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Craig L104 Service Manual

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SERVICE MANUAL

CRAIG®

L104

40-CHANNEL MOBILE CB TRANSCEIVER



SPECIFICATIONS

RECEIVER

SENSITIVITY	0.4 μ V for 10 dB (S+N)/N
BANDWIDTH	7 KHz @ -6.0 dB
AGC	Charge in audio output less than 10 dB from 10 μ V to 1.0 V
SQUELCH	Adjustable; Threshold, less than 0.5 μ V. Tight, more than 250 μ V
POWER OUTPUT	4.0 W at 10 % THD
IMAGE REJECTION	Better than 90 dB
IF REJECTION	Better than 60 dB
ADJACENT CHANNEL REJECTION	Better than 60 dB
IF FREQUENCY	10.695 MHz

TRANSMITTER

RF POWER OUTPUT	4.0 W
SPURIOUS ATTENUATION	60 dB minimum
OUTPUT IMPEDANCE	50 ohm

GENERAL

CHANNELS	40 AM
FREQUENCY RANGE	26.965 to 27.405 MHz
FREQUENCY TOLERANCE	0.005 % from -30 C° to 50 C°
FREQUENCY STABILITY	+0.001%
MICROPHONE	Dynamic
POWER SOURCE	13.8 Vdc, pos. or neg. ground
CURRENT DRAIN; RECEIVE:	0.7 A at max. audio output
	0.3 A at standby
TRANSMIT	1.5 A

P.A. SYSTEM

POWER OUTPUT	4.0 W
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NOTE: ALL DATA SUBJECT TO CHANGE WITHOUT NOTICE

PARTS PRICE LIST

REF. No.	CRAIG KEY No.	DESCRIPTION	MFR's SUGG RET. PRICE
PACKAGING			
	L104001	Individual Carton	\$ 3.35
	L104002	Stryfoam, FRONT	1.30
	L104003	Stryfoam, REAR	1.30
	L103507	Microphone (Complete)	22.40
	L150396	Bracket, Mic Mounting	.75
	XFU002	Spare Fuse, 2A	1.00
	L104100	Mounting Bracket (Unit)	1.45
	L103212	Mounting Screw (Unit)	.40
	L103004	Mounting Hardware Kit	1.15
	4101033	D.C. Power Plug w/Cord	3.50
CABINET & CHASSIS			
1	NSP	Chassis	----
2	L104050	Cabinet Top	5.10
3	L103100	Wool Tack	.25
4	L104051	Cabinet Bottom	5.15

SUBJECT TO CHANGE WITHOUT NOTICE. USE ALL AVAILABLE NUMBERS AND COMPLETE DESCRIPTION WHEN ORDERING, INCLUDING MODEL NUMBER
THESE PRICES HAVE BEEN REVISED AS OF 1/20/80

REF. No.	CRAIG KEY No.	DESCRIPTION	MFR's SUGG RET. PRICE
CABINET & CHASSIS (CONTINUED)			
5A	L104010	Assy, FRONT ESCUTCHEON	\$ 8.35
5	L104011	Front Escutcheon	7.40
6	L103071	Optical Filter (Ch. Display)	.55
7	L104070	Window, Front Display	3.20
8	L104100	Mounting Bracket (Unit)	1.45
9	L103212	Mounting Screw (Unit)	.40
10	L103231	Rubber Washer (Mtg. Brkt.)	.25
11	L103026	Knob, CHANNEL SELECT	1.40
12	L103027	Knob, VOL/SQUEL/MIC & RF GAIN	.90
13	L103291	Spring Plate, Ch. Sel. Knob	.25
14	L103028	Pushbutton, PA/ANL/DIM SW	.65
15	L104380	Holder, LED TX/RX Ind.	.30
16	NSP	FCC Plate	----
17	NSP	Mica Insulator	----
18	NSP	Rivet	----
19	NSP	Heat Sink	----
20	NSP	Ground Lug	----

