

The VHF Amateur Reviews:

The Clegg Thor 6 Transceiver

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LONGTIME A PIONEER in VHF innovations, Clegg Laboratories of Mt. Tabor, New Jersey, recently introduced the Thor 6, a 50 mc transceiver featuring 60 watts input on a.m. and c.w. with v.f.o. control. This unit consists of two packages; one, the a.c. power supply and modulator and the other, the receiver and transmitter r.f. unit. Combining many of the well known characteristics of its predecessors, the Clegg Interceptor and Zeus, the Thor 6 comes very close to providing the ultimate in medium power VHF transceiving.

As can be seen in the accompanying block diagram, two methods of establishing transmitter frequency are provided. Crystal control is achieved through a conventional crystal oscillator with harmonic amplification, wherein one half of the 6U8 functions as the xtal osc./ harmonic generator with 25 mc output. Design is such that crystals may be either of the 8.33 or 12.525 mc variety, with 6U8 output at 25 mc regardless. The 12BA7 functions as a frequency doubler to 50 mc. V.f.o. operation is by heterodyne generation in the 12BA7 wherein the output of a 10.7 mc crystal oscillator, one half of the 6U8, is mixed with the output of the 39.3—41.3 mc v.f.o. The sum of these two frequencies is selected in the 12BA7 plate circuit and will automatically coincide with the 50-52 mc frequency to which the receiver is tuned.

The 6DJ8 first 50 mc amplifier is in a conventional cascode circuit and drives the 7558 as a Class C 50 mc second amplifier. The 6883 is a conventional Class C amplifier with modulation of both screen and plate voltage. Normal plate input is approximately 62 watts. A well designed pi-network tank circuit furnishes output efficiency in the order of 65-70%. A 12AT7 serves to amplify the microphone output to adequate voltage and power level for the input stage of the modulator. Audio gain is adjustable at the rear of the r.f. chassis.

For receiving, signals are amplified in the grounded grid 6CW4 r.f. stage; three tuned circuits are employed here to provide essentially flat response over the 50-52 mc range. The tunable oscillator and cathode follower, 6DJ8, tunes between 39.3 and 41.3 mc. This beats with the signal in the 6EH7, first mixer, for 10.7 mc output. A selective crystal lattice filter is used in the mixer plate circuit for maximum selectivity. The 6BL8 performs two functions: a pentode second mixer, and an 11.156 mc crystal oscillator which converts the 10.7 mc filter to 455 kc. Two transformers with associated capacitors produce a filter arrangement to supplement the selectivity of the 10.7 mc crystal filter.

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View of the receiver and r.f. unit. Controls are (left to right) BFO INJECTION, crystal socket, receiver-v.f.o. tuning dial (above), VFO-XTAL switch, SEND-RECEIVE-ANL, and (top to bottom, far right) final plate tuning, antenna loading and ON-OFF-VOLUME. The Thor 6 50 mc transceiver runs 60 watts input and is v.f.o. controlled. Not shown in photo is the modulator and power supply unit, located remote and connected by a 10 foot cable.

