

handic[®]



SERVICE MANUAL

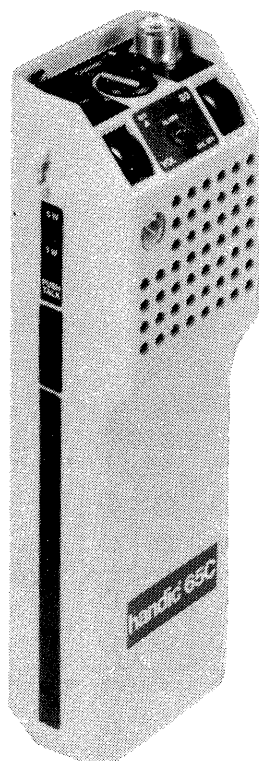
FOR

handic 65C/D FCC DATA: 431.032

CITIZEN'S BAND TRANSCEIVER

HANDHELD TYPE

6 CHANNELS 5 WATT



handic

bolagen



Telephone: 031-450180 Telex: 2558
Box 156, S-42122 V. Frölunda, Sweden

SPECIFICATIONS

GENERAL

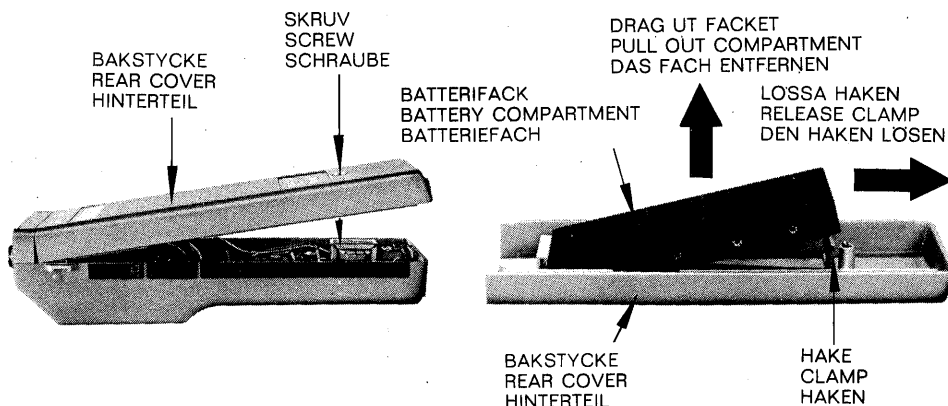
Receiving System	Crystal controlled superheterodyne
Channels	Any 6 in CB band. Supplied with channel 15 crystals ("A" position)
Frequency Coverage	26.965 to 27.405 MHz with appropriate crystals
Power Requirements	12 – 12.5 V DC, 8 "AA" Cells with 2 dummy batteries or 10 NiCd batteries, negative ground only
Speaker-microphone	Dynamic type (8 Ohms)
Semiconductors	1 IC, 14 transistors, 12 diodes, and 1 thermistor
Dimension	75 W x 50 D x 250 H mm

TRANSMITTER

Final Power Input	6 watt
RF Power Output	4 watt
Modulation	90–100%
Emission Type	A3
Frequency Tolerance	0.005%
Antenna Impedance	50 ohms (SO-239 type receptacle)
Current Drain	750 mA (5 W), 400 mA (1 W)

RECEIVER

Sensitivity	0.6 μ V for 10 dB (S + N)/N
Selectivity	6 kHz at -6 dB
Adjacent Channel Rejection	60 dB
Audio Power	2 W 10% at 1000 Hz
Signal-to-noise Ratio	40 dB
Intermediate Frequency	455 kHz
Squelch Sensitivity	Threshold less than 1 μ V
Current Drain	25 mA with minimum output



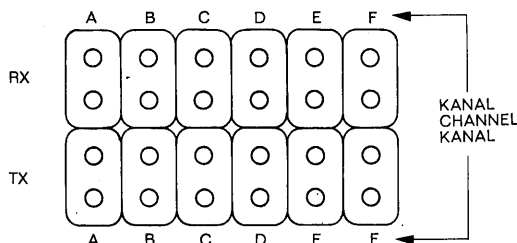
BATTERY INSTALLATION

The detachable battery compartment in the rear cover will take 10 battery cells. If dry batteries are used 8 cells are required. The remaining two subcompartments are bridged over with the enclosed two metal "dummy batteries". When rechargeable batteries of NiCd-type are used the 10 cells will fill the battery compartment without any dummy batteries.

