

- (f) using a rf wattmeter, check unmodulated power output-- it should be at least 8 watts, but no more than 13 watts.
- 9.2 Second Method:
- (a) connect the Model MB antenna thru 50 ohm coaxial cable to a rf wattmeter and artificial 50 ohm load.
  - (b) energize the transmitter and apply 1 KHz modulation sufficient to cause maximum modulation. At the microphone input, 100 mv rms audio signal will easily do this.
  - (c) Make certain that C124, C129 and C131 (schematic 4101163) have been adjusted to maximize rf drive at midband to the power amplifier--at least 1.2v rms.
  - (d) adjust C206, C210 and C217 in the power amplifier section to produce maximum power output.
  - (e) check that current to the final transistor, with no modulation, is less than 2 amperes. This current can easily be determined by measuring the voltage across RF choke L217, which has a dc resistance of .088 ohms.
  - (f) the unmodulated power output should be at least 8 watts, but no greater than 13 watts. (Excessive carrier output results in less than full modulation.)
10. Frequency stabilization: provided by the crystal-controlled oscillator circuit with Q101 (see schematic 4101163 and crystal drawing 2100804). The oscillator can be redrawn as a Colpitts oscillator in which the base-collector inductance is provided by the crystal operating slightly above series resonance. The collector-emitter capacity is obtained by the combination L101 and C102, which together appear capacitive over the operating frequency range of 39.3 to 45.3 Mhz. L101 and C102 appear inductive at lower crystal overtone frequencies, preventing oscillation at those frequencies. The crystals are 3rd overtone types, and are remotely selected by grounding any one crystal through its corresponding pin diode (CR101A, B, etc.) The crystal series resonant frequency is specified slightly below the operating frequency, since it must appear inductive.
11. Circuits that suppress spurious radiation and limit modulation:
- 11.1 Modulation limiting is performed by the automatic level control (ALC or "compressor") circuit in the audio amplifier/modulator (schematic 4101070). In the transmit mode, the signal level at the ALC output (U6 pin 4) is detected by CR12 and CR13, and the resulting dc voltage amplified by the op amp part of U6 whose output is pin 5. The amplified dc is applied to the gate of FET Q3, which acts as a variable resistor and forms a voltage divider in combination with R66. In this way the audio level at the ALC output is held to approximately 650 mv. rms. The gain from the ALC output through the modulator output is then adjusted by trimpot R75, to allow for gain variations in the output transistors, to produce approximately 85% modulation when the ALC output is 650 mv. However, modulation greater than 85% is also prevented by "soft limiting" in the audio power amplifier stage, should R75 be misadjusted.