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 COMPILED BY
 G.T.Or fice

TMC SPECIFICATION NO. S - 202

TITLE: Modification of AMD Ton D modulator (AMD-2)

JOB

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A. PURPOSE

This specification provides modification procedures which result in greater shifts of the Model FFR BFO and HFO as requested from users of the equipment in remotely-controlled systems. The modification results in greater voltages presented to the receiver, and the equipment so modified shall be designated Model AMD-2 Tone Demodulator. Specifically, the BFO channel will deliver ± 5.0 volts (nominal) and the HFO channel ± 3.3 volts (nominal) for an input tone range of 20 db below 0 dbm.

B. COMPONENTS REQUIRED

SYM	DESCRIPTION	TMC PART NUMBER
R102	RESISTOR, fixed: composition, 3300 ohms, $\pm 5\%$, $\frac{1}{2}$ watt.	RC20GF332J
R103	Same, 150,000 ohms 5%	RC20GF154J
R104	Same, 470,000 ohms, 10%	RC20GF474K
R106	Same, 510,000 ohms, 5%	RC20GF514J
R107	Same, 390,000 ohms, 5%	RC20GF394J
R108	Same, 4.3 Megohms, 5%	RC20GF435J
R112	Same, 180,000 ohms, 5%	RC20GF184J
R113	Same, 1,000 ohms, 5%	RC20GF102J
R114	Same, 470,000 ohms, 10%	RC20GF474K
R116	Same, 470,000 ohms, 5%	RC20GF474J
R117	Same, 330,000 ohms, 5%	RC20GF334J
R118	Same, 3.3 Megohms, 5%	RC20GF335J
	Tinned copper wire, #24, 2 inches	WL-100-8
	Insulated stranded wire, 16 inches	SRIB-1(7)22UXX
	Insulation sleeving, #22, 6 in	PX-100-X-034

C. WIRING PROCEDURE

- Remove all resistors mounted on resistor board PX-118,
- Remove all resistors connected to this board, i.e., R104 (150K), R105 (82K), both connected to R106 terminal; R114 (150K), R115 (150K), connected to R116 terminal; and the remaining two resistors R109 (68K) tied to terminal R107 and ground, R119 (68K) connecting terminal R117 to ground. Having removed all resistors mounted on and connected to the board, loosen the two 6-32 screws which fasten this board to the chassis.
- Below terminal board PX-118, remove the two black jumpers between R106 & R107 lugs, R117 & R116 lug. Cut the blue lead at lug R107 (connected to C101C), and blue lead at lug R116 (end of this lead is connected to C104C). Both of these leads should remain in the unit connected to the condensers, since they will be re-connected to different terminal lugs.

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Remove white lead connecting R117 and Potentiometer R120. Fasten terminal board to the chassis again, with same 6-32 screws.

Using sketch on page three (3) as a guide, connect leads to terminal lugs as follows:

(Numbers refer to steps indicated)

- (1) Connect ground end of potentiometer R101 lug nearest board to top R106 terminal with 3" insulated wire.
- (2) Connect a 2 $\frac{1}{4}$ " insulated wire from top R107 terminal to nearest terminal of Choke L101.
- (3) Connect a 2 $\frac{1}{2}$ " insulated lead from top terminal R117 to nearest choke terminal L102.
- (4) Connect ground end of potentiometer R111 lug, farthest from resistor board, to top terminal R116 with a 3 $\frac{1}{2}$ " insulated lead.
- (5) Connect end of blue lead (one connected to C101C) to bottom terminal R106.
- (6) Jump bottom terminals R106 and R107 with Tinned copper wire.
- (7) Connect a 4 $\frac{3}{4}$ " insulated wire between bottom terminal R117 to potentiometer R120. This lug is nearest the resistor board. Dress this lead underneath the resistor board.
- (8) Jump bottom terminals R117 and R116 with Tinned copper wire.
- (9) Connect the remaining blue lead (one end connected to C104C) to bottom terminal R116.
- (10) Insert resistors R106, R107, R108, R118, R117, and R116 as per list, page one, this specification.

4. At tube sockets V101 and V102, make the following connections:

- (1) V101 pin 3 to ground, replace Part RC20GF152K with RC20GF332J.
- (2) V101 pin 1 to standoff terminal, replace RC20GF104K with RC20GF154J.