A PRODUCT OF CRAIG CORPORATION

REF. No.	CRAIG KEY No.	DESCRIPTION	MFR's SUGG RET. PRICE
CABINET & CHASSIS (CONTINUED)			
21	-----	PH Tapp. Scr. M3x6	\$.25
22	L103213	Plastic PH Scr. M3x6	.25
23	-----	Hex Nut M3	.25
24	L103213	Plastic PH Scr. M3x6	.25
25	-----	PH Tapp. Scr. M3x6	.25
26	-----	FH Scr. M3x5	.25
27	-----	PH Scr. M3x8	.25
28	-----	PH Tapp Scr. M3x8	.25
29	-----	Flange Nut M3	.25
**	L103004	Hardware Mounting Kit	1.15
30	L150396	-Brkt., Mic Mounting	.75
31	-----	-RH Tapp. Scr. M3.5x8	.25
32	-----	-RH Tapp. Scr. M5x10	.25
33	-----	-Lock Washer M3.5	.25
34	-----	-Star Washer M5	.25
D301	UR202	LED, Channel Indicator	9.15
D401	TLRG101	LED, TX/RX Indicator	2.05
FC401	L103800	7 Lead Flexible Cable	.35
FC402	L103800	7 Lead Flexible Cable	.35
FC403	L104800	10 Lead Flexible Cable	.35
IC1	TA7222P	I.C.	5.65
J401	L103607	Connector, Coaxial Antenna	1.80
J402	L103609	Jack, PA Speaker	.75
J403	L103609	Jack, External Speaker	.75
J405	4101027	Socket, D.C. Power Conn.	1.75
J501	L103608	Socket, Mic Connector	2.15
M401	L103604	Meter, SIGNAL/TX Power	9.05
PC266	L104516	PCB w/Comp., MIC JACK	3.05
PC417	NSP	PCB w/Comp., MAIN	----
PC421	L104517	PCB w/Comp., LED CH. IND.	9.35
PC608	L104518	PCB w/Comp., CH. SELECT SW	10.55
PL401	L103550	Pilot Lamp, SIG/TX Meter	1.05
S201	L104530	Rotary SW, (Ch. Select)	9.15
S401	-----	SW, POWER On/Off (see VR320)	----
S402	L103533	Push SW, ANL On/Off	3.30
S403	L103533	Push SW, PA/CB Select	3.30
S404	L103533	Push SW, DIM/BRITE Select	3.30
SP401	L103702	Speaker (16 Ohms)	6.40
SW149	L104531	Assy, Push SW (S402, 403 & 404)	9.00
TR7	2SC2075	Transistor	.45
TR8	2SC2091	Transistor	.45
VR320	L104570	Power On/Off SW; VOL Cont.	2.90
VR403		VR 50K (VOLUME Cont.)	
S401		SW, POWER On/Off	
VR401	L104571	VR 1K (RF GAIN Cont.)	1.70
VR402	L104572	VR 50K (SQUELCH Cont.)	1.70
VR404	L104573	VR 5K (MIC GAIN Cont.)	2.10
YD041	NSP	Mica Insulator	----

MISCELLANEOUS ELECTRICAL			
F401	XFU002	Fuse, 2A	1.00
FC401	L103800	7 Lead Flexible Cable	.35
FC402	L103800	7 Lead Flexible Cable	.35
FC403	L104800	10 Lead Flexible Cable	.35
J401	L103607	Connector, Coaxial Antenna	1.80
J402	L103609	Jack, PA Speaker	.75
J403	L103609	Jack, External Speaker	.75
J405	4101027	Socket, D.C. Power Conn.	1.75
J501	L103608	Socket, Mic Connector	2.15
MIC1	L103507	Microphone (Complete)	22.40
M401	L103604	Meter, SIG/TX Power	9.05
PC266	L104516	PCB w/Comp., MIC JACK	3.05
PC417	NSP	PCB w/Comp., MAIN	----
PC421	L104517	PCB w/Comp., LED CH. Ind.	9.35
PC608	L104518	PCB w/Comp., CH. SELECT SW	10.55
PL401	L103550	Pilot Lamp, SIG/TX Meter	1.05
S201	L104530	Rotary SW, (Channel Select)	9.15
S401	-----	SW, POWER On/Off (see VR320)	----
SW149	L104531	Assy, Push Switch	9.00
S402	L103533	Push SW, ANL On/Off	3.30
S403	L103533	Push SW, PA/CB Select	3.30
S404	L103533	Push SW, DIM/BRITE Select	3.30
SP401	L103702	Speaker (16 Ohm)	6.40
VR320	L104570	Power On/Off SW; VOL Cont.	2.90
VR403		VR 50K (VOLUME Cont.)	
S401		SW, POWER On/Off	
VR1	L104591	Semi-Fixed Res. 20K Ohm	.65
VR2	L104590	Semi-Fixed Res. 500 Ohm	.65
VR3	L104591	Semi-Fixed Res. 20K Ohm	.65
VR4	L600593	Semi-Fixed Res. 50K Ohm	.70

