

# The Yaesu FT-450

## HF/50MHz Transceiver

The ability to produce a 1.8 – 28MHz and 50MHz 100W transceiver in a small box is aptly demonstrated by the Yaesu FT-450. It's no heavyweight and would make an ideal transceiver for a holiday or DXpedition.

The only addition would be a 12V power supply capable of 25A, that would increase the overall weight. But when you see the specifications of the FT-450, it really is quite amazing how it all fits into a space that is 229 x 84 x 217mm and weighs no more than 4kg!

The power cable is bulky and the in-line fuses are close to the power supply connections so, cannot be hidden, unless you hide the power supply! However, perhaps that's the idea, as there's plenty of cable. The items would all fit into a padded carrying bag, with, possibly, a wire antenna as well for a trip to an exotic location!

I feel that the FT-450 is not the ideal rig for the home station, especially as the knobs and buttons are getting even smaller. The shape is ergonomically good but for a main station I prefer a much larger transceiver with a tuning knob that's about twice the size as provided on this rig (just a personal choice, for ease of tuning).

The supplied microphone is also larger than the normal and has that new J connector (I think it's horrible). Microphones with the extra controls, up/down, fast tuning, come as optional extras. In the list of the optional extras there's a carrying handle, which struck me as strange!

Looking at the price, the FT-450 is quite a reasonable choice for somebody starting in the hobby and even better if you live in the USA! New in the USA, the FT-450 is under US\$1000. Regardless of the value of Sterling against the Dollar, we still seem to pay the same in pounds as USA based Amateurs pay in Dollars!

### Solidly Constructed

The FT-450 can be compared to my FT-1000MP in size from the photograph in Fig 1. The '450 is solidly constructed in a die-cast aluminium chassis, is well laid-out and clean, without untidy internal cables and wiring. This compact transceiver has a new design to attain that useful and much-sought-after 'simplicity of operation'.

The transceiver has all the important functions easily accessible, in contrast to the multiple controls of previous models. The speaker is mounted on the top cover, so beware



of that if you take the cover off! However, it does unplug, so the cover can be put on one side.

Interestingly enough, the transceiver incorporates technology derived from the recent FT-2000 (I own one of these). As can be seen from the photographs, Fig 2 and 3, the power amplifier (p.a.) uses two Mitsubishi RD100HHF1 m.o.s.f.e.t.s operating in the push-pull mode.

The p.a. unit is built up on one printed circuit board (p.c.b.), which also comprises the transmit low-pass filters (l.p.f.) with their band-switching relays. The p.a. is similar to that employed in the FT-2000 and provides 100W output on all bands.

The receiver is a dual conversion superhet with the first intermediate frequency (i.f.) at 67.899MHz. Here, the 67.899MHz four-pole roofing filter and eight band-pass filters at the radio frequency (r.f.) stage provide excellent suppression of out-of-band interference.

The first i.f. signal, on leaving the roofing filter, passes via the 3SK151 first i.f. amplifier to an image-rejecting second mixer, which down converts it to 24kHz in one step. The 24kHz i.f. drives the digital signal processing (DSP). This unit is an ADI Blackfin Type ADSP – BF531SBST and like most modern transceivers nowadays, the emphasis is heavily on DSP.

The FT-450's backlit liquid crystal display (l.c.d.) shows all data and graphical indications required for effective operator control of the radio. The generously-sized screen also features a chart (in block diagram format) showing which controls and features are activated, including adjustment of the digital (DSP) i.f. filter.

As in the FT-2000, bar-graph displays are provided on the FT-450 for the **Contour**, **Notch**, **DNR** (noise reduction), **Width** and **Shift** controls, and metering for power output, ALC and s.w.r. metering indications. All the controls are simple (as compared to the 9000 and 2000 series). In fact, this transceiver

**Roger Cooke G3LDI enjoys using Yaesu equipment and has much experience with his own FT-1000MP. Here, he looks at a newly introduced transceiver from the same stables.**

has only five knobs, including the main variable frequency oscillator (v.f.o.) dial. This helps to de-clutter the front panel and aim for optimum ergonomic efficiency.

Among other features, a dedicated port is provided for the digital modes, using a 6-pin DIN. It has an 8-pin DIN for connecting to an external a.t.u., a 10-pin DIN for connecting to the optional VL-1000 linear amplifier and a DB-9 RS-232 connector for computer control.

The ATU-450 automatic antenna tuner (a.t.u.), covering all bands 1.8 to 50MHz (160 to 6m), is located in the underside of the chassis. It's an optional extra on the FT-450 and factory-fitted on the FT-450AT version and **Fig. 4** shows the (relatively simple) simple rear panel.