1. Detach the rear cover after loosening the screw at the lower part of the rear cover.
2. Detach the battery compartment carefully, and install the eight battery cells with two dummy batteries (or the ten NiCd cells). Put the cells into place in the compartment as shown.

CRYSTAL INSTALLATION

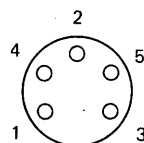
You can operate on any six of the 40 CB radio channels by installing suitable crystals in each internal crystal socket. Crystal sockets are located inside the case, on the printed circuit board. Remove the screw at the back of the cabinet and take off the back cover. Transmitting crystals are plugged into sockets marked TX and receiving crystals into sockets RX. Be careful to plug crystals in correct sockets. In the sockets for channel A there should be one TX and one RX crystal for the same channel etc. The receiving crystal is in most cases marked with a frequency which is 0.455 MHz lower than the transmitting frequency for the same channel.



UNIVERSAL CONNECTOR

The 5-pole DIN standard connector in the bottom of the cabinet suits the hand ic Universal Cassette, which automatically switches between the different functions. If other connections are made, please note the following:

1. Earphone or external loudspeaker: Connect to pins 2 and 3. Also connect pin 1 to pin 4 to make the batteries to supply power.
2. External power supply: Positive lead to pin 4, negative to pin 2. Also connect pin 3 to pin 5 to get the built-in loudspeaker to function.
3. Recharge of NiCd cells: A battery charger of current-limiting type for 50 mA at 14.5 V is connected with the positive lead to pin 1 and the negative to pin 2.

