

SERVICE MANUAL FOR **handic** **micman**



handic
electronic ab

ELECTRIC FUNCTION

TRANSMITTING SECTION

The handie micman use TX X-tal operating directly on transmit frequency. The change between the two available channels, A and B, is made by means of diode switches. Then the channel switch is in position A the diode D110 is off and D106 is on connecting the "A" X-tal to oscillator transistor via D106, C114 and C113.

Simultaneously the X-tal "B" is disconnected due to D105 is off and D107 is on and makes shortcircuit of X-tal B to ground thru the channel switch. Above is reversed then channel switch is in B position.

The serial coils L106 and L105 is used for adjustment of TX frequency of channel A respective B. T102 is tuned for TX frequency. FET Q116 is buffer amplifier and Q102 together with T101 is the driver stage feeding the Q101 power amplifier.

The antenna switch comprise of D102 in on- and D101 in off-state during transmit. The thereafter following lowpass filter reject unwanted harmonic radiation and transforms the impedance to 50 Ohm. L102 together with C104 makes a notchfilter and is tuned to suppress the second harmonic.

Modulation from the buildt in electret microphone or a external electret microphone is amplified and audio response is shaped in the first half of IC101. The second part of IC101 together with transistor Q111 and FET Q112 is a AGC circuit. This limits the maximum deviation. The level can be set by VR101.

RECEIVING SECTION

The receiver is a crystal controlled single conversion type with a IF frequency of 455 kHz. In receiving the signal is passing via the lowpass filter and the diodes D101 and D130 and through the impedance matching network T103 to RF amplifier Q113. The local oscillator connects to correct X-tal by means of diode switches D127 for channel A and D128 for channel B. The two signals, RF and oscillator, is mixed inside IC102. IC102 performs as well IF-amplification, FM-detection and squelch. IF bandpass is made up of T106, ceramic filter CF101 and T107.

The signal is after deemphasies and additional audio shaping feed to the VOLUME control. From here the signal is feed to the audio amplifier IC103 and then to speaker or earphone.

The switching between TX and RX is performed of Q116 switched on in transmit and Q117 switched on in receive mode.

SELECTIVE CALL SECTION

TX MODE

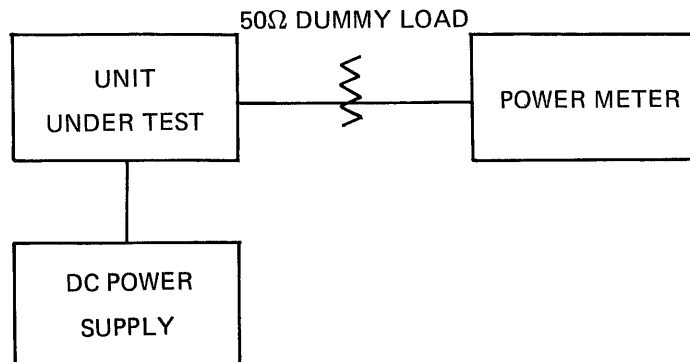
The selective call circuit acts as two oscillators on the frequency determined by the tuningforks installed. The oscillators transistors is Q105 and Q106 with feedback signal thru D122 and D114 then selcall switch is in CALL position. The signals from this oscillators mixes by R128 and R129. The mixed signal is feed to the modulator via C109. Simultaneous the call switch force the unit into TX-mode by means off inverter transistor Q115.

RX MODE

The signal from the FM-detector is amplified by Q104 and passed thru the two tuningforks. If correct signals is passed thru the tuningforks the two signals is rectified and added together. This in turn switch off Q107 and Q109. The voltage at Q109 is then going hi switching Q108 on and consequently keeping base of Q109 low as long as +B is on. This circuit is a memory which by use of Q110 keep the ALARM lamp on and release the audio muting.

TRANSMITTING SECTION ALIGNMENT

Connect the instruments as shown in figure 1.



