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Craig L101 Service Manual

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SERVICE MANUAL

CRAIG®

L101

40-CHANNEL MOBILE CB TRANSCEIVER



SPECIFICATIONS

GENERAL

Channels.....40
 Frequency Range.....26.965 to 27.405 MHz
 Frequency Tolerance... $\pm 0.005\%$ from -30 C to $+50\text{ C}$
 Frequency Stability... $\pm 0.001\%$
 Microphone.....Dynamic with press-to-talk switch and coiled cord
 Power Source.....13.8V DC \pm Ground
 Current Drain.....Receive: 0.7A @ maximum audio output 0.5A standby (no signal)
 Transmit: AM full mode -2.0A
 Meter.....Illuminated. Indicates receiving signal strength, relative power output

TRANSMITTER

RF Power Output.....4.0 watts
 Modulation Capability.100%
 Spurious Attenuation..60 dB minimum
 Output Impedance.....50 ohm

RECEIVER

Sensitivity.....Better than 0.5uV for 10 dB (S+N)/N
 Bandwidth..... $\pm 3\text{kHz}$ @ -6 dB
 AGC.....Change in audio output less than 12 dB from 10uV to 0.5 volts
 Squelch.....Adjustable. Threshold less than 0.5uV. Tight, more than 250uV
 Distortion.....10% at 3.5 watts output
 Image Rejection.....Better than 60 dB
 IF Rejection.....Better than 60 dB @ 10.695MHz
 Adjacent Ch. Rejection,Better than 60 dB @ $\pm 10\text{ kHz}$
 IF Frequency.....1st IF 10.695 MHz
 2nd IF 455 kHz

P. A. SYSTEM

Power Output.....3.5 watts

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.

A PRODUCT OF CRAIG CORPORATION

Description of Transmitter Circuit

27 MHz Carrier Amplifier

The channel frequency is made by mixing the VCO frequency and the reference frequency. The reference frequency is resonated at T301 before being injected into the mixer and removing spurious radiation. Both above frequencies are mixed by FET (Q26). The reference frequency is fed to gate of Q26, and VCO's frequency to source of Q26. CR43, which is connected to drain output of Q26 will switch to "ON CONDITION" when VCO is under out-of-lock, and the output of the mixer is grounded through C304. Q27 and Q28 are the amplifiers of the 27 MHz carrier signal. Q29 is a driver, and Q30 is a power amplifier. The carrier is modulated by Q29 and Q30 and coupled to the antenna via lowpass filter (harmonic filter).

Modulator

In Transmit mode, when the microphone is keyed, an audio signal from the microphone is fed to the audio amplifier Q21. Through the audio lowpass filter Q22, driver Q23, and audio power amplifier, the amplified audio signal is fed to the secondary of T202 which then modulates the driver Q29 and the power amplifier Q30 of transmitter.

Modulation Limiter

A portion of the modulation signal is rectified by diodes CR39 and CR40. The rectified positive voltage is filtered and applied to the emitter of audio amplifier Q21. The rectified positive voltage bias increases in proportion according to the increase of percentage of modulation. This is done to prevent exceeding 100 percent modulation. R226 is adjusted for modulation limiter.

RFO Meter Circuit

Power output signals are coupled through C329 and rectified by CR44. This positive DC voltage is then fed to the meter via the limiting potentiometer R319.

Modulation Indicator

The audio modulator output appears at the secondary of T202, and is fed to the base of the modulation lamp driver Q34 through detector (CR46 and CR47), and flashes the lamp located in the channel selector knob.

Description of P.L.L. Circuit

The frequencies of the TRANSMITTER/RECEIVER of this transceiver (L101) are made by a P.L.L. digital synthesizer using only one crystal. The details are explained below.

Reference Frequency Oscillator (Q1)

Q1 is the oscillator of REFERENCE FREQUENCY, which is 10,240 MHz at receiving and 10,2381 MHz at transmitting. The change from TX to RX/RX to TX is achieved by the variable capacitance diode (CR2), and the switching of this is conveyed by Q2. The frequency adjusted by L1 and the frequency at receiving can be properly adjusted by R11. The reference frequency is used as the second local frequency at receiving and the local frequency at transmitting. This frequency is supplied through a buffer (Q3) to the divider to make standard frequency.

Standard Frequency

The reference frequency after passing the buffer is divided into 1024 (divided by 16 counter (U1) and divided by 64 counter in U3). After being divided, this frequency becomes 10 KHz at receiving and can be added onto the phase detector as the standard frequency.

Phase Detector

The phase detector units are in U3. Two frequencies are injected in the phase detector. One is the standard frequency and the other is the frequency of the out-of-programmable divider. The phase detector compares the difference of the above two frequencies, and translates any phase difference into a DC bias voltage which is fed to the VCO. Thus, the DC bias voltage pumps the VCO's frequency up if too low, or down if too high, and the frequency goes to lock in.