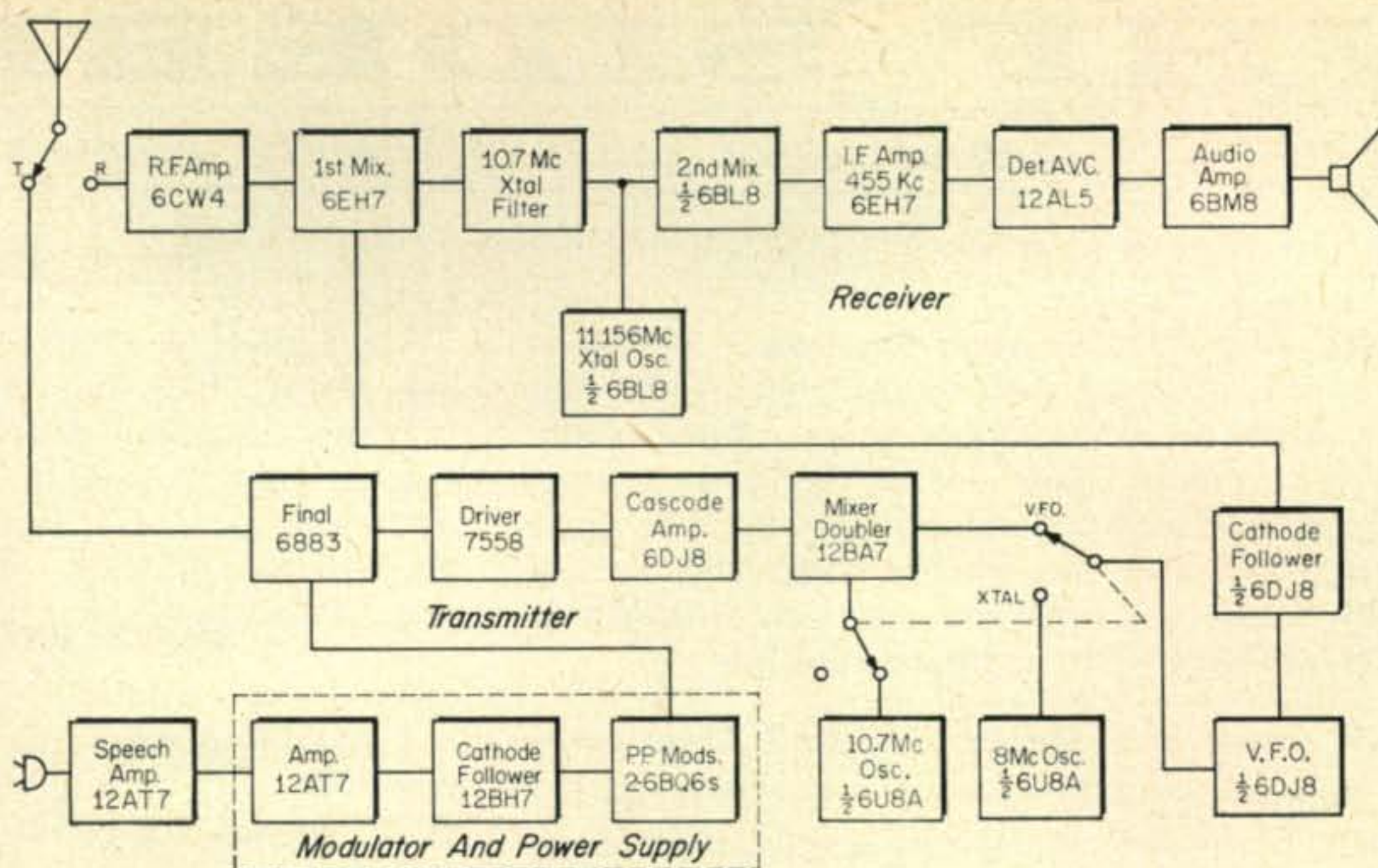
The 6EH7 functions as a conventional 455 kc i.f. amplifier with sufficient gain to assure linear operation of the detector circuit. An a.v.c. control is applied to the 6EH7 i.f. as well as the 6CW4 r.f. stage. A 12AL5 is used as both detector and a.v.c. rectifier. A 1N645 silicon diode serves as self-adjusting series peak noise limiter, which is controllable from the front panel TRANSMIT-RECEIVE switch by simply injecting ANL. The two sections of the 6BM8 furnish more than 1½ watts of audio output, better than necessary to drive headphones or a speaker. The calibrated S meter indicates changes in the plate current of the a.v.c. stages. It might be added that this meter is much more reliable in giving out signal reports than most used today.

Selectivity specifications read 5 kc at 6 db down and 12 kc at 50 db down, something just short of the Interceptor for sharpness.

