



The Yaesu FT-1000 Series

Don Field G3XTT offers a guide to the ever-popular FT-1000 series of transceivers from Yaesu, along with their major accessories.

Sadly, with the passing of Chris Lorek G4HCL, our bi-monthly *Buying Second-hand* column went into abeyance. However, there were a few topics that Chris and I had discussed as suitable for the column and I really didn't want to let them slide because I feel they will be of interest to readers.

The first, and close to my own heart because I have owned and used most of them, is the Yaesu FT-1000 series of rigs. Each of them was undoubtedly a top-of-the-range transceiver at the time they appeared but the first FT-1000 was launched close to 30 years ago and the last was made over 10 years ago so they certainly qualify as second-hand buys. However, each and every one is still an excellent basis for an HF station.

The Range

Let's start with an overview of the various models. The first was the FT-1000D, a radio that I consider a true classic

nowadays. Then came the FT-1000MP. Finally, the FT-1000 MkV and the FT-1000 MkV Field (commonly referred to simply as the Field). I'll cover all of them here, along with their principal accessories and add-ons.

FT-1000D

The FT-1000D, **Fig. 1**, was introduced in 1990 to wide acclaim and was Yaesu's answer to the very successful TS-930/940/950 from Kenwood (I hope to cover that series of transceivers on a future occasion). Indeed, I bought mine, **Fig. 2**, to replace a Kenwood TS-940 that had served me well for several years. This was a high-end fully analogue radio to complement the FT-990 (single receiver, 100W output) and the first to have an element of digital signal processing (hence the 'D').

What the FT-1000D offered was 200W output with an internal power supply, a second receiver with separate VFO knob (very useful for chasing DX and in serious contest operation) and the facility for

adding a wide selection of additional filters of various bandwidths, both for the main and sub-receivers. By fitting an additional bandpass filter (BPF-1) unit, the sub-receiver could monitor a different band to that of the main receiver, something we consider normal nowadays but unusual at the time. It meant, for example, that when used in HF Field Day (as I did with the Reading club over several years), the operator could run on, say, 20m but easily check for openings on the 10m band where contacts scored double-points.

The FT-1000D also included a computer interface, albeit you needed to buy or build an external level converter to interface to RS232 (the Yaesu unit is designated FIF-232C and you will still see them for sale second-hand from time to time). Given that computer logging was becoming popular in the late 80s/early 90s, this was an important feature. And as well as the main antenna input(s) (normally one but two with the added BPF-1 unit), there was a separate receive antenna input, handy when using, say, a small loop

or other dedicated receive-only antenna. The FT-1000D also featured a built-in ATU, which handled VSWRs of up to 3:1.

The main receive architecture was a quad-conversion superhet (triple conversion for FM) with intermediate frequencies (IF) of 73.62 and 8.215MHz then down to 455 and 100kHz. The sub-receiver had three IFs at 48.64MHz, 7.66MHz and 455kHz. The main reason for introducing such a high first IF was to enable Yaesu to offer full general coverage receive over the whole HF spectrum, something that customers were increasingly demanding (earlier generations of transceiver had tended to be amateur bands only).

The Yaesu range of after-market filters (for the 455kHz IF) included 2.4 and 2.0kHz SSB filters and 600, 500 and 250Hz CW filters. However, once the FT-1000D's popularity became assured, high-quality filters were also available from other suppliers such as the Fox Tango Corporation (and, later, IRC and then INRAD).

Other Yaesu options included the DVS-2 digital voice synthesiser, useful in voice contests if you are repeatedly calling CQ, a high-stability temperature-controlled crystal oscillator, the TCXO-1, normally only needed for data mode applications and the SP-5 external loudspeaker (which incorporated some further audio filtering).

Other third-party modifications and additions included a modification to round off the CW keying, which could be somewhat 'clicky'. I recall adding this mod to my own rig (which I owned for well over ten years from 1992 because nothing came along during that time to tempt me to change until I eventually weakened and bought a second-hand FT-1000 MkV).