Low Pass Filter

DC control voltage made by the phase detector is added to the VCO after cutting ripple and noise by passing through a low pass filter.

Voltage Controlled Oscillator (VCO) Q8

The VCO (Q8) is the LC oscillator and variable capacitance diode which is used as C (Capacitance). C makes the oscillation frequency when DC control voltage is added to it. The VCO frequency is supplied through the buffer (Q9) to the first mixer of receiving and first mixer of transmitting as the first local frequency. The frequency of VCO is, in the case of CH1, 16.270 MHz at receiving and 16.7269 MHz at transmitting. This VCO frequency is too high to be added to the programmable divider, so frequency conversion is made to get a lower frequency.

Mixer (Q5)

The VCO output is added to the mixer (Q5) through the buffer (Q7). The reference frequency is multiplied 3/2 times by U1 and Q4, and this frequency (3/2 X Reference Frequency) is used as the local frequency of the mixer. So the local frequency is 15.360 MHz at receiving and 15.35715 MHz at the transmitting output frequency of the mixer (QH1).

at receiving: $16.270 \text{ MHz} - 15.360 \text{ MHz} = 910 \text{ KHz}$

at transmitting: $16.7269 \text{ MHz} - 15.35715 \text{ MHz} = 1369.75 \text{ KHz}$

Programmable Divider (U2, U3)

The mixer output is divided at the programmable divider. The divided number is decided by a binary number which is pre-set by the channel selector. The programmable divider is constructed as an 8 bit binary counter (U2 and part of U3). Refer to the Table of Channel Program (see Chart on Page 3) which shows the relation of the pre-set program, the divided number and the channel. The divided number at receiving is different from the one at transmitting. For example, in the case of CH1,

at receiving divided number N = 91
 divide output 10 KHz when locked

at transmitting divided number N = 137
 divide output 9.998 KHz when locked

Out-Of-Lock Circuitry

The VCO is a free-running oscillator until it is locked in by the OKK circuit. Under out-of-lock conditions, a low level pulse appears at 12th pin of U3; when in locked-in conditions, it is always high level. The low level pulse is detected by Q11 and drive Q12. In other words, under out-of-lock conditions, almost 5 volts of DC bias appears at the emitter of Q12. The DC bias is fed to CR43 of transmitter mixer, and kills transmitting operations alternately.

In the middle of each channel, the channel selector is wired so that out-of-lock driver Q12 switches to the "ON CONDITION" and kills transmitting operations.

The two digit, seven segment, channel indicator is directly driven by the channel selector switch. The brightness of the channel display is controlled by a push-pull dimmer switch, which is part of squelch control.

Table of Channel Program

Receiver								Transmitter										
N	A	B	C	D	E	F	G	H	CH	A	B	C	D	E	F	G	H	N
91	1	1	0	1	1	0	1	0	1	1	0	0	0	0	1	1	37	137
92	0	0	1	1	1	0	1	0	1	0	1	0	0	0	1	1	138	138
93	1	0	1	1	1	0	1	0	1	1	0	1	0	0	0	1	139	139
94																	140	140
95	1	1	1	1	1	0	1	0	1	0	1	0	0	0	1	1	141	141
96	0	0	0	0	0	1	1	0	1	0	0	0	0	1	1	1	142	142
97	1	0	0	0	1	1	0	1	1	0	0	0	0	1	1	1	143	143
98	0	1	0	0	0	1	1	0	1	0	0	1	0	0	1	1	144	144
99																	145	145
100	0	0	1	0	0	1	1	0	1	0	0	1	0	0	1	1	146	146
101	1	0	1	0	0	1	1	0	1	1	0	0	1	0	0	1	147	147
102	0	1	1	0	0	1	1	0	1	0	0	1	0	0	1	1	148	148
103	1	1	1	0	0	1	1	0	1	1	0	1	0	0	1	1	149	149
104																	150	150
105	1	0	0	1	0	1	1	0	1	1	0	1	0	0	1	1	151	151
106	0	1	0	1	0	1	1	0	1	0	0	1	1	0	0	1	152	152
107	1	1	0	1	0	1	1	0	1	1	0	0	1	0	0	1	153	153
108	0	0	1	1	0	1	1	0	1	0	1	0	0	1	1	1	154	154
109																	155	155
110	0	1	1	1	0	1	1	0	1	0	0	1	1	0	0	1	156	156
111	1	1	1	1	0	1	1	0	1	1	0	0	1	1	0	1	157	157
112	0	0	0	0	1	1	1	0	1	0	0	1	1	0	0	1	158	158
113	1	0	0	0	1	1	1	0	1	1	0	0	1	1	0	1	159	159
114																	160	160
115	1	1	0	0	1	1	1	0	1	0	0	0	1	0	1	1	161	161
116	0	0	1	0	1	1	1	0	1	0	1	0	1	0	1	1	162	162
117	1	0	1	0	1	1	1	0	1	1	0	0	1	0	1	1	163	163
118	0	1	1	0	1	1	1	0	1	0	0	1	0	1	0	1	164	164
119	1	1	1	0	1	1	1	0	1	0	0	1	0	1	0	1	165	165
120	0	0	0	1	1	1	1	0	1	0	0	1	0	1	0	1	166	166
121	1	0	0	1	1	1	1	0	1	0	1	0	1	0	1	1	167	167
122	0	1	0	1	1	1	1	0	1	0	0	1	0	1	0	1	168	168
123	1	1	0	1	1	1	1	0	1	0	1	0	1	0	1	1	169	169
124	0	0	1	1	1	1	1	0	1	0	1	0	1	0	1	1	170	170
125	1	0	1	1	1	1	1	0	1	0	1	0	1	0	1	1	171	171
126	0	1	1	1	1	1	1	0	1	0	1	0	1	0	1	1	172	172
127	1	1	1	1	1	1	1	0	1	0	1	0	1	0	1	1	173	173
128	0	0	0	0	0	0	0	1	33	0	1	1	0	1	0	1	174	174
129	1	0	0	0	0	0	0	1	34	1	1	1	0	1	0	1	175	175
130	0	1	0	0	0	0	0	1	35	0	0	0	0	1	1	0	176	176
131	1	1	0	0	0	0	0	1	36	1	0	0	0	1	1	0	177	177
132	0	0	1	0	0	0	0	1	37	0	1	0	0	1	1	0	178	178
133	1	0	1	0	0	0	0	1	38	1	1	0	0	1	1	0	179	179
134	0	1	1	0	0	0	0	1	39	0	0	1	0	1	1	0	180	180
135	1	1	1	0	0	0	0	1	40	1	0	1	0	1	1	0	181	181