TRANSMITTER ALIGNMENT CHART

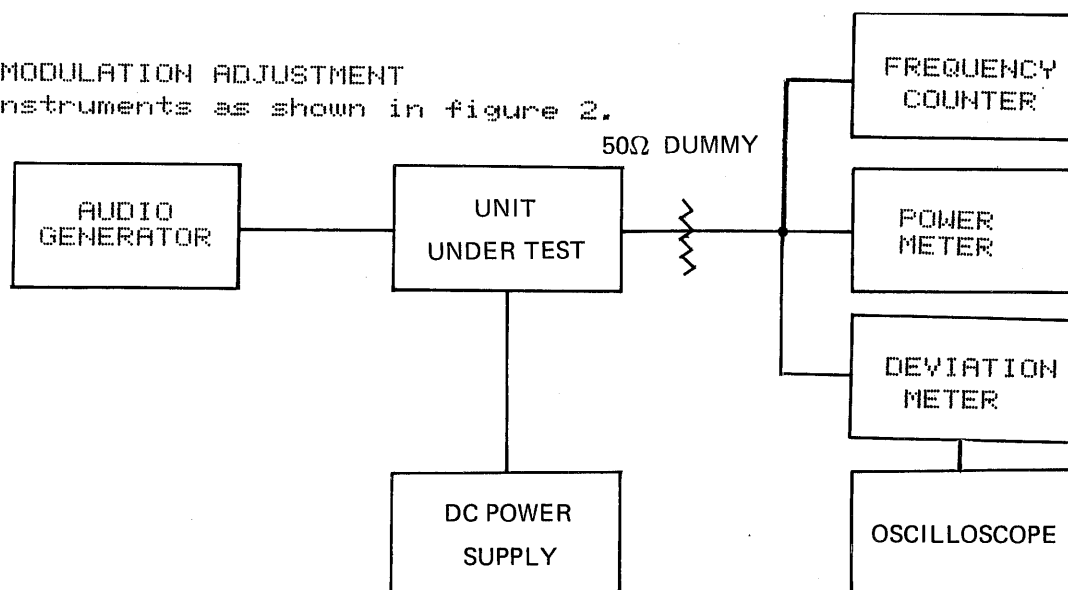
STEP	CONTROL SETTING	TEST EQUIPMENT	TEST EQUIPM. SET	ADJUST	REFER FIGURE
1		POWER SUPPLY	SET TO 6.7V		1
2	VOLUME ON CH-A	RF-POWER METER 50 OHM DUMMY		SCREW DOWN L102 SLUG 2 TURN FROM FULLY DISENGAGED POSITION	1
3				ADJ.T102 FOR MAX POWER	1
4				ADJ.T101 FOR MAX POWER	1
5				ADJ.L101,103,104 FOR MAX POWER	1
6				TURN SLUG T102 CCW TO STOP OSCILLATION AND THEN CW 1/4 TURN BEYOND POWER POINT	
7				THE POWER SHOULD NOW EXCEED .4 WATT	

TX CRYSTAL SPECIFICATION

Type	HC 25/U
Drive level	1 mW
Tolerance	20 ppm
Effective impedance	40 Ohm max.
Capacitance	27 MHz 4.9 pf
	29 MHz 4.5 pf
Fo	+10 kHz = 0

TX FREQUENCY MODULATION ADJUSTMENT

Connect the instruments as shown in figure 2.

