

THE FT-203 CIRCUIT DESCRIPTION

Due to the excellent instruction book supplied it is possible to get a good look at the works and see what happens. The receiver is the usual double conversion set up with 10.7 MHz and 455 kHz IFs. While it might seem strange, a single bipolar transistor is used as an RF stage feeding the first mixer, also a bipolar through a three section varactor tuned band pass filter. The varactors are controlled from the PLL system. A monolithic filter at 10.7 MHz feeds the second mixer which is included in an IC which also contains the 455 kHz IF, limiter, discriminator, noise amplifier and squelch switching circuit. This certainly makes for a simple receiver circuit with two transistors and one IC making up the basic system.

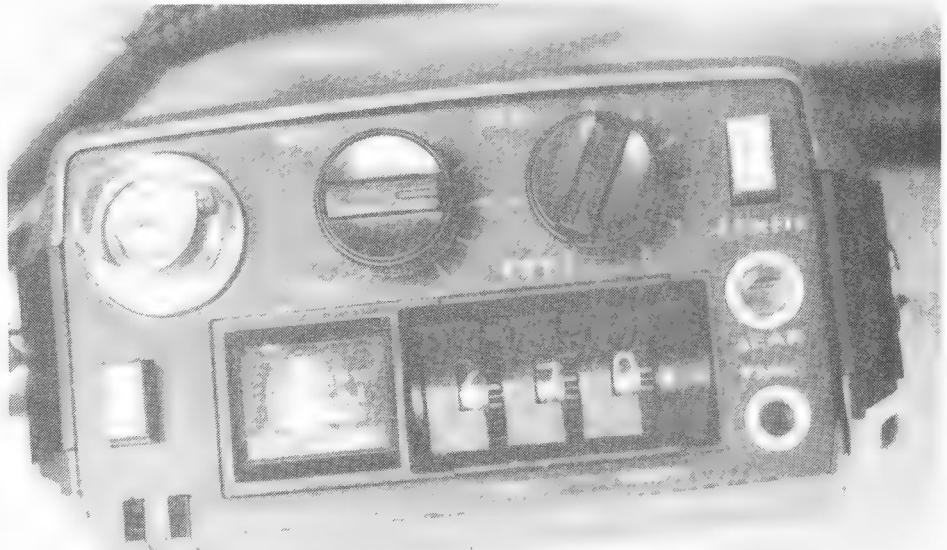
Of course extra components are required for audio output and drive for the "S" meter etc.

The audio input circuitry is a bit more complex than most due to the VOX provision. Again a good part of the action is taken care of by one IC which incorporates the instantaneous deviation control, low pass filter and VOX amplifier. A VCO in the PLL section is modulated with a varactor diode and the output at around 73 MHz is fed to the main transmitter section where it is doubled and amplified to the final output.

Other circuits are the 5 V regulator for the PLL and VOX sections and of course the transmit receive switching control section.

THE FT-203 ON THE AIR

First impressions are excellent. The overall finish of the case and controls is as good as I have ever seen. The battery pack slides off to one side after the spring loaded lock is pushed up. It can however be recharged while in place on the transceiver, and a second connector allows operation of the transceiver while the battery charges. An optional DC-DC adaptor, the PA-3 is required to do this. Unfortunately the otherwise superb manual fell down here as no circuit is supplied of it. As the transceiver normally needs 10.8 V, I assume that it contains a regulator at this voltage supplying the 700 mA or so required plus a 50 mA output for charging all from a 12/13.8 volt car system. It shouldn't be too hard to come up with a suitable circuit.



Top view of the Yaesu FT-203R.

The thumb wheel, or perhaps they should be called finger nail switches are no better or worse than others I've used. You get used to them after a while. Two small LEDs, one green indicates that the squelch has opened on receive, the other a red one indicates transmit. The meter shows relative transmitter power output and received signal strength on a scale of zero to ten. Received audio quality is sharp and clear. The 203 has a very distinctive received sound. I found it a little too tippy for my taste but others who heard it thought it excellent. Try it before you buy. Transmitted audio was good although it was necessary to talk closely to the inbuilt microphone to get adequate deviation.

Now to the VOX system. As mentioned before, it requires the use of the YH-2 head set. This consists of a single ear phone with head band and a light weight boom microphone attached to the single head phone. When plugged into the "mic" and "ear" sockets on the 203, the VOX system comes into action. Set the VOX switch at the rear of the 203 to the required VOX sensitivity and talk. The drop out delay time is fixed and appears to be a little under one second, so you will certainly need to practise operation before trying to make a contact on the local repeater. Transmitted audio quality was reported as being rather harsh with some distortion on sibilant sounds when using both the boom or inbuilt microphones.

The VOX control switch and the repeater off set switches on the rear are difficult to operate. Only a minute amount of toggle is above the back plate. Actuation is by sharp finger nail only. I can see that with a little use, the paint will soon be worn off the back plate.

The FT-203 receiver performance was rated on subjective tests as fair. On comparative tests the sensitivity was not as good as a couple of other transceivers available, although probably adequate in relation to the transmit performance. Probably the worst aspect of the receiver is the cross modulation. Again, if you only use an attached antenna you won't be troubled but with an external base station antenna

you might be. I got considerable cross mod on the 146.650 and 146.750 repeaters when the Melbourne 146.70 repeater was on the air. On the other hand, the transmitter power was insufficient to access these repeaters.

Battery life as with all hand helds, depended on the amount of transmit time. The 203's 2.5 to 3.0 watts output is a little higher than some but of course the battery drain is also higher. I get the impression that most amateurs use their hand helds more for receiving than for transmitting anyway.