RX: 1st I. F. 10.695 MHz
 2nd MIX OSCILLATOR 10.240 MHz
 2nd I. F. 455 KHz

TX: MIX OSCILLATOR 10.2381 MHz

CH	CHANNEL FREQUENCY	VCO FREQUENCY		P. L. L. MIXER OUTPUT	
		RX 1st OSC	TX MIX OSC	RX	TX
1	26.965	16.270	16.7269	910 KHz	1369.75 KHz
2	26.975	16.280	16.7369	920 "	1379.75 "
3	26.985	16.290	16.7469	930 "	1389.75 "
4	27.005	16.310	16.7669	950 "	1409.75 "
5	27.015	16.320	16.7769	960 "	1419.75 "
6	27.025	16.330	16.7869	970 "	1429.75 "
7	27.035	16.340	16.7969	980 "	1439.75 "
8	27.055	16.360	16.8169	1000 "	1459.75 "
9	27.065	16.370	16.8269	1010 "	1469.75 "
10	27.075	16.380	16.8369	1020 "	1479.75 "
11	27.085	16.390	16.8469	1030 "	1489.75 "
12	27.105	16.410	16.8669	1050 "	1509.75 "
13	27.115	16.420	16.8769	1060 "	1519.75 "
14	27.125	16.430	16.8869	1070 "	1529.75 "
15	27.135	16.440	16.8969	1080 "	1539.75 "
16	27.155	16.460	16.9169	1100 "	1559.75 "
17	27.165	16.470	16.9269	1110 "	1569.75 "
18	27.175	16.480	16.9369	1120 "	1579.75 "
19	27.185	16.490	16.9469	1130 "	1589.75 "
20	27.205	16.510	16.9669	1150 "	1609.75 "
21	27.215	16.520	16.9769	1160 "	1619.75 "
22	27.225	16.530	16.9869	1170 "	1629.75 "
23	27.255	16.560	17.0169	1200 "	1659.75 "
24	27.235	16.540	16.9969	1180 "	1639.75 "
25	27.245	16.550	16.0069	1190 "	1649.75 "
26	27.265	16.570	17.0269	1210 "	1669.75 "
27	27.275	16.580	17.0369	1220 "	1679.75 "
28	27.285	16.590	17.0469	1230 "	1689.75 "
29	27.295	16.600	17.0569	1240 "	1699.75 "
30	27.305	16.610	17.0669	1250 "	1709.75 "
31	27.315	16.620	17.0769	1260 "	1719.75 "
32	27.325	16.630	17.0869	1270 "	1729.75 "
33	27.335	16.640	17.0969	1280 "	1739.75 "
34	27.345	16.650	17.1069	1290 "	1749.75 "
35	27.355	16.660	17.1169	1300 "	1759.75 "
36	27.365	16.670	17.1269	1310 "	1769.75 "
37	27.375	16.680	17.1369	1320 "	1779.75 "
38	27.385	16.690	17.1469	1330 "	1789.75 "
39	27.395	16.700	17.1569	1340 "	1799.75 "
40	27.405	16.710	17.1669	1350 "	1809.75 "

ALIGNMENT PROCEDURES

EQUIPMENT REQUIRED

- * 12.0 VDC Regulated POWER SUPPLY
- * FREQUENCY COUNTER
- * RF OUTPUT METER (50 Ohms, 5W)
- * 50 Ohm Dummy Load
- * V.T.V.M.
- * SYNCHRO-SCOPE
- * CB RF SIGNAL GENERATOR

NOTES:

- ** RF OUTPUT METER or 50 Ohm Dummy Load should be connected to Antenna Connector.
- ** Coupling to Frequency Counter should be as loose as possible.
- ** Signal Input must be kept as low as possible to avoid overload or clipping.
- ** Non-Metalic tools should be used for all adjustments.
- ** Squelch Control Knob should be set at extreme counter-clockwise.

