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Teaberry Mighty “T” Service Manual

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SERVICE MANUAL

MIGHTY T

TEABERRY
ELECTRONICS CORP.
INDIANAPOLIS, INDIANA U.S.A.
46226

SPECIFICATIONS

Class D 23 ch. CB Transceiver
Test Channel 13 ch. (27.JJ5 MHz)
Power Supply 13.8V DC
Ant. Load 50 ohms resistor
AF Output load 8 ohms resistor
Standard Output at 500mW

RECEIVER SECTION

1.	Channel frequency tolerance	± 1350 Hz
2.	Inter frequency First IF	11.275 MHz
	Second IF	455 KHz
3.	Sensitivity for standard output 500mW	0.25 uV
4.	Sensitivity for 10 dB S+N/N	0.5 uV
5.	AGC figure of merit 10 KuV	70 dB
6.	Bandwidth at 6 dB down (Ref. 4)	6.5 KHz
7.	Adjacent channel rejection ± 10 KHz (Ref. 4)	± 50 dB
8.	Overload signal at 100 KuV input	6%
9.	Audio power output at 8 ohms maximum	3.5 W
	10% distortion	2.5 W
10.	Distortion at 500 mW output, 1 KuV input	4.0%
11.	Battery drain at no signal	250 mA
12.	Fidelity input 1 KuV (1 KHz 0 dB Ref. 4)	
	at 400 Hz	-8 dB
	at 2000 Hz	-10 dB
13.	Squelch sensitivity at the deepest point	100 uV
14.	Oscillator dropout voltage	6.5 V
15.	Image rejection (Ref. 4) at 26.745 MHz	50 dB
16.	S/N ratio at 1 KuV 10% distortion output	55 dB
17.	Squelch sensitivity	0.25 uV
18.	Conducted spurious suppression	better than 20000 uuW

TRANSMITTER SECTION

1.	Channel frequency tolerance	± 1350 Hz
2.	Power output across 50 ohms load at no mod.	3.5 W
	at 100% mod.	up or no change
3.	Modulation capability	90%
4.	Conducted spurious suppression	-55 dB
5.	Battery drain at no mod.	800 mA
6.	Battery drain at 100% mod.	1200 mA

ALIGNMENT OF RECEIVER SECTION

EQUIPMENT REQUIRED

Signal Generator	27 MHz
V. T. V. M.	
Oscilloscope	50 MHz
Distortion Meter	
DC Power Supply	13.8 V, 1.5 A
Frequency Counter	

NOTES: Allow test equipment and set at least 15 minutes to warm up before starting the alignment.
Output Level: Keep signal generator as low as possible to prevent AGC overload.
Output level of test set should be kept under 2 volts.
See "ALIGNMENT POINTS" on page

ALIGNMENT OF TRANSMITTER SECTION

EQUIPMENT REQUIRED

Audio Signal Generator	
V. T. V. M.	
RF Power Meter	50 ohms
Oscilloscope	50 MHz
Frequency Counter	
Spectrum Analyzer	
CM Coupler	
MIC. Plug for test (See Figure 4.)	

ALIGNMENT PROCEDURE OF TRANSMITTER SECTION

STEP	Connect Signal Source to	Connect Output Indicator to	Adjust	Adjust for
1	Set Channel Selector to Ch. 13.			
2	Key Transmitter by using Mic. Plug for test. (See Figure 4.)			
3		Oscilloscope (50 MHz) connected to L904 secondary	L901	Maximum 38 MHz output
4			L902	
5			L903	
6			L904	
7		Oscilloscope (50 MHz) connected to L907 secondary	L905	Maximum 27 MHz output
8			L906	
9			L907	
10	Set Test Switch to A Position.			
11	No modulation	RF Power Meter connected to CM Coupler	L908	Maximum reading on RF Power Meter
12			L909	
13			L914	
14			VC 1	
15	Repeat steps 11 thru 14 to obtain maximum reading. Then, RF output should be approx. 4 watts if the unit is under normal condition.			
16	No modulation	RF Power Meter connected to CM Coupler	VC 1	Turn VC 1 counterclockwise to obtain 3.5 watts (limit: 3.2 watts) reading on RF Power Meter. While this step is proceeding, keep L914 obtaining maximum RF Output.
17	Audio Signal Generator (Output level: 15 mV) connected to Mic. Jack The 15 mV reading can be checked on V.T.V.M.	Oscilloscope (50 MHz) connected to CM Coupler	VR 5	No distortion of modulation wave-form at 100% modulation.
18	Set Test Switch to B position			
19	No modulation	Relative Field Strength Meter or Spectrum Analyzer connected to CM Coupler	L915	Minimum 54 MHz output

