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4/21/67
Addendum to Preliminary
Technical Manual for TTR-10A
IN 1004X

TECHNICAL MANUAL
for
TRANSISTORIZED SSB
TRANSMITTER/RECEIVER
MODEL TTR-10B

The technical manual for TTR-10A will apply as written for TTR-10B except as follows:

- (1) TTR-10B can operate on both LSB and USB.
- (2) Relay K1503 is not used in TTR10B, thus automatic AME operation in channel 1 is disabled.
- (3) Transmitter i-f alignment procedure in paragraph 5-7a should be deleted and the attached procedure should be followed.
- (4) The attached parts list for Transmit IF Board and AF Transmitter Board for the present IF and Audio Transmitter Board parts list contained in this manual.
- (5) Transmit IF Board schematic diagram, Sheet 7-7 of figure 7-1 should be replaced with CK1312 (copy attached).

5-7. TRANSMITTER SECTION ALIGNMENT.

a. For transmitter channel frequency change, perform TTRT module alignment as outlined in the TTRT technical manual and steps (1) through (3), steps (8) through (17), and step (23) of paragraph c below (Linear Amplifier Alignment). Exciter alignment, paragraph b, and the remainder of the linear amplifier alignment are to be used for corrective maintenance purposes only.

b. EXCITER ALIGNMENT. This procedure must be performed with TTRT module installed.

(1) Ensure that TTR-10 has been allowed to warm up for at least 30 minutes.

(2) Using frequency counter, monitor frequency at terminal 8 of XMIT i.f. board. Adjust capacitor C1734 as required to obtain 1.75 Mc indication on frequency counter.

(3) Turn drive potentiometer (Control D) of associated TTRT module fully counterclockwise.

(4) Turn potentiometer R1738 fully clockwise.

(5) Set CW/SSB/-20DB CARRIER/AM/MCW switch at AM.

(6) Connect an oscilloscope to terminal 9 of XMIT i.f. board. Adjust C1725 and C1728 for maximum indication on scope.

(7) Set CW/SSB/-20DB CARRIER/AM/MCW switch at SSB.

(8) Adjust C1703, R1707 (LSB) or C1703 and R1716 (USB) as required for minimum indication on scope.

(9) Repeat step (8) until no further reduction in signal level is obtained by adjustment of any of the controls.

(10) Connect Two-Tone generator between terminal 1 of TB1500 and ground. Connect a-c VTVM across terminal 1 and of TB1500 and ground, and adjust generator output to 78 mv indication on VTVM.

(11) Disconnect a-c VTVM from TB1500 and connect oscilloscope to

terminal 9 of XMIT i-f board. Adjust R1738 as required to obtain 500 millivolt PEP indication on scope.

(12) Disconnect signal generator. Repeat steps 8, and 9 to assure prior adjustments to balanced modulator have not been disturbed.

(13) Disconnect scope from terminal 9.

(14) Connect two-tone generator and VTVM between terminal 1 of TB1500 and ground. Adjust output of generator for 78 mc indication on VTVM.

(15) Connect spectrum analyzer between terminal 9 and 10 of XMIT i-f board. Adjust analyzer to accept 1.75 Mc signal; two-tone display should be obtained on spectrum analyzer.

(16) Adjust gain of spectrum analyzer as required to bring tone levels 3db below zero reference. Distortion products should be 40db below zero reference; if proper indication is not obtained, alignment procedure (steps 2 through 15) should be repeated.

(17) Set CW/SSB/ -20DB CARRIER/AM/MCW switch at CW.

(18) Connect a-c VTVM between terminal 10 of CW OSC board and ground. Connect jumper between terminal 11 and 12 of TB1501.

(19) Adjust potentiometer R1533 on CW OSC board as required to obtain 14 mv indication on VTVM; lock R1533. Single tone display should be obtained on spectrum analyzer. Disconnect a-c VTVM.

(20) Observe spectrum analyzer for second harmonic distortion signals; this distortion signal should be more than 30db below audio oscillator tone.

