SECTION 7.
TROUBLESHOOTING

7.1 CONTROL INTERFACE

The following information will be helpful when testing the radio or when interfacing to an external control system. Connector CN10S is a 37 pin D connector (See Figure 7-1). A mating connector is supplied with the KG106. Other connections include a three pin power plug and a UHF antenna jack. Provision has been made for an additional antenna connector (BNC) for applications requiring two antennas. This hole is located just above the control connector.

Table 7-1. Control Interface

FUNCTION	CN10S PIN	COMMENTS
POWER SUPPLY	36, 37	+13.6 VDC regulated, 10 A continuous duty.
	18, 19	–Ground
POWER SWITCH	35	Apply ground or 13.6 V depending on position of jumper J4
CHANNEL SELECT	23, 22, 21	Binary address selects channel.
	20, 1, 2, 3	Binary number is read from right to left and is one less than the channel number.
	Ex: 0000000 = ch 1 1110000 = ch 8	
	May be a pull-up or pull-down depending on jumper J1.	
RECEIVER AUDIO	13	–6 dBm level
	14	Speaker level
	6	Discriminator audio
SQUELCH CONTROL	12	If external squelch control is used, remove internal FVR103. Requires 10 k pot.
PTT	15	Ground keys transmitter.
TX AUDIO	33 high 34 gnd.	–34 dBm audio input.
BUSY	9	Indicates when squelch has opened. Logic 0.2 V or 8 V, depending on position of J2
S METER	26	Analog voltage 1 V to 7 V representing signal strength.
ROM DATA	4	Goes to 5 V when an unprogrammed channel is selected.

7.2 JUMPER FUNCTIONS

Four jumper plugs are located on the terminal unit just behind the front panel (See Figure 7-1). Their functions are as follows:

Table 7-2. Jumper Functions

JUMPER	PROCEDURE
J1	Selects method of control of channel select lines. A side: Lines are high and must be pulled down. B side: Lines are low and must be pulled up.
J2	Selects logic of BUSY line. A side: BUSY line goes low when squelch opens. Note: "A" position permits BUSY line to key transmitter if connected to [PTT].
J3	Selects power routing of 12V line. A side: Power switch on pin 35 controls power to both KG106 and CN10S-36 & 37. B side: Power switch controls only power to CN10S-36 & 37. KG106 remains on.
J4	Selects logic of power control, pin 35 A side :Ground turns on power. B side :13.6 V turns on power.

7.3 HANDSET

As with most microphones and handsets, most of the problems which are likely to be encountered with the handset will be associated with the connectors and cabling between component sections of the handset and the radio. In any event, we have included waveforms and troubleshooting flow charts in this section to help with any servicing that may have to be performed.

NOTE:

Many of the components in the handset are static sensitive and may be damaged or destroyed by improper handling of either the components or the circuit boards. Technicians making repairs or adjustments to the circuit boards should take appropriate action to insure that the workpiece, worker, and the soldering equipment are all grounded before performing any of the procedures outlined in this section.