NOTE: NSP= Non-Serviceable Part

REF. No.	CRAIG KEY No.	DESCRIPTION	MFR's SUGG RET. PRICE
MISCELLANEOUS ELECTRICAL (CONTINUED)			
VR5	L104590	Semi-Fixed Res. 500 Ohm	\$.65
VR401	L104571	VR 1K, RF GAIN Cont.	1.70
VR402	L104572	VR 50K, SQUELCH Cont.	1.70
VR404	L104573	VR 5K, MIC GAIN Cont.	2.10
X1	L103722	Crystal (10.24 MHz)	4.55

COILS, TRIMMERS & XFORMERS			
CF1	L103670	Ceramic Filter, 10.695 MHz (FL048)	1.40
CF2	L103671	Ceramic Filter, 455 KHz (FL066)	6.45
L1	L104670	Coil (LA029)	.90
L2	L104671	Coil (LA138)	.90
L3	L103675	Coil (LA181)	.90
L4	L103675	Coil (LA181)	.90
L5	L104672	Coil (LA106)	.90
L6	L103678	Coil (LA204)	.85
L7	L104673	Coil (LA276)	.90
L8	L104674	Coil (LE096)	.25
L9	L103687	Coil (LE093)	.25
L10	L103686	Coil (LC073)	.75
L11	L103685	Coil (LD033)	.40
L12	L104675	Coil (LD087)	.50
L13	L104676	Coil (LC130)	.80
L14	L103683	Coil (LA208)	.90
L15	L104677	Coil (LA165)	.90
L16	L104678	Coil (LA201)	.90
L17	L104679	Coil (LA088)	.90
L18	L104680	Coil (LA198)	1.75
L20	L104676	Coil (LC130)	.80
L50	L104675	Coil (LD087)	.50
L401	L104681	Coil (LD088)	.70
L501	L104682	Coil (LD055)	.80
L502	L104682	Coil (LD055)	.80
T1	L103641	Transformer, Output (TF177)	3.55
T2	L103642	Coil, AF Choke (TF083)	1.05

SEMICONDUCTORS			
D1	1S2075	Diode	.35
D2	1S2075	Diode	.35
D4	1N60	Diode	.95
D5	1S2075	Diode	.35
D6	1N60	Diode	.95
D7	1S2075	Diode	.35
D8	1S2075	Diode	.35
D9	1S2075	Diode	.35
D10	1N4003	Diode	.65
D11	1S2688	Vari-Cap Diode	1.25
D12	1S2075	Diode	.35
D13	RD75EB2	Zener Diode	.50
D14	1S2075	Diode	.35
D15	RD10EB1	Zener Diode	.40
D16	1S2075	Diode	.35
D17	1N4003	Diode	.65
D18	1S2075	Diode	.35
D301	UR202	LED, Channel Indicator	9.15
D401	TLRG101	LED, TX/RX Indicator	2.05
FET1	2SK104H	FET	.65
FET2	2SK104H	FET	.65
IC1	TA7222P	I.C. (AF Power)	5.65
IC2	TA7310P	I.C. (TX MIX)	1.75
IC3	TC9106P	I.C. (PLL)	11.65
TR1	2SC1674	Transistor	.45
TR2	2SC710	Transistor	.45
TR3	2SC710	Transistor	.45
TR4	2SC710	Transistor	.45
TR5	2SC711	Transistor	1.15
TR6	2SC711	Transistor	1.15
TR7	2SC2075	Transistor	.45
TR8	2SC2091	Transistor	.45
TR9	2SC710	Transistor	.95
TR10	2SC711	Transistor	1.15
TR11	2SC710	Transistor	.95
TR12	2SC710	Transistor	.95
TR13	2SC711	Transistor	1.15
TR14	2SA628	Transistor	.45
TR15	2SC710	Transistor	.95
TR16	2SA628	Transistor	.45
TR17	2SC2236	Transistor	.50
TR18	2SC22360	Transistor	.55
TR19	2SC711	Transistor	1.15