THE FT-203 INSTRUCTION BOOK

While most instruction books are getting worse, Yaesu's are getting better all the time. Two books are supplied with the 203, one very complete instruction, description and maintenance manual and a technical supplement with circuit board layouts and other technical data. Top marks Yaesu.

THE FT-203 CONCLUSIONS

This transceiver is highly recommended. It is a good performer in most respects. While the receiver performance leaves a little to be desired, it is on a par with many other hand held transceivers and I doubt that its shortcomings will worry many operators.

The VOX accessory is unique with this type of equipment and certainly interesting. I suggest you give it a try, you might like it, you might not.

Our thanks to Dick Smith Electronics, Head Office for the loan of the FT-203 used in our tests.

All enquiries should be directed to a Dick Smith store near to you.

EVALUATION AND ON AIR TEST OF THE YAESU FT-203R 2M FM TRANSCEIVER

Serial No 3N011790 *Rating code. Poor* Satisfactory**
Very good*** Excellent*****

APPEARANCE

Packaging
*** Moulded foam container in carton.
Size
*** Shirt pocket size.

Weight

*** Only 450 grams.

External finish

**** Beautifully finished.

Construction quality

*** I didn't open it up, but appears very good.

PANEL CONTROLS

Frequency selection

** Thumb wheel switches. OK when you get used to them.

Other controls

*** Knobs and push buttons of good size and feel.

Rear panel switches

* Definitely need improving.

RECEIVER OPERATION

Sensitivity

** OK for a hand held.

Signal handling

** OK on helical antenna. Poor on external antenna.

"S" Meter

*** Good to see one. Calibrated zero to ten only.

Received audio

** Rather sharp but intelligible.

TRANSMIT OPERATION

Power output

*** Three watts and .3 watts.

Transmit audio

** OK but not 100 per cent clean.

VOX operation

**** Great fun. Give it a try.

Switching noise

**** All diode switched. Very smooth.

Metering

*** "S" meter shows relative trans-output. LED shows

Tx status.

MANUAL

**** If only the others were half as good.



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THE LONG AND SHORT OF TWO METRE ANTENNAE FOR HAND HELD

Just about every one who owns a two metre hand held transceiver wishes that he could put a better signal into the local repeater. A few hours listening on your local repeater will soon confirm that many HT operators really don't cut the mustard. The answer, or at least part of the answer is to put a better antenna on top.

As you have probably noticed several extended antennae are on the market at the moment which claim to give improved output when used in place of the normal flexie (rubber duck) antenna.

For the tests we carried out, the following antenna types were used:

- 1 Icom IC2A type helical
- 2 Vocom $\frac{3}{8}$ wave telescopic antenna
- 3 Superstick $\frac{3}{8}$ wave telescopic antenna
- 4 AEA $\frac{1}{2}$ wave telescopic antenna
- 5 Superstick short helical antenna
- 6 $\frac{1}{4}$ wave whip antenna (home made)
- 7 All of the telescopic antennae in their retracted positions.

Before going into the results of our tests, it might be of interest to describe the methods used to evaluate the various antennae.

As the object of all the so called gain antennae is to produce a better signal, less noise or better quieting into the repeater, is seemed reasonable to assume that if the noise level from the repeater was measured on another receiver, any reduction in that noise would

represent gain. While it could, of course, be argued that noise reduction in a receiver may not be linear in respect to an increase in signal, it seemed that this would, nevertheless, produce a figure of merit for the various antennae.

An audio VTVM was connected across the output of the normal home station two metre receiver. It was thus possible to measure down to about -60 dBm. The hand held transceiver AN IC-2A was operated in the low power position and all tests were done from the exact same spot which was selected to produce the greatest noise output from the local channel two repeater, while using the standard helical antenna. The various test antennae were then substituted for the helical and the resultant noise measured.

The results were as follows:

1 Standard Helical	0 dB (reference)
2 Short Super Stick Helical	-.5 dB
3 Vocom $\frac{3}{8}$ telescopic	+6 dB
4 Super Stick $\frac{3}{8}$ telescopic	+3 dB
5 AEA $\frac{1}{2}$ wave telescopic	+6 dB
6 Super Stick set to $\frac{1}{4}$ wave	+2 dB
7 Vocom set to $\frac{1}{4}$ wave	0 dB
8 AEA set to $\frac{1}{4}$ wave	+5 dB
9 $\frac{1}{4}$ wave whip	+2.5 dB

Perhaps the greatest surprise in all of these tests was the relative performance of the short helical which was only .5 dB down on the standard helical and about half its length.

Both the $\frac{3}{8}$ antennae were rather hard to handle and I would recommend that they be used outdoors and then with care. The Super Stick is about 1.4 metres long and the Vocom 1.22 metres which means you will need a home with high ceilings to use them inside.

The AEA half wave was shorter, just about 1 metre and also very much lighter and so somewhat easier to handle.

The best overall performer on the basis of size, cost and performance was the $\frac{1}{4}$ wave home made whip. All of the telescopic antennae worked to some extent in their telescoped positions but the only one to deliver any gain was the Super Stick. Considering their bulk, it is hardly worth using them in this state.

One interesting feature of the Super Stick is that it screws apart into three sections and it is claimed that a broken telescopic antenna section can be replaced. The BNC base section is also used with the short helical.

Over a long period of time, it might be interesting to see what effect the heavy $\frac{3}{8}$ antennae have on the BNC connectors on hand held transceivers. I doubt that they were designed to take the weight of these antennae for long periods.

For additional information on the Vocom $\frac{3}{8}$ antenna, refer to the review on this by Ron Cook VK3AFW in the April 1983 issue of AR.

My thanks to friends who loaned antennae for these tests.

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