## On The Air

At home, I operate on the air most days and join the Ex-G net on 14MHz, so I replaced my FT-1000MP with the FT-450 review rig and called in as usual. No comments were passed until I asked for a comment on my transmission. The general consensus of opinion was that the audio was not good. This was also the consensus when I tested it with some local stations on 3.5MHz.

In fact, most reports were quite critical of the audio, even when using the tailoring. I was using the MH-67 fist microphone supplied with the transceiver. These are fine for frequency modulation (f.m.) use and obviously are cheap to supply but I think a decent microphone would prevent criticism of the actual transceiver itself.

Personally, I would use a Heil headset with microphone insert. However, it's not easy to change microphones because of the J plug connector and I shall obviously have to construct an adaptor! I think it would be a good idea not to supply a microphone in the first place but put more into the actual audio tailoring so that a good quality microphone could then be acquired enabling an excellent audio signal to be heard.

The tuning knob I have already commented on and the FT-450 would have been easier to tune with a larger version. (This would enable more comfortable fine 'digit' tuning). While considering the main knob tuning, as we use them together, it's also worth mentioning the main display. Looking at a grey-scale TFT-LCD (thin film transistor liquid crystal display) when I already have a colour display on the FT-1000MP, it's obviously different but then again that on the FT-450 is quite adequate in what's shown. It's perhaps not a good idea to compare it to the FT-1000/2000 anyway but as I own an FT-1000 and 2000 its difficult not to! That said, the overall performance of the FT-450 is very good on all modes.

## Using The CW Mode

I then tried the transceiver on the c.w. mode, having wired a temporary plug for the keying jack, as the FT-450's was different to mine. I just tested it first before connecting it to my paddle, holding two pieces of wire, in a straight key mode, (if you could call it that!).

I then sent "test de G3LDI" at a wobbly 15w.p.m. on 14MHz and **W5ZR** called me! How embarrassing, I then had to conduct a QSO holding two pieces of wire! However, it was sufficient to illicit a report on the actual keying. I was happy with the side-tone and **W5ZR** was happy with the note and keying (the transceiver, not mine!) at the other end.

Sensitivity on the FT-450 is good and there is a pre-amplifier that can be switched in and out and this may be used in tandem with a 20dB attenuator. This produces four situations, which can be useful, especially on the lower bands.

The roofing filter, in conjunction with the DSP i.f. provides some interesting selectivity possibilities. It's just a matter of using the DSP/SEL button together with the shift and width controls to set the pass-band and the peak and null just where you want them

**Product** Yaesu FT-450 h.f. and 50MHz transceiver

**Company** Yaesu UK

**Contact** Sales on **(01962) 866667**.

### Pros & Cons

**Pros** The rig is solidly constructed and has a new compact design to achieve simplicity of operation – using only five knobs – and the DSP offers interesting selectivity possibilities. I think Yaesu have a winner here and the price isn't bad either!

**Cons** No carrying handle (required for portable work) and supplied microphone not to my liking.

**Price** £639.99 (£739.99 with a.a.t.u.)

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*Fig. 1: Roger Cooke G3LDI enjoys using Yaesu equipment and the FT-450 for evaluation joined his FT-1000MP in the shack.*

for the mode in use. Using the system does take a bit of practice but it will pay dividends for a new operator to sit and play with the transceiver in conjunction with the handbook for quite some time, becoming familiar with the controls and what can be obtained.

The notch filter and Digital Noise Reduction (DNR) system both help to enhance the s.s.b reception. The DNR system uses 11 different noise-reduction algorithms. Each of these is selectable and each can deal with different noise profiles. Bargraphs give a graphic display of all these selections and of the DSP settings. Metering functions are also bargraphs; Power Out, ALC and SWR are selectable from the Meter/Dim button. Power can be set to any level from 5 up to 100W.

All the normal functions on the transceiver can be set from the extensive menu system, including the DSP microphone equaliser. Once you have mastered the sequence of button pushing, it is fairly straightforward. However, as usual with new transceivers these days, reading the manual is the first mandatory exercise!

Using s.s.b., the audio can be tailored and there is a selection of ten available DSP equalisation settings. The gain can also be adjusted. The transmitted audio can be monitored using the monitor feature, enabling the user to hear any changes in audio tailoring. For DX chasing the flexible split operation, using the VFO-A and VFO-B frequency registers makes life easy. It is also possible to run different bands and modes in each register. Another audio feature is the voice recording, two memories of ten seconds each.

On c.w., it's possible to use a straight key or set up for using

the in-built electronic keyer, which has programmable parameters, speed, weighting, mark/space ratio, pitch, side tone and so on. There is also a programmable c.w. trainer and a beacon feature. However, I would have preferred to see the c.w. jack socket on the rear apron instead of the front panel. It would have been nice to see some c.w. envelope shaping in the menu too. I then tested the c.w. mode with several locals, all of whom said the keying was adequate.

