George Misic, KE8RN, ke8rn@comcast.com

Classic Radio

The Clegg 66er and 22er Family

After some early success with 6-meter radios like the Clegg 99er, Thor VI, and the SSB Venus, Clegg decided to build the similar 6- and 2-meter Clegg 66er and 22er AM radios for fixed and mobile use (see Figure 1). Both radios included a 120 V ac and nominal 12 V dc negative or positive ground power supplies and speakers. The transmitter-receivers — not called transceivers because they did not transmit on the receive frequency — featured push-to-talk (PTT) operation that was missing from their model 99er. Both units used only crystal-controlled transmit; Clegg never made a VFO for these radios.

Jim Fisk W1DTY
RFD 1, Box 138
Rindge, N. H. 03461

The Clegg 66'er Six Meter Transceiver

Interested in 6 meters? The Clegg 66'er from Squires-Sanders does an outstanding job and is an ideal rig for the ham who operates on our 50-MHz band. This transceiver contains a stable and sensitive receiver and a 22-watt transmitter in one compact package. It was designed specifically for the six meter band and will cover the amateur frequencies as well as those for MARS, CAP and Civil Defense. In addition, both the 117 Vac and 13 Vdc power supplies are included in the package.

The dual conversion superhet receiver is extremely sensitive and less than 0.35 uV signal will provide a signal plus noise to noise ratio of 10 dB. The basic frequency range is 49.9 to 52.1 MHz, but for special applications, an expanded tuning range is available on special order. The two *if* frequencies of 10.7 MHz and 456 kHz provide 8 kHz selectivity and result in rejection of spurious responses by more than 60 dB.

The receiver is relatively straightforward with a 6EH7 in the front end, followed by a 6DJ8 converter to the 10.7 MHz *if* and a 6BA6 *if* amplifier. The injection frequency for the first conversion is provided by a 6KE8 VFO/buffer, this combination is quite satisfactory and results in less than 3 kHz drift per hour after a 20 minute warmup. The 10.7 MHz *if* signal is converted to 456 kHz in a crystal controlled 6BE6 converter and further amplified in another 6BA6 stage, followed by a 12AL5 detector, a 6AN8 audio amplifier and a 6AQ5 audio power stage.

The AGC voltage generated in the 12AL5 detector stage is applied directly to the two *if* amplifiers and the 2nd mixer and through a Zener diode to the rf amplifier; in this way no AGC is applied to the input stage until comparatively large signals exist. The other half of the 12AL5 is connected as a series gate impulse limiter; it is very effective in cutting down ignition and other types of impulse noise.

A semiconductor diode is connected as a series squelch diode between the output of the detector and the input to the first audio stage. Whenever the cathode of this diode is more positive than the anode, the audio sections of the receiver are effectively disconnected from the front end of the receiver. Since the anode of the squelch diode is connected to the screen voltage of the

90 73 MAGAZINE

Figure 1 — An advertisement for the Clegg 66er 6-meter radio. [Photo courtesy of the April 1967 issue of *73* Magazine]

Both units were the same size and weight (see Figure 2). They both measured 12 inches wide, 12 inches deep, and 6½ inches high, exclusive of knobs, connectors, and feet. They weighed 19 pounds. Clegg went on to make 22er FM radios when 2-meter FM became a popular mode. After the tube-type 22er FM radios, they went to solid-state radios for 2-meter FM, like the Clegg FM-27B.

Final Amplifier Stage

Both transmitters used a 2E26 tetrode vacuum tube in the final amplifier. The 2E26 was a smaller, lower-power version of the popular 6146 tube. The 66er ran an input power of 22 W input power. The 22er was rated at 20 W input power. Both transmitters produced about 50 – 65% of the input power. A single pi network output coupler was used in both the 22er and 66er. Built-in television interference (TVI) filters were used in both radios.

The grid circuit tuning was available on the front panel. There was no way to meter grid current because there was no separate means to properly tune the grid tuning. In the transmit mode, the panel meter indicated output power and was not calibrated in any way. The transmitter was set for maximum output, which was achieved by adjusting the controls for maximum meter reading.

Crystal Oscillator and Multiplier Stages

Both the 66er and 22er radios started out the transmitter with a type-6KE8, nine-pin miniature triode-pentode tube. The triode was used as a crystal oscillator, using crystals of about 8 MHz, 12 MHz, or 24 – 26 MHz. If 8 MHz crystals were used, the tube tripled the crystal frequency. If 12 to 13 MHz crystals were used, the oscillator doubled the frequency. The pentode portion of the tube doubled the frequency in the 66er with an output frequency of 49.9 to 52.1 MHz. In the 22er, the pen-

Figure 2 — The Clegg 22er and 66er pair. [David Thomas, KM4NYI, photo]

tode section of the 6KE8 was used as a frequency tripler to reach 72 to 74 MHz. Broadband couplers were used on both of these stages, so no tuning of the 6KE8 stages was needed in the first 2 MHz of the 6-meter band, or anywhere in the 2-meter band.

