

Equipment Review - The YAESU FT-2400H two metre FM Transceiver

Ron Fisher VK30M
"Galanungah"
Beaconsfield Upper

OVER THE LAST five years or so, the average two metre FM transceiver has decreased in size and weight and at the same time the power output has increased and now averages around 50 watts. As all owners of these transceivers know, all of this adds up to one thing, lots of heat. It's interesting to note that as FM transceivers went from 25 to 50 watts output, the overall size and weight remained much the same. As the overall efficiency remained similar, the heat output just about doubled. Well, maybe the trend is about to change.

Enter the FT-2400H

The new FT-2400H is a 50 watt output two metre transceiver which has reversed this trend. It also offers improvements in other areas as well. But more on this later. It is quite a bit larger and heavier than the FT-212RH. In fact, it could be an interesting exercise to look at how Yaesu two metre transceivers have evolved in size and weight over the last few years. The ten watt output FT227 makes a good starting point. It weighs 2.7 kg and measures 180 x 60 x 220mm and I don't recall ever hearing about overheating

problems with this rig. It still performs well and can be an excellent second hand choice for a beginner on two metres. Next was the FT230. Output was now up to 25 watts, the weight halved to 1.3 kg and the size at 150 x 50 x 174mm. Heating was up with the 230, but still not too much of a problem.

Following the FT230 came an interesting but not well known transceiver, the FT270R/RH. The "R" was rated at 25 watts output, and the "RH" at 45 watts output. The important feature of these rigs was the use of a ducted air flow system with a small blower to keep the air moving. As I have never seen one of these, I cannot comment on just how well the idea worked, but it sure looked good on paper. Next in line was the FT211RH again a 45 watt output transceiver.

Weight was 1.5 kg and the overall size 160 x 50 x 175 mm, or, just 10 mm wider and .2 kg up on the 25 watt FT230. With extended transmissions, the FT211 can get very hot but overall it's not too bad.

Next up was the FT-212RH. Rated at 45 watts maximum output, the overall weight was down to 1.25 kg and the size just 140 x 40 x 160 mm. Compared to the earlier 25 watt FT230 it was both lighter and smaller. Heating with the FT-212RH could be a problem at times.

The new FT-2400H in contrast to the earlier models weighs in at 1.5kg and measures 160 x 50 x 180 mm, a step in the right direction at last. Just how this works out in actual use will be revealed later in this review.

Yaesu claim that the FT-2400H is built to professional standards, and is in fact a special version of their premier range of commercial transceivers. Yaesu also state that the FT-2400H is the first two metre amateur transceiver to take full advantage of the military grade mechanical and electronic construction techniques, which was previously reserved for the top of the line professional grade commercial land mobile transceivers. In fact, it is built to meet the USA MIL-STD-810C for shock and vibration. I must state now that I did not try any of these tests on the FT-2400H.

One thing that the FT-2400H does have is simplified operation. Seldom used controls are situated behind a drop down flap on the front panel.



The Yaesu FT-2400H showing the alpha name display facility.

This leaves only five operational push buttons plus squelch, audio volume, tuning control and power on/off visible on the front panel. The LCD is larger than usual and displays a multitude of information, some of which is quite new and most interesting.

While the frequency readout is larger than average, the "S"/power output bargraph is somewhat smaller than average. But as the "S" meter usually reads full scale on most signals, this is not of great importance. At the three transmitter power output settings, the output scale gives a reasonably good comparative reading. The readout also includes an excellent selection of status indications for many transceiver functions.

The FT-2400H Transmitter Tests

For a comparative test on heating, I set up the FT-2400H and an FT-212RH side by side running into dummy loads and keyed the transmitters on and off at the same time to simulate normal operating conditions. The heat sink on the FT-212RH became too hot to handle much quicker than the FT-2400H, and after an hour of operation, the FT-2400H was noticeably cooler than the FT-212RH. The extra size and weight of the FT-2400H does indeed help with cooling.