STEP	CIRCUIT	INPUT SIGNAL	OUTPUT INDICATOR	SET CH. SELECTOR TO	ADJUST	ADJUST FOR		
P. L. L.								
1	Mixer Output		Connect a Synchro-Scope to pin #6 of U2	Ch. 19	T1	Maximum waveform of Synchro-Scope		
2	V.C.O.		Connect a V.T.V.M. to anode of CR4	Ch. 1	L3	Obtain a reading of 4.0V		
TRANSMITTER								
1	Pre-Alignment	Transmit w/no modulation	Set C328 to center - Connect a Synchro-Scope to collector of Q27	Ch. 19	L4,T301, L302,L303, T302	Maximum peak level		
2			Disconnect Synchro-Scope from Q27		L4,T301, L302,L303, T302,L305, L308,L309	Maximum peak level, and obtain approximately 6W output power		
3	Alignment	Connect a audio Signal Generator (1 KHz approximately 100% modulation) to Mic input, and decrease Power Source to 12.0V DC	Connect an RF Output Meter with 50 Ohm Dummy Load to Antenna input	Ch. 19	L4,T301, L302,L303	Maximum peak level		
4		Un-modulated Signal					L305	Turn clockwise to decrease output power approximately 1W
5		Modulation 80%					L308,L309	Turn counter-clockwise, and adjust to expand modulated waveform
6		Un-modulated Signal					L308	Turn clockwise, and adjust to prescribed output power

NOTE: * Adjustment of T301, L302, and L303 have an effect on near-by and spurious signals.
 Disparity of Output Power.....Within 0.5W (comparing Ch. 1 - Ch. 40).
 Output Power.....4.0 Watts \pm 5%.

1	Modulation Limiter	Connect a audio Signal Generator to the Mic input (Frequency: 1 KHz) and increase Mic input power 20 dB	Connect an RF Output Meter with a 50 Ohm Dummy Load to Antenna input	Ch. 19	R226	85% Modulation \pm 5%
2	RFO Meter	Un-modulated Signal			R319	Press Mic Button, and obtain a reading of "4" on RFO Meter
3	50 MHz Trap				C328	Minimum dip at 54 MHz
4	Frequency		Connection same as above. Connect Frequency Counter to output		L1	Press Mic Button, and adjust for an output Frequency reading of 27.185000 MHz
5			Connect Frequency Counter to collector of Q3		R11	Release Mic Button, and adjust for reading of 10.24000 MHz

RECEIVER

1	Sensitivity	Connect a CB Signal Generator Input: 1uV (6dB) at 1 KHz, 30% modulation	Connect an RF Output Meter w/50 Ohm Dummy Load to Antenna input	Ch. 20	T101,T102, T103,T104, T105,T106, T107	Maximum peak level
NOTE: Adjustment of T105, T106, and T107 is not based on audio output, but the peak level of Signal Meter.						
1	Squelch	Connect a CB Signal Generator Input: 250uV (54dB) Squelch Knob to full clockwise	Connection same as above	Ch. 19	R117	Adjust for open Squelch point
2	Signal Meter	Input: 100uV (46dB) (Un-modulated)			R128	S-9 on "S" Meter

P A R T S P R I C E L I S T

SUBJECT TO CHANGE WITHOUT NOTICE. USE ALL AVAILABLE
 NUMBERS AND COMPLETE DESCRIPTION WHEN ORDERING, INCLUDING MODEL NUMBER
 * * * "THESE PRICES HAVE BEEN REVISED AS OF 9-8-77" * * *

Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price	Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price
L101001		Individual Carton	2.95	4101004		Bkt, Mic Mtg	.65
L101002		Styrofoam, Top	.95			Fuse, 2A	.35
L101003		Styrofoam, Left	.95	LA20		Slide Mtg Bkt	17.95
L101507		Microphone	17.00	4103004		Hardware Kit	.70