Straight-Through Stage

A unique feature in the design of both Clegg radios was the use of a straight-through driver stage using a 12BY7A tube. The tube in the 66er operated on the 6-meter band and assured the 2E26 got plenty of grid drive, without tuning the oscillator and doubler stages. The 22er employed this stage between the oscillator/tripler and doubler stages and operated at 72 to 74 MHz; as in the 66er, a type-12 BY7A tube was used in this stage. The extra gain when compared to other similar radios allowed Clegg to employ pass-band couplers in the early stages of the transmitter, while still generating enough RF to properly drive the 2E26 final amplifier.

The final doubler was only used in the 22er. It followed the straight-through amplifier stage, and it also used a 12BY7A tube to drive the final amplifier tube at 144 to 148 MHz. This tube was not used in the Clegg 66er transmitter-receiver.

Audio Circuitry

The audio output stage of both radios used two 6AQ5 audio output tubes. In receive, one of the 6AQ5 tubes was biased off when receiving, as one tube has plenty of power output for the receiver. To fully modulate the final at 20 or 22 W of input power, it took both 6AQ5s in parallel. The lower-level audio stages were a 12AX7 dual-triode in the 22er; the 66er used a 6AN8 triode-pentode. In the 66er, the 6AN8 triode was the microphone amplifier, and the pentode was the voltage amplifier stage for both the receiver and transmitter.

The two 6AQ5 tubes were in parallel to plate-modulate the 2E26 final amplifier. The audio transformer had a secondary winding to drive the speaker; the primary winding has the B+ fed to a tap on the winding; the two 6AQ5s are connected to one end and the plate and screen circuit of the 2E26 is connected to the other end.

A short jumper cable with a phono connector on each end connects the jack on the rear panel of the chassis and a second phono jack on the back of the cabinet connects to the internal speaker.

The 66er Receiver

There were a lot of differences in the receiver designs in the 66er and the 22er. The 66er is a double-conversion design. The 66er starts with a high-gain RF amplifier stage, using a 6EH7 tube. It is followed by a 6DJ8, operating as a mixer down to the first IF of 10.7 MHz. The tunable local oscillator is the triode portion of a 6KE8 triode-pentode. The pentode section is used as a buffer-amplifier to improve the stability of the local oscillator. The local oscillator covers 39.2 to 41.4 MHz to receive 49.9 to 52.1 MHz.

The first intermediate frequency (IF) uses the common 10.7 MHz. The second IF is identified as 456 kHz, rather than the more common 455 kHz. Back in the 1930s, the common IF was often called 456 kHz. The crystal used to convert 10.7 MHz to 456 kHz is an 11.156 MHz crystal. The 66er has one IF amplifier at 10.7 MHz and a second amplifier at 456 kHz; both stages use 6BA6 pentode tubes. The bandwidth of the last IF is specified as 8 kHz. With no filter devices, the selectivity of the receiver is suitable for its frequency stability.

The 22er Receiver

A triple-conversion design was used for the 22er receiver, which used a metal Nuvistor tube as the RF amplifier. The stage used a grounded grid design. The tunable local oscillator was tripled for the first conversion of the 144 to 148 MHz 2-meter band down to 44 to 45 MHz, using the tripled local oscillator covering 100 to 103 MHz. The first conversion used

the pentode portion of a 6KE8 as the mixer and the triode portion of the same tube as the frequency tripler. The 44 to 45 first IF was converted to 10.7 MHz with the fundamental frequency of the tunable local oscillator, which was 33.3 to 34.3 MHz. The second conversion used a high-gain 6EJ7 tube as the mixer. A 6KE8 was used for the tunable oscillator with the triode as the oscillator and the pentode as a buffer stage to improve stability.

The 10.7 MHz second IF was converted to the last IF of 455 kHz by a 6BE6 pentagrid converter stage using a 10.245 MHz crystal to generate the frequency needed for the final conversion. A 6BA6 served as the 10.7 MHz second IF amplifier and a second 6BA6 as the 455 kHz third IF amplifier. A 6AL5 diode served as the AM detector in the 22er. Automatic noise limiting (ANL) was provided using the second diode in the 6AL5, along with a squelch to make periods with no signal more pleasant.