The FT-2400H on the Air

If you intend to use the FT-2400H as a home station transceiver, you will need a solid power supply that can deliver a maximum output of 12 amps at 13.8 volts. Used as a mobile rig, your normal car electrical system should take care of the power requirements without trouble. Setting up for operation is simple, but a look through the excellent instruction manual is very desirable. The FT-2400H has a capability of storing thirty memories and any one channel can include, frequency, repeater offset or simplex information, CTCSS encode/decode, DTMF status. I started off by loading the memories with several of the local repeater and simplex channels. With this done, one of the interesting features of the FT-2400H can be used. There is a built in option which enables you to give your frequencies a name. Have a look at the photo and you will see what I mean. Once you have entered the

frequency and offset, you can proceed to give it a name. In the example shown, the Shepparton repeater on 146.650 MHz has been named SHEP. Touch one button and you can have either the name or the frequency. The actual characters of the display are also somewhat larger than usual although the "readability" is not as good as might be expected. I think that the reason for this is due to each segment of the character being longer than usual but no thicker. Also some of the letter characters use somewhat less than ideal layout. Having said that, I think it is a step in the right direction and I am sure we will see more like this in the future.

The transmitter has three levels of power output, 50, 25, and 5 watts. The two lower powers are adjustable either up or down so that the five watt level can be set as low as .5 watt. Current drain at the normal power settings is 12, 9 and 5 amps. Normal transmit coverage is 144 to 148 MHz but the receiver is tunable from 140 to 174 MHz. The tuning steps are user selectable at 5, 10, 12.5, 15, 20, 25, and 50 kHz. I set the FT-2400H up for 25 kHz steps which fits our band plan and enables quick tuning through the range. Current consumption on receive is around 400 mA.

Our review transceiver was supplied with two microphones, the MH-27a8j which has a DTMF keypad on the front and a MH-26g8j which is the standard up/down scanning type supplied with the unit. The MH-27a8j will be an option which can be purchased separately. The MH-27a8j in addition to the DTMF feature also has a couple of transceiver operating functions on the front. Memory/VFO selection and priority channel selector. A small switch on one side allows the entire key pad to be rear illuminated. Both microphones are connected to the transceiver via an eight pin plastic telephone type jack. Just when I thought we had standardised on the eight pin metal connector albeit with several different connections patterns, here is a new one to battle with. If you intend to use the FT-2400H as a base station and would like to use a desk microphone such as the MD1, then you could be in trouble. I wonder if Yaesu intend to make adapters available for this?

On-air tests were carried out in two

ways. Firstly, I transmitted to a friend and then the transceiver was taken to his location so that I could hear just what it sounded like. We both agreed on the result. Firstly the difference between the two microphones was minimal, but both sounded rather spitty on sibilant sounds. Overall we would rate the transmitted audio as fair only. Deviation was rated as good.

Receiver operation proved to be excellent. Firstly though, it should be stated that two options were not installed in our review transceiver. These are the FTS-17A CTCSS tone unit and the FRC-6 DTMF pager unit. This is unfortunate, as I feel many amateurs could be interested in using these units.

Receiver audio quality is good through the internal speaker and very good through a better quality external speaker. I note that Yaesu offer a new external speaker (the SP-7) as an option, and I look forward to testing this soon.

One of the features of the FT-2400H, as sold in Australia by Dick Smith, will be a special microprocessor customised for the Australian band plans. What this means is that if you activate the automatic repeater shift facility, the transceiver will automatically select the correct repeater offset. This feature can be overridden if so desired.

There are 31 memory channels available and these can be used in a wide variety of ways. I have already mentioned the four character display which can be used in conjunction with the actual frequency display. It is also possible to "tune" away from a memory frequency if required, a most useful feature. The memories also can include repeater offset, CTCSS tone information and can be programmed to set band scanning limits. Channel "one" can be used as a priority frequency which is checked for activity every five seconds. Unfortunately, this will only work with one other channel in use. It is not possible for instance to have the transceiver scanning the memories or in band scan mode and have the priority channel checking feature operating. I must admit that I prefer to be able to scan all channels and still have the priority alert working. Perhaps that's one Yaesu might think of for the next model. The scanning system can only be initiated via the up/down but-



The two microphones as referred to in the text.

tons on the microphone. There is no scan button on the transceiver itself.

Front end performance.

Do you get pager interference? The FT-2400H might be just what you are looking for. The front end performance has been improved in several aspects over the FT-212RH. Firstly, there is more front end selectivity, and this is tunable using information supplied by the CPU. The RF stage is an improved dual gate FET system which has better strong signal handling characteristics. The FT-2400H was set up at a location where pagers were a problem with a certain transceiver. The FT-2400H proved to be a great deal less susceptible to interference than the normal rig. It was estimated that while the FT-2400H was not immune from the trouble, it was at least 20 dB better off than our comparison transceiver. In terms of overall sensitivity, the FT-2400H was a few dB worse than our comparison rig, but still excellent in overall terms.

