diode), squelch amplifier Q16, or C37 (de-coupling capacitors).

H. The last circuit in the receiver, we should mention, is the squelch. The squelch circuit provides a variable bias to the emitter of Q6 through R21 and to the AGC line through CR6. If the control is set, say for a 10 microvolt signal so that it just quiets the receiver, then a 20 microvolt signal will open the squelch to provide full volume. Checking the squelch performance up to 1000 microvolts by squelching a signal and then doubling the signal level to see if the squelch opens, is the best way to check if operation is correct or not.

I. For component location, see Figure 4.3, "Component Layout". For typical voltage values, see Figure 4.4, "Voltage Chart".

4.5 TRANSMITTER SERVICING

4.5.1 TEST EQUIPMENT REQUIRED

A. 52-ohm Load (See Figure 4.5, Pearce-Simpson Recommended Dummy Antenna)
B. Oscilloscope - 5" Service-type Scope with RF Pick-up Loop (See Figure 4.6)
C. Hex-type Alignment Tool for IF Cans
D. Hex-type Alignment Tool for Pi-network Coils
E. VTVM, Hewlett-Packard 410B or equivalent
F. Wattmeter
G. DC Ammeter, 0-1 Amp
H. Power Supply, 13.8 VDC, 3 Amp Minimum, Regulated

4.5.2 ALIGNMENT PROCEDURE

WARNING

FCC RULES REQUIRE THAT TRANSMITTER ADJUSTMENTS WHICH MAY AFFECT FREQUENCY, POWER OUTPUT, MODULATION PERCENTAGE OR HARMONIC AND SPURIOUS CONTENT OF THE OUTPUT MUST BE MADE BY, OR UNDER THE SUPERVISION OF, THE HOLDER OF A 2ND CLASS OR HIGHER RADIO TELEPHONE LICENSE.

4.5.2.1 GENERAL

The DIRECTOR 23 transmitter has been carefully tuned and loaded at the factory for maximum legal power input of 5 watts and an output of 3 watts when operating into a 52-ohm resistive load. The transmitter has also been tuned so that it will work into an antenna which has a Standing Wave Ratio no greater than 3:1. The nearer the SWR of your antenna is to 1:1, the more efficiently your radio will perform. For instance, if you have an SWR of 3:1 and your transmitter puts out 3 watts, then .8 of a watt will be reflected back. However, if your SWR is 1.5:1, you will reflect back less than .2 of your 3 watts output. You can see it is to your advantage to tune your antenna for the lowest possible SWR rather than the transmitter into a bad antenna.

4.5.2.2 ALIGNMENT

NOTE: DO NOT align the transmitter without the proper test equipment. Misadjustment can cause off-frequency operation.

A. Connect a 52-ohm load to the antenna connector. (See Fig. 4.5 for Dummy Antenna.
B. Connect a 0 - 1 amp DC meter to the collector current jack.
C. Pre-set the following adjustments:

T12	SLUG	TOP
L6	SLUG	2 TURNS IN FROM TOP
L7	SLUG	TOP (Do not adjust or break factory seal)

D. Set Channel Selector to Channel 11.
E. T10 and T11 have been carefully tuned at the factory. Do not make field adjustments. The only exception is when it becomes necessary to replace one of the two transformers, and then only make adjustments with extreme care.

> WARNING
>
> IMPROPER TUNING OF T10 AND T11 WILL CAUSE OFF-FREQUENCY OPERATION AND BURN OUT OF THE DRIVER TRANSISTOR Q14.

Adjust top and bottom slugs of T10 and T11 for maximum signal as measured at the base of Q14 with a high frequency oscilloscope or AC VTVM. With either instrument, you must use a high impedance low capacity probe.

NOTE: Procedure for tuning T10 and T11 using a DC VTVM. Connect VTVM probe to the base of Q13 and set to plus 5 volt scale. Tune top and bottom slugs of T10 for minimum voltage. Now connect the probe to the base of Q14 and set to negative .5 volt scale. Tune the top and bottom slugs of T11 for peak.

F. Connect the RF pickup loop to the oscilloscope and place the loop on, or near, L-7 (pi-net coil). If a high frequency scope with a low capacity probe is used, then connect to the antenna connector.

G. Adjust L-6 (antenna loading) for maximum power output. Then turn slug in to 3 watts output.

H. Tune slug of T12 in until 420 ma is indicated on the current meter.

I. If power output is not 3 watts at 420 ma, re-adjust T12 to decrease drive to the final. Back the slug of T12 outward 1/4 turn at a time and re-tune L6 for 420 ma. Continue until you have above 3 watts out with 420 ma collector current.

J. Your radio should be ready to connect to an antenna.

4.5.3 TRANSMITTER LOADING

A. If the transmitter is properly aligned using a 52-ohm dummy load, then it should require no more tuning when connected to a 52-ohm antenna with an SWR of 3:1 or less.

