A Review of the Yaesu FRG-7700 Receiver

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The Yaesu Corporation has over the last few years established itself as a leader in the field of general coverage communications receivers. The original FRG-7 was the first receiver to incorporate the Wadley Loop principle in a popular priced receiver that actually looked and handled as a communications receiver should. Many might question this and suggest that the South African produced Barlow XCR-30 was the first. However, while this was certainly an excellent all wave receiver, it could not be called a communications receiver in the true sense of the definition. Why Barlow never went ahead with their rumoured version of the XCR-30 will perhaps never be known, but they certainly missed the boat. Yaesu undoubtedly saw the opportunity and came out with the incredibly successful FRG-7. This set the standard for some years. The updated FRG-7000 did not appear to achieve the popularity of the earlier model. The new FRG-7700 sets a new standard and we predict that it will be a top seller for Yaesu.

Let's take a good look at the FRG-7700 and see what it offers the ardent SWL or amateur who requires a good general coverage receiver. Operation has been greatly simplified with the elimination of the preselector tuning. This is now taken care of electronically along with the MHz selector switch. An LED digital readout indicates frequency to the nearest one kHz point. This readout also doubles as a clock. Certainly a first in the popular priced receiver is the optional memory unit which will allow up to 12 frequencies to be programmed for instant recall. Unfortunately our review receiver did not have this feature included, so we are unable to report on its actual operation.

Another first is the provision of all mode reception which includes not only AM, SSB and CW but also FM complete with squelch control. The addition of a simple converter for your favourite VHF band will now give all mode coverage. Perhaps in the future Yaesu might even produce a suitable device to give general coverage up to say 200 MHz.

One of the slight problems with the older receivers using the Wadley Loop system was the strong internally generated carrier on each MHz point. The new receiver has changed to a PLL generated heterodyne circuit coupled to a 48 MHz first IF which completely eliminates the problem.

Broadcast band DXers on both short wave and medium wave are well taken care of with three positions of selectivity, 12, 6 and 2.7 kHz at the 6 dB points. SSB selectivity is also 2.7 kHz at 6 dB with a rather wide 8 kHz at the 50 dB point. FM bandwidth is rated at 15 kHz.

Other features are: AGC fast or slow selection, noise blanker, dial light and frequency display dimmer, constant output record jack, variable RF attenuator and clock switching for the receiver and external accessories such as a tape recorder. A nice feature is a band switch segment that allows sequential switching of all the amateur bands, including the new WARC allocations.

CIRCUIT FEATURES

Antenna input connections are via an SO-239 coax socket for 50 ohms inputs or via separate push down terminals for long wire antennas for either short wave or broadcast band/long wave reception.

The front panel attenuator is connected between the antenna and the input to the front end band pass filters. These are automatically switched for the following ranges: 150 kHz to 1 MHz, 1 to 2 MHz, 2 to 4 MHz, and 4 to 8, 8 to 16 and 16 to 30 MHz.

The RF stage, a 3SK73GR dual gate MOS FET is followed by a buffer stage into a balanced first mixer using two FETs. A double conversion system is used converting first to 48 MHz and then 455 kHz with both heterodyning signals supplied from the P11 system.

WIA

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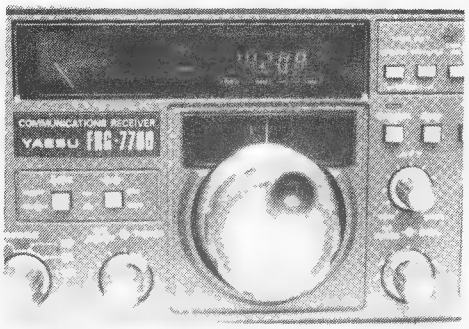


View of digital read-out S meter.

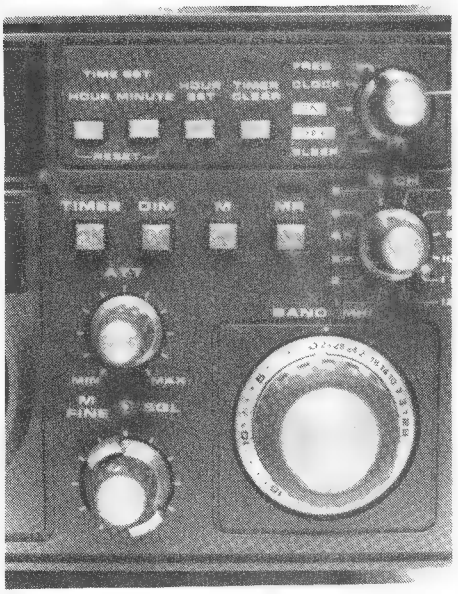
The 48 MHz IF has a 20 kHz bandwidth to reduce cross modulation effects. This is obtained from a special 48 MHz crystal filter. The second mixer is also balanced but this uses two dual gate FETs. Yaesu designers have gone to considerable trouble to keep spurious signals to a minimum. A second 20 kHz filter follows the second mixer at 455 kHz to give improved noise blanker operation. Three ceramic filters are switched by the front panel mode switch to obtain the SSB and three AM bandwidth positions. In the FM mode, output is taken from the 455 kHz IF section at the 20 kHz filter and then taken to a separate FM IF and discriminator circuit. The audio output is rated at 1.5 watts output and is fed to either the internal speaker or to a 3.5 mm jack for an external speaker or to a front panel mounted ¼ inch phone jack for headphone output.