The FT-1000D was certainly not a budget radio. I recall that in its basic form the list price was £2995 and the addition of options such as filters and the DVS-2 could take this to well over £3000, which would equate to around £5000 nowadays. And adding filters (something that we generally don't have to do with modern rigs, where the filtering is all done by clever algorithms in the DSP software) was certainly a worthwhile investment, especially for CW operators wanting the best selectivity. Mind you, it took very many years, in my opinion at least, before digital signal processing offered the same clean filtering that crystal and mechanical filters produced. I do recall reviewing an early DSP rig for the magazine *Ham Radio*



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Today and noting that a weak DX station was 100% copy on my FT-1000D whereas on the DSP rig all I could hear was splatter from the pile-up calling the DX station, even though that pile-up was 1kHz or so higher in frequency. With current radios, that wouldn't be the case, I should add – DSP has come a very long way since then.

Good second-hand FT-1000Ds don't come up that often and still command prices of several hundred pounds, especially if they have a full set of filters. The downside is that spares are unlikely to be available nowadays but my own radio bore some rough treatment over the years I owned it (being taken several times to the Channel Islands for contest operations, for example) and never faltered. I eventually sold it to a fellow club member who, so far as I know, still uses it.

There is lots of additional information on the internet (Google is your friend), including the original manual, and the rig was reviewed by **Peter Hart G3SJK** in the June 1991 issue of *RadCom*.

Fig. 1: A modern classic, the original FT-1000D. Fig. 2: The author's station in 1992 – FT-1000D, Kenwood TL-922 amplifier, Kenwood monitor scope, FT-726 (for 6m, 2m and 70cm) and (out of sight on shelf above) Icom IC-735 for expedition use. The keyboard connects to a 286-based PC (out of shot) – yes, I had already been computer-logging for several years at that time. Fig. 3: The FT-1000MP.

FT-1000MP

The FT-1000MP, **Fig. 3**, was introduced in 1995 to replace the FT-1000D. This was a 100W rig with (AC version) or without (DC version) an internal power supply. Either could, though, be run from an external 13.8V supply for mobile or portable operation. It covered the same frequency bands as the FT-1000D and, again, featured a second receiver. However, it introduced what Yaesu called Enhanced Signal Processing (EDSP) technology, **Fig. 4**, taking the use of DSP a step beyond what had been included in the FT-1000D. It still had traditional filters but the EDSP added a

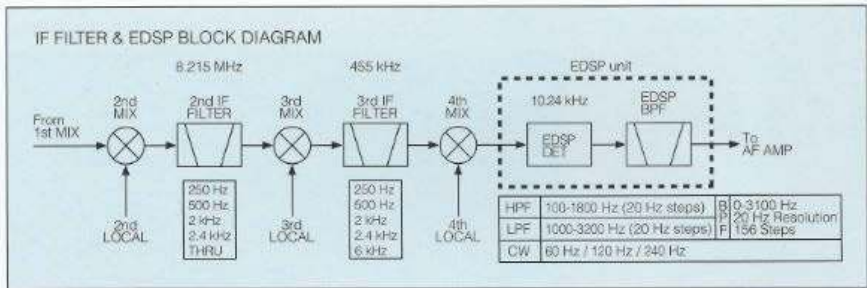
Fig. 4: FT-1000MP EDSP, taken from the 1998 Yaesu catalogue. Fig. 5: The FT-1000MP MkV along with FTV-1000 6m transverter. The MkV is distinguishable by the large heatsink to deal with the 200W power level.

further level of selectivity and noise reduction. I recall the first time I used one, at a friend's station in an SSB contest, being impressed by the way the FT-1000MP could 'take out' an interfering carrier in the middle of the passband without causing much distortion to the received SSB signals, something that would be impossible with traditional filtering.

Other new features included shuttle/jog tuning – an outer ring around the main tuning knob, which allowed the user to rapidly tune the band rather than having to tediously spin the tuning dial. The other obvious difference compared with its predecessor was that a number of the functions were now accessible by menu control – I do recall that this gave us some issues on a major DXpedition because team members who owned one of these radios would change some of the menu settings to whatever their particular preference might be. The next operator to sit at the radio would then wonder what was going on because the radio felt 'different'. We had to make it a team rule to leave everything alone!

