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PRELIMINARY OPERATING INSTRUCTIONS

Clegg 22'er MK II

Note: This preliminary operating data is being supplied with initial deliveries of the Clegg 22'er MK II. A detailed Owner's Operating and Maintenance Manual is in preparation and will be supplied in the near future. It is important that you return the enclosed Owner's Registration Card to assure receipt of your final manual.

1. CONTROLS, CONNECTORS and INDICATORS

- 1.1 POWER CONNECTORS - The MK II is provided with two separate power plugs. One of these is supplied with a conventional AC line cord and plug and is, of course, the one to be used for 115 Volt AC operation. It plugs into the mating connector in the rear of the unit.

The DC power plug has been factory wired with all necessary jumpers except for the battery cable itself. Two wires of length and current capacity suitable for the specific installation must be provided by the user. These are connected to Pins 12 and 13 of the DC plug. BE CERTAIN TO OBSERVE POLARITY REQUIREMENTS. Pin #13 must go to the POSITIVE pole of the 12VDC system and Pin #12 must be the NEGATIVE pole and vehicle ground.

1.2 PANEL CONTROLS and INDICATORS

1.2a - MAIN TUNING DIAL is the large dual speed knob and associated dial scale at the left of the panel. This dial controls RECEIVER TUNING ONLY and is calibrated in 100KHz increments. The special DUAL SPEED feature permits rapidly tuning between band extremities while providing a smooth mechanical band spread of a limited segment of the band.

1.2b - VOLUME CONTROL - ANL SWITCH serves in the conventional manner as a audio gain control for the receiver. The ANL (Automatic Noise Limiter) is disengaged when the knob is in the normal depressed position. To engage the ANL the knob is merely pulled out to the limit of its travel.

1.2 PANEL CONTROLS and INDICATORS - cont.

1.2c - SQUELCH CONTROL - POWER ON/OFF SWITCH

This control will normally be operated FULLY CLOCKWISE. To turn the MK II OFF (in either 115VAC or 12VAC installations) the control is turned fully counter clockwise. The SQUELCH characteristics of the MK II are such that the receiver audio is muted in the absence of signals when the control is retarded from the fully clockwise position. When the control is near the counter clockwise extremity, very large signals will be required to unmute the receiver.

1.2d - SPOT SWITCH - This switch actuates the low level transmitter stages and produces sufficient signal to be heard on the receiver. It is used to SPOT one's own transmitter frequency on the receiver and for adjusting the VFO to a specific receiver frequency or "zero-beating" a received signal.

1.2e - VFO-XTAL SWITCH is used to select between the internal VFO or a CRYSTAL as the frequency control for the transmitter. The stability characteristics of VFO in the MK II are such that most operators prefer to utilize it exclusively except for NET operations.

NOTE: DO NOT OPERATE TRANSMITTER IN XTAL POSITION WITHOUT A SUITABLE CRYSTAL INSTALLED IN PANEL CRYSTAL SOCKET!

1.2f - TRANSMITTER TUNING CONTROLS - The three controls on the right side of the panel perform their captioned functions for adjusting the GRID, PLATE and LOADING circuits in the final amplifier. They are always adjusted for MAXIMUM READING on the panel meter during TRANSMIT. Once properly adjusted they will not normally require readjustment unless a frequency change of more than 500KHz or so is made.

1.2g - VFO control is the tuning control used to set the transmitter frequency when operating with the VFO-XTAL SWITCH in the VFO mode. An approximate calibration of the transmit frequency may be read from the calibrated scale on this control. More precise frequency readout should be made by observing the SPOT frequency indication on the Receiver in compliance with FCC regulations.

1.2h - PANEL METER - This meter serves the dual functions of indicating the strength of received signals and transmitter output. On Receive the calibration is such that a signal of approximately $\frac{1}{4}$ microvolt

1.2h - PANEL METER - cont.

will read S1 and a signal of about 3 millivolts will result in full scale deflection. On Transmit all three Transmitter Tuning controls should be adjusted for MAX deflection. When operating the MK II into a properly matched 50 ohm load, a meter reading in the center 1/3 of the scale should be attained.