B. If it appears that tuning is necessary, then re-tune the radio to your antenna by backing out slug in L6 for maximum power output, providing you have checked antenna installation and tuned it for as low as SWR as possible.

SECTION V
REPLACEMENT PARTS

CAPACITORS

SYMBOL	DESCRIPTION	PART NO.
C-1	.01 MFD 50VDC Disc	0401-032
C-2	.01 MFD 50VDC Disc	0401-032
C-3	.01 MFD 50VDC Disc	0401-032
C-4	1 PF 500VDC Molded	0401-041
C-5	.33 MFD 200VDC Mylar	0404-025
C-6	.01 MFD 50VDC Disc	0401-032
C-7	.1 MFD 16VDC Disc	0401-072
C-8	.01 MFD 50VDC Disc	0401-032
C-9	2.2 PF 500VDC Molded	0401-042
C-10	.005 MFD 1000VDC Disc	0401-018
C-11	.47 MFD 10VDC Disc	0401-054
C-12	.005 MFD 1000VDC Disc	0401-018
C-13	.1 MFD 16VDC Disc	0401-072
C-14	.001 MFD 1000VDC Disc	0401-015
C-15	.005 MFD 1000VDC Disc	0401-018
C-16	.01 MFD 50VDC Disc	0401-032
C-17	.47 MFD 10VDC Disc	0401-054
C-18	.02 MFD 1000VDC Disc	0401-023

CAPACITORS (Continued)

SYMBOL	DESCRIPTION	PART NO.
C-19	.1 MFD 50VDC Disc	0401-034
C-20	.1 MFD 50VDC Disc	0401-034
C-21	160 MFD 25VDC Electrolytic	0406-053
C-22	125 MFD 16VDC Electrolytic	0406-049
C-23	1000 MFD 16VDC Electrolytic	0406-057
C-24	1000 MFD 16VDC Electrolytic	0406-057
C-25	.001 MFD 1000VDC Disc	0401-015
C-26	15 MFD 15VDC Tantalex	0409-001
C-27	2.5 MFD 64VDC Electrolytic	0406-016
C-28	15 MFD 15VDC Tantalex	0409-001
C-29	15 MFD 15VDC Tantalex	0409-001
C-30	.01 MFD 50VDC Disc	0401-032
C-31	39 PF 500VDC Dur-Mica	0402-058
C-32	5 - 25 PF Trimmer	0403-033
C-33	12 PF 500VDC Dur-Mica	0402-056
C-34	18 PF 500VDC Dur-Mica	0402-053
C-35	1000 MFD 16VDC Electrolytic	0406-057
C-36	.005 MFD 1000VDC Disc	0401-018
C-37	4.7 MFD 6VDC Tantalex	0409-002
C-38	.05 MFD 100VDC Disc	0401-066

CAPACITORS (Continued)

SYMBOL	DESCRIPTION	PART NO.
C-39	16 MFD 16VDC Electrolytic	0406-060
C-40	470 PF 100VDC Dur-Mica	0402-052
C-41	8 PF 500VDC Dur-Mica	0402-049
C-42	.05 MFD 100VDC Disc	0401-066
C-43	.01 MFD 50VDC Disc	0401-032
C-44	.01 MFD 50VDC Disc	0401-032
C-45	.01 MFD 50VDC Disc	0401-032
C-46	.01 MFD 50VDC Disc	0401-032
C-47	.01 MFD 50VDC Disc	0401-032
C-48	.01 MFD 50VDC Disc	0401-032
C-49	62 PF 500VDC Dur-Mica	0402-063
C-50	330 PF 500VDC Dur-Mica	0402-055
C-51	.001 MFD 1000VDC Disc	0401-015
C-52		
C-53	100 PF 500VDC Dur-Mica	0402-001
C-54	75 PF 500VDC Dur-Mica	0402-061
C-55	200 PF 500VDC Dur-Mica	0402-002
C-56	.001 MFD 1000VDC Disc	0401-015
C-57		
C-58	.001 MFD 1000VDC Disc	0401-015

CAPACITORS (Continued)