P A C K A G I N G

C A B I N E T & C H A S S I S

1	NSP	Plate Spr, Mtg Bkt	**	41	L101552	Meter Lamp, 14V 85mA	1.20
2	LA20	Ass'y, Slide Mtg Bkt	17.95	42	4102013	Plate Bkt, Power So Mtg	.35
3	L101369	Coupler, Coaxial Ant Conn	2.95	43	4102014	6P Conn So, Power	2.95
4	4102015	PCB Conn, Power (J2)	3.45	44	L101570	VR 10k w/Sw, Volume Cont	1.95
5	NSP	Bkt, Ext SP Jack Mtg	**	45	L101571	VR 10k, Squelch w/Dimmer Sw	4.05
6		Washer, M7	.25	46	L101531	Switch, PA/CB/ANL (Sw2)	2.30
7	4101034	Jack, Ext. Speaker	1.45	47		Rubber Washer, M7	.25
8	L101800	Fuse Holder	.70	48	NSP	Bkt, Mic Jack Mtg	**
9		Fuse, 2A	.35	49	4101020	5P Mic Jack (J1)	4.15
10	L101052	Slide Rail	.95	50	L101430	Cushion, Mod Meter	.30
11	L101050	Top Cabinet	4.45	51		Fiber Insulator	.25
12	L101516	Ass'y, Main PCB w/Comp	98.95	52	L101431	Rubber Cushion	.75
13	NSP	Stud, PCB Mtg	**	53	L101010	Front Escutcheon	5.00
14	L101620	Flexible Conn, PCB Junct	.75	54	L101086	Lens, Digital Display	.30
15	L101517	Ass'y, PLL PCB w/Comp	39.95	55	L101087	Overlay, Front Escutcheon	.85
16	NSP	Shield Plate	**	56	4101023	Cap, Knob Support	.25
17	NSP	Heat Sink	**	57	L101026	Knob, CH Selector	1.20
18	2SC1014	Audio Output Trans (Q24,25)	1.65	58		Plate Spr, CH Selector Knob	
19		Heat Sink, Driver Transistor	**	59		Inner Knob, CH Selector	
20	2SC495	Driver Transistor (Q29)	1.75	60		Lens, CH Selector Knob	
21	4350017	Coaxial Antenna Socket	3.95	61	L101028	Knob, Volume Cont	.95
22	NSP	Main Chassis	**	62	4101014	Knob, Squelch/PA-CB-ANL	.95
23	2SC1306	RF Output Transistor (Q30)	3.20	63		Scr, PH M3X4	.25
24	NSP	Heat Sink, RF Output	**	64		Tapp Scr, PH M2.6X4	.25
25	L101530	Rotary Sw, CH Selector S4)	9.85	65		Tapp Scr, PH M2.6X5	.25
26	4101025	Speaker	3.95	66		Blk Scr, PH M4X6	.25
27	4101026	Speaker Grille	.35	67		Blk Scr, PH M2.6X5	.25
28	L101051	Bottom Cabinet	4.10	68		Scr, PH 3X4	.25
29	L101518	Ass'y, Sw PCB w/Comp	5.55	69		Plastic Scr, PH M2.6X6	.25
30	L101519	Ass'y, Dimmer PCB w/Comp	4.10	70		Hex Nut, M3	.25
31	NSP	Bkt, Dimmer PCB Mtg	**	71		Tapp Scr, PH M2.6X7	.25
33	L101621	15P Connector Plug	2.85	72		Washer, M3	.25
34	L101550	Modulation Lamp, 6V 60mA	1.50	73		Lug, M3	.25
35	L101380	Bkt, Mod Lamp Holder	.95	74		Scr, PH M3X7	.25
36	NSP	Plate, Display Hold	**	75		Lock Washer, M3	.25
37	L101551	Digital Display	16.95	76		Insulator Washer, M3 (Trans)	.25
38		Sponge Cushion	.25	163		Tapp Scr, PH M2.6X4	.25
39	L101604	Meter (M1), Modulation	4.95				
40	4101029	Bushing, Lamp Hold	.30				

S E M I C O N D U C T O R S

CR1,	1N448	Diode	.75	U4	78L08AWC	I. C.	1.40
4-21,	"	"	"	Q1,3,	2SC710	Transistor (NPN)	1.15
32,33,	"	"	"	4,6,	"	"	"
36,37,	"	"	"	7,8,	"	"	"
39,40,	"	"	"	9,13,	"	"	"
43,	"	"	"	16,17,	"	"	"
48-63	"	"	"	18,27,	"	"	"
CR2,3	MV201	Vari-Cap Diode	1.40	28	"	"	"
CR22,	1N34A	Diode	.60	Q2,10,	2SC1647	Transistor	.95
23,30,	"	"	"	12,20,	"	"	"
34,46,	"	"	"	22,23,	"	"	"
47	"	"	"	32	"	"	"
CR24,	1N60	Diode	.45	Q5	2SK45B	F.E.T.	2.60
25,27,	"	"	"	Q11,19	2SA844C	Transistor (PNP)	1.05
28,29,	"	"	"	Q14,15	2SK41F	F.E.T.	1.55
44	"	"	"	26	"	"	"
CR35,	BZ090	Zener Diode	1.50	Q24,25,	2SC1014	Transistor	1.65
38	"	"	"	31,34	"	"	"
CR41	1S1211	Diode	.85	Q21	2SD187	Transistor	2.10
CR42,	1N4002	Diode	.95	Q29	2SC495	Transistor	1.75
45	"	"	"	Q30	2SC1306	Transistor	3.80
U1	7493	I. C. (9393), PLL	4.15				
U2	MC14526CP	I. C., PLL	5.65				

