

THE YAESU FRG-7

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A lot has been said about the Yaesu FRG-7 in recent DX bulletins. Some of the comments are favorable, while others are unfavorable; and some actually conflict with one another. This review, a "hands on" evaluation of the FRG-7 and a comparison with the HQ-180A, will hopefully clear up some of the confusion.

The FRG-7 is a triple conversion superheterodyne receiver which tunes from 0.5 to 30 MHz. The receiver's list price is \$299, although some mail order outfits, such as Gilfer, offer it for \$20-30 less.

OPERATION. The FRG-7, affectionately known as the frog, was obviously designed with portable operation in mind. It is small in size (13.375"W x 11.25"D x 6"H) and weighs only 15.4 lb. It has a handle on the right side of the cabinet and rubber feet on the left side. The receiver can operate from any of three power sources: 110 v.a.c., 8 "D" cells (mounted in an internal battery holder), or an external 12 volt d.c. power supply. The receiver has a built-in diode switch which switches to battery power when a.c. power is lost.

Stations are tuned in by adjusting the MHz control (which has marks every 1 MHz from 0 to 29 MHz) and the main tuning control (which tunes from 0 to 1000 kHz with marks every 10 kHz). A light-emitting diode (LED) is next to the MHz control; if the LED is not illuminated, the local oscillator circuitry is operating properly. A small knob next to the main tuning control is used to slide the dial marker back and forth for calibration purposes. A preselector control and bandswitch are used to tune the receiver's r.f. stage to the desired frequency. So if, for example, you wish to tune in a station on 1540 kHz, set the MHz control to "1" and verify that the LED is not lit. Then set the MAIN TUNING control to "540". Set the bandswitch to 0.5-1.6 and peak the preselector control. If you are not quite on 1540 at this point, readjust the main tuning knob until you're tuned in properly and then move the dial marker to the "540" mark.

An attenuation switch is used to adjust receiver sensitivity by attenuating incoming signals. It has three positions: NORMAL (no attenuation), DX (for listening to weak stations next to locals), and LOCAL (for listening to strong local signals).

A tone control switch is used to select NORMAL (250-3000 Hz), NARROW (400-2500 Hz), or LOW PASS (250-1500 Hz) audio. The control is quite handy for reducing the "hash" from nearby stations and other noise sources.

Other controls include a volume control, a headphone jack, a power on-off switch, an on-off switch for the dial lights (to conserve battery

power) and a mode switch which selects upper sideband, lower sideband, AM, or AM with noise limiter operation. An output jack is provided for connecting to a tape recorder. The jack provides a 50 mv signal, independent of volume or tone control settings. The receiver also has a built-in speaker and an S-meter.

The rear panel contains a jack for an external speaker, connections for SW & CCB antennas, a ground connection, and an external power supply jack.

CIRCUIT DESCRIPTION. The FRG-7 is a triple conversion receiver and uses a Wadley loop system to cancel drifting in the local oscillator. A block diagram of the receiver is shown in figure 1.

Incoming signals are amplified and filtered in the r.f. stage and mixed with a signal from the first oscillator in the first mixer stage. The signal from