SYMBOL	DESCRIPTION	PART NO.
C-59	22 PF 1000VDC Disc	0401-045
C-60	.001 MFD 1000VDC Disc	0401-015
C-70	180 PF 100VDC Dur-Mica	0402-069
C-71	180 PF 100VDC Dur-Mica	0402-069
C-72	180 PF 100VDC Dur-Mica	0402-069
C-73	180 PF 100VDC Dur-Mica	0402-069
C-74	180 PF 100VDC Dur-Mica	0402-069
C-75	180 PF 100VDC Dur-Mica	0402-069
C-76	180 PF 100VDC Dur-Mica	0402-069
C-77	.47 MFD 10VDC Disc	0401-054
C-78	.001 MFD 1000VDC Disc	0401-015
C-79	.02 MFD 1000VDC Disc	0401-023
C-80	.001 MFD 1000VDC Disc	0401-015
C-101	39 PF 500VDC Dur-Mica	0402-058
C-102	47 PF 500VDC Dur-Mica	0402-057
C-103	270 PF 100VDC Dur-Mica	0402-060
C-104	.01 MFD 50VDC Disc	0401-032
C-105	470 PF 100VDC Dur-Mica	0402-052
C-106	.01 MFD 50VDC Disc	0401-032
C-107	47 PF 500VDC Dur-Mica	0402-057

CAPACITORS (Continued)

SYMBOL	DESCRIPTION	PART NO.
C-108	68 PF 500VDC Dur-Mica	0402-048
C-109	270 PF 100VDC Dur-Mica	0402-060
C-110	.01 MFD 50VDC Disc	0401-032
C-111	.05 MFD 100VDC Disc	0401-066

RESISTORS

SYMBOL	DESCRIPTION	PART NO.
R-1	1000 Ohms, 1/4 Watt	2025-102
R-2	1000 Ohms, 1/4 Watt	2025-102
R-3	1000 Ohms, 1/4 Watt	2025-102
R-4	150 Ohms, 1/4 Watt	2025-151
R-5	1000 Ohms, 1/4 Watt	2025-102
R-6	680 Ohms, 1/4 Watt	2025-681
R-7	47 Ohms, 1/4 Watt	2025-470
R-8	1000 Ohms, 1/4 Watt	2025-102
R-9	390 Ohms, 1/4 Watt	2025-391
R-10	4700 Ohms, 1/4 Watt	2025-472
R-11	10K Ohms, 1/4 Watt	2025-103
R-12	470 Ohms, 1/4 Watt	2025-471
R-13	22K Ohms, 1/4 Watt	2025-223
R-14	100K Ohms, 1/4 Watt	2025-104

RESISTORS (Continued)

SYMBOL	DESCRIPTION	PART NO.
R-15	27K Ohms, 1/4 Watt	2025-273
R-16	150K Ohms, 1/4 Watt	2025-154
R-17	6.8K Ohms, 1/4 Watt	2025-683
R-18	50K Ohms (Vol. Control)	2008-054
R-19	220K Ohms, 1/4 Watt	2025-224
R-20	3300K Ohms, 1/4 Watt	2025-335
R-21	22K Ohms, 1/4 Watt	2025-223
R-22	6.8K Ohms, 1/4 Watt	2025-682
R-23	22K Ohms, 1/4 Watt	2025-223
R-24	10K Ohms, 1/4 Watt	2025-103
R-25	27 Ohms, 1 Watt	2002-270
R-26	33 Ohms, 1/2 Watt	2001-330
R-27	180 Ohms, 2 Watt	2003-181
R-28	5 Ohms, 5 Watt	2011-018
R-29	2 Ohms, 5 Watt	2011-003
R-30	100 Ohms, 1/2 Watt	2001-101
R-31	390K Ohms, 1/4 Watt	2025-394
R-32	33K Ohms, 1/4 Watt	2025-333
R-33	10K Ohms, 1/4 Watt	2025-103
R-34	1000 Ohms, 1/4 Watt	2025-102

RESISTORS (Continued)

SYMBOL	DESCRIPTION	PART NO.
R-35	2700 Ohms, 1/4 Watt	2025-272
R-36	1000 Ohms, 1/4 Watt	2025-102
R-37	22K Ohms, 1/4 Watt	2025-223
R-38	10K Ohms, 1/4 Watt	2025-103
R-39	1000 Ohms, 1/4 Watt	2025-102
R-40	10K Ohms, 1/4 Watt	2025-103
R-41	8200 Ohms, 1/4 Watt	2025-822
R-42	680 Ohms, 1/4 Watt	2025-681
R-43	50K Ohms (Squelch Control)	2008-055
R-44	10K Ohms, 1/4 Watt	2025-103
R-45	680 Ohms, 1/4 Watt	2025-681
R-46	4700 Ohms, 1/4 Watt	2025-472
R-47	100 Ohms, 1/4 Watt	2025-101
R-48	4.7K Ohms, 1/4 Watt	2025-472
R-49	4.7K Ohms, 1/4 Watt	2025-472
R-50	470 Ohms, 1/4 Watt	2025-471
R-51	10K Ohms, 1/4 Watt	2025-103
R-52	470 Ohms, 1/4 Watt	2025-471
R-53	180 Ohms, 1/4 Watt	2025-181
R-54	2200 Ohms, 1/4 Watt	2025-222