REVIEW

OPERATOR'S REPORT
THE YAESU FT-7B

The FT-7 is a Yaesu transceiver well known to most readers. Until recently it was available at the bargain price of $389. Now the FT-7B is available. This article reviews the FT-7B and compares it with the FT-7.

The Yaesu FT-7B

GENERAL

The FT-7B is a small compact rig of about the same size as the older FT75/FT75B series. It uses the same case as the FT7 and is only 30 mm deeper due to the addition of an external heatsink for the larger PA. The transceiver runs a nominal 100W input, is completely solid state and does not require adjustment of tune and load controls as do rigs with valve PAs. The receiver is almost identical to the FT-7 and is therefore very sensitive and provides a generous 3W of audio to cope with the usual background noise when mobile. The operator has the choice of AM as well as CW and SSB operation.

TECHNICAL FEATURES

The transceiver operates on the 80 through 10m bands. Unlike the FT-7 a full 2 MHz coverage is provided for 10m. The VFO is tuned by a large centrally placed knob and covers 500 kHz. The scale has 1 kHz divisions. Once calibrated the readout error is less than 1 kHz. One revolution of the tuning knob covers 16 kHz. A 100 kHz calibration signal, derived from a 12.8 MHz crystal, is provided. Both receiver and transmitter use fixed and tunable bandpass circuits at signal frequencies. Both the receiver RF amplifier and PA driver circuits are peaked by a single knob labelled TUNE.

A clarifier is provided to allow reception of signals up to 3 kHz either side of the transmitted signal.

As with the FT-7 semi-break-in CW operation with sidetone is provided. An audio filter has been added and this is a worthwhile feature for CW reception, as it has a nominal 80 Hz bandwidth.

Although the FT-7 could be used with an external VFO this option is not available with the FT-7B but has been replaced by the ability to use the YC-7B remote digital display of frequency. This display can be mounted in a more convenient position for the mobile operator than under the dash with the transceiver.

The RF drive is adjustable, an important feature for AM operation and for the Novice CW operator. An effective noise blanker is provided and another feature not found in the FT-7, a 20 dB RF attenuator, has been added. Although the power rating has been increased by a factor of five and many features added, the weight has increased by only 0.5 kg. It appears that there was a little room left in the FT-7, after all.

CIRCUIT DESCRIPTION

The incoming signal passes through a tuned circuit and is amplified by a dual gate MOS FET which has AGC applied. The amplified signal passes through a bandpass filter and a buffer amplifier to a balanced mixer using Schottky barrier diodes. This gives excellent sensitivity and a low noise figure, most noticeable on 10m, and a high degree of freedom from cross-modulation. The IF is at 9 MHz and the mixer output is coupled to a monolithic filter to give some modest selectivity before passing through an amplifier and a diode noise gate. An 8 pole crystal filter is used to obtain excellent selectivity. The selectivity figures claimed are the same as claimed for most modern transceivers available in Australia, namely 2.4 kHz at —6 dB and 4.0 kHz at —60 dB. Further amplification follows before the signal is detected by a ring demodulator and then passed to the audio stages. An IC provides up to 3W output into a 4 ohm speaker.

For CW reception the audio filter is switched in to give an 80 Hz bandwidth at —6 dB. The centre frequency can be adjusted once the cover has been removed.

There are several unusual features. For example, the noise blanker has a separate mixer and a 455 kHz IF coupled from the output of the main mixer prior to the first filter. There are no adjustments for threshold level, however the blanker was found to work well in both base and mobile situations. The marker generator uses a single IC to divide the 12.8 MHz crystal oscillator signal down to 100 kHz. Coupling to the antenna terminal is via a diode switch. Almost all the RF signals are diode switched, a notable exception being the antenna changeover, which uses a relay.

The VFO tunes 5.0 to 5.5 MHz and the adjustment for calibration is done with a varicap diode controlled by a lever control situated below the main tuning knob. Except on 80m the VFO is premixed with a crystal oscillator before being applied to the Schottky diode balanced mixer. This mixer, along with the filter and part of the IF amplifier, are used for both transmitting and receiving.

For SSB transmission a single IC amplifies the microphone output and drives a diode ring modulator. The resulting 9 MHz signal is amplified, passed through the crystal filter and on to the Schottky diode mixer. After amplification by a dual gate MOS FET, at what is now the signal frequency, the signal passes through the same bandpass filter used in the receiver to a broad-band pre-driven amplifier. This is coupled through a tunable LC network to the PA.