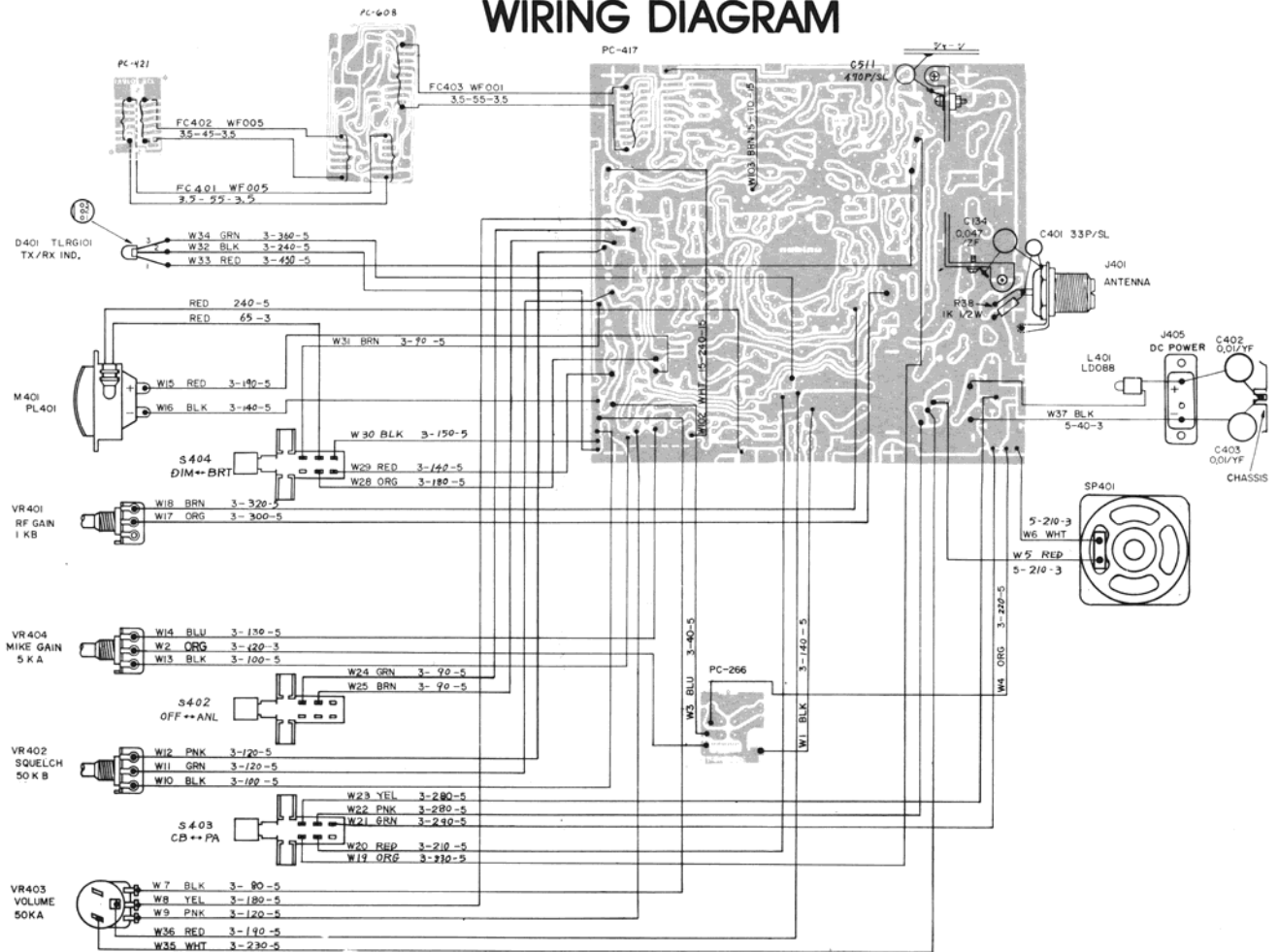
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WARNING