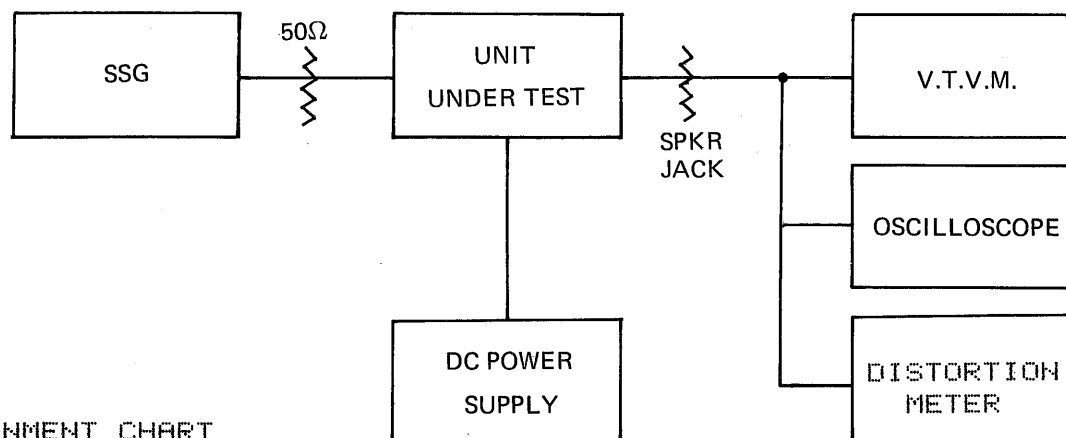


TX FREQUENCY MODULATION CHART

STEP	CONTROL SETTING	TEST EQUIPMENT	TEST EQUIPM. SET	ADJUST	REF. FIGURE
1		POWER SUPPLY	SET TO 6.7V		2
2	CHANNEL B	POWER METER DUMMY LOAD		CONNECT A SHORT WIRE BETWEEN X-TAL IN CH B POSITION AND SHIELDPLATE	2
3	VOLUME ON PRESS PTT	FREQUENCY COUNTER		ADJUST L105 FOR SIGNAL FREQ. $\pm 200\text{Hz}$	2
4				REMOVE TEMPORARY THE X-TAL CONFIRMING NO OUTPUT POWER	
5				CONNECT X-TAL BACK AND POWER SHOULD BE MORE THAN 0.4 W	
6		DEVIATION METER. AUDIO GENERATOR	10mV	ADJUST VR101 FOR 1.5 KHZ DEVIATION	
7		AUDIO GENERATOR	100mV	DEV. SHOULD BE < 1.8 KHZ WITH $< 5\%$ THD.	2

RECEIVING SECTION ALIGNMENT

Connect the instruments as shown in figure 3.