Performance

On the air operation of the Clegg Thor 6 is a real pleasure. Once the 10 foot connecting cable is in place between the units, the modulator/power supply can be stored out of the way, as all controls except the AM-CW switch are on the r.f. unit. The Thor is wired for push-to-talk operation, although normal control methods are also available through the TRANSMIT-RECEIVE switch. A 3-8 ohm speaker should be connected to the jack on the rear apron of the r.f. unit. As the unit is turned on and the lamp illuminates the panel, it will be noticed that the S meter will

Fig. 1—Block diagram of the new Clegg Thor 6 50 mc transceiver. Note that the transmitting v.f.o. also serves as the tunable oscillator in the receiving section. The 6883 final amplifier tube operates "straight through" at 50 mc and is conservatively rated at 60 watts input. Two 6BQ6's operate in push-pull as modulators furnishing that "typical Clegg" effect. The v.f.o. (1/2 6DJ8) operates in the 39.3-41.3 mc range and is mixed with the 10.7 mc crystal oscillator output from 1/2 6U8 in the 12BA7.



swing up to full scale initially, then gradually return to near zero during receiver warmup; this is normal for the circuitry employed.

Tuning the receiver for the first time can be quite a shock to those uninitiated with the Thor's very selective tuning characteristics. With this transceiver, one tends to tune at a slower rate than usual, stopping to listen to the many stations now heard for the first time. A very sensitive receiver, the Thor makes Q5 copy out of even S1-2 signals! QRM is almost non-existent, since the selectivity permits separation of even the closest signals. If local noise becomes aggravating, simply injecting the ANL solves the problem. Tuning c.w. and s.s.b. is easy through a unique three-step b.f.o. control on the far left front panel of the r.f. unit. With the control in the AM position, no beat is present. Advancing it through the three b.f.o. positions to the right, however, injects a beat tone into the receiver in graduated degrees, depending on the strength needed to obtain the best readability on the received signal. For example, a local s.s.b. signal might require more signal injection than a weaker one 100 miles away. The Thor 6 handles them both supremely.

The transmitter is amazingly simple to operate. When you are in transmit, either through the TR switch or push-to-talk, the S meter converts to a relative output meter for transmitter loading; all controls are simply tuned for maximum output. With a 1:1 s.w.r. into a standard 52 ohm antenna, the meter registers approximately half-scale. Measured output under test conditions was 45 watts, a hefty signal to say the least! Effective low-pass circuitry kept TVI to a minimum at this QTH.

When using the Thor in the v.f.o. position, the transmitter is always "tracking" the receiver, i.e., the v.f.o. is on the same frequency as the receiver. This concept is altogether new to VHF, although a great number of lower frequency commercial s.s.b. transceivers have been using this principle for quite some time and have been well received. Basically, what it amounts to is this: when you answer a CQ, you answer on

frequency. When you are calling a CQ, you listen on frequency. If you start to tune the receiver after your CQ, you must return the dial to your original calling frequency before replying. An easy cure is simply to mention when calling CQ that you will reply on the frequency of the answering station. This way you can tune the entire band and any caller will know where to listen. Of course, you can always use the optional crystal control or an external v.f.o.

Modulation is what the local six meter gang terms "typical Clegg." Roughly translated: maximum audio, superb clipping characteristics. It's phenomenal how many stations comment on the fullness of "talk power" inherent in the Thor 6. "Really cuts through . . ."

Those whose eyes light up with talk of VHF mobiling will be interested to learn that the Thor with its 60 watts input can be used in the family buggy. An optional Clegg Model 418 transistorized 12 v.d.c. power supply/modulator is available which can be permanently installed in the car. The Thor r.f. unit can then be plugged into either the mobile supply, or the a.c. supply in the shack. Just connect the cable, and you're in business!

Of special interest is the Owner's Manual, shipped with each unit. This guide is a handy item, especially when the Thor 6 is to be put in the mobile, etc. Offering many hints and operating data for those unfamiliar with this type of transceiving, it suggests new ways of calling and working stations, making the most of each feature. Large fold-out schematics are included as well as parts layout sheets, enabling the purchaser to become well acquainted indeed with his new Clegg Thor 6.

At this writing with my Thor four weeks old, 936 different stations have been worked in 24 states. It went with me on vacation providing a convenient, compact 6 meter station for use at the trailer, home, mobile and mountaintopping. I was amazed at the number of stations amassed during the recent VHF contest, especially when compared to my usual totals. The Clegg Thor 6 is available through your dealer at \$349.95. ■