NSP: Non-Servicable Part

Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price	Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price
<u>M I S C E L L A N E O U S E L E C T R I C A L</u>							
DS1,2	L101552	Lamp, 14V 85mA (METER)	1.20	R143	L101571	VR 10k, SQUELCH w/SW3	4.05
DS3,4	L101550	Lamp, 6V 60mA (MODULATION)	1.50	R11	4101060	Semi-Fixed Res, 50k	.75
DS5	L101551	Digital Display	16.95	R117,128	4101059	" " " 10k	.75
K1	L101802	RELAY	3.55	R226	4101059	" " " 10k	.75
SW1		(Power Sw.) See VOL Cont.		R319	4101061	" " " 100k	.75
SW2	L101531	Sw, PA-CB-ANL	2.30	R501	2107508	" " " 5k	.75
SW3		(Dimmer Sw.) See SQUELCH Cont.		C328	4101057	Trimmer Cap, 10pF	1.95
SW4	L101530	Channel Select Sw	9.85	R44-51	L101801	Resistor Array, 100k x 8	.85
R142	L101570	VR 10k, VOL Cont w/SW1	1.95				

<u>C H O K E S , C O I L S , F I L T E R S & T R A N S F O R M E R S</u>							
L1	L101670	Coil (Z353ZZ)	1.35	T1	L101680	Coil (Z176IT)	1.30
L2	L101671	Choke Coil, 100uH	.60	T101	4101048	HF Coil, (C294DD)	1.90
L3	L101672	Coil (Z355N)	1.35	T102	L101681	HF Coil, (C337BD)	1.15
L4,302,	L101673	HF Coil, (C354NZ)	1.35	T103,140	L101682	RF Coil, (F001AS)	1.80
L303	L101673	HF Coil, (C354NZ)	1.35	T301	L101682	RF Coil, "	1.80
L5,301	L101674	HF Coil, 22uH	1.35	T105,106	4101051	IFT (EIA227B)	1.85
L304	4101039	HF Coil, 2.5uH	.55	T107	L101683	IFT	.85
L305	L101675	HF Coil, (CO43N)	1.05	T201	4101053	Input Transformer	3.85
L306	L101676	Coil, 8.2uH	.65	T202	L101684	Output Transformer	2.85
L307	4101041	HF Coil, 0.65uH	.65	T302	4101056	HF Coil, (CO42DD)	1.85
L308,309	L101677	HF Coil, (CO45ZD)	1.05	FL1	L101685	Ceramic Filter, 10.7MHz	1.70
L310	L101678	HF Coil, 0.42uH	.55	FL2	L101686	Filter, 455kHz (LF-B6)	5.15
L311	4101045	HF Coil, 0.85uH	.55	Y1	L101687	Crystal, 10.240MHz	5.90
L401	L101679	AF Choke (K-18)	1.55				

Ref. No.	Description	Ref. No.	Description	Ref. No.	Description	Ref. No.	Description
<u>R E S I S T O R S , C A R B O N , O H M S , ± 5% , 1/4W , 0.25¢ EACH OR NOTED</u>							

