

## Equipment review

# The Yaesu FT-450 all mode HF and six metre transceiver with IF DSP

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Photos by Bill Roper VK3BR.

### The FT-450 - an overview

**No, not just another HF transceiver. This one is different in all aspects of design and presentation. It is in some respects a small version of the popular FT-2000, sharing the IF signal processing and many other features of this transceiver.**

It is advertised as a "compact" transceiver. The actual size is 229 mm wide, 84 mm high, 217 mm deep and it weighs 3.6 kg. Interestingly, the front panel is the same size as the old FT-7, one of the first solid state transceivers that Yaesu produced. I am sure many readers will remember and are still using this wonderful old transceiver.

So what does the FT-450 have and where does it fit into the scheme of things? Looking at the last question first, I see the FT-450 as a compact home station rig or for use as a portable, but perhaps not as a mobile. A mobile bracket is offered as an option which might be useful if you drive a bus, but as the front panel cannot be made to operate remote from the body, I don't think it would be practicable to easily fit into a normal car.

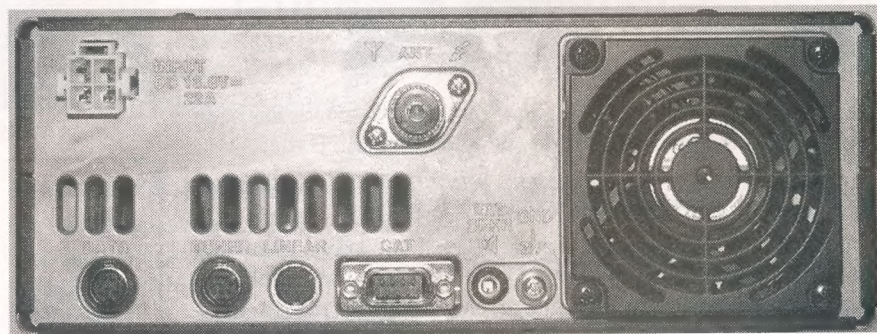
One change introduced in the FT-450 is a new DC connector in place of the six pin plug and socket that we have become used to over many years. This is a four pin plastic plug which Vertex tells me is the new "standard". I must say that Yaesu is not the only manufacturer to adopt this plug. I have to wonder if the various companies get together to decide on these changes.

The FT-450 is a rugged, multi band multi mode transceiver that provides coverage of the 160 to 6 metre amateur bands. There is also a full general coverage receiver tuning from 30 kHz to 56 MHz. It runs 100 watts output on all modes except AM where the power is reduced to 25 watts. An external 13.8 volt power supply rated at 22 amps is needed.

An inbuilt automatic antenna tuner,



FT-450 front with mic

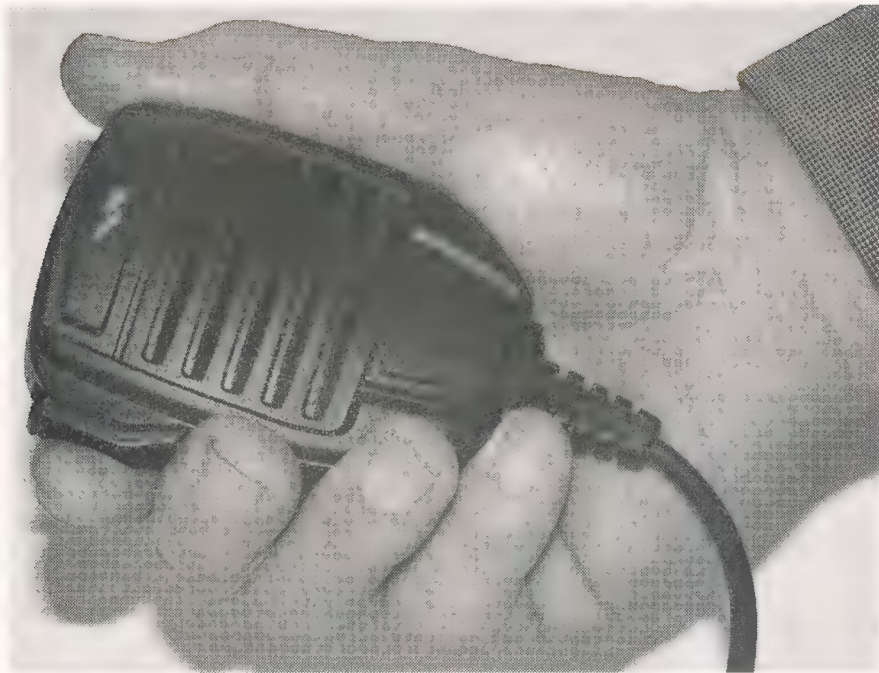


FT-450 back panel

the ATU-450 is available as an optional extra and this can be installed by Vertex on purchase of the transceiver. This tuner was fitted to the transceiver supplied for our review. Other antenna tuners are available as options which I will describe later in this review. The transceiver comes with a hand held microphone, a DC power cord and a comprehensive instruction manual which comes with a

complete set of circuit diagrams.