1.3 OTHER CONTROLS and CONNECTORS

1.3a - A modulation level control is located at the rear of the unit near the bottom edge just to the right of center (as viewed from the rear). This control should be set so that a slight deflection of the panel meter is observed when talking in the normal voice level. Advancing this control excessively clockwise may result in distortion and hum on the transmitted signal.

1.3b - MICROPHONE JACK is located on the left side of the cabinet near the front edge. This jack accepts the Clegg Push-To-Talk Ceramic microphone furnished with the MK II.

1.3c- SPEAKER connections are arranged so that the MK II may be operated with the self contained speaker or with a suitable external speaker. To utilize the internal speaker it is merely necessary to connect the patch cable equipped with standard PHONO plugs between the two PHONO JACKS on the left side of the unit. This patch cord is supplied with the MK II.

A suitable external speaker (3-4 ohm voice coil impedance) equipped with a shielded cable and phono plug may be connected to the LOWER of the two PHONO receptacles if desired.

DO NOT OPERATE THE MK II WITHOUT EITHER THE INTERNAL SPEAKER OR A SUITABLE EXTERNAL SPEAKER CONNECTED!

1.3d - A conventional HEADPHONE JACK is located on the rear panel of the MK II. For best performance, low impedance headphones are recommended.

1.3e - ANTENNA receptacle is a standard UHF Coaxial receptacle located on the rear panel.

2. CIRCUIT DESCRIPTION

The 22'er MK II employs an all solid state receiving system and transmitter VFO. Vacuum tubes are utilized in both the RF and Modulator functions in the Transmitter.

2. CIRCUIT DESCRIPTION - cont.

The basic details of the entire unit are shown in the attached BLOCK DIAGRAM.

- 2.1 RECEIVER DESCRIPTION - The MK II Receiver physically consists of two separate printed boards - one of which contains all the VHF circuitry and the other contains the IF and AUDIO systems.

2.1a - FRONT END MODULE - This section of the receiver is mounted on the rear of the main tuning capacitor and includes:

1. Type 40673 Dual Gate MOSFET RF amplifier stage with delayed AGC.
2. Type 40673 MIXER converting to the 1st IF of 17450 KHz.
3. Type 2N3563 Tuneable 1st Oscillator.

2.1b - IF/AF MODULE - This section of the receiver is located at the left side of the main chassis. The chassis has been designed to permit access to both sides of the P/C board to facilitate service.

The 17,450KHz 1st IF signal from the FRONT END MODULE is converted to 455KHz in a 40673 Mixer Stage with crystal controlled injection at 17905KHz supplied by a 40245 oscillator.

The 455KHz output is filtered by 5 resonator ceramic mechanical filter having a 3db pass band of 13KHz and more than 60db rejection of signals 10KC removed from the pass band.

The filtered output is then amplified in a CA3053 Linear Integrated Circuit and further amplified by a Type 40246. Amplified AGC is applied to the first of these stages.

4 Type IN34A diodes are used for detection, AGC and as a series noise limiter. Two type 40233s are employed as DC amplifiers to drive the AGC system and to gate the Audio System for SQUELCH purposes.

A type CA3020A Integrated Circuit provides squelched audio gain and audio power amplification. Approximately 1 Watt of audio output is produced for use with either the internal 3.2 ohm speaker or a similar impedance external speaker. A headphone jack is provided (in the lower rear corner). Insertion of the phone plug automatically disables the speaker.

2.2 TRANSMITTER DESCRIPTION

2.2a - OSCILLATORS - The MK II provides for both VFO and CRYSTAL control of operating frequency. Separate oscillators are utilized.