ALIGNMENT PROCEDURE OF RECEIVER SECTION

STEP	Connect Signal Source to -	Connect Output Indicator to -	Set Signal to -	Adjust	Adjust for	STEP
1	Set ANL Switch to OFF position and Channel Selector to Ch. 13.					1
2	Turn Volume Control fully clockwise.					2
3	Turn Squelch Control fully counterclockwise.					3
4		V. T. V. M. connected between R301's lead wire and ground		VR 1	1.9 volts V. T. V. M. Indication	4
5	Signal Generator connected to Antenna Jack	V. T. V. M. connected across External Speaker Jack	27.115 MHz	L101	Maximum output	5
6				L102		6
7				T301		7
8				T302		8
9				T303		9
10				T304		10
11				T305		11
12				T306		12
13	Repeat steps 5 thru 12 as necessary to obtain maximum sensitivity.					13
14	Turn Squelch Control fully clockwise.					14
15	Signal Generator connected to Antenna Jack	V. T. V. M. connected across External Speaker Jack	27.115 MHz	VR2	Squelch open with 100 uV input	15

TROUBLE SHOOTING

RECEIVER SECTION

(1) Pilot Lamp does not light when power switch is turned on.

a. Check that power supply is connected with correct polarity.
b. Check if power supply circuit is shorted.
c. Check if power supply circuit is open because of accidental wire disconnection.
d. Check if the Diode D706 is shorted.
e. Check fuse.

(2) No sound (noise) from speaker.

a. Check with an external speaker.
b. Check if speaker leads are broken. Also, check other leads.
c. Check that microphone switching is operating correctly.
d. Check to be sure the audio circuit is functioning.
Check the terminal voltages of transistor Q701, Q703, Q705 and Q706. (If you touch the terminals of volume control VR4 with your finger, you should hear noise. Thus, you know the audio circuit is functioning.)
e. Check the squelch circuit is operating in a normal condition.
f. Check for presence of 23 MHz, 14 MHz and 11.730 MHz oscillation. If so, check that all oscillations are strong enough.
g. Check the connections of Channel Selector switch.

(3) ANL (Automatic Noise Limiter) does not work.

a. Check D503.

(4) Squelch does not work

a. Check the terminal voltages of transistor Q501, Q502, and Q701.
b. Check D504
c. Check the terminal voltages of transistor Q302.

TRANSMITTER SECTION

(1) No output

a. Insure microphone plug is inserted correctly.
b. Try replacing microphone.
c. Check for the presence of 23 MHz, 14 MHz and 11 MHz oscillations. If so, are they strong enough?
d. Check if VC1 is not shorted.

(2) No modulation (Modulation lamp dows not light.)

a. Check if the direct current resistance of third coil of modulation transformer (T702) is from 1 to 1.2 ohm.
b. Try replacing microphone.
c. Check the terminal voltages of Q702 and Q704.
d. Check if Q707 is operating normally.
e. Check if C941 is not shorted.

NO RECEIVING AND NO TRANSMITTING

(1) Check if microphone circuit is abnormal.
(2) Check for presence of 23 MHz and 14 MHz oscillations.
(3) Check if circuit voltages of Q901 and Q903 are OK.
(4) Check if voltages of Q902 are OK.
(5) Check if wire leads of coil L902, L903 and L904 are disconnected.

CRYSTAL SYNTHESIS

Your Mighty "T" comes equipped with crystals for all 23 transmit and receive frequencies of the Citizens Radio Service.

Crystal selection is determined by the "synthesis" technique; that is 12 crystal frequencies are selectively mixed to provide 46 crystal fixed transmit and receive frequencies.

These crystals plug into the printed circuit board. Listed below, you will find which crystals affect each of the specific channel frequencies. You will also find a diagram locating each of these crystals as they are placed in the printed circuit board.

To determine which channels are affected by which crystals locate your transmit or receive channel. The crystal frequency at the top of that column, and the crystal frequency at the left of that column are the two crystals which determine that channel. For example, channel 6 transmit is determined by the 23.340, the 14.960 and 11.275 crystals (23.340 + 14.960 - 11.275 = 27.025).

Transmit/Receive

	23.290	23.340	23.390	23.440	23.490	23.540
14.950	1	5	9	13	17	21
14.960	2	6	10	14	18	22
14.970	3	7	11	15	19	--
14.990	4	8	12	16	20	23