(21) Set CW/SSB/-20DB CARRIER/AM/MCW switch at MCW; carrier signal should appear on spectrum analyzer in addition to CW OSC tone (see step 23).

Carrier level should be 8db \pm 2db above the audio tone. The second harmonic of the audio tone should be 42db \pm 2db below carrier level.

(22) If necessary, align TTRT module/s as outlined in TTRT equipment manual.

PARTS LIST

for

IF TRANSMITTER, BOARD ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1701	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10,000 uuf, GMV; 1,000 WVDC.	CC100-16
C1702	Same as C1701.	
C1703	CAPACITOR, VARIABLE, MICA DIELECTRIC; 10 to 75 uuf; 350 WVDC.	CV109-8
C1704	NOT USED	
C1705	CAPACITOR, FIXED, MICA DIELECTRIC: 22 uuf, $\pm 5\%$; 100 WVDC.	CM111C220J1S
C1706	CAPACITOR, FIXED, MICA DIELECTRIC: 1,000 uuf, $\pm 5\%$; 100 WVDC.	CM111C102J1S
C1707 thru C1710	NOT USED	
C1711	Same as C1701.	
C1712	Same as C1701.	
C1713	Same as C1705.	
C1714	Same as C1703.	
C1715 thru C1720	NOT USED	
C1721	CAPACITOR, FIXED, MICA DIELECTRIC: 180 uuf, $\pm 5\%$; 100 WVDC.	CM111C181J1S
C1722	Same as C1721.	
C1723	CAPACITOR, FIXED, CERAMIC DIELECTRIC: .2 uf, $\pm 80\%$ -20%; 25 WVDC.	CC100-33
C1724	Same as C1723.	
C1725	CAPACITOR, VARIABLE, MICA DIELECTRIC: 30 to 280 uuf, 350 WVDC; compression type.	CV114-1
C1726	CAPACITOR, FIXED, MICA DIELECTRIC: 1,500 uuf, $\pm 5\%$; 100 WVDC.	CM112C152J1S
C1727	Same as C1726.	

PARTS LIST (CONT)

IF TRANSMITTER, BOARD ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1728	Same as C1725.	
C1729	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, $\pm 80\%$ -20% ; 100 WVDC.	CC100-28
C1730	Same as C1723.	
C1731	Same as C1729.	
C1732	Same as C1729.	
C1733	CAPACITOR, FIXED, MICA DIELECTRIC: 47 uuf, $\pm 5\%$; 100 WVDC.	CM111C470J1S
C1734	Same as C1703.	
C1735	NOT USED	
C1736	Same as C1706.	
C1737	Same as C1729.	
C1738	Same as C1705.	
C1739	Same as C1733.	
C1740	Same as C1701.	
C1741	Same as C1723.	
C1742	Same as C1729.	
C1701	SEMICONDUCTOR DEVICE, DIODE: germanium.	1N34A
CR1702 thru CR1708	Same as CR1701.	
FL1701	FILTER, SIDEBAND: low 1750.300 Kc max. at 3 db, high 1753.000 Kc min. at 3 db, low 1749.000 Kc min. at 60 db, high 1755.000 Kc max. at 60 db; for LSB operation.	FX10014-1
FL1702	FILTER, SIDEBAND: low 1747.000 Kc max. at 3 db, high 1749.700 Kc min. at 3 db, low 1745.000 Kc min. at 60 db, high 1751.000 max. at 60 db; for USB operation.	FX10014-2
L1701	NOT USED	

PARTS LIST (CONT)