Operation using RTTY is possible using FSK via the data socket on the rear apron. Various shifts are available from the menu. Other data modes, including packet, can be used via the Data socket too. For RTTY it would be advisable to reduce the power as with any of 100% duty cycle modes.

The FT-450 contains 500 regular memories, two **Home** channels – one on h.f. and the other on 50MHz – two special programmed limit memory pairs, one quick memory, and five 5MHz band channels. Memories within the 500 can be organised into ten groups for easy identification, including labelling. There is also a comprehensive memory and v.f.o. scanning system, again all are programmable from the menu.

Other features include display settings, beeper adjustments, automatic power off after non-use for a definable period, and a voice announcement of frequency. Of the optional extras available, I think I would pay a few pounds more for a carrying handle.

I used the transceiver on 50MHz, a band that I don't have equipment for – although I do have an antenna – and it just happened to show signs of activity. I managed four countries, 9A, I, IT9 and T7, all on s.s.b.

I think Yaesu have a winner here, with the few exceptions I have mentioned. It is well designed and thought out, well built and ideal as I have said for portable use, holiday locations and mobile. The price at £639.99 (£739.99 with a.a.t.u.) is not bad either! My thanks to Yaesu for the loan of the transceiver for review.



Fig. 4: The (relatively) simple rear panel.



Figs. 2 and 3: Internal views of the FT-40 circuitry, including power amplifier stage.

## Manufacturer's Specifications

Obviously the figures quoted are not checked, as *PW* authors have no access to the test equipment (calibrated to the necessary legal standards) to qualify or substantiate these in any way. This review, as usual, is an experienced user evaluation. **Editor.**

### General FT-450 Specifications

Frequency Range – Receive:	30kHz – 56MHz
Transmit:	1.8 to 50MHz
Emission Modes:	A1 (c.w.), A3 (a.m.), A3J (l.s.b./u.s.b.), F3 (f.m.)
Synthesiser Steps (Min.):	10Hz (c.w./s.s.b.), 100Hz (a.m./f.m)
Antenna Impedance:	50Ω, Unbalanced
Operating Temp. Range:	-10 °C to +50 °C
Frequency Stability:	± 4p.p.m. from 1 min. to 60 min after power on. @25 °C: 1 ppm/hour
Supply Voltage:	Normal: 13.8V d.c. ±10%, Negative Ground
Current Consumption:	
Squelched:	1A (Approx.)
Receive:	1.5A
Transmit:	22A
Case Size:	229 (W) x 84 (H) x 217 (D)mm
Weight (Approx.):	3.6kg

### Transmitter

Radio freq. power output:	100W @13.8V d.c.
Modulation Types:	Balanced modulator (s.s.b.).
Early stage (Low Level) on a.m and variable reactance (f.m.)	
Maximum deviation (f.m.):	±5kHz (FM-N: ±2.5kHz)
Spurious radiation:	-50 dB (1.8-29.7MHz) -70 dB (50MHz)
Carrier suppression:	>40dB
Opp. sideband Suppression:	>50dB
Frequency response (s.s.b.):	400Hz to 2600Hz (-6 dB)
Microphone impedance:	200 to 10kΩ (Nominal: 600Ω)

### Receiver

Circuit Type:	Double conversion superheterodyne
Intermediate frequencies:	First: 67.899MHz, second 24 kHz
Sensitivity: (c.w./s.s.b., and a.m./ f.m.)	1.8 - 28MHz 0.2μV (c.w./s.s.b) 2μV (a.m./f.m.) - 28 - 30MHz 0.2μV and 0.5μV 50 - 56MHz 0.16μV, 1μV and 0.25μV
(s.s.b./c.w./a.m. = 10 B S/N, FM = 12dB SINAD)	
Image rejection:	70dB
Intermediate freq. rejection:	60dB
Selectivity (-6/-60 dB): s.s.b./c.w:	2.2 kHz/4.5kHz
a.m.:	6 kHz/20kHz
f.m.-N:	9 kHz/25kHz
c.w.-N:	500Hz/2kHz
Audio output:	2.2W (at 4Ω, 10% THD or less)
Audio output impedance:	4-16Ω

### Available Options

YH-77STA Stereo Headphone	FP-1030A DC Power Supply
MH-31A8J Microphone	MHG-1 Carrying Handle
MD-200A8X Microphone	ATU-450 Antenna Auto Tuner
MLS-100 External Speaker	MMB-90 Mobile mounting bracket
SP-2000 External Speaker	