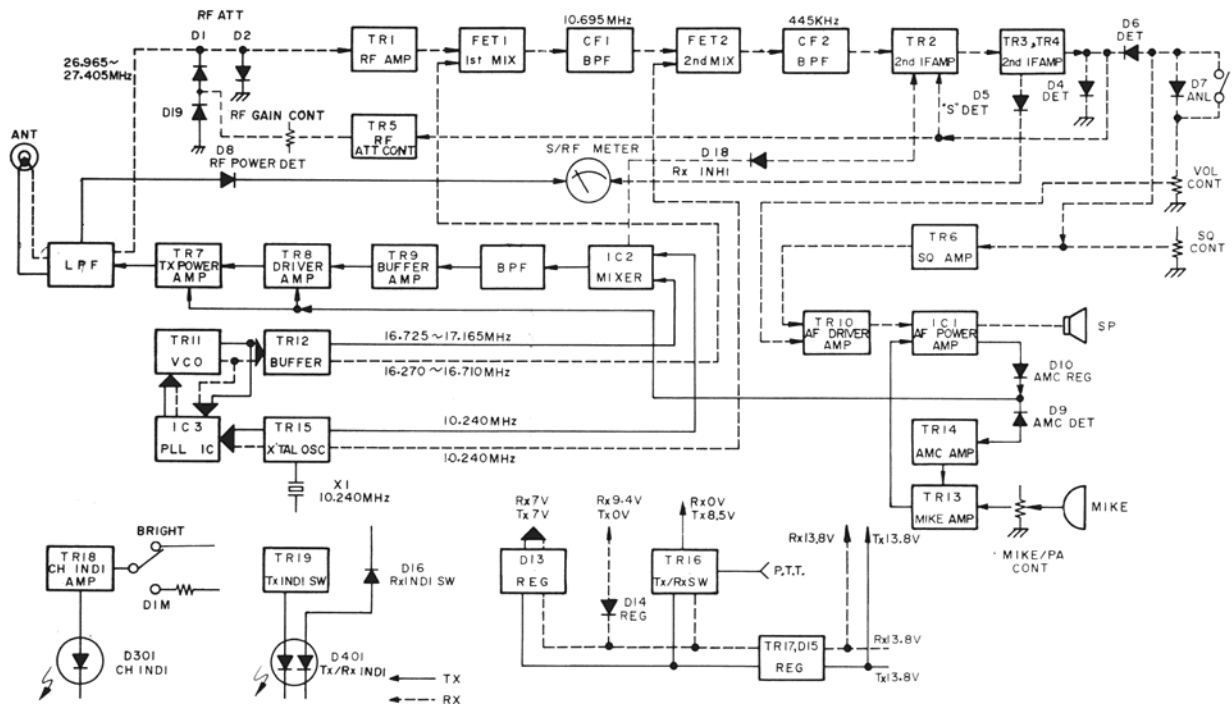
Replacement or substitution of IC's, crystals, transistors, regulator diodes, or any other part of a specialized nature with parts other than those recommended by Craig may cause the operator to be in violation of the Type Acceptance requirements of Part 2 of the Rules.

FCC Rules require that ALL transmitter section adjustments, other than those supplied by Craig as front-panel operating controls, be made by or under the immediate supervision of the holder of an FCC First or Second Class Radio-Telephone Operator's License.