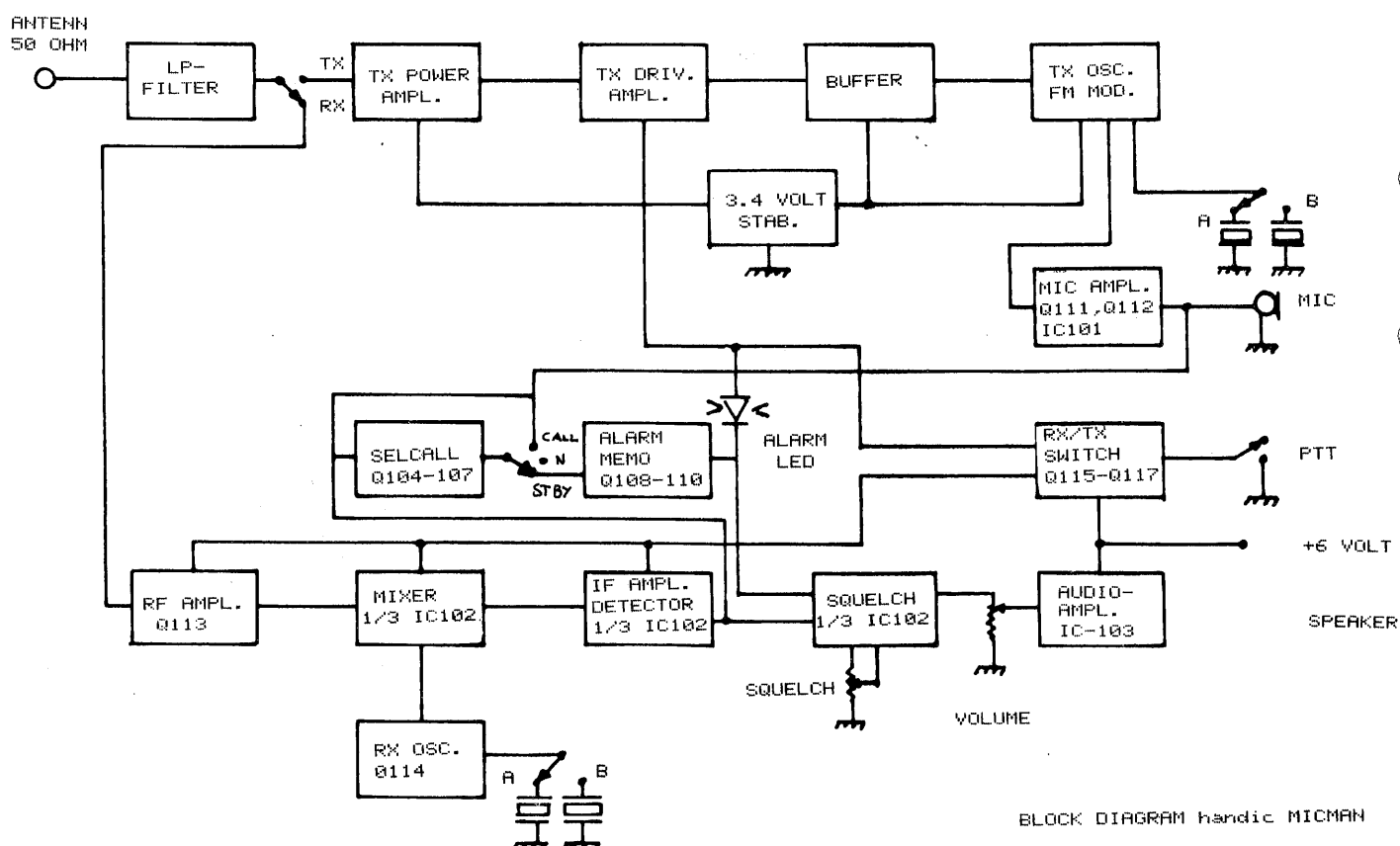
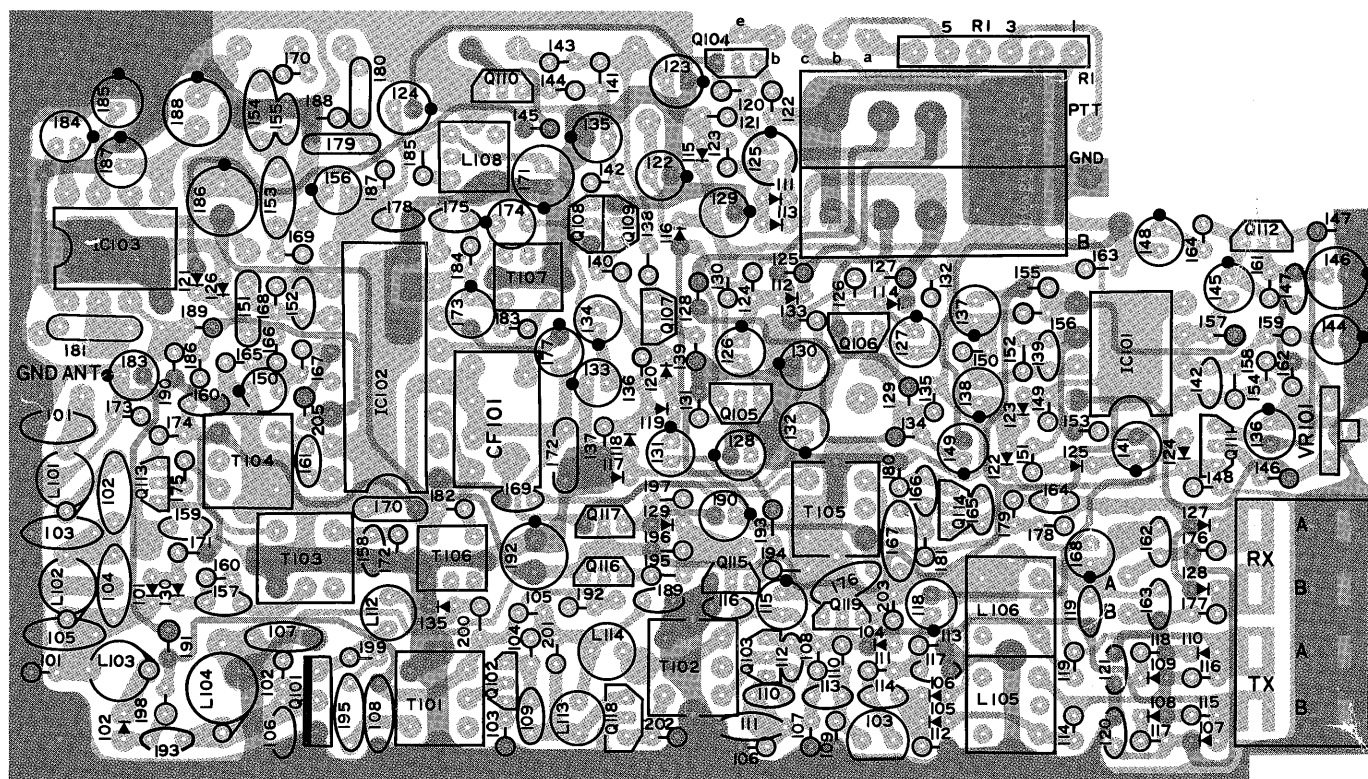