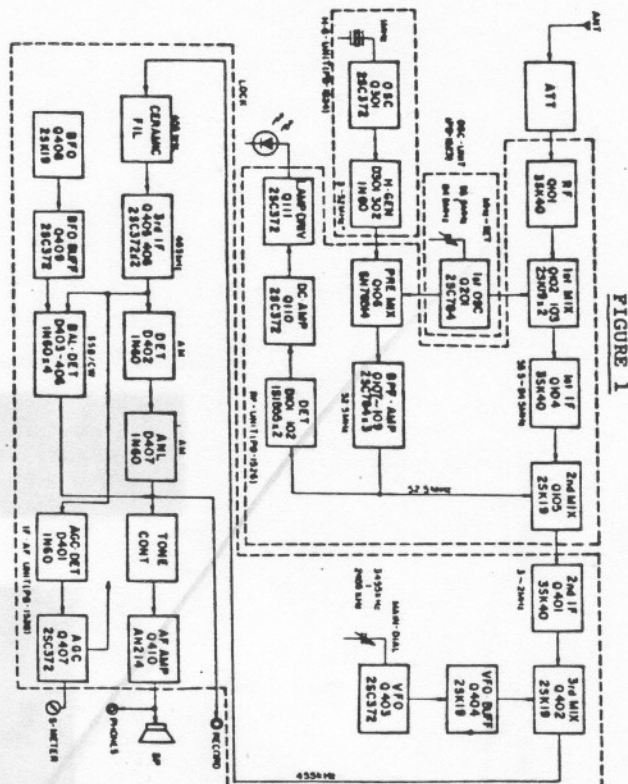


FIGURE 1

the first mixer is between 55.5 and 84.5 MHz and is determined by the setting of the MHz control. When mixed with this signal, incoming signals are upconverted to the 54.5-55.5 MHz first i.f. and amplified. The signals are downconverted to the 2-3 MHz second i.f. by mixing with a 52.5 MHz signal in the second mixer stage. Since the signals to both the first and second mixers are derived from the same oscillator, any drift in the oscillator is cancelled out. After being amplified in the second i.f. amplifier, signals are then downconverted to 455 kHz. This is accomplished by mixing with a signal between 2455 and 3455 kHz, determined by the Main Tuning dial setting. The output of the third (455 kHz) i.f. amplifier is then converted into audio, which is either fed into a tape recorder or filtered and amplified for headphones or the speaker.

PERFORMANCE. Sensitivity of the FRG-7 is excellent. A side-by-side comparison between an FRG-7 and an HQ-180A, using an SM-2 antenna, revealed very little difference between the two. On one occasion, CMAF-880 was nothing more than a SAH against WCBs on the HQ-180A, whereas clear audio was heard on the FRG-7. There have been other instances where reception was better on one than on the other due to the HQ-180A's superior selectivity or the FRG-7's superior audio quality. However, I would rate the two as equal in sensitivity. Both receivers' specifications give sensitivity as 2.0 uv.

Selectivity is the frog's greatest weakness. Selectivity is specified as +3 kHz at -6 db and +7 kHz at -50 db. By comparison, the HQ-180A selectivity, in its widest mode, is +3 kHz at -6 db and +7 kHz at -65 db; and is considerably better in the 2.0, 1.0, & 0.5 kHz selectivity modes. It is no surprise that at times TIOS-825 has been heard with little, if any, slop on the HQ-180A, when on the FRG-7 the WCCO audio ends where the WBAP audio begins. Still, in Seattle at least, most strong splits, such as Russia-647, Pyonqyanq-655, & Belize-834 can be easily heard on an FRG-7.

The frog's audio quality is excellent. In fact, it is the best I have ever heard from a communications receiver. The audio, monitored on either the speaker or headphones, is very crisp and distinct with no appreciable hum or noise, little distortion, and good frequency response. Unlike the muddy audio that most communications receivers (including the HQ-180A) put out, the frog's audio is quite pleasant to listen to. The superb audio was, of course, achieved in part at the expense of poorer selectivity. But just the same, I some-

times prefer to use the FRG-7 when DXing next to a splashy station; there's more slopover, but readability is better. My only complaint about the audio is that once in awhile the speaker rattles.

Because of the complexity of the FRG-7's design, there are a few "birdies" present. But fortunately, most of them are of little consequence. With the antenna disconnected, signals can be heard every 1.0 MHz on shortwave. With the antenna reconnected, the one on 15 MHz interferes with WWV, but most of the others are masked out. There is a birdie on 910 kHz which bothers local KIXI. Since KIXI is NSP I'm not too concerned, but if 910 is one of your favorite DX frequencies you might have problems.

Dial accuracy is fairly good when tuning across any one MHz band. While I haven't checked too closely on SW, accuracy seems to be about +10 kHz on both BCB & SW and can easily be corrected by adjusting the dial marker position. If you desire more accuracy on SW, a crystal calibrator, such as the Radio Shack \$10 model, can be installed.