WIRING DIAGRAM

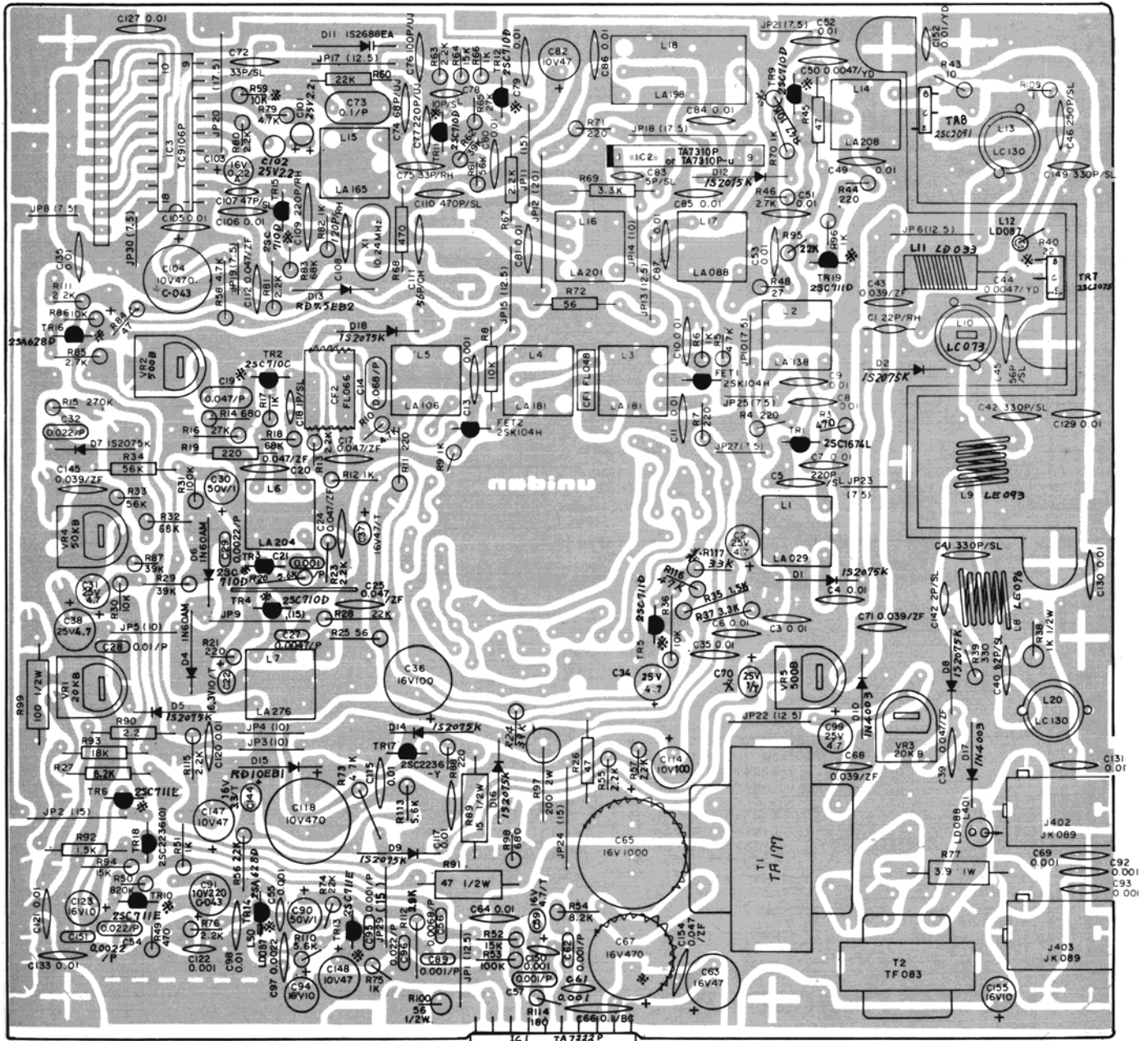


BLOCK DIAGRAM



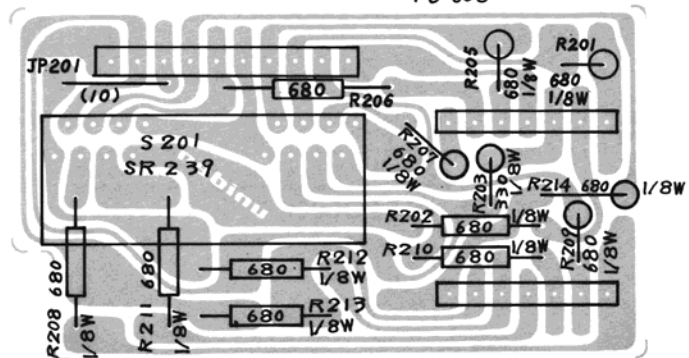
MAIN PCB

PC-417



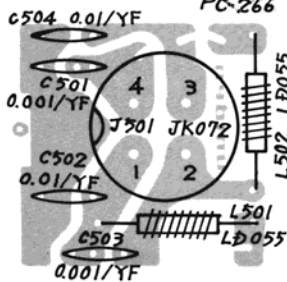
CHANNEL SELECT PCB

PC-608



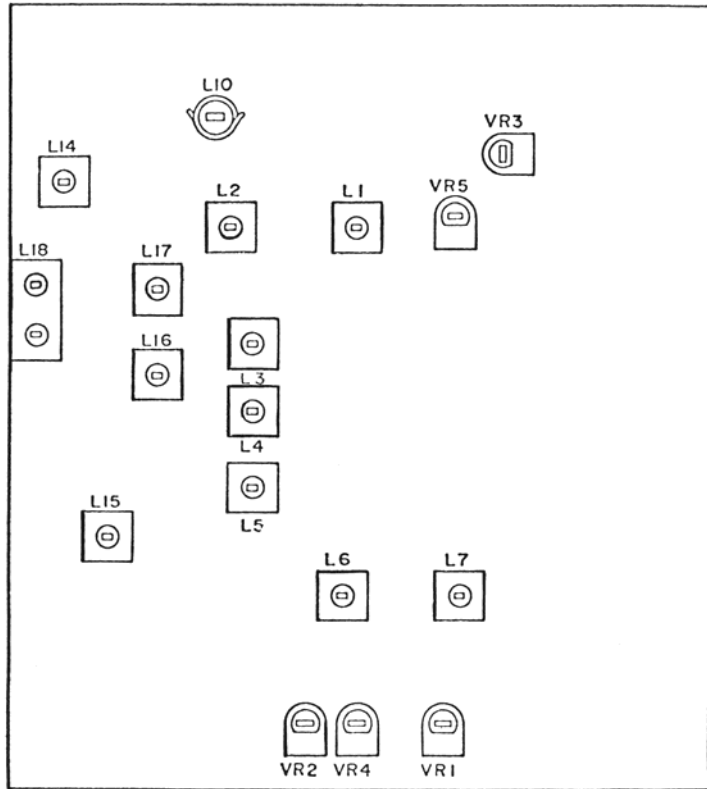
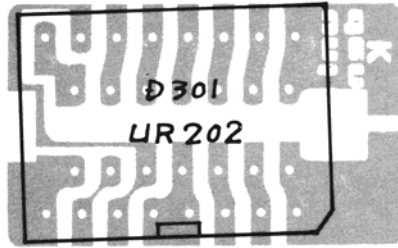
MIC JACK PCB

PC-266



LED CHANNEL INDICATOR PCB

PC-421



ALIGNMENT PROCEDURES

TEST EQUIPMENT REQUIRED

- a) Oscilloscope
- b) D.C. Volt Meter
- c) VTVM
- d) RF Wattage Meter
- e) Frequency Counter
- f) 50 Ohm Dummy Antenna Load
- g) Signal Generator

STEP	SET TO	CONNECTIONS	ADJUST	ADJUST FOR
P.L.L. CIRCUIT				
1	Channel 40. No Modulation. TX Mode.	D.C. Volt Meter To Pin #7 Of IC 3 (TP1).	L15	Reading Of Approx. 3 V On D.C. Volt Meter.
2	Channel 1. No Modulation. TX Mode.	Oscilloscope To Secondary Of L16 (TP2).	L16	Maximum Indication On Oscilloscope.
TRANSMITTER				
1	Channel 19. No Modulation. TX Mode.	RF Wattage Meter To Antenna Jack (J403).	L17,L18	Maximum Indication On RF Wattage Meter.
2	Same As Step 1	Same As Step 1.	L10,L14	Same As Step 1.
