2.983 (d) (6) Active Parts Information

Main Board		**Integrated Circuits**	
Designator	KG P/N	Generic P/N	Description
IC 1	IC013032	TC75W51FU	OP-AMP IC (DCS MOD/MOD)
IC 2	IC013028	TC4W66FU	SW IC (N/W SW)
IC 3	IC042001	MB1505PF	PLL IC
IC 4	IC013031	TC75S51FU	OP-AMP IC (BUFF)
IC 5	IC013028	TC4W66FU	SW IC (SW)
IC 6	IC013019	TC7S66FU	SW IC (SW)
IC 7	IC090017	M68731L	RF-PA IC (VHF-L SPLIT)
IC 7	IC090016	M68731H	RF-PA IC (VHF-H SPLIT)
IC 8	IC013017	TA75S01FU	OP-AMP IC (RF Po COMP)
IC 9	IC013007	TA31136FN	IF IC
IC 10	IC013028	TC4W66FU	SW IC (SW)
IC 11	IC013028	TC4W66FU	SW IC (SW)
IC 12	IC013032	TC75W51FU	OP-AMP IC (BUFF)
IC 13	IC042002	MB88347PFV	D/A Converter IC
IC 14	IC011002	TK11250M	REG IC (5V)
IC 15	IC076004	RN5VL55C	RESET IC (5.5V)
IC 17	IC013033	TC7W02FU	NOR GATE IC (UNLOCK)
IC 18	IC013017	TA75S01F	OP-AMP IC (AF BUFF)
IC 19	IC013035	S3275	Si Diode (DBM)
IC 201	IC090021	M38267E8GP	CPU
IC 202	IC103001	AK2342A	BASE-BAND IC (CTCSS)
IC 203	IC013018	TC4W53FU	MULTIPLEXER IC
IC 204	IC104001	CAT24C04JI	EEPROM
IC 205	IC076003	RN5VL40C	RESET IC (4V)
IC 206	IC011002	TK11250M	REG IC (5V)
IC 207	IC013019	TC7S66FU	SW IC

Sub-Board		**Integrated Circuits**	
Designator	KG P/N	Generic P/N	Description
IC 401	IC025010	NJM2073D	AF-AMP IC

Main Board **Transistors**

Designator	KG P/N	Generic P/N	Description
Q 1	TR013014	2SA1586-Y	Chip Tr (PLL LOOP SW)
Q 2	TR013007	2SC4116-GR	Chip Tr (PLL LOOP SW)
Q 4	TR013007	2SC4116-GR	Chip Tr (VCO REG)
Q 5	TR013018	2SC5065-Y	Chip Tr (F.B BUFF)
Q 6	TR013018	2SC5065-Y	Chip Tr (RF AMP)
Q 7	TR036005	2SC3357T	Chip Tr (RF AMP)
Q 8	TR013007	2SC4116-GR	Chip Tr (Po DET SW)
Q 9	TR078027	DTC144EUA	Chip Tr (Po SW,R1=R2=47kΩ)
Q 10	TR013018	2SC5065-Y	Chip Tr (LOCAL BUFF)
Q 11	TR013018	2SC5065-Y	Chip Tr (F/E BUFF)
Q 12	TR013002	2SA1298	Chip Tr (TX5V REG SW)
Q 13	TR078018	UMC5N-TR	Chip Tr (REG SW FOR IC1,IC13)
Q 14	TR013018	2SC5065-Y	Chip Tr (IF BUFF)
Q 15	TR078027	DTC144EUA	Chip Tr (CF SW,R1=R2=47kΩ)
Q 16	TR078027	DTC144EUA	Chip Tr (CF SW,R1=R2=47kΩ)
Q 17	TR013007	2SC4116-GR	Chip Tr (SQ TEMP SW)
Q 18	TR013014	2SA1586-Y	Chip Tr (SQ SW)
Q 19	TR078015	DTC343TK	Chip Tr (MUTE SW,R1=4.7kΩ)
Q 201	TR078027	DTC144EUA	Chip Tr (LIGHT SW,R1=R2=47kΩ)
Q 202	TR078028	DTC314TK	Chip Tr (MUTE SW,R1=10kΩ)
Q 203	TR078028	DTC314TK	Chip Tr (MUTE SW,R1=10kΩ)

