SMALL 150W. AM-CW TRANSMITTER USING A 6DQ5 FINAL

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IN these days of s.s.b. and so forth an a.m./c.w. transmitter may seem a rather out of date sort of piece of equipment to describe. Personally, I feel there is a place for both modes of communications as each has its own strong points and weaknesses, so no more need be said in this vein. This particular transmitter was built on Macquarie Island for communications around Macquarie on voice and to New Zealand on c.w. on a frequency of approximately 2.7 Mc. In this regard, it has proved highly successful, having been heard in Australia quite well on both voice and c.w.

The transmitter in this article is not intended to be copied unless you are working crystal control on 160 metres say, as it was designed for a particular job on Macquarie. Many of the ideas used in this transmitter may be applicable to some pet project. The main part of the article is to give the operating conditions of the 6DQ5 p.a. stage. An article was presented in "Amateur Radio" for June '65 by VK3AFQ using an 807 in the same role that I have the 6DQ5 working.

This is an "efficiency" modulated transmitter in the a.m. mode and its peak input is approximately 150 watts, which means that it is approximately equivalent to a 40 watt plate and screen modulated transmitter. In the c.w. mode it runs a full 150 watts and puts out about 110 watts. Before I launch into a description of this transmitter, I would recommend that you read VK3AFQ's article and also read in the R.S.G.B. Handbook, page 261, "Series Gate Modulation". Both of these articles will put you fully into the picture on the way this modulation and c.w. keying system works.

The oscillator and driver are quite conventional and require no comment other than that the driver is keyed and not the final. The microphone preamplifier circuit is also quite conventional and once again no comment is necessary.

The 6DQ5 requires little comment with the exception of the by-passing and the screen circuits. Pins 4 and 8 of the 6DQ5 should each have a separate by-pass of about 100 pF. if the transmitter is to be used at high frequencies. Pins 3 and 6 should be treated in like manner.

"GATED SCREEN" MODULATION

At this point I will give a brief rundown on the operation of this "gated screen" modulation system. We will consider the c.w. situation first as it will help to make clear the operation of the a.m. modulation system. With key up, there is no negative voltage developed at the grid of the 6DQ5 and therefore the grid pin 7 of the 12AU7 modulator is at earth potential or a few volts negative due to the grid being positive in respect to the cathode pin 8, which is set a few volts negative by the slider on VR3. The actual voltage present on the grid and cathode is controlled by VR3, the "c.w. cut off" bias potentiometer. Pin 7 isn't quite as negative as pin 8. This triode pins 6-7-8 is conducting heavily and the voltage on pin 6 is also negative with respect to earth by a few volts. Pin 2 is also negative by the same amount, being directly connected to pin 6. Pin 2 is slightly more negative than pin 3. Triode 1-2-3 is virtually at cut-off. Triode 1-2-3 and its series cathode resistor act as a potential divider, the triode acting as a variable resistance, and depending on its state of conduction will depend the voltage applied to the screen of the 6DQ5.

As the 1-2-3 triode is not conducting, or virtually so, the negative 105 volts will be applied through the 0.22 meg. resistor to the screen of the 6DQ5. With a negative voltage on the screen, no current will be drawn by it, and with this valve all plate current ceases when the screen is negative by about 10 volts. In the case where an 807 is used, which has a much different screen characteristic, this voltage may be a few volts positive. This is the condition with key up.

With key down and drive to the final, a high negative bias is applied to pin 7 so cutting this triode off. With this triode cut off, pins 6 and 2 tend to rise to full high tension, causing triode 1-2-3 to conduct heavily, the cathode becomes positive and current flows through the

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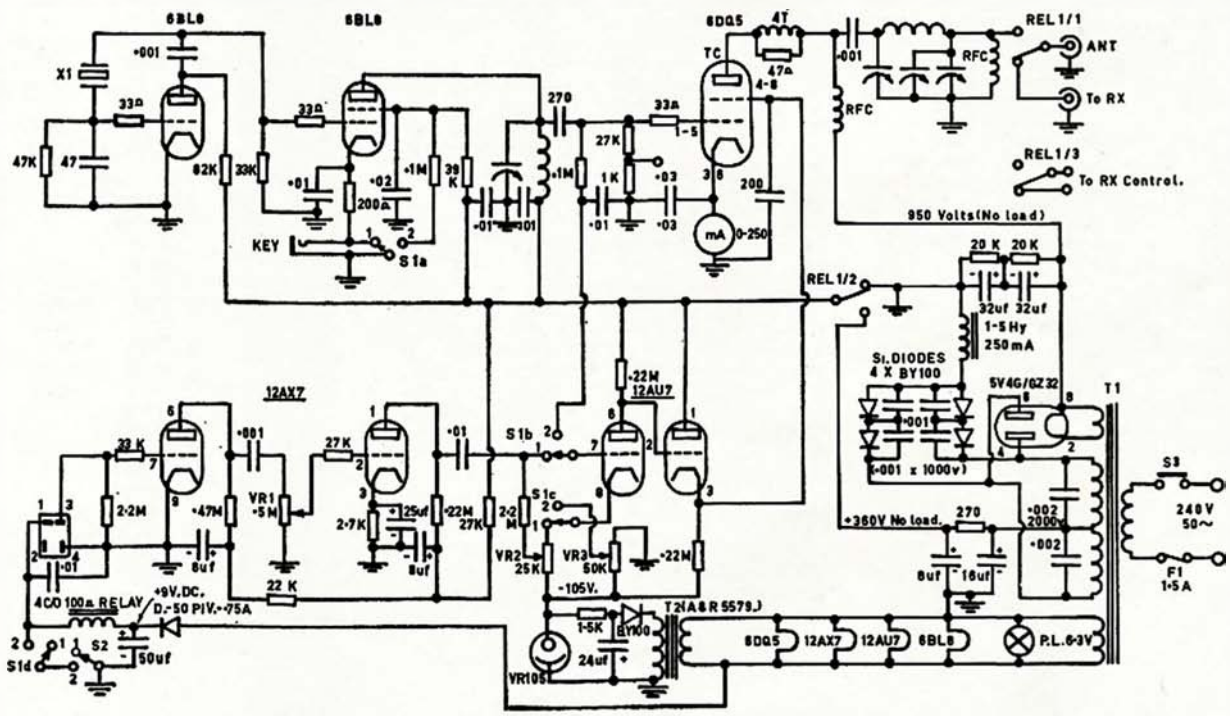

FIG.1. 150 WATT AM/CW TRANSMITTER.

S1—Pos. 1: a.m.
Pos. 2: c.w.

S2—Pos. 1: receive.
Pos. 2: transmit c.w.

S3—Mains on/off switch.
VR1—Modulator gain.

VR2—a.m. carrier set.
VR3—c.w. cut off.