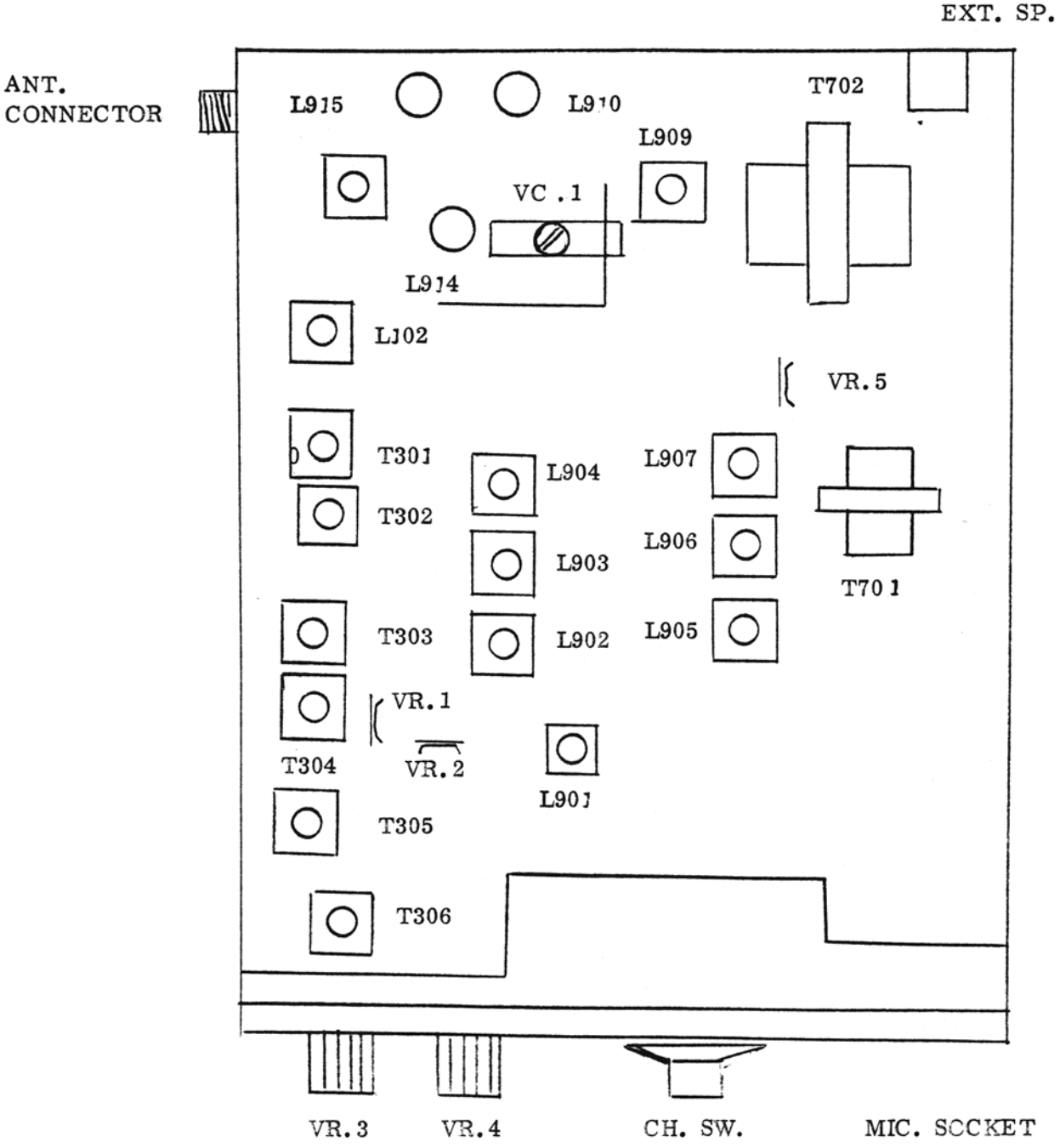
2nd Local	Transmit	11.275 MHz
	Receive	11.730 MHz
1st IF		11.275 MHz
2nd IF		455 KHz

TRANSISTOR VOLTAGE CHART

NOTES:
1. Power supply voltage = 13.8 V
2. All voltage measurements are with no signal input.
3. Parenthesized voltages are measured under squelched condition.
4. Measured with V. T. V. M.

	RX (V)	TX (V)		RX (V)	TX (V)		RX(V)	TX (V)
B	1.8	----	B	----	2.0	B	1.4	1.4
Q101 C	6.2	----	Q702 C	----	5.0	Q902 C	7.0	7.0
E	1.1	----	E	----	1.5	E	0.7	0.7
B	1.7	----	B	1.4	1.4	B	1.62	1.62
Q102 C	6.2	----	Q703 C	10.5	10.5	Q903 C	5.8	5.8
E	1.1	----	E	0.75	0.75	E	1.0	1.0
B	1.7	----	B	----	2.9	B	3.7	----
Q301 C	6.0	----	Q704 C	----	3.4	Q904 C	6.8	----
E	1.1	----	E	----	2.3	E	3.3	----
B	1.8	----	B	0.63	0.63	B	----	2.6
Q302 C	6.0	----	Q705 C	13.5	13.5	Q905 C	----	6.5
E	1.1	----	E	0.03	0.03	E	----	2.0
B	0.72	----	B	0.63	0.63	B	----	0.8
Q303 C	6.2	----	Q706 C	13.5	13.5	Q906 C	----	6.5
E	0	----	E	0.03	0.03	E	----	0.2
B	0 (0.68)	----	B	----	0	B	----	2.0
Q501 C	0.72 (0)	----	Q707 C	----	0	Q907 C	----	13.5
E	0 (0)	----	E	----	0	E	----	1.4
B	0.72 (0)	----	B	----	12.3	B	----	----
Q502 C	0.02(2.46)	----	Q708 C	----	0.2	Q908 C	----	10.5
E	0 (0)	----	E	----	13.5	E	----	0.18
B	1.8 (1.9)	----	B	2.1	2.1	B	----	----
Q701 C	3.0 (6.8)	----	Q901 C	7.0	7.0	Q909 C	----	12.0
E	1.15(2.1)	----	E	1.4	1.4	E	----	0

ALIGNMENT POINTS



Mighty T 9/9

Figure 1