Power Supply

The power supply operated off 120 V ac with an internal power transformer that supplies high-voltage dc to operate all stages in either radio and a filament winding providing 12.6 V ac for the tube filaments. The power supply also provided for 13.8 V dc nominal input for mobile operation with either positive or negative ground. Very few 12 V automobiles were positive ground. The Clegg 22er and 66er employed two transistors as an oscillator to make ac to operate the power transformer. The wiring of the S-312-CCT power socket that plugged on the back of the transmitter-receiver connected the power supply for 120 V ac or 13.8 V dc positive or negative ground. The jumpers used on the S-312-CCT configured the power supply for 120 V ac operation or 12 V dc positive or negative ground operation. When using dc power, the tubes were lit directly from the dc input power. Fuses were provided for both 120 V ac and 12 V dc input. There was no need to change the fuse in one fuse holder like on some ham radio equipment.

Maty Weinberg, KB1EIB, events@arrl.org; www.arrl.org/special-event-stations

Special Event Stations

Working special event stations is an enjoyable way to help commemorate history. Many provide a special QSL card or certificate!

Feb. 13, 1700Z – 2359Z, NI6IW, San Diego, CA. USS *Midway* (CV-41) Museum Ship. **Raising Mt. Suribachi Flag**. 14.320 7.250; 14.070 (PSK31); D-STAR via PapaSystem repeaters. QSL. USS *Midway* CV-41 COMEDTRA NI6IW, 910 N. Harbor Dr., San Diego, CA 92101. **www.qrz.com/db/ni6iw**

Feb. 13 – Feb. 14, 0800Z – 1400Z, K4US, Alexandria, VA. Mount Vernon Amateur Radio Club. **George Washington's Birthday at Mount Vernon**. 14.260 14.074 7.040. QSL. MVARC, P.O. Box 7234, Alexandria, VA 22307. *Members will be operating remote stations this year due to COVID, with many operating from the original grounds of the former plantation of George Washington and his wife, Martha Washington.* **k4us@mvarc.org**

Mar. 13, 1700Z – 2359Z, NI6IW, San Diego, CA. USS *Midway* (CV-41) Museum Ship. **Launching of USS *Midway***. 14.320 7.250; 14.070 (PSK31); D-STAR via PapaSystem repeaters. QSL. USS *Midway* CV-41 COMEDTRA NI6IW, 910 N. Harbor Dr., San Diego, CA 92101. **www.qrz.com/db/ni6iw**

Mar. 14, 0000Z – 2359Z, N2RE, Princeton, NJ. David Sarnoff Radio Club. **Pi Day**. 14.250 14.050 7.200 7.050. QSL. Bob Uhrik, 104 Knoll Way, Rocky Hill, NJ 08553. *Famous Princetonian Albert Einstein was born on Pi Day.* **n2re.org**

Mar. 20 – Mar. 21, 1800Z – 0300Z, K7SWI, Middleton, ID. South West Idaho Amateur Radio Club. **Arrows from the Air**. 28.427 14.227 7.227 3.827. Certificate & QSL. South West Idaho Amateur Radio Club, 332 W. Dewey Ave., Nampa, ID 83686. **nq6s@att.net** *or* **www.qrz.com/db/k7swi**

Mar. 23 – Mar. 25, 1400Z – 2100Z, W4LX, Fort Myers, FL. Fort Myers Amateur Radio Club. **Honoring World War II Gunners at Buckingham Airfield**. 28.360 21.360 14.270 146.685. Certificate. W4LX Fort Myers Amateur Radio Club, P.O. Box 61183, Fort Myers, FL 33906. **www.fmarc.net**

Certificates and QSL cards: To obtain a certificate from any of the special event stations offering them, send your QSO information along with a 9 × 12 inch self-addressed, stamped envelope (three units of postage) to the address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information. *Note: Some clubs may ask for a nominal fee to cover the cost of the certificate or QSL. Request will be made on air during the event or on the club's website.

Special Events Announcements: For items to be listed in this column, use the ARRL Special Events Listing Form at **www.arrl.org/special-events-application**. A plain-text version of the form is available at that site. You may also request a copy by mail or email. Off-line completed forms can be mailed, faxed (Attn: Special Events), or emailed.

Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; a special event listing for **June** *QST* would have to be received by **April 1**. In addition to being listed in *QST*, your event will be listed on the ARRL Web Special Events page. Note: All received events are acknowledged. If you do not receive an acknowledgement within a few days, please contact us. ARRL reserves the right to exclude events of a commercial or political nature.

You can view all received Special Events at **www.arrl.org/special-event-stations**.