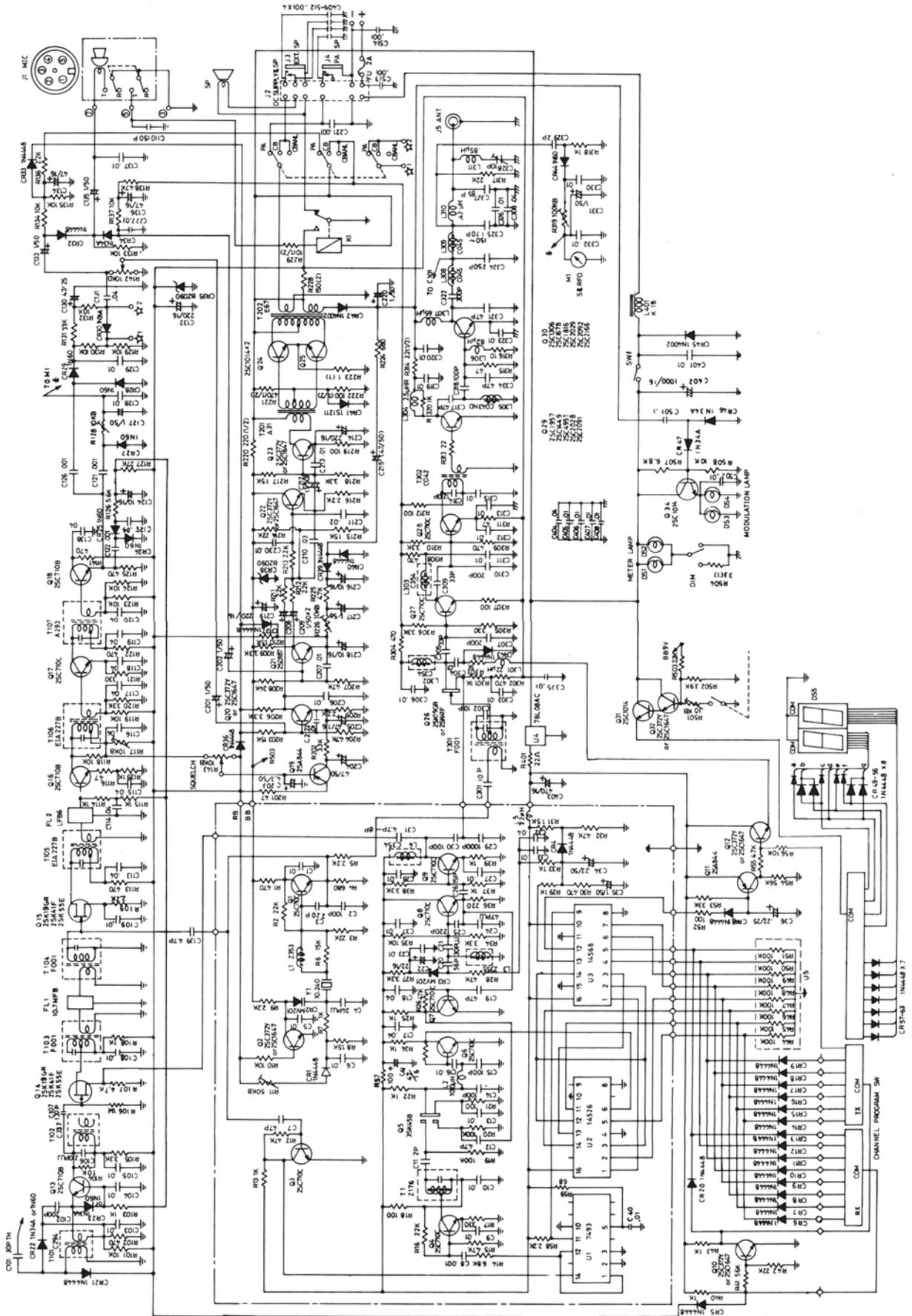
R106	1M Ohm, 1/4W	R133,134,		R212,213,		R17,121,	
R19,20	100k Ohm, 1/4W	135,137,		216,401,		305	330 Ohm, 1/8W
R41,54	56k Ohm, 1/4W	508	10k Ohm, 1/8W	503	2.2k Ohm, 1/8W	R36	220 Ohm, 1/8W
R12,23,		R14,507	6.8k Ohm, 1/8W	R8,31,210	1.5k Ohm, 1/8W	R220	220 Ohm, 1/2W
26,28	47k Ohm, 1/4W	R126	5.6k Ohm, 1/8W	R7,13,22,		R18,21,52,	
R53,131	33k Ohm, 1/4W	R15,32,55,		24,25,29,		57,219,	
R127	27k Ohm, 1/8W	138,204,		33,37,39,		307,312	100 Ohm, 1/8W
R208	24k Ohm, 1/8W	207,225,		40,43,103,		R222	100 Ohm, 1/2W
R2,3,16,		107	4.7k Ohm, 1/8W	108,114,		R59	68 Ohm, 1/8W
42,214,		R502	3.9k Ohm, 1/8W	115,139,		R116,201,	
317	22k Ohm, 1/8W	R27,34,		140,230,		311,316	47 Ohm, 1/8W
R6,203,		38,105,		301,303,		R313,401	22 Ohm, 1/8W
215,217	15k Ohm, 1/8W	120,202,		318,320	680 Ohm, 1/8W	R316	10 Ohm, 1/8W
R10,35,		206,209,		R1,30,102,		R229	10 Ohm, 1/2W
56,101,		218,306,		122,125,		R314	2.2 Ohm, 1/2W
104,118,		310	3.3k Ohm, 1/8W	141,302,		R228	150 Ohm, 2W
119,123,		R5,9,58,		304,308,		R504	33 Ohm, 1W
124,129,		109,136,		309	470 Ohm, 1/8W	R223	1 Ohm, 1W
130,132	10k Ohm, 1/8W	205,211	2.2k Ohm, 1/8W	R221	470 Ohm, 1/2W		

Ref. No.	Description	Ref. No.	Description
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C A P A C I T O R S