3	Same As Step 1	Same As Step 1.	L10	Nominal 3.8W Of Power.
4	Repeat Steps 1,2 & 3 To Insure That Adjustments Made Are Correct.			
5	Channel 19. TX Mode. 1 KHz (100 uV) Applied Thru Mic Input.	Signal Generator To Mic Jack (J501). Oscilloscope To Antenna Jack (J401) Through 50 Ohm Load And Attenuator.	VR5	95 % Modulation.
6	Same As Step 1	RF Wattage Meter To Antenna Jack (J401).	VR3	Reading Of 3 To 4 On TX Meter (M401)
7	All Channels. TX Mode. No Modulation.	Frequency Counter To Antenna Jack (J401) Through 50 Ohm Load And Attenuator.		Check All Channels For Correct Frequency Operation.
RECEIVER				
1	Volume; MAX. Squelch; MIN. ANL; OFF	Signal Generator To Antenna Jack (J401) At Ch. 19 Frequency, (27.185 MHz). VTVM To EXT. SPKR. Jack (J403).	L1,L2,L3, L4,L5,L6, L7	Maximum Audio Output.
2	Same As Step 1	Same As Step 1.	VR2	2 V Output With S/G Output Level Of .4 uV.
3	Volume; MAX. Squelch; MAX. ANL; OFF	Same As Step 1.	VR4	2 V Output With S/G Output Level Of 100uV.
4	Same As Step 1	Same As Step 1.	VR1	Reading Of 9 On Sig. Meter (M401) With S/G Output Level Of 100 uV.

CABINET & CHASSIS