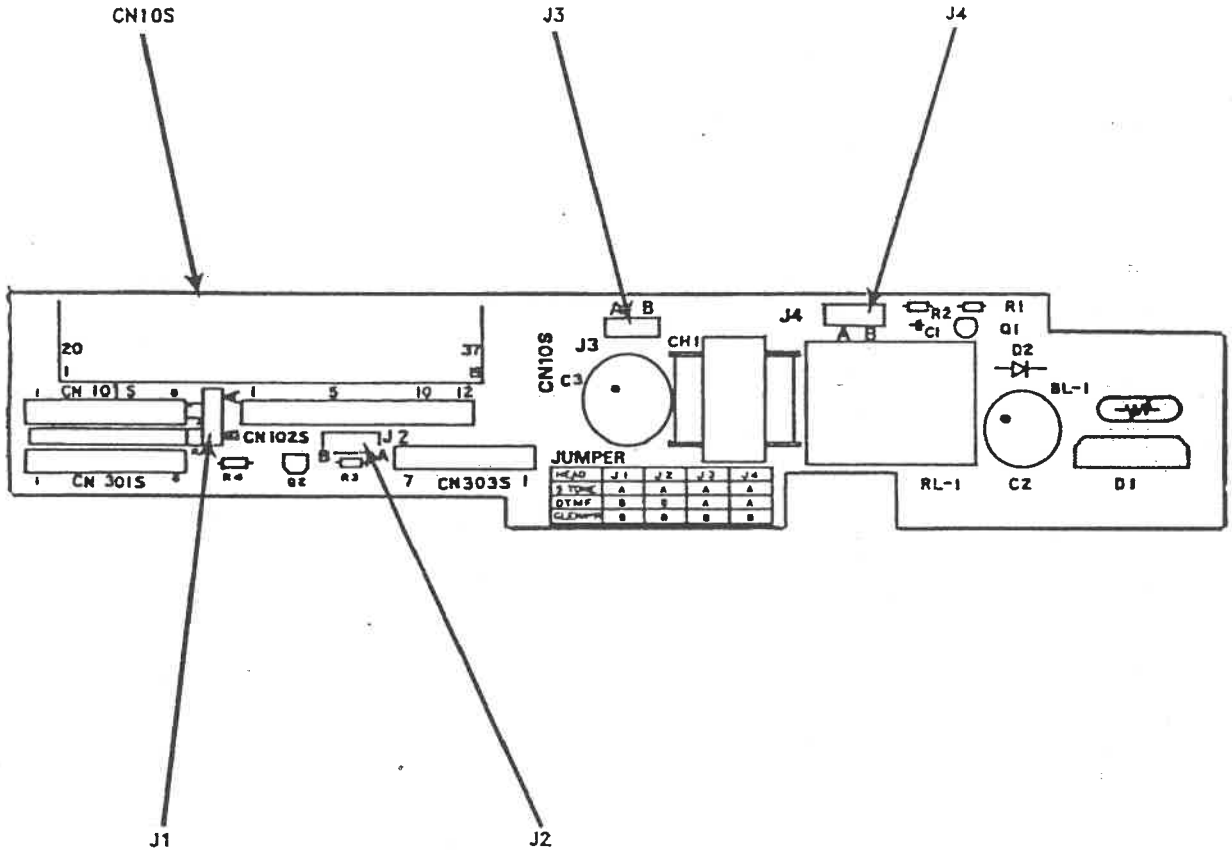

Figure 7-1. Jumper Positions on Terminal Unit PCB

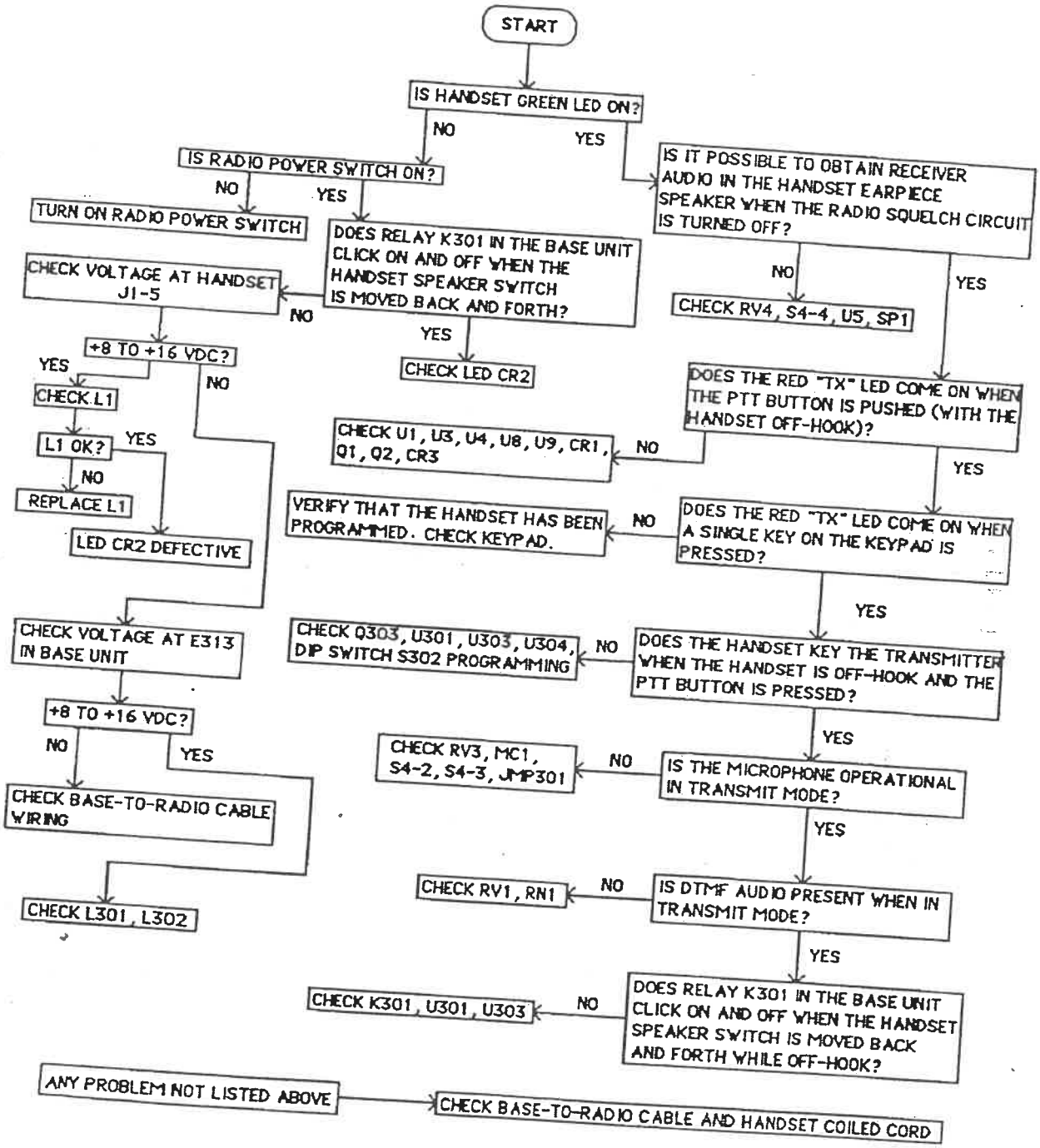

Figure 7-2. Handset Troubleshooting Flowchart

7.4 VOLTAGE CHARTS

Table 7-3. RX Unit, PLL

REF.	DESCRIPTION	FUNCTION	BASE	EMITTER	COLLECTOR
Q101	2SC3358		0.79 V	0 V	6.9 V
Q103	2SC2669		2.3 V	1.6 V	6.6 V
Q104	2SC2458	SQ Open	0.67 V	0 V	0 V
		Tight	0 V	0 V	8.0 V
Q105	RN2202	SQ Open	1.1 V	8.0 V	8.0 V
		Tight	8.0 V	8.0 V	0 V
Q106	2SA1048		7.0 V	6.6 V	3.4 V
Q107	2SA1048		7.0 V	6.6 V	3.4 V
Q108	2SC2458		3.9 V	3.3 V	7.9 V
Q109	2SA950	J801 Off	7.3 V	8.0 V	7.9 V
		J801 On Press	8.0 V	8.0 V	0 V
Q110	RN2202	J801 Off	8.0 V	8.0 V	7.3 V
		J801 On Press	0.73 V	8.0 V	8.0 V
Q112	RN2202	RX	7.9 V	8.0 V	0 V
		RX Unlock	0.85 V	8.0 V	8.0 V