IF TRANSMITTER, BOARD ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
L1702	COIL, RADIO FREQUENCY: fixed; 220 uh, + <u>+10%</u> ; max. DC resistance 5.0 ohms.	CL275-221
Q1701	TRANSISTOR	2N2084
Q1702 thru Q1706	Same as Q1701.	
R1701	RESISTOR, FIXED, COMPOSITION: 1.000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF102J
R1702 thru R1706	Same as R1701.	
R1707	RESISTOR, VARIABLE, COMPOSITION: 500 ohms, <u>+10%</u> ; 0.25 watts.	RV111U501A
R1708 thru R1715	Same as R1701.	
R1716	Same as R1707.	
R1717 thru R1720	Same as R1701.	
R1721	RESISTOR, FIXED, COMPOSITION: 10,000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF103J
R1722	Same as R1721.	
R1723	RESISTOR, FIXED, COMPOSITION: 50,000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF503J
R1724	Same as R1701.	
R1625	RESISTOR, FIXED, COMPOSITION: 1,500 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF152J
R1726	Same as R1701.	
R1727	RESISTOR, FIXED, COMPOSITION: 470 ohms, <u>+5%</u> ; 1/2 watt.	RC20CF471J
R1728	RESISTOR, FIXED, COMPOSITION: 39,000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF393J

PARTS LIST (CONT)

IF TRANSMITTER, BOARD ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R1729	RESISTOR, FIXED, COMPOSITION: 15,000 ohms, $\pm 5\%$; 1/2 watt.	RC20GF153J
R1730	RESISTOR, FIXED, COMPOSITION: 12,000 ohms, $\pm 5\%$; 1/2 watt.	RC20GF123J
R1731	RESISTOR, FIXED, COMPOSITION: 47,000 ohms, $\pm 5\%$; 1/2 watt.	RC20GF473J
R1732	Same as R1701.	
R1733	Same as R1701.	
R1734	Same as R1728.	
R1735	Same as R1729.	
R1736	Same as R1727.	
R1737	RESISTOR, FIXED, COMPOSITION: 820 ohms, $\pm 5\%$; 1/2 watt.	RC20GF821J
R1738	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms, $\pm 10\%$; 0.25 watts.	RV111U103A
R1739	RESISTOR, FIXED, COMPOSITION: 100 ohms, $\pm 5\%$; 1/2 watt.	RC20GF101J
S1701	Non-replaceable item. Part of Z1701.	
T1701	TRANSFORMER, INTERMEDIATE FREQUENCY: fixed; 1.75 mc; nominal primary inductance 5.0 uh, ± 0.250 uh; four terminals, wire lead type.	TZ124
T1702	TRANSFORMER, INTERMEDIATE FREQUENCY: fixed; 1.75 mc; nominal primary inductance 5.5 uh, ± 0.300 uh; five terminals, wire lead type.	TZ125
Y1701	CRYSTAL UNIT, QUARTZ: operating frequency 1750.00 Kc; max. impedance 400 ohms; HC-25/U type holder.	CR10006
Z1701	OVEN. CRYSTAL: 115 VAC; current rating 0.05 amps; operating temperature 75°C, ± 2.5 °C.	OC100-3

PARTS LIST

for

AF TRANSMITTER, BOARD ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1701	CAPACITOR, FIXED, ELECTROLYTIC: 6 uf, -10% +150% at 120 cps (Hz) at 25°C; 15 WVDC; polarized.	CE105-6-15
C1702	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 200,000 uuf, +80% -20%; 25 WVDC.	CC100-33
C1703	CAPACITOR, FIXED, ELECTROLYTIC: 50 uf, -10% +150% at 120 cps (Hz) at 25°C; 15 WVDC; polarized.	CE105-50-15
C1704	Same as C1701.	
C1705	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf, -10% +150% at 120 cps (Hz) at 25°C; 15 WVDC; polarized.	CE105-10-15
C1706	Same as C1705.	
C1707	Same as C1705.	
C1708	CAPACITOR, FIXED, ELECTROLYTIC: 4 uf, -10% +150% at 120 cps (Hz) at 25°C; 15 WVDC; polarized.	CE105-4-15
C1709	Same as C1701.	
C1710	Same as C1703.	
C1711	Same as C1702.	
C1712	CAPACITOR, FIXED, ELECTROLYTIC: 20 uf, -10% +150% at 120 cps (Hz) at 25°C; 15 WVDC; polarized.	CE105-20-15
C1713 thru C1728	NOT USED	
C1729	Same as C1705.	
C1730 thru C1760	NOT USED	
C1761	Same as C1702.	
C1762	NOT USED	
C1763	NOT USED	
C1764	Same as C1702.	