Sub-board **Transistors**

Designator	KG P/N	Generic P/N	Description
Q 401	TR078028	DTC314TK	Chip Tr (AF MUTE SW,R1=10kΩ)
Q 402	TR078029	2SB1188-Q	Chip Tr (AF-AMP REG SW)
Q 403	TR013014	2SA1586-Y	Chip Tr (AF MUTE SW,R1=10kΩ)
Q 404	TR078027	DTC144EUA	Chip Tr (ALM SW,R1=R2=47kΩ)
Q 405	TR078027	DTC144EUA	Chip Tr (REG SW,R1=R2=47kΩ)
Q 406	TR078027	DTC144EUA	Chip Tr (SP MUTE,R1=R2=47kΩ)

CIRCUIT & DEVICE DESCRIPTIONS

2.983 (d) (10-12)

(10) Oscillator and other Frequency Stabilizing Circuit Descriptions:

The frequency reference is a self-contained quartz crystal oscillator (TCXO) module, operating 12.8 MHz.

The TCXO is compensated by internal temperature compensating circuit providing ± 5.0 ppm stability from -30°C to +60°C.

(11) Circuit or devices employed for suppression of spurious radiation:

a. The radio has metal cover and metal cabinet.

b. Extensive use of discrete bypass capacitors in the Option and Remote Control Connector of the radio reduces radiation from remote cables.

c. Low pass harmonic filter follows power amplifier output.

d. Internal shields surround synthesizer, power amplifier and radio control logic circuitry.

e. In addition the Control Unit package is metallized to suppress microprocessor radiation.

f. During acquisition of the synthesizer phase lock loop, the transmitter output is inhibited by an RF gate and the removal of DC voltage to the gain control stage of the RF power chain.

CIRCUIT & DEVICE DESCRIPTIONS

2.983 (d) (10-12)
(Continued)

(11) Circuit or Devices employed for limiting modulation:

a. Reference is made to the schematic diagram MD00-TC-0081 .

b. Instantaneous audio limiting is accomplished Audio IC (IC501).
The Audio IC provides both limiting and Post-Limiting filtering. The Audio IC runs from a regulated supply voltage, which prevents deviation changes vs. changes in radio power supply voltage. Following the limiter, a summing amplifier is used to add in any optional tone modulation, such as CTCSS modulation, which is also temperature and voltage stable. The output from the summing amplifier then passes through the post-limiting filter to a modulation level adjust liner attenuator (also contain IC501), which is in turn coupled to the FM modulated oscillators. The attenuator insures maximum deviation $\pm$ 4.5 kHz.

(12) Circuit or devices employed for suppression of spurious radiation:

a. The radio has metal cover and metal cabinet.

b. Extensive use of discrete bypass capacitors in the Option and Remote Control Connector of the radio reduces radiation from remote cables.

c. Low pass harmonic filter follows power amplifier output.

d. Internal shields surround synthesizer, power amplifier and radio control logic circuitry.

e. In addition the Panel Control Unit package is metallized to suppress microprocessor radiation.

f. During acquisition of the synthesizer phase lock loop, the transmitter output is inhibited by an RF gate and the removal of DC voltage to the gain control stage of the RF power chain.

ALIGNMENT PROCEDURE

6A-C 2.983 (d) (9) Alignment Procedure

1. Test Equipment

Service Monitor	(HP8920B or equivalent)
DC Voltmeter	(Input Impedance > 1 Mohm)
DC Power Supply	(7.5 Volts at 3 A)
IBM Personal Computer	(or compatible equivalent)
Programming Interface Box	(TQ3370)
Audio Test Box	(TQ0613)
KH Radio Programming Software	[ProGrammer (Conventional Version)]
KH Programming Cable	(RPM 113 2472/1)
KH Battery Eliminator	(BKB 191 203/3)
RF Antenna Adapter	(ST 3559)