C402	Electrolytic,	1000uF/16V	C311,312,313,315,	
C403	"	470uF/16V	316,319,320,323,	
C132,214,219	"	220uF/16V	326,330,332,335,	
C38,134,136,205	"	47uF/16V	401,405,406,407,	
C22	"	22uF/16V	408,502,	Ceramic, 0.01uF/50V
C124,216,218	"	10uF/16V	C8,29,121,122,	
C203,204,215,130	"	4.7uF/50V	126,221,409,510,	
C127,133,135,201,			511,512,513,514	" 0.001uF/50V
202,208,209,212,			C322	Mica, 300pF/50V
217,331,220			C324	" 250pF/50V
C35	"	1uF/25V	C25,3	" 220pF/50V
C34	"	0.22uF/35V	C102,307,310	" 200pF/50V
C36	"	0.22uF/25V	C325	" 170pF/50V
C501	Mylar,	0.1uF/50V	C110	" 150pF/50V
C17,18,32,113			C314	" 120pF/50V
thru 120,125,			C2,14,15,30,318,	
131,138,308,			107	" 100pF/50V
404	"	0.04uF/50V	C327	" 85pF/50V
C210	"	0.03uF/50V	C20	" 56pF/50V
C211	"	0.02uF/50V	C7,19,317,321,334	" 47pF/50V
C1,5,6,9,10,13,			C24	Ceramic, 47pF/50V
16,23,27,28,33,			C305,309	Mica, 33pF/50V
37,40,103,104,105,			C21,101	Ceramic, 30pF/50V
108,128,129,137,			C4	" 24pF/50V
206,207,213,222,			C106	" 20pF/50V
230,303,304,306	Ceramic	0.01uF/50V	C26	Mica, 15pF/50V
			C302,301	" 10pF/50V
			C12,31	" 4.7pF/50V
			C11,329	" 2pF/50V

SCHEMATIC DIAGRAM



TRANSISTORS

SYMBOL	TRANSMITTER MODE				RECEIVER MODE		
	E	C	B		E	C	B
Q1	2.6	7.0	3.0		3.6	7.3	3.6
Q2	0	5.0	0		0	0.05	0.7
Q3	0	3.5	0.3		0	3.4	0.3
Q4	0.68	6.3	1.0		0.68	6.4	1.0
Q6	0	2.8	0.55		0	2.8	0.52
Q7	0	3.0	0.35		0	3.0	0.37
Q8	1.25	5.5	0.8		1.25	5.5	0.78
Q9	1.25	5.5	0.8		1.25	5.6	0.88
Q10	0	6.4	0.04		0	0.07	0.65
Q11	0	6.6	6.0		0	6.6	6.0
Q12	0	6.6	0		0	6.6	0
Q13	0.4	0	0.45		0.75	6.0	1.5
Q16	0	0	0.35	Unsquelled	3.8	7.1	1.35
				Squelched	3.8	8.2	1.35
Q17	0	0	0		1.48	7.0	2.0
Q18	0	0	0		3.2	5.8	3.8
Q19	0	0	0	Unsquelled	0	1.3	9.0
				Squelched	9.0	0	9.0
Q20	0	0	0	Unsquelled	1.3	6.2	1.8
				Squelched	3.4	8.2	1.8
Q21	1.5	6.0	1.45		9.0	9.0	1.4
Q22	3.0	9.2	3.4		3.0	9.2	3.4
Q23	0.9	12	1.48		0.9	12	1.48
Q24	0.1	13	0.68		0.1	13	0.68
Q25	0.1	13	0.68		0.1	13	0.68
Q27	0.54	10	1.2		9.0	13.8	1.5
Q28	1.0	11.5	1.5		9.0	13.8	1.75
Q29	0	11.5	0		0	13.8	0
Q30	0	11.5	0		0	13.8	0
Q31	4.8	13.8	5.4		4.7	13.8	5.4
Q32	5.4	13.8	5.8		5.4	13.8	5.8
Q34	4.3	13	4.7		4.5	13.8	4.8

VOLTAGE CHART

Q33: Vacant

F.E.T.

SYMBOL	TRANSMITTER MODE			RECEIVER MODE		
	G (1) (2)	D	S	G (1) (2)	D	S
Q5	0 0	4.0	0.25	0 0	4.2	0.25
Q14	0	0	0	0	8.5	2.3
Q15	0	0	0	0	8.5	1.8
Q26	0	12.5	0.18	0	13.8	4.6

IC

SYMBOL	PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		U1	RECEIVE	1.2	0	0	0	4.7	0	0	1.8	1.7	0	3.0	1.2	0	2.4
TRANSMIT	1.2		0	0	0	4.7	0	0	1.8	1.7	0	2.8	1.2	0	3.4	-	-
U2	RECEIVE	3.0	6.0	0	0	6.0	2.8	3.2	0	3.2	0	0.4	0	0	0	3.2	6.5
	TRANSMIT	3.0	5.7	0	0	5.7	2.8	3.2	0	3.2	0	5.7	0	1.2	0	3.0	6.7
U3	RECEIVE	3.0	0	1.7	6.0	0.4	0	0.4	0	2.8	6.5	0	6.5	2.8	0	0	6.5
	TRANSMIT	3.0	0	1.2	0	5.7	0	5.7	0	2.8	6.6	0	6.6	4.0	0	0	6.6

SYMBOL	PIN	Input	Output	Ground
		U4	TRANSMIT	13.8
RECEIVE	13.8		8.0	0