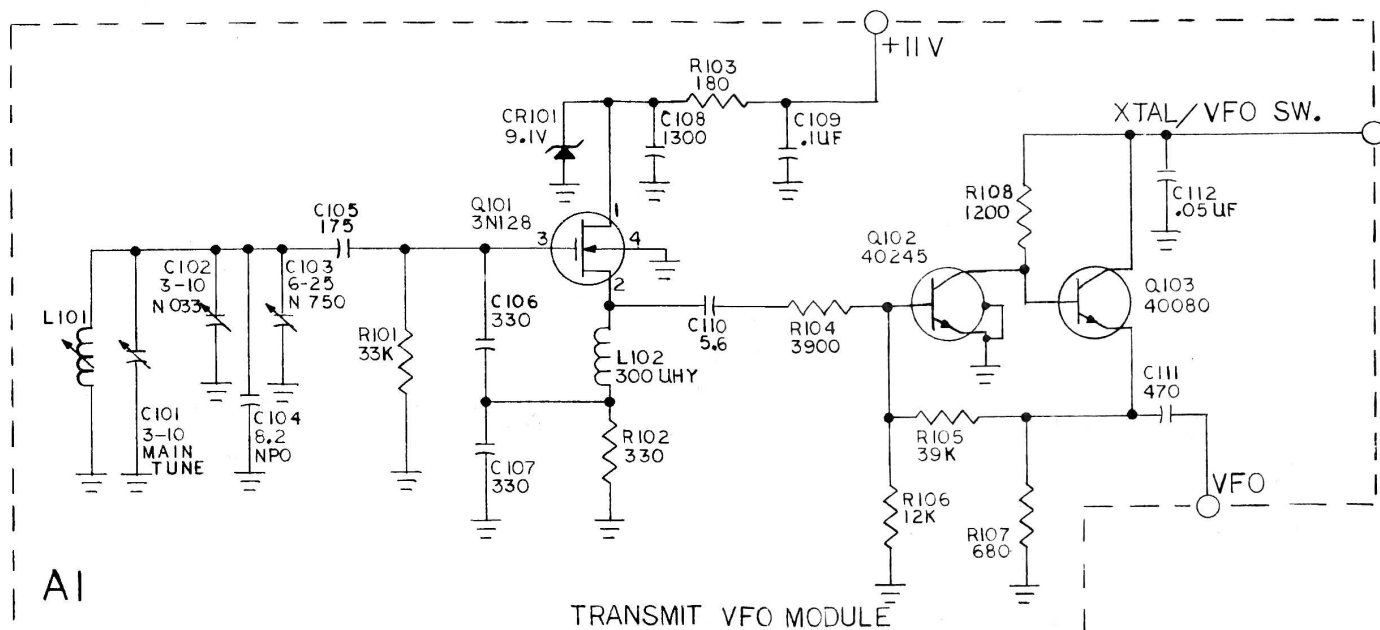
1. VFO utilizes an insulated gate FET, type 3N128 and two buffer stages. Operating frequency is continuously variable from 12.00 to 12.33MHz.
2. CRYSTAL control utilizes one section of a 6KE8 tube in a Pierce configuration. Either 8MC or 12MC crystals may be utilized; the latter is recommended.

2.2b - FREQUENCY MULTIPLIERS - The second (pentode) section of the 6KE8 receives excitation from either the VFO or CRYSTAL oscillator and multiplies frequency to 24MHz. This output drives a 12GN7 which doubles to 144MHz. Both the 24MHz and 72MHz tuned circuits are broad banded. The plate of the second 12GN7 is matched into the final amplifier grid with a high Q network tuneable from the front panel (GRID control).

2.2c - FINAL AMPLIFIER - The final amplifier stage employs a Type 8150 VHF power pentode with high level modulation applied to both plate and screen. A half wave (series tuned) tank circuit with tuned link coupling is utilized. This stage is neutralized with a small positive feedback stub between grid and plate.