THE FRG-7700 IN USE

The receiver is simple to operate and it takes only a short time to become familiar with the various controls. A quick check on the standard broadcast band showed up excellent quality AM reception. Dropping down to 398 kHz to listen to the terminal information from the local airport distant about 15 km provided a surprise. I could not locate it through the broadcast cross modulation. My old (very) tube type receiver pulls it in loud and clear. Things improved as the receiver was tuned higher and once above 2 MHz, cross modulation performance was rated as excellent. About this time, I noticed that the dial and S meter illumination was rather dull. I pushed the dim button and it almost went out. Please, Yaesu, boost up the dial illumination. The tuning was smooth and very free of backlash with a similar feel to the FT-101Z. But a surprising thing is the very non-linear tuning. The tuning rate varies almost two to one, depending on which part of the range you are in.

The low frequency end of the scale to about the 300 kHz point covers almost twice the scale length as compared with the middle section. The action of the RF attenuator was somewhat ineffective. It didn't do anything to help the cross modulation mentioned earlier on the low frequency band and wasn't needed on the short wave end. A more useful control would be an RF gain of the threshold type, similar to the FT-101Z. However full marks to the AGC fast/slow switch and an excellent tone control that provided adequate high frequency cut. This control is ganged with the audio gain control but one may be used without effecting the other. Frequency readout was checked and found to be spot on when in the AM mode but an error of around 1.5 kHz occurred when receiving SSB due to the fact that the BFO oscillator is not counted for the frequency readout.

We compared the sensitivity with an FT-101Z and found that any signal copiable on the 101 was there with equal readability on the 7700. But on the higher frequency bands the S meter of the 7700 was very



Band switch showing separate amateur band and general segment.

reluctant to move off the stop. It took something like an S 7 indication on the 101Z before the meter of the 7700 would show any sign of moving. It would seem that the overall gain of the receiver is just a bit too slow. The general resolution of SSB signals was excellent and the AGC action in the slow mode ideal.

The receiver was checked for spurious signals and found to be very clean. Only two of any significance were found, one at 18.675 MHz, the other at 23.572 MHz and both of these all but disappeared with the antenna connected. There were others audible with the antenna disconnected, but quite inaudible with the antenna on.

Perhaps one other small point. Why not a 24 hour clock display ,or better still a choice of 12 or 24 display?

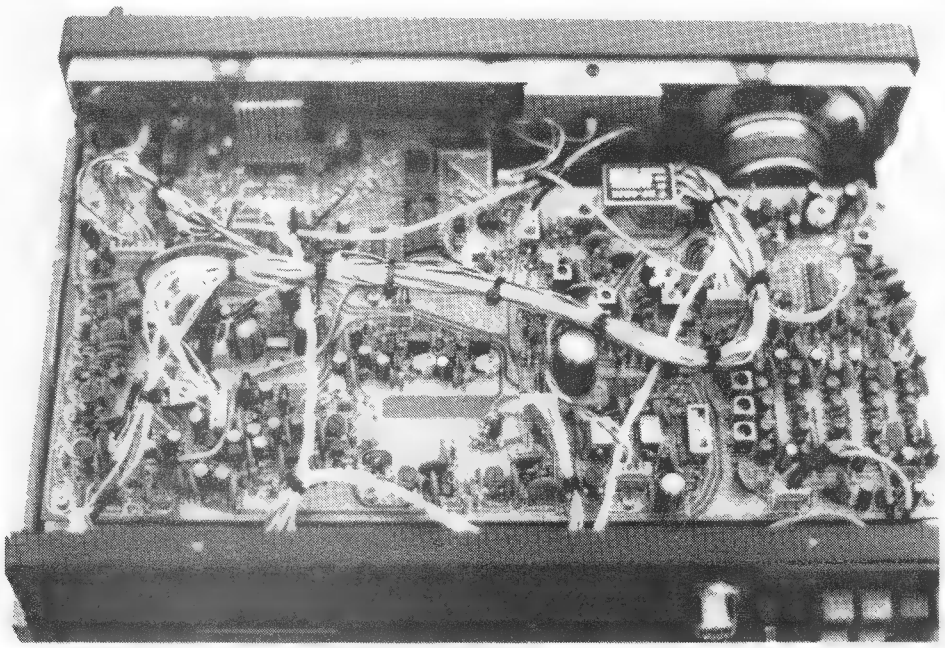
All in all the 7700 proved to be a smooth performer at which only minor criticisms can be levelled. I am sure that Yaesu will sort these out in the near future.

INSTRUCTION BOOK

It seems that the Yaesu instruction books are getting better all the time (perhaps the others are getting worse).

There is plenty of well illustrated information on operating the receiver. But best of all, plenty of data on maintenance and alignment. While it is probably true that most people would not attempt to align their receiver, this section does a lot to help owners to understand the operation of their receivers. There is also an excellent description of the circuit.

A full parts list and clear schematic diagram is included. Our receiver was supplied by Bail Electronics of Wangaratta. ■



Top view of receiver.

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