REF.	DESCRIPTION	FUNCTION	GATE	SOURCE	DRAIN
Q102	2SK152		0.77 V	0 V	7.4 V
Q111	2SK184	Monitor On	4.5 V	4.0 V	4.0 V
		Monitor Off	1.3 V	4.0 V	2.0 V

REF.	DESCRIPTION		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IC107	TK10420		7.9 V	7.2 V	7.4 V	7.9 V	1.1 V	1.1 V	1.2 V	7.9 V
			(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
			3.7 V	2.0 V	2.0 V	0.92 V	0 V	0.66 V	0 V	2.1 V

REF.	DESCRIPTION		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IC104	µPC571C		5.1 V	2.4 V	0 V	0 V	3.9 V	5.6 V	1.13 V	1.16 V
IC108	NJM4558D		3.7 V	3.7 V	3.7 V	0 V	4.3 V	4.3 V	4.3 V	8.0 V
IC109	CX7932		4.5 V	0 V	3.5 V	0 V	4.7 V	3.4 V	0 V	7.9 V
IC110	NJM4558D		4.0 V	4.0 V	3.76 V	0 V	4.0 V	4.0 V	4.0 V	8.0 V
IC111	NJM2073		3.7 V	8.0 V	3.7 V	0 V	0.6 V	0 V	0 V	0.6 V