PARTS LIST (CONT)

AF TRANSMITTER, BOARD ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
CR1701	SEMICONDUCTOR DEVICE, DIODE	1N34A
CR1702 thru CR1705	Same as CR1701.	
Q1701	TRANSISTOR: germanium; NPN; JEDEC type 2N1308 transistor with a controlled hfe limit of 80-150; JEDEC type T09 case.	TX106
Q1702	TRANSISTOR: germanium; PNP; JEDEC type 2N1370-4 transistor with a controlled hfe limit of 60-75; JEDEC type T09 case.	TX107
Q1703 thru Q1705	Same as Q1702.	
Q1706	Same as Q1701.	
Q1707	Same as Q1702.	
Q1708	TRANSISTOR	2N2001
R1701	RESISTOR, FIXED, COMPOSITION: 22,000 ohms, $\pm 5\%$; 1/2 watt.	RC20GF223J
R1702	RESISTOR, FIXED, COMPOSITION: 10,000 ohms, $\pm 5\%$; 1/2 watt.	RC20GF103J
R1703	NOT USED	
R1704	RESISTOR, FIXED, COMPOSITION: 4,700 ohms, $\pm 5\%$; 1/2 watt.	RC20GF472J
R1705	RESISTOR, FIXED, COMPOSITION: 2,200 ohms, $\pm 5\%$; 1/2 watt.	RC20GF222J
R1706	Same as R1702.	
R1707	Same as R1705.	
R1708	RESISTOR, FIXED, COMPOSITION: 68,000 ohms, $\pm 5\%$; 1/2 watt.	RC20GF683J
R1709	Same as R1702.	

PARTS LIST (CONT)

AF TRANSMITTER, BOARD ASSEMBLY

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R1710	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, $\pm 5\%$; 1/2 watt.	RC20GF332J
R1711	Same as R1710.	
R1712	RESISTOR, FIXED, COMPOSITION: 220 ohms, $\pm 5\%$; 1/2 watt.	RC20GF221J
R1713	Same as R1702.	
R1714	Same as R1702.	
R1715	RESISTOR, FIXED, COMPOSITION: 8,200 ohms, $\pm 5\%$; 1/2 watt.	RC20GF822J
R1716	RESISTOR, FIXED, COMPOSITION: 3,900 ohms, $\pm 5\%$; 1/2 watt.	RC20GF392J
R1717	RESISTOR, FIXED, COMPOSITION: 1.000 ohms, $\pm 5\%$; 1/2 watt.	RC20GF102J
R1718	RESISTOR, VARIABLE, COMPOSITION: 500 ohms, $\pm 10\%$; 0.25 watt at 70°C.	RV111U501A
R1719	RESISTOR, VARIABLE, COMPOSITION: 250,000 ohms, $\pm 10\%$; 0.25 watt at 70°C.	RV111U254A
R1720	RESISTOR, FIXED, COMPOSITION: 1.5 megohm, $\pm 5\%$; 1/2 watt.	RC20GF155J
R1721	NOT USED	
R1722	Same as R1702.	
R1723	RESISTOR, FIXED, COMPOSITION: 5,600 ohms, $\pm 5\%$; 1/2 watt.	RC20GF562J
R1724	Same as R1704.	
R1725	Same as R1702.	
R1726	Same as R1717.	
R1727	Same as R1723.	
R1728	RESISTOR, FIXED, COMPOSITION: 100,000 ohms, $\pm 5\%$; 1/2 watt.	RC20CF104J

PARTS LIST (CONT)