RECEIVER ALIGNMENT CHART

STEP	CONTROL SETTING	TEST EQUIPMENT	TEST EQUIPM. SET	ADJUST	REFER FIGURE
1		POWER SUPPLY SIGNALGEN.	SET TO 6.7V FM 1 KHZ	RX FREQUENCY	
2	VOLUME NORMAL SQ TO NORMAL	SSG.	1 MV	L106 FOR MAX	3
3				T106, T107 FOR MIN. DISTORTION	
4				THD SHOULD NOW BE <6% OR ADJ. L106 AGAIN	
5		SSG.	1.0 uV	ADJUST T103, T104 FOR MAX SINAD	
6		SSG	0.5 uV	SINAD SHOULD BE >12 DB	
7		SSG	0.5 uV	SQ SHOULD OPEN AT < 0.5 uV	
8	SQUELCH MAX			SQ. SHOULD OPEN AT < 20 DB SINAD	

RX CRYSTAL SPECIFICATION

Type	HC 25/U
Drive level	1 mW
Tolerance	20 ppm
Effective impedance	40 Ohm max.
Capacitance	27 MHz 4.8 pf
	29 MHz 4.5 pf
Fo	+ 15 ppm = 0



SPECIFICATIONS

GENERAL

Receiving system	Crystal controlled superheterodyne.
Channels	2
Frequency coverage	300kHz in 27 - 31 MHz band.
Power requirements	5 - 6 V DC, 4 "AA" or NiCd batteries.
Speaker	Dynamic type 8 Ohm, plastic cone.
Semiconductors	3 IC, 19 transistors, 32 diodes, 1 zener diode and 2 LED.
Dimension	70W x 38D x 165 H mm.

TRANSMITTER

RF power output	0.5 W
Type of emission	F3 (FM)
Modulation	1.5 kHz
Frequency tolerance	+/-0.005%
Antenna impedance	50 Ohm (TNC type receptacle)
Current drain	240 mA

RECEIVER

Sensitivity	0.3 uV for SINAD 12 dB
Adjacent Channel Rejection	60 dB
Audio power	0.2 W (10% THD) at 1000 Hz
Signal-to-noise ratio	60 dB
Intermediate frequency	455 kHz
Squelch sensitivity	Threshold less than 0.3 uV
Current drain	8 mA with minimum output

SELECTIVE CALL SYSTEM

Type	Two tone simultaneous
Turning fork	AFB TX or EFM-CG
Frequency	288,5 - 3000 Hz

MAIN SPARE PARTS

DIODES:

1SS85	D101, D130
S5277B	D102, D131, D132
FC-52	D103
02B23.9	D104
BA243S	D105, D106, D107, D110
1S1555	D108, D109, D111, D112
	D113, D114, D115, D116
	D117, D118, D119, D120
	D121, D122, D123, D124
	D125, D126, D127, D128
	D129, D135
TLR102	D133, D134

INTEGRATED CIRCUITS:

LM358N	IC101
MC3357P	IC102
LM386-1	IC103

TRANSISTORS

2SC2314(F)	Q101
2SC2668(O)	Q102, Q113, Q114
2SC2458(Y)	Q103
2SC2458(GR)	Q104, Q108, Q109, Q110
	Q111, Q115, Q119
2SK192A(Y)	Q105, Q106, Q118
2SA1150(O)	Q107, Q116
2SK161(Y)	Q112
2SC2710(O)	Q117

VARIABLE RESISTORS

50K	VR101
50K(C)	VR1
50K(A)	VR2

CERAMIC FILTER

LF-H6SD	CF1
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MISSELANEOUS

Battery case
Cap channel SW
Cap STBY-N-CALL
Connector ANTENNNA
Jack CHG
Jack EAR/MIC
Knob talk
Knob VOL/SQ
Microphone
Socket tuningfork
Socket crystal
Speaker
Switch Channel
Switch PTT
Switch SELCALL
Switch VOX
Battery terminal
Front case
Speaker holder
Beltclip
Panel side B
Panel side C
Panel side D
Rear case
Battery cover

COILS AND TRANSFORMERS

4LNC191	L101
4LNC189	L102, L103
6LNC190	L104
GR-N611	L105, L106
GR-D674	L108, T106, T107
LF4-101K	L110, L111, L113, L114
LF4-100K	L112
1624B	T101, T103, T104
GR-N2229	T102, T105



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