REF.	DESCRIPTION		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
IC115	TA7303		1.84 V	1.87 V	0.37 V	0.5 V	0 V	3.75 V	0 V	0 V	7.9 V

Table 7-4. RX Unit, VCO

REF.	DESCRIPTION	FUNCTION	BASE	EMITTER	COLLECTOR
Q202	2SC2753	J801 Off RX	1.83 V	1.1 V	7.95 V
		J801 On TX	0 V	0 V	0 V
Q203	2SA1048	RX	7.25 V	8.0 V	7.93 V
		TX	8.0 V	8.0 V	0 V
Q204	RN2202	RX	8.0 V	8.0 V	7.25 V
		TX	1.4 V	8.0 V	8.0 V
Q205	2SA1048	RX	6.6 V	7.34 V	7.3 V
		TX	6.9 V	7.46 V	0 V
Q206	RN2202	RX	7.3 V	7.34 V	0 V
		TX	0.72 V	7.46 V	7.45 V
Q207	2SC3623	RX	8.0 V	7.34 V	8.0 V
		TX	8.0 V	7.46 V	8.0 V
Q208	2SC2458	RX	5.6 V	4.9 V	8.0 V
		TX	5.6 V	4.9 V	8.0 V

REF.	DESCRIPTION	FUNCTION	BASE	EMITTER	COLLECTOR
Q201	SST310	RX	0 V	2.2 V	7.3 V
		TX	0 V	0 V	0 V

REF.	DESCRIPTION		(1)	(2)	(3)	(4)
IC201	µPC1651		4.9 V	0.85 V	0 V	3.5 V

Table 7-5. TX Unit, PLL / VCO

REF.	DESCRIPTION	FUNCTION	BASE	EMITTER	COLLECTOR
Q301	2SC2644		0.5 V	0.35 V	7.9 V
Q302	2SC2131		-0.72 V	0 V	7.1 V
Q303	2SB1019		12.5 V	13.1 V	8.5 V
Q304	RN2202	TX	8.1 V	8.1 V	0 V
		TXUNLOCK	1.8 V	8.1 V	8.0 V
Q305	RN2202	RX	8.1 V	8.1 V	0 V
		TX	0.74 V	8.1 V	8.1 V
Q306	RN1202	RX	0 V	0 V	7.4 V
		TX	8.1 V	0, V	0 V

REF.	DESCRIPTION		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IC304	µPC571C		5.0 V	2.2 V	0 V	0 V	3.8 V	5.5 V	0 V	0 V
IC309	NJM4556D		4.5 V	4.5 V	4.5 V	0 V	4.4 V	4.4 V	4.4 V	8 V

REF.	DESCRIPTION		(1)	(2)	(3)
IC308	M5236L		11.3 V	0 V	1.23 V

REF.	DESCRIPTION	FUNCTION	BASE	EMITTER	COLLECTOR
Q402	2SC2753	RX	0 V	0 V	0 V
		TX	1.8 V	1.12 V	8.0 V
Q403	2SA1048	RX	8.1 V	8.1 V	8.1 V
		TX	7.3 V	8.1 V	8 V
Q404	RN2202	RX	0.86 V	8.1 V	8.1 V
		TX	8.1 V	8.1 V	7.3 V
Q405	2SA1048	RX	7.7 V	7.7 V	0 V
		TX	7.4 V	6.7 V	7.4 V
Q406	2SC3623	RX	8.1 V	7.7 V	8.1 V
		TX	8.1 V	7.4 V	8.1 V
Q407	2SC2458	RX	5.5 V	4.8 V	8.1 V
		TX	5.5 V	4.8 V	8.1 V

REF.	DESCRIPTION	FUNCTION	GATE	SOURCE	DRAIN
Q401	SST310	RX	0 V	0 V	0 V
		TX	0 V	2.6 V	7.3 V

REF.	DESCRIPTION		(1)	(2)	(3)	(4)
IC401	µPC1651		4.8 V	0.79 V	0 V	3.3 V