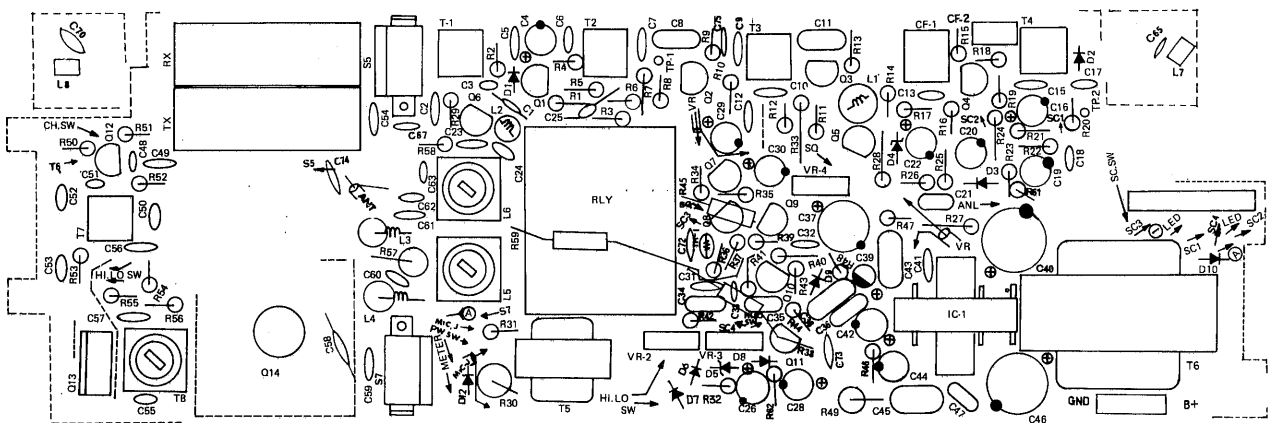


GENERAL ALIGNMENT

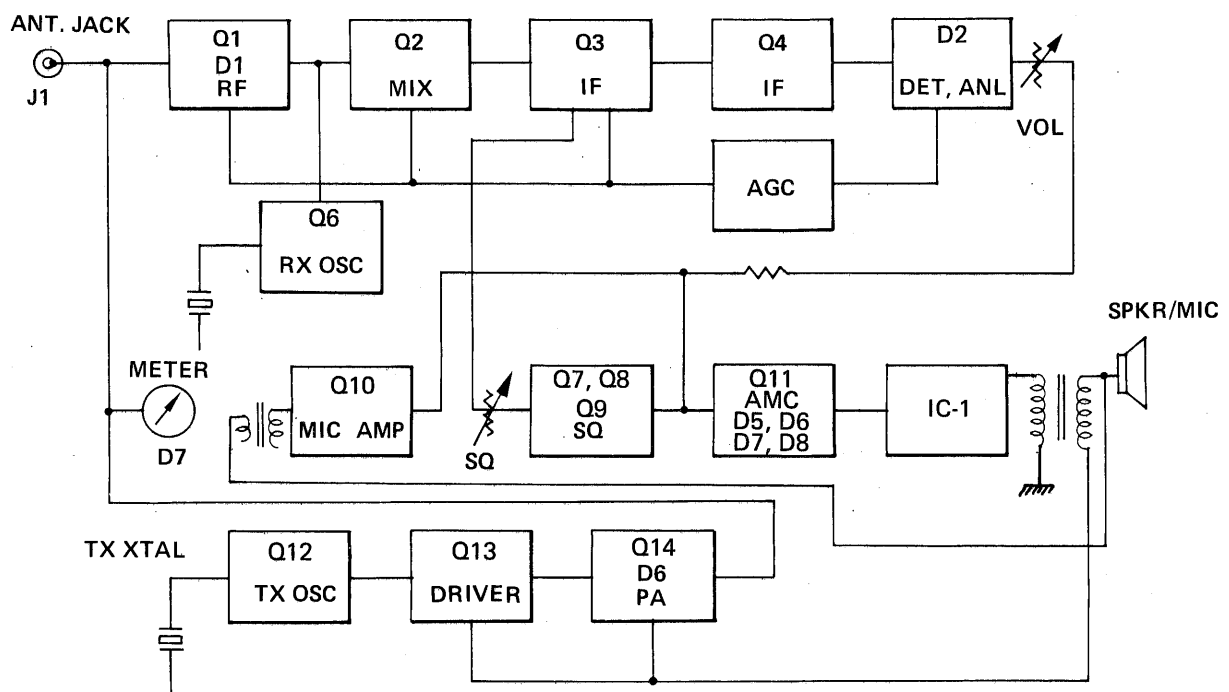
Test equipment required

1. RF standard signal generator (S.S.G.)
2. AF signal generator
3. V.T.V.M. (AC)
4. V.T.V.M. (DC)
5. Oscilloscope
6. Monitor receiver
7. Frequency counter
8. DC power supply
9. 1 A DC ammeter
10. 8 Ω dummy load
11. RF power meter with 50 Ω dummy load
12. Radiation (Field strength) meter

ALIGNMENT POSITION



BLOCK DIAGRAM



TRANSMITTER SECTION ALIGNMENT

1. Connect the equipment as shown in Figure 4.
2. Perform the alignment procedure described in Table 1.

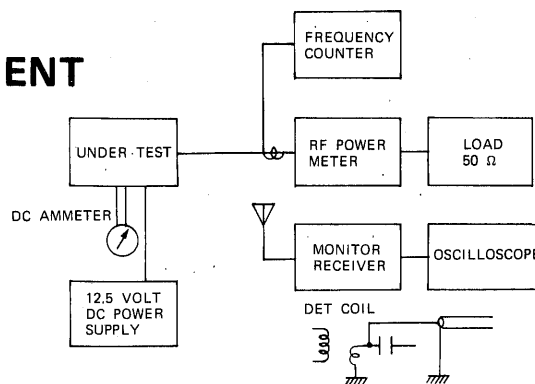


FIGURE 4

TRANSMITTER SECTION ALIGNMENT CHART

Step	Control Setting	Test Equipment Setting	Power Supply Voltage	Adjust	Remarks
1	CH: A position 27.135 MHz	Power meter (50 Ω): to EXT. ANT. Jack 1A ammeter: in series with lead between modulation winding of T6 and collector of Q14 Monitor receiver: connect an oscillo- scope and set the frequency to 27.135 MHz	Supply voltage: 12.5 volts		
2	Press the P.T.T. SW	"	"	T7, T8	Max. power output
3	"	"	"	L5	Peak on the power meter and dip on the ammeter to get max. output at EXT. ANT. Jack
4	"	Power meter (50 Ω): to EXT. ANT. Jack 1A ammeter: in series with lead between modulation winding of T7 and collector of Q15	Vary supply voltage from 15 to 9 volts	T7	If no output adjust T7 to assure output at both voltage extremes
5	"	Audio frequency generator: to C31 (or talk into Microphone)	Reset the supply voltage to 12.5 volts		Check modulation
6					Repeat steps 2 to 4
7	CH: A position Press the P.T.T. SW	Couple the frequency counter as shown in Figure 4	Supply voltage 12.5 volts		Check the trans- mitting frequency