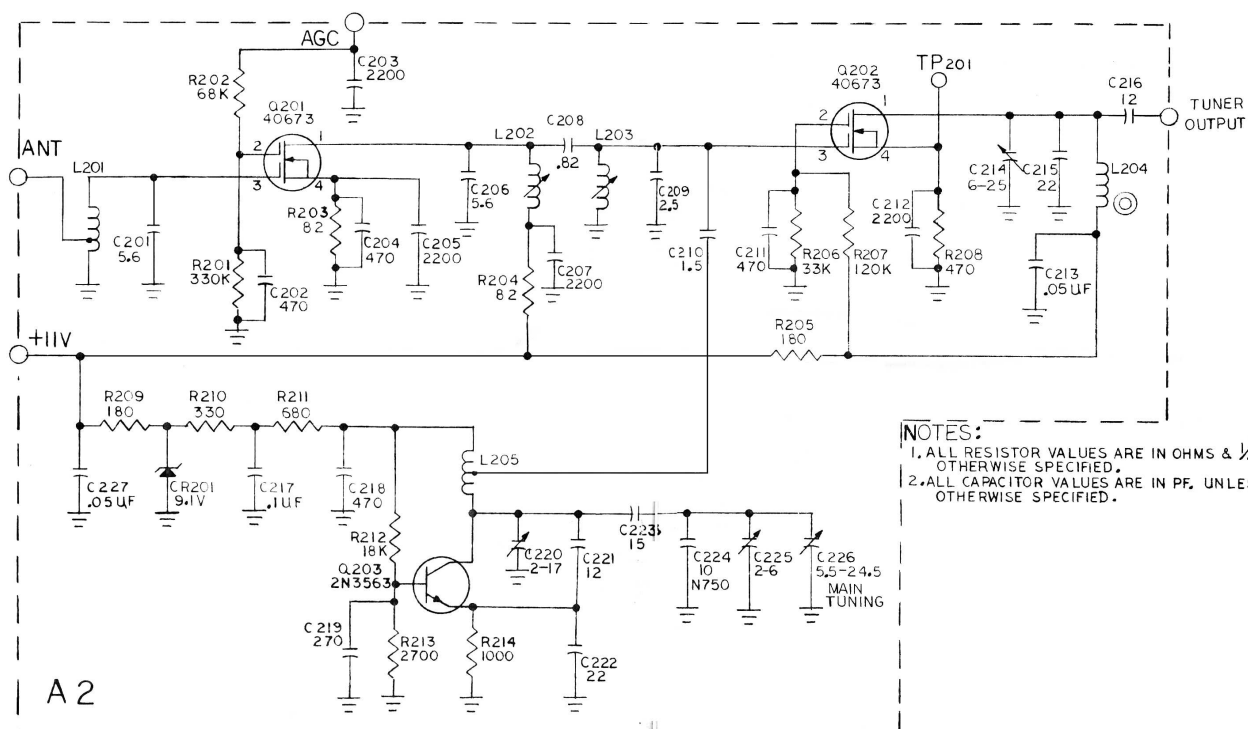
Plate and screen input power is approximately 35 to 40 watts (Nominally 325 volts at 115 Ma). Approximately 15 to 20 watts carrier output is obtained.

2.2d - AUDIO-MODULATOR STAGES - Two type 6973 tubes in push pull are utilized in Class AB with Zener regulated cathode bias to obtain 20 watts of modulating power. These are driven by a 12AU7 phase inverter preceded by 2 cascaded voltage amplifiers (12AX7). The operating levels are so arranged that peak clipping is attained at the grids of the 6973 tubes. The specially designed modulation transformer provides a low pass filter characteristic to attenuate harmonics produced by this clipping action.



NOTES:

1. ALL RESISTOR VALUES ARE IN OHMS & $\frac{1}{4}$ W. UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITOR VALUES ARE IN PF. UNLESS OTHERWISE SPECIFIED.