Initial setup

Attach Power Supply to KH via KH Battery Eliminator.
Attach TQ3370 Programming Interface Box to KH UDC connector via Programming Cable.
Attach Interface Cable between Programming Interface Box and personal Computer.
Set power supply to 7.5 Volts DC.
Apply power to KH, and turn radio On/Off switch to On position.
Execute radio programming software.
Under software direction, program radio for the following conventional test channels: See Figure 1.
(If test channels are already set to Figure 1, then no further programming is necessary.)
Turn the radio On/Off switch to the Off position. Remove the programming cable from the TQ3370 box and connect it to the TQ0613 Audio test box.
Attach an RF coaxial cable (50 ohms) between antenna adapter and the HP8920B.
Attach a cable from the HP8920B AUDIO OUT port to the TX AUDIO port of the TQ0613 box.
Attach a cable from the RX AUDIO port of the TQ0613 box to the HP8920B's Audio In port.
Make sure the HP8920B audio in port status is set to FLOATING.
Turn radio On/Off switch to On position.

4. Rx Noise Squelch Tuning

a. Monitor the audio at the internal speaker of the HP8920B.
b. Set receiver frequency to 145.225 MHz or 162.100 MHz (Ch 2 in Figure 1).
c. Set RF generator level until the Rx SINAD is 8 ± 2 dB SINAD at the HP8920B SINAD meter.
d. Adjust the squelch opening threshold tracking data until the squelch opens around 8 dB SINAD.
e. Adjust the squelch closing threshold tracking data until it closes at an RF level that is 1.5 – 2.0 dB lower in signal level than the signal level needed to open the squelch.

Factory Programmed Frequencies Figure 1

	136 - 155 MHz		150.8 - 174 MHz				
Channel	Tx Frequency	Rx Frequency	Tx Frequency	Rx Frequency	CTCSS /CDCSS	Wide /Narrow	Tx Power
Ch 1	136.025	136.225	150.825	150.950		W	H
Ch 2	145.025	145.225	162.025	162.100		W	H
Ch 3	154.975	154.750	173.975	173.900		W	H
Ch 4	136.025	136.225	150.825	150.950		N	L
Ch 5	145.025	145.225	162.025	162.100		N	L
Ch 6	154.975	154.750	173.975	173.900		N	L
Ch 7	145.025	145.225	162.025	162.100	103.5 Hz	W	L
Ch 8	145.025	145.225	162.025	162.100	103.5 Hz	N	L
Ch 9	145.025	145.225	162.025	162.100	627	W	L
Ch 10	145.025	145.225	162.025	162.100	627	N	L
Ch 11	147.125	147.125	163.150	163.150	67.0 Hz	W	L
Ch 12	147.125	147.125	163.150	163.150	210.7 Hz	N	L
Ch 13	147.125	147.125	163.150	163.150	023	W	L
Ch 14	147.125	147.125	163.150	163.150	023	N	L
Ch 15	147.125	147.125	163.150	163.150		W	L
Ch 16	147.125	147.125	163.150	163.150		N	L

ALIGNMENT PROCEDURE

6. TX Modulation Adjustments
   a. Set transmitter frequency to 145.025 MHz or 162.025 MHz (Ch 2 in Figure 1).
   a. Set AF generator output level to 100 mVrms.
   b. Push PTT key on Programming Interface.
   c. Adjust Tx tracking data until the FM Deviation is 4.5 ± 0.1 kHz.
   d. Set transmitter frequency to 145.025 MHz or 162.025 MHz (Ch 7 in Figure 1).
   e. Set AF generator output level to zero.
   f. Push PTT-key on Programming Interface.
   g. Adjust TX Modulation RV301 until the FM Deviation is 750 Hz ± 100 Hz.
7. Tx Frequency Adjustment
   a. Set transmitter frequency to 145.025 MHz or 162.025 MHz (Ch 2 in Figure 1).
   b. Push PTT key on Programming Interface.
   c. Adjust Tx frequency tracking data until the frequency is within ± 1 ppm.
8. Transmitter Power Adjustment.
   a. Adjust Tx power tracking data so that RF power is 5 % above rated power.