AF TRANSMITTER, BOARD ASSEMBLY

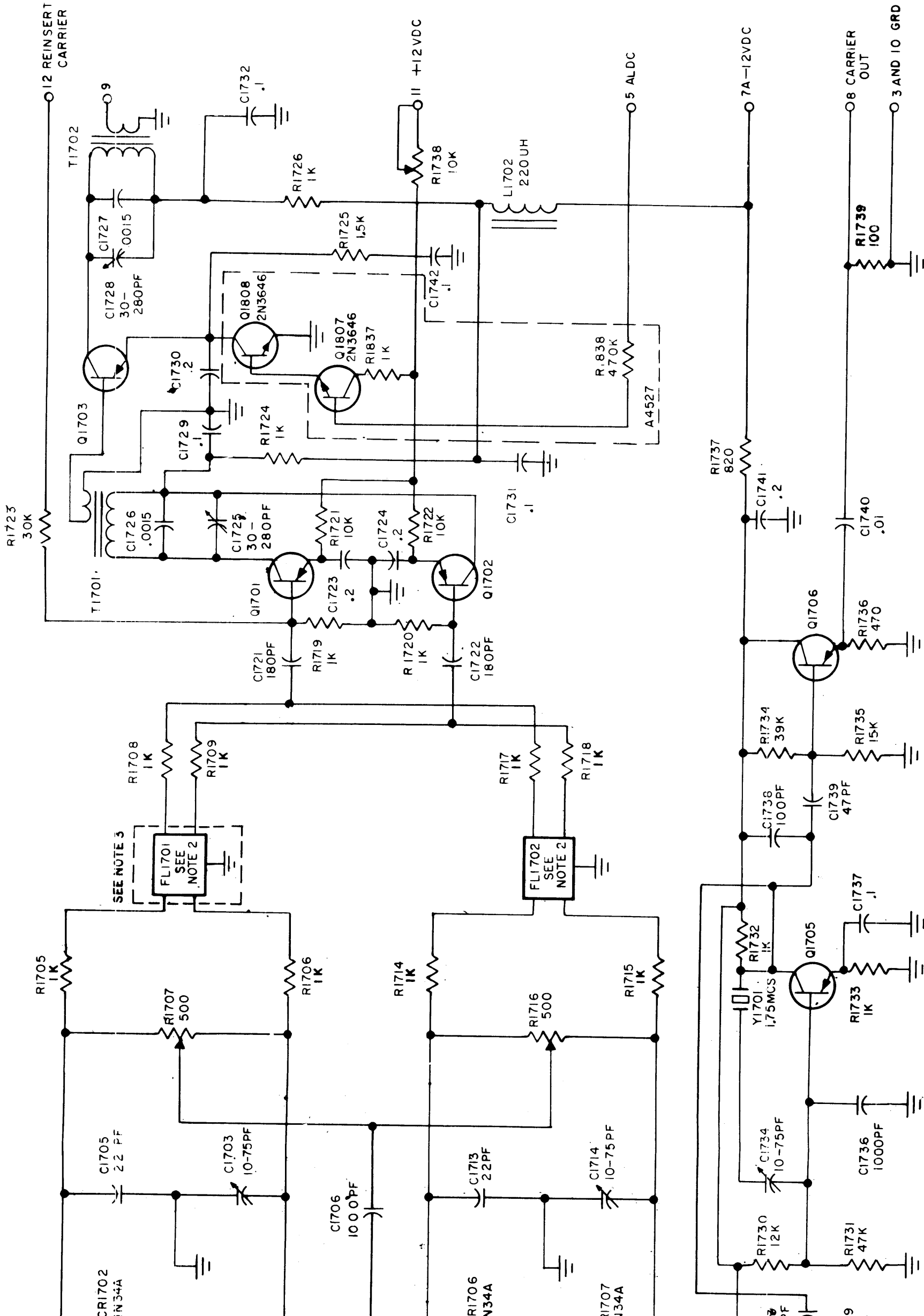
REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R1729	RESISTOR, FIXED, COMPOSITION: 150,000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF154J
R1730	Same as R1704.	
R1731	Same as R1705.	
R1732	Same as R1715	
R1733	Same as R1729.	
R1734	RESISTOR, FIXED, COMPOSITION: 33 ohms, <u>+5%</u> ; 1 watt.	RC32GF330J
R1735	Same as R1729.	
R1736 thru R1773	NOT USED.	
R1774	RESISTOR, FIXED, COMPOSITION: 100 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF101J
T1701	TRANSFORMER, AUDIO FREQUENCY: fixed; primary inped- ance 25,000 ohms, CT; 1,550 ohms DC resistance, <u>+20%</u> ; secondary impedance 1,200 ohms, CT; 88 ohms DC resistance, <u>+20%</u> ; operating frequency range 200 to 15,000 cps (Hz); frequency response <u>+3db</u> at 250 to 3,500)Hz).	TF267-4
T1702	TRANSFORMER, AUDIO FREQUENCY: primary impedance 500 ohms CT; 60 ohms DC resistance; operating frequency range 100 cps (Hz) to 20 KC; open frame, lacquer coated.	