22'ER MK II
TUNER FRONT END
FIG.4

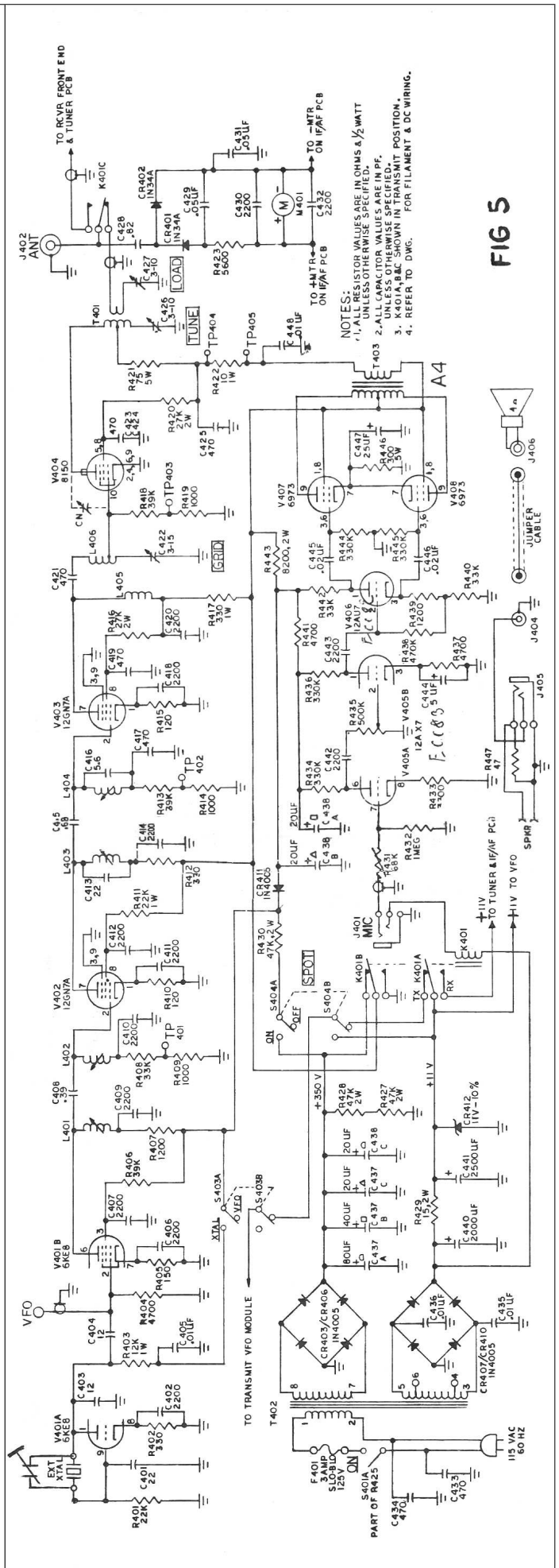
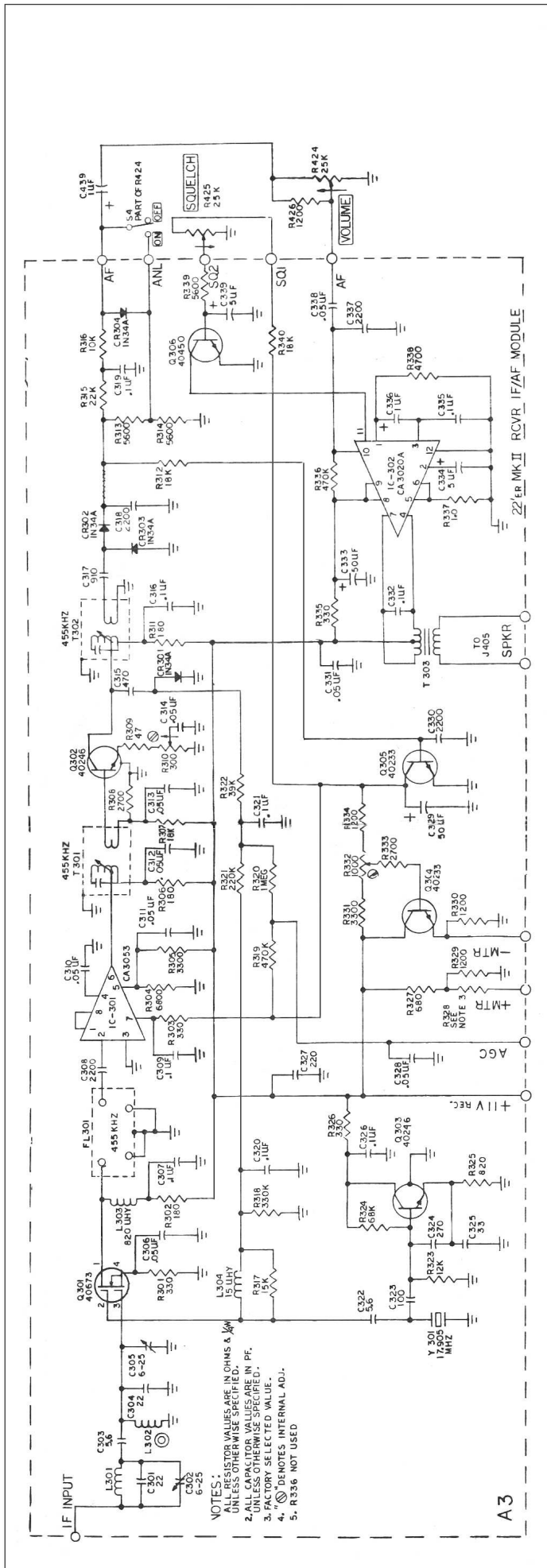


FIG 5



A4 DC/AC CONVERTER ξ FILAMENT DIAGRAM