For computer interfacing, the FT-1000MP incorporated an internal level converter so had a direct RS232 connection. A Band Data port also allowed ready access to band information for, for example, remote antenna switching or interfacing with the VL-1000 linear amplifier. The front panel, rather than featuring a traditional moving coil meter, had a bargraph display for signal strength and other measurements. The frequency display also carried a lot more information than its predecessor. The various add-on options were much as with the FT-1000D – high stability crystal oscillator, various additional filters, external loudspeaker and DVS-2. The optional FH-1 remote keypad also allowed direct access to various menu features, to permit rapid selection of features pre-programmed by the user. The FT-1000MP also had a low-level transverter socket for driving external VHF transverters and could have the display mapped to the transverter frequency.

The FT-1000MP quickly achieved popularity and many are still in use. They frequently appear second-hand too and make an excellent basis for a high-perfor-



EDSP™ operates in transmit and receive modes, producing enhanced signal-to-noise ratio and improved intelligence recovery on both ends of the communication path. EDSP provides 4 random-noise reduction settings, enhanced audio intelligibility with 4 voice response equalization programs, razor sharp CW band pass filters, and an automatic notch filter which identifies and attenuates carriers or heterodynes. Band pass selectable contour filtering offers high, mid, and low cuts.

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mance HF station. Second-hand prices vary from around £500 to £700 depending on what filters are fitted, the general condition of the rig and, indeed, whether the original packaging, microphone and so on are still to hand.

The FT-1000MP was reviewed in the January 1996 issue of *RadCom*.

Yaesu VL-1000 Linear Amplifier

Before moving on to the later models in the FT-1000 series, I wanted to mention the VL-1000 Quadra linear amplifier. This was introduced to complement the various Yaesu rigs although it could equally be used with transceivers from other vendors and covered a wide frequency range from topband to 6m. But it did and does interface very nicely with Yaesu equipment, allowing two transceivers and up to four antennas to be left connected, switching conveniently between them (the antennas can be set up to connect automatically when the relevant band is selected on the transceiver and the transceiver is selected by way of a switch on the front panel). The Quadra runs up to 1000W out (500W on 6m), rendering it very comfortable (cool) at the UK 400W power level, even when in use for data modes or for extended operation in contests or on a DXpedition.

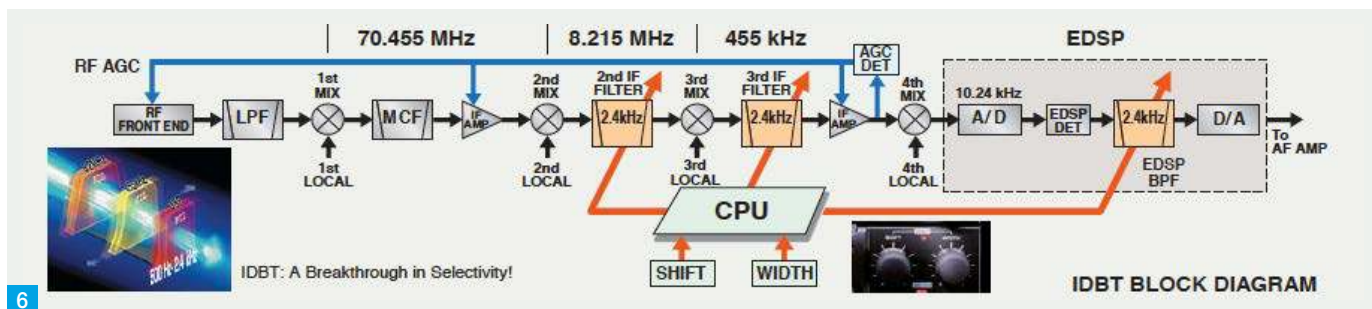
The VL-1000 comprises two separate units, the RF deck and power supply. The power supply can conveniently be located away from the operating desk if required.

FT-1000MP MkV

The FT-1000MP MkV, **Fig. 5**, introduced in 2000, as its names suggests, was a successor to the FT-1000MP. However, don't be fooled. There was never a Mk2, 3 or 4. The 'V' designation referred to five areas of improvement/enhancement compared with its predecessor (I suspect 'not a lot of people know that!'). These were:

- Improved electrical performance.
- Integrated Digital Bandwidth Tracking, IDBT, **Fig. 6**.
- Higher Transmit Power.
- Class-A PA.
- Separate 30V power supply.