The FRG-7 is designed for a 50 to 75 ohm antenna on shortwave and a high impedance antenna on BCB. The receiver performs very well with a Space Magnet antenna and would probably work well with any other amplified loop. It has not worked very well with either my 75 foot longwire or box loop so far. On the latter, I have been unable to properly peak the antenna when it is connected to the FRG-7, although I have not yet tried to figure out why. The FRG-7 also works very well when one side of the phone lines are used as an antenna.

The receiver tends to overload on strong locals when the preselector and/or antenna is not tuned to the proper frequency. With all controls set properly, front end overload immunity is as good as most other receivers in its price range.

The frog was taken on a five-day camping trip and, for the most part, performed quite well as a portable. On one occasion, one of the batteries worked itself partly loose from its holder after a day of travelling on mountain roads. The receiver does have a tendency for the lock indicator to come on after a couple of hours of battery operation, but only when the dial lights are on. In addition, the paint on the cabinet tends to chip when bumped against hard objects, such as the bumper of a 1969 Ford, hi.

Some DXers and reviewers have complained that the S-meter is sluggish and/or poorly scaled. But for peaking and tuning in signals it is more than adequate. I have no complaints whatsoever.

The receiver has a 90 day warranty but only a small percentage of frog purchasers need to use it. The FRG-7 comes with an instruction booklet with a schematic, parts list, and alignment and operation procedures. However, it is not well written and often difficult to comprehend.

CONCLUSIONS. I find it difficult to decide which receiver I like better, the FRG-7 or the HQ-180 -- the weak points of one are the strong points of the other. After five months of use, I found the FRG-7 to be better than or equal to the HQ-180A in performance about 80-90 percent of the time. However, this listening was done between March and July, which is not exactly the best time of the year for DXing. And most foreign stations heard on the west coast are four or five kHz from domestics, or on even channels. East coast DXers trying to hear TAs a couple of kHz from domestics would not be so charitable to the FRG-7, nor will west coast DXers when TP stations go to a 9 kHz spacing a year from now.

For domestic DXing, casual listening, and a limited amount of foreign listening, the frog is an excellent buy. It has excellent sensitivity and superb audio. The battery operation and small size make it ideal for DXpeditions. Since the dial is calibrated every 10 kHz from 0.5 to 30 MHz, it is ideal for checking shortwave parallels. The frog is all solid-state and will therefore require less maintenance than older tube-type receivers.

The electronics experimenter will find the FRG-7 to be an excellent test-bed receiver. Some possible additions and changes that could be made include improved selectivity, addition of a noise blanker and a notch filter, modifying the pre-selector to tune longwave, and other modifications.

There is plenty of room inside the receiver for additional circuits and assemblies, although front panel space is somewhat limited. It is quite likely that an FRG-7, properly modified with mechanical filters, would outperform an HQ-180A or any other receiver in its price class. Last fall, for example, Grant Manning heard France-1554 from San Diego using an FRG-7 with a Collins 2.1 kHz mechanical filter. Any improvement in selectivity would be at the expense of audio quality, but would still be well worth the effort.

The prospective frog buyer who, however, does not want to modify his receiver has three choices: 1) Purchase an "improved selectivity" model from Gilfer, 2) wait for Yaesu to come out with an improved selectivity model, 3) purchase something else.

The general opinion among frog owners is that they like the receiver, with the reaction ranging from reserved satisfaction to outright infatuation. Most owners like everything about it except the selectivity. But in spite of that one limitation the FRG-7 is an excellent receiver for the BCB DXer.

FOOTNOTE: In the time it took to write this article, Yaesu has come out with a "Mark II" model with a +5 kHz vernier knob. The Mark II model now sells for \$299, those FRG-7's without vernier tuning are now \$269. Modification kits to add vernier tuning to those receivers without it cost \$5.00.

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REFERENCES

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