A notable feature is the liquid-crystal display which presents a very large and clear frequency readout. A bargraph is calibrated as an "S" meter, transmitter power output meter, an SWR meter and an ALC indicator. Another display shows the status of the DSP setting. These include the contour setting, which allows the shaping of the receiver pass band to



A close-up of the microphone supplied with the FT-450

enhance the receive audio quality, the position of the notch filter, the degree of IF selectivity, the amount of noise reduction selected and the position of the IF shift control. The third section of the display depicts a block diagram of the receiver and shows which of the various parameters have been set by the operator. These include the front end attenuator, the intercept point optimization selector, the noise blanker and AGC status.

Like all modern radios, the FT-450 is menu driven. There are actually 65 menu items, most of which are set and forget. To make thing easier, the menu mode can be set to display all 65 items or an abbreviated set of the 19 most used items.

## A technical overview

Starting at the front end, the signal goes through the selectable 20 dB attenuator. Then through the eight band pass filters to reduce out-of-band interference. The RF stage has two 2SK520 JFETs before going into the first mixer. The RF stage can be bypassed by switching on the IPO. The first IF frequency is 67.899 MHz and this is preceded by the four pole 10 kHz roofing filter which reduces adjacent signal interference. The second IF at 24 kHz is where the magic of the DSP takes place.

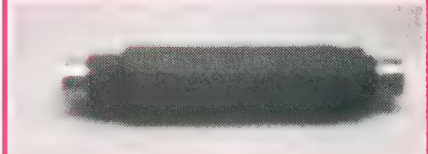
**...an excellent little transceiver, let down by a few very simple omissions**

## The FT-450 on the air

The first impression when using the transceiver is the small size of the tuning knob. Not only is it small, it is hard to get used to. There is no spinning action to help. Also with the lack of a tilt bail to raise the front of the transceiver the bottom of the knob is very close to the desk. One solution is to use the DSP selector control which enables you to zip up and down the bands in pre-selectable steps. The received audio on SSB through the internal speaker was quite acceptable, but perhaps a little lacking in both high and low frequencies. Switching to AM, this was even more noticeable. At this point, I decided to run a frequency response test to see what was going on. With the AM band width set to the widest point of 9 kHz, I noted the following: With 1 kHz set for reference at 0 dB, 250 Hz -6 dB, 300 Hz +2 dB, 600 Hz +1.5 dB, 2200 Hz -6 dB and 3000 Hz -20 db. No wonder the audio sounded restricted.

Putting it on SSB, one of the first things I listened for was the digital buzz. I had been alerted to this from reports from the US, and sure enough it was there loud and clear. Whilst it does not block out the transmit audio, it is none the less most annoying. In later tests, using AM on 160 metres, the buzz was not reported.

## TVI High Pass Filter with Braid Breaker.




### An inline TVI filter with Braid Breaker.

A large amount of TVI can travel down the outer braid of Coax as well as the centre conductor. The braid breaker isolates the centre conductor and braid from the TV/VCR/DVD. The High Pass filter cuts in at 50MHz. This filter has -80dBm attenuation at 40, 80 and 160 Metres.

### Pager Notch Filter:

A receive filter that can be used in an outdoor housing (Pictured) to be mounted close to your antenna on the mast, or can be used in a diecast box for indoor use near your transceiver or receiver. The filter is set to 148.5 MHz but may be tuned by the user across the 148 to 149 MHz Pager band. A selection of connectors are available including BNC and N Type. Where transmit is required this filter can be switched out of circuit by the use of coaxial relays linked to the PTT switch.

Contact us if you need a special filter, we manufacture here in  Australia rather than overseas.

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It seems that this problem is confined to early model transceivers and only on SSB. One wonders!

One feature that was appreciated is the digital microphone equalizer. After battling with others where there might be hundreds of settings, this one has ten preset functions and these are shown graphically on the display. You can choose flat, bass boost or cut, middle boost or cut and high end boost or cut or a combination of any of these. A few on air tests will soon sort out the best setting for your voice. Tests I carried out on air indicated that for AM, the flat position "0" was best, while for SSB position "4", flat bass and middle with high boost was preferred.