It could be argued that most of these enhancements were irrelevant to many users. If you already use a linear amplifier, for example, the increase of transmit power from 100W to 200W doesn't add anything (but the MkV is readily distinguishable by the large heatsink fins, top rear, to deal with the higher power level). I also always wondered (I did own a MkV for several years) how many owners took advantage of the Class A PA facility



(offering improved IMD – intermodulation distortion) and the external power supply was a necessary change simply to accommodate the higher voltage and current requirements of the 200W PA. The improved electrical performance and digital bandwidth tracking, though, were a result of the transceiver coming along five years after the FT-1000MP and therefore benefiting from better DSP capabilities (our amateur radio transceivers tend to follow military and commercial DSP by several years, as the capabilities improve and the prices fall).

Again, the main features are very similar to the previous transceivers in the FT-1000 series, offering a main and sub-receiver with a superhet architecture, mixing to a high first IF. Yaesu also included a so-called high-Q VRF (Variable RF Filter) preselector, shades of Q-multipliers of old! (This feature of a Hi-Q VRF pre-selector was further developed in the later FT-2000, FTdx5000 and FTdx9000 transceivers as the μ (Mu) Tuning Kits for the 160, 80/40 and 30/20m bands). The purpose of all this additional filtering was to prevent very strong signals (for example, from a local broadcasting station or, in the case of a big contest station, from adjacent high-power transmitters operating on other bands) from getting into the receive path and affecting the weak signals that the user was trying to hear.

Once again, accessories included various additional filters, external loud-speaker, FH-1 remote keypad and two TCXOs, depending on just how stable you needed the frequency to be (The TCXO-4 offering ± 2 ppm stability and the TCXO-6 ± 0.5 ppm).

The FT-1000MP MkV was reviewed in the October 2000 issue of *RadCom*. Second-hand models in good conditions with a full set of filters still sell for close to £1000.

FTV-1000

Introduced alongside the FT-1000MP MkV was the FTV-1000 transverter for the



6m (50MHz) band, see Fig. 4 again. This interfaced seamlessly with the FT-1000MP MkV, drawing its power from the shared external power supply to put out a very handy 200W of transmit power on 6m.

FT-1000 MkV Field

The MkV Field, Fig. 7, came along after the MkV and, I suspect, was a recognition that not all users wanted a 200W radio. The Field offered 100W output with an internal AC power supply but which could also be run off an external 13.8V DC supply, for use, for example, on remote DXpeditions or Field Days where the only supply was a car battery or similar. In all other respects, as far as I am aware, the Field was essentially the same as its bigger brother. However, when using the optional FTV-1000, it was necessary to use a suitable higher power PSU, because the internal power supply of the Field had insufficient capacity (thus, the FP-29 PSU that came with the FT-1000MP MkV was also sold separately for use in this situation).

Roofing Filters

One of the limitations, at least as far as the more demanding operators were concerned, of the FT-1000 architecture was the high first IF. While this was chosen for good reasons, when the early FT-1000 models appeared filter technology was such that no narrow filters were available to work at that frequency. Thus, the first filters allowed in strong adjacent signals, which could then cause problems further down the receive chain. Later, filter manufacture improved and various third

Fig. 6: Block diagram of the IDBT feature, introduced in the FT-1000MP MkV. Fig. 7: The FT-1000MP MkV Field alongside the VL-1000 Quadra linear amplifier.

parties sold narrow filters for that first IF. These were originally sold as just that – first IF filter – but have, over the years, become colloquially known as roofing filters because they put a protective ‘roof’ over the following stages. For the best performance on narrow-band modes (CW and data modes), having such filters fitted is definitely worthwhile.

FTdx5000

To bring the story up to the present, the FT-1000 line was eventually discontinued by Yaesu, to be followed by the FT-2000, FTdx9000 and, in 2010, by the excellent FTdx5000 range of transceivers. The latter has many of the same features as the radios I have been describing and, for the time being at least, will remain on sale in parallel with the recently-launched FTdx101 series so that buyers have the choice between traditional superhet and SDR architectures. The FTdx5000 can also be a superb second-hand buy but, at £2000+, is probably beyond what most amateurs would consider as a second-hand purchase, albeit that is half of what they originally sold for (but the new price has been discounted somewhat in the last two or three years).

Finally, my thanks to **Paul Bigwood G3WYW** of Yaesu UK for putting me right on some of the history of this classic series of radios – any errors are entirely mine!