PARTS LIST

for

ALDC BOARD ASSEMBLY

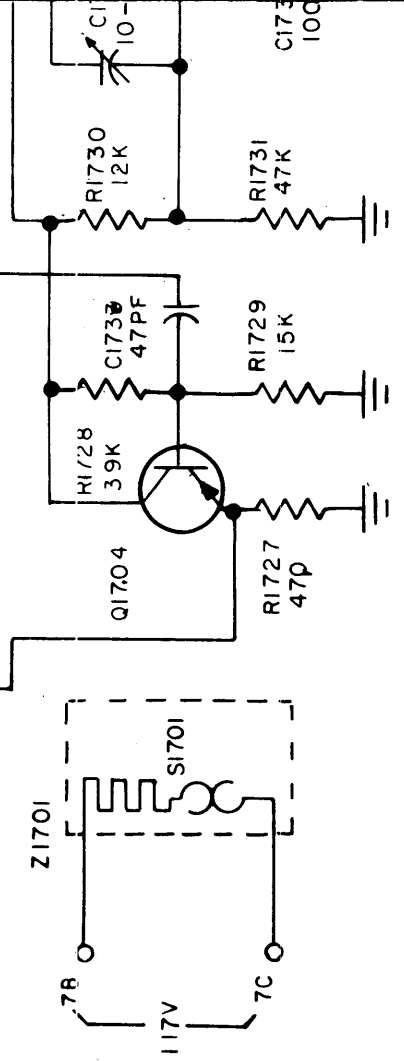
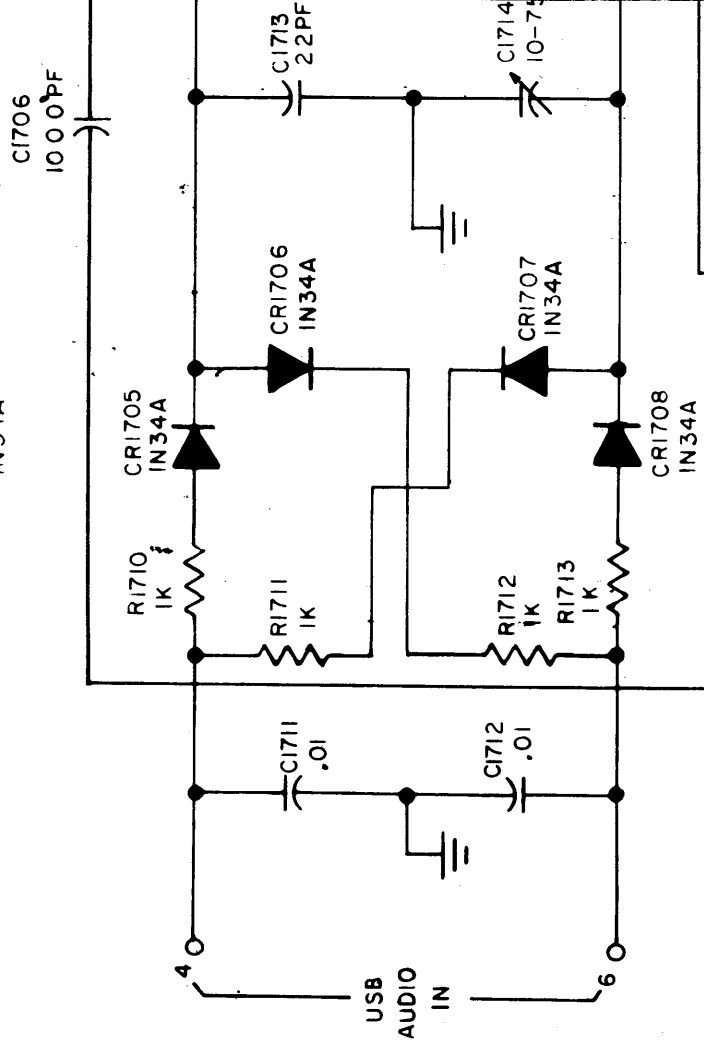
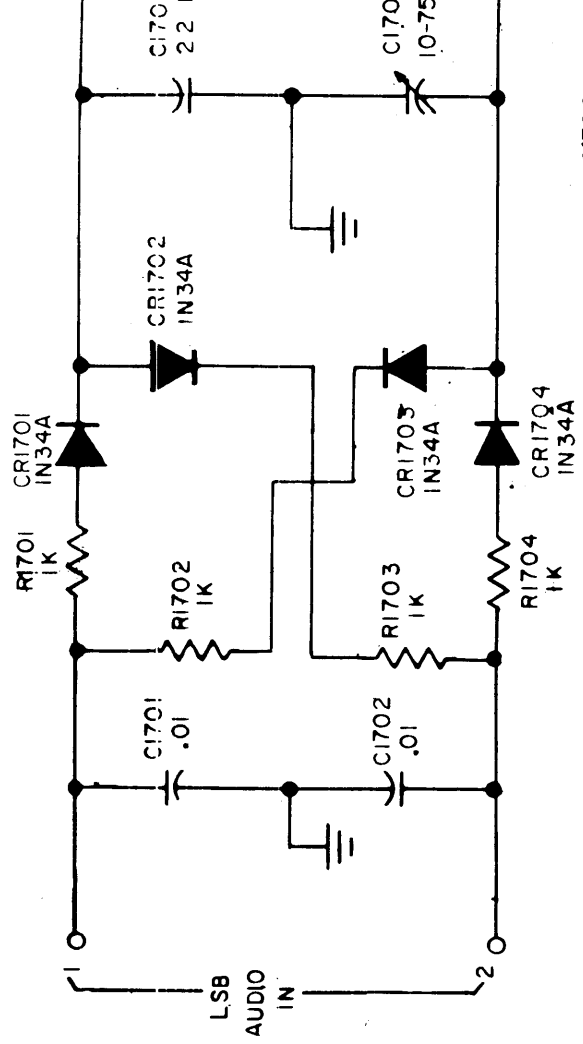
REF SYMBOL	DESCRIPTION	TMC PART NUMBER
Q1800 thru Q1806	NOT USED	
Q1807	TRANSISTOR	2N3646
Q1808	Same as Q1807.	
Q1800 thru Q1836	NOT USED	
R1837	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF102J
R1838	RESISTOR, FIXED, COMPOSITION: 470,000 ohms, <u>+5%</u> ; 1/2 watt.	RC20GF474J



LAST SYMBOLS	MISSING SYMBOLS
FL1702	C1704, C1707 THRU
C1742	C1710, C1715 THRU
CR1708	C1720, C1735,
L1702	L1701
Q1706	
R1739	
S1701	
T1702	
Y1701	
Z1701	

- NOTES
- 1- UNLESS OTHERWISE SPECIFIED ALL RESISTORS IN OHMS, 1/2 WATT. ALL CAPACITORS MICROFARADS.
 - 2- FL1701 IS FX10014-1
FL1702 IS FX10014-2
 - 3- LOWER SIDEBAND FILTER REMOVED FOR "USB - ONLY" APPLICATION.
 - 4- ALL TRANSISTORS 2N2084.

Figure 7-1. TTR-10A Schematic Diagram (Sheet 7 of 7)



62-6

63-3