A feature carried on from the FT-212RH is the automatic lighting intensity of the display and control knobs. This is controlled by a photo sensor on the left hand side of the front panel. In theory, this could be a good idea, but in practice, I find it an annoying feature. Often, putting your hand on one of the controls is enough to shade the sensor and suddenly reduce the light intensity. I would prefer the lighting intensity to be adjustable via one of the front panel controls.

It is unfortunate that our review transceiver was not fitted with the CTCSS and DTMF units. It appears from the instruction book that they are

capable of providing some very useful features.

The FT-2400H Instruction Manual

In a word, it's good. Yaesu manuals overall now set the standard. Although not set up in the glossy fashion of the FT1000 or 990, it is very well presented. You might initially get the idea from the coverage of the manual that the FT-2400H is a complicated rig to operate, but nothing could be further from the truth. Most of the basic functions can be mastered very quickly and the instruction book is very easy to follow. The separate circuit is easy to follow, but as is unfortunately the usual thing these days, there is a noticeable lack of technical information. There are however a few pages devoted to basic adjustments such as power output setting and deviation setting. Instructions are also included on the installation of the two optional boards.

The FT-2400H Conclusions

If you are in the market for a top line 50 watt two metre FM transceiver, then the FT-2400H must come high on your shopping list. Being somewhat larger than average, it operates at a more moderate temperature and should have a much longer life. The solid construction will also help in this regard. The larger display could be an advantage, although the smaller than average "S" meter and power output bargraph is a small disadvantage. The variable LCD illumination may or may not be to your liking. The memory naming facility is an interesting feature which is certainly a first for Yaesu. I wonder if this might be carried on to HF equipment. I would think it could be most useful on a HF communications receiver, but perhaps six letters would be better than the four on the FT-2400H.

All in all, a very innovative rig which

puts Yaesu right in the front line of VHF transceivers.

Specifications

General

Frequency range: 144-148 MHz, Tx, 140-174 MHz Rx
 Channel steps: 5, 10, 12.5, 15, 20, 25 & 50kHz
 Frequency stability: (10ppm (-20 to +60 degrees Celsius)
 Mode of emission: F3
 Antenna impedance: 50 ohms, unbalanced
 Supply voltage: 13.8V DC +/- 10%, negative ground
 Current consumption (typical): Rx: 400 mA, Tx hi/med/low: 12/9/5A
 Operating temperature range: -20 to +60 degrees Celsius
 Case size (WHD): 160 x 50 x 180mm (w/o knobs)
 Weight: 1.5kg (3.3lb)

Transmitter

Output power (high/med/low): 50/25/5W
 Modulation type: variable reactance
 Maximum deviation: +/- 5 kHz
 Spurious radiation: less than -60dB
 Microphone impedance: 2kΩ

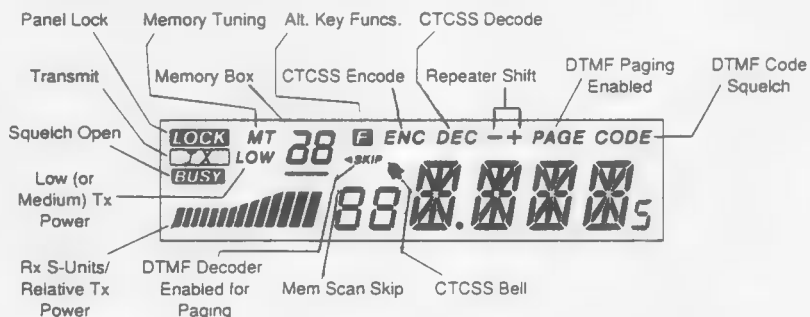
Receiver

Circuit type: double conversion superheterodyne
 IFs: 21.4MHz & 455kHz
 Sensitivity (for 12dB SINAD): better than 0.2 μV
 Selectivity (-6/-60dB): 12/30 kHz
 IF rejection: better than 70 dB
 Image rejection: better than 70 dB
 Maximum AF output: 2W into 8 ohms @ 10% THD

Specifications subject to change without notice or obligation.

The FT-2400H will retail for \$699-00 and will soon be available from most Dick Smith outlets.

Our thanks to Dick Smith Electronics for the loan of our review transceiver. ar



The Yaesu FT2400H front panel display as shown in the manual.