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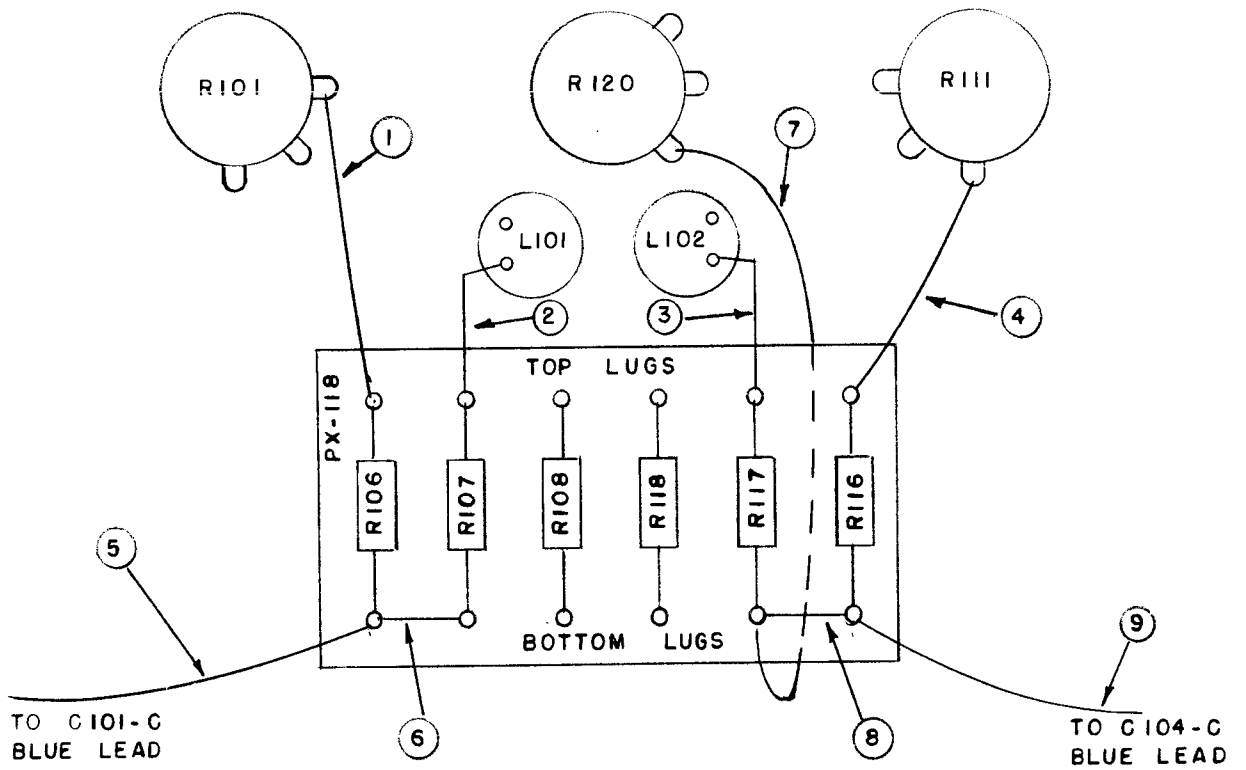
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- (3) Cut lead from pin 2 of V101 to center lug of Potentiometer R101; replace this lead with Part RC20GF474K, trim pigtailed to a desirable length, using sufficient insulated sleeving over leads.
- (4) V102 pin to 7 to ground, replace Part RC20GF152K with RC20GF102J.
- (5) V102 pin 9 to standoff terminal, replace R112, Part RC20GF823J with RC20GF184J.
- (6) Cut lead from pin 8 of V102 to center lug R111 and replace with Part RC20GF474K. Trim pig-tails to a desirable length, using sufficient insulated sleeving over leads.

D. ELECTRICAL TEST

1. Mount the modified AMD (Now known as AMD-2) to the FFR Receiver rear panel and connect power supply lead and CA-149 interconnecting cable as before.
2. Connect a 400 cycle audio tone to BFO tone terminal located at rear of AMD-2; Monitor BFO DC output voltage with a DC vacuum tube voltmeter. Off-set the VTVM so that mid-scale corresponds to zero input volts. Set the input tone level to 0.36 volts (-7 dbm) and adjust the gain control R101 so that DC output equals zero. Change tone level to 0.80 volts (0 dbm), and output DC voltage should swing to -5.0 volts. A -20 dbm (0.08 volts) tone level should now cause the VTVM to indicate +5.0 volts. Similarly, if the BFO channel gain control R101 is adjusted to -27 dbm (0.036 volts) for zero DC output, then a 20 dbm dynamic input tone, i.e., -20 dbm to -40 dbm (0.08 volts to 0.008 volts) will cause the DC output to swing from -5.0 to +5.0 volts.

A similar test is performed on the HFO channel. The DC output for any 20 dbm dynamic input (0 dbm across 600 ohms reference and maximum input) will cause a symmetrical voltage change about zero volts. A nominal value of 3.3 volts magnitude will be obtained. If this nominal value is greater than 3.3 volts it can be reduced by the DC adjust control, R120. Furthermore, with this control HFO shifts can be reduced when desired.

(See page five for tabulated test data)

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D. ELECTRICAL TEST (con't)

3. Tabulated test data taken from sample AMD-2.

Input Tone Level		DC Output Voltage	
		BFO Channel	HFO Channel
0 dbm	0.8 volts	-4.8	-3.1
-7	0.36	0*	0*
-20	0.08	+5.0	+3.3
-20	0.08	-5.0	-3.1
-27	0.036	0*	0*
-40	0.008	+5.0	+3.4
*Channel gains adjusted for zero output voltage			