The PA consists of 4 RF transistors operating in a broad-band circuit to produce a nominal 50 watts out. The two output transistors operate in class B in a push-pull circuit using broad-band transformer coupling. Negative feedback is used for the three stage amplifier to reduce distortion. Thermal run-away is prevented by bias diodes mounted on the PA transistors. Harmonic output is reduced by means of a low-pass filter, one for each band, selected by the band-change switch.

A frequency independent directional coupler is used to sense both forward and reflected power. The forward power is used to provide ALC operation and prevents the output being pushed beyond limits. The ALC is inhibited from operating until the output reaches a pre-set level in excess of 50 watts. Any attempt to increase power beyond this level causes the IF gain to be reduced. When the transmitter operates into a mismatched load the reverse power also causes the gain and hence the output to be reduced. The reduction is negligible for a VSWR of 1.5 : 1 but reaches 50 per cent at 2 : 1 and the output is reduced to 20 per cent at 3 : 1. A separate ALC circuit is used for AM operation. This uses a simple diode voltage-doubler circuit and is followed by an additional PI filter for harmonic suppression.

Most of the circuitry is easy to follow and the majority of the components are fitted to 14 plug-in PC boards. This should make servicing very easy. The instruction manual supplied is adequate with clear print and diagrams, although care is needed when tracing interconnections on the main circuit diagram. A total of 86 transistors, 83 diodes and 7 ICs are fitted inside this little rig. A modification is available to provide operation at Novice power levels.

ON AIR TESTS

The receiver showed itself to be very sensitive and was noticeably better on 28 MHz than a FTDX401, which was used as a standard for comparison. The immunity to cross-modulation seemed to be the same. The unit tested showed a maximum dial error of 300 Hz when checked at five 100 kHz points. The calibrator signals were consistently strong on all bands. Power output was measured at about 60 watts on all bands, for a 13.5 volt supply.

The CW sidetone level was too loud and when the case was opened the adjustment was found to be fully up. It was a simple matter to reset it; it seems to be factory policy to set it right up. Incidentally, as with the FT-7, the covers fit very tightly and need assistance in removal.

There is a generous amount of microphone gain resulting in considerable compression due to ALC action. An input in excess of 130 watts was recorded.

The rig appears to be built for the installation on the operator's right (left hand drive vehicles), as the gain controls and microphone are on the left. Otherwise the controls are well laid out and easy to use and precise in action.

For mobile tests the rig was coupled via an ATU to a 28 MHz whip and operated on 28 MHz. For tune-up the rig was switched to CW and the input set to about 10 watts until the ATU adjustments were completed. Briefly the set performed well and in known poor locations the extra power over the FT-7 was a great asset. Tests were run with both fixed and mobile stations in the Melbourne area. Performance was excellent even in heavy traffic where the noise blanker proved to be quite adequate.

More extensive tests were carried out in the quiet of the shack using the set as a base. An inverted trapped dipole was used on 40 and 80m and a TH6DX for the other three bands. Band conditions were only fair yet three lengthy QSOs were easily held with ZS stations on 15m. All three ZS stations were running 200 to 300W out and gave reports that varied from 1 S unit less to 1 S unit more than the reading on the FT-7B's meter. Shortly after an 0E8 using an FT301D was worked with 5 x 7 both ways. Nine European stations were worked on 28 MHz and reports up to S8 were obtained. A number of other stations were contacted on other bands. In all cases the reports were complementary and under weak signal conditions the reports were better than might be expected for a 100 watt rig. The recovered audio was of good quality, very good in fact, when the size of the inbuilt speaker is considered.

CONCLUSIONS

The FT-7B is a fine, compact rig. It does not have some of the features of the top-of-the-line sets, for example there is no speech processing. It is of course only half the price of these sets and if desired these facilities can often be added externally. The extra power over the FT-7 is most useful and makes the rig useful for serious DX work. The current drain is modest and allows for extended operation from a stationary vehicle without the fear of a long walk home.

It represents good value for money and appears to have serious competition in the market only from the TS120S. It is a rig worthy of consideration whether it is to be your first rig or whether you are trading in your old FT200. The FT-7B gives a good account of itself in both mobile and base use.

The unit tested was kindly made available by Bail Electronic Services. ■

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