The speech processor is actually in operation all the time unless the low setting of the microphone gain has been selected. Slightly strange idea but it works very well.

Comparing the receive capabilities to my FT-1000, I would consider the FT-450 to be a shade better when compared on 40 metres, listening to European DX in the late afternoon. This is where the selectable DSP comes into its own.

The digital noise reduction was most effective in reducing the general background noise that seems to plague 40. The noise blanker also seems to be very effective particularly when used with the DNR. Strong signal handling was excellent as was the rejection of these same signals when trying to pull a weak "G" out on an adjacent channel.

Another useful feature is the voice readout. This needs to be set up in the menu and from there a push of the "voice button" gives the frequency, mode and "S" meter reading. A very handy feature for visually impaired amateurs. One thing to watch when using menu mode is that the tuning will be locked. Just push and hold the "F" button for one second and get back into VFO mode. I have to say that I got caught on this one a few times. However another similar experience is worth noting. If you are using AM mode, and tuning below 1.8 MHz, the tuning will lock. You are expected to use the DSP/SEL knob to tune in steps. This is the default setting in the menu. Once you know, this can be changed easily to produce a normal tuning output. I got caught on that one too.

The ATU-450 internal auto antenna tuner appeared to work well. It is

designed to match a 3:1 SWR. Most of my antennas are well below this, but I set up an ATU to produce a 3:1 SWR which the FT-450 fixed easily.

## A quick description of the FC-30 and FC-40 ATUs

These are both external units, but can be controlled from the FT-450. Firstly, the FC-40 is designed to match a long wire antenna. It will operate from 160 to 6 metres with a 20 metre or longer wire. Secondly, the FC-30 appears to have the same matching range as the ATU-450. Note that neither of these units was supplied for review.

## The operational manual

This runs to a total of one hundred pages and, in general, is well put together, with many very clear diagrams. You will need to keep it handy when setting up the menu items. It is nice to see that a full set of circuit diagrams is included in the manual. Perhaps the only thing that is missing is an actual index. While the table of contents is very complete, a full index could save time looking for an elusive item.

## Conclusions

The FT-450 is an excellent little transceiver. However, it is let down by a few very simple omissions.

- Number one is the curious lack of a tilt bracket to lift the front panel. There is not even one offered as an option.
- Number two is the poor audio response in AM mode. I am sure there are still many of us out there who enjoy listening to AM broadcast stations when the bands are dead. Is a reasonably flat response from 100 Hz to 4 kHz too much to ask for?
- The supplied microphone is very large and has no up/down buttons. Could I suggest the MH-31A8J would have been a much better choice?
- Connecting a linear amplifier other than the very desirable VL-1000 could present a problem. The ten pin mini din plug needed to interface to the FT-450 is not available from Vertex nor from any of the usual electronic parts distributors. I presume that the required connecting cable is

supplied with the VL-1000.

Having said all of that, there is a great deal to like about the FT-450. The overall design is top class. The receiver performance in SSB is top notch. Transmit audio is good, but not outstanding. I would have liked to have tried one that did not have the digital buzz on the transmit audio but one was not available. I gather this has been fixed on later models but how did our review transceiver and many others get out of the factory with a problem like this?

I was curious about the supplied microphone, the MH-67A8J. There is no mention as to just what type of microphone it is. I decided to unscrew the back and take a look. For the huge size of the case I expected a bit more than a 4 mm diameter electret insert on a small circuit board with a microswitch for the PTT, and a couple of steel plates about 25 mm square bolted inside. In spite of the impressive grille on the front, the actual opening for the microphone is a slot about 4 mm by 1 mm. However it produces acceptable audio quality.

The FT-450 has been a pleasure to review. I would like to thank the staff at Vertex Standard for their help answering my questions and of course for supplying the review transceiver.

## FT-450 pricing and options

FT-450 Transceiver	\$1815.00
ATU-450 Internal ATU	
FC-40 Auto ATU	
FC-30 Auto ATU	
VL-1000/VP-1000 1 kW linear	
Extra DC Lead	
Note: the DC plug is not available as a separate item.	
MH-31A8J Hand Mic	
Carry handle	
Mobile bracket	

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### Comment from Vertex Standard (Australia) Pty. Ltd.

Peter,

Thank you to Ron and yourself for giving us the opportunity to have our product reviewed. We apologize for being unable to make a newer version without the digital buzz available for the review. We have no amendments to recommend or comments to publish.

Daniel Cole, Marketing Coordinator