TABLE 1

RECEIVER SECTION ALIGNMENT

1. Connect the equipment as shown in Figure 5.
2. Perform the alignment procedure described in Table 2.

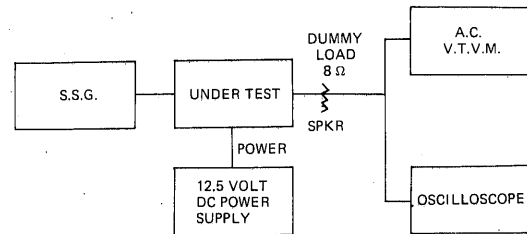


FIGURE 5

RECEIVER SECTION ALIGNMENT CHART

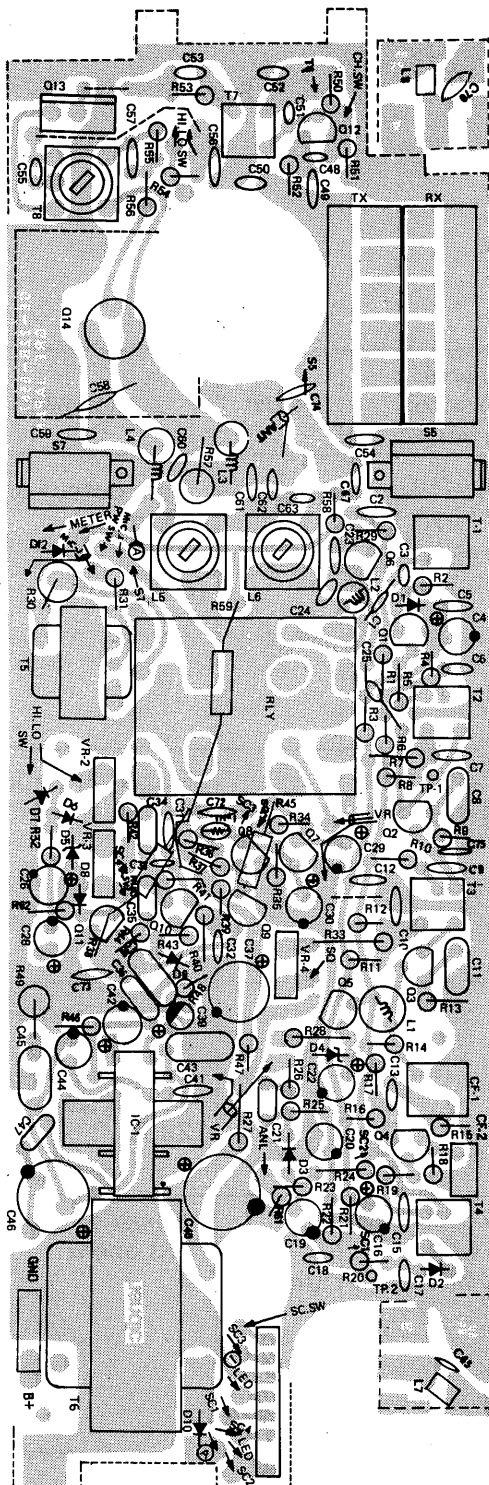
Step	Control Setting	Test Equipment Connector	Signal Generator Setting/Supply	Adjust	Remarks
1	Volume control: Max. (Rotate downward fully) SQ control: Min. (Rotate upward fully) CH: A position 27.135 MHz	V.T.V.M.: Parallel with 8 Ω dummy load connected to EXT. DC/SPKR Jack Signal generator: through 100 pF to the base of Q2 2SC1815 (O)	Freq.: 455 kHz MOD.: 1 kHz 30% Supply volts 12.5 volts	T3, 4	Max. output on voltmeter
2	"	V.T.V.M.: Parallel with 8 Ω dummy load connected to EXT. SPKR Jack Signal generator: to EXT. ANT. Jack	Freq.: 27.135 MHz Mod.: 1 kHz 30%	T1	Max. S/N Ratio
3	"	"	"	T2	Max. output on voltmeter
4					Repeat steps 2 to 3
5	Volume control: adjust for desired audio level SQ control: Min. (Rotate upward fully)	V.T.V.M.: Parallel with 8 Ω dummy load or across speaker to EXT. DC/SPKR Jack Signal generator to EXT. ANT. Jack	Freq.: 27.135 MHz Mod.: 1 kHz output: 500 μ V	VR4	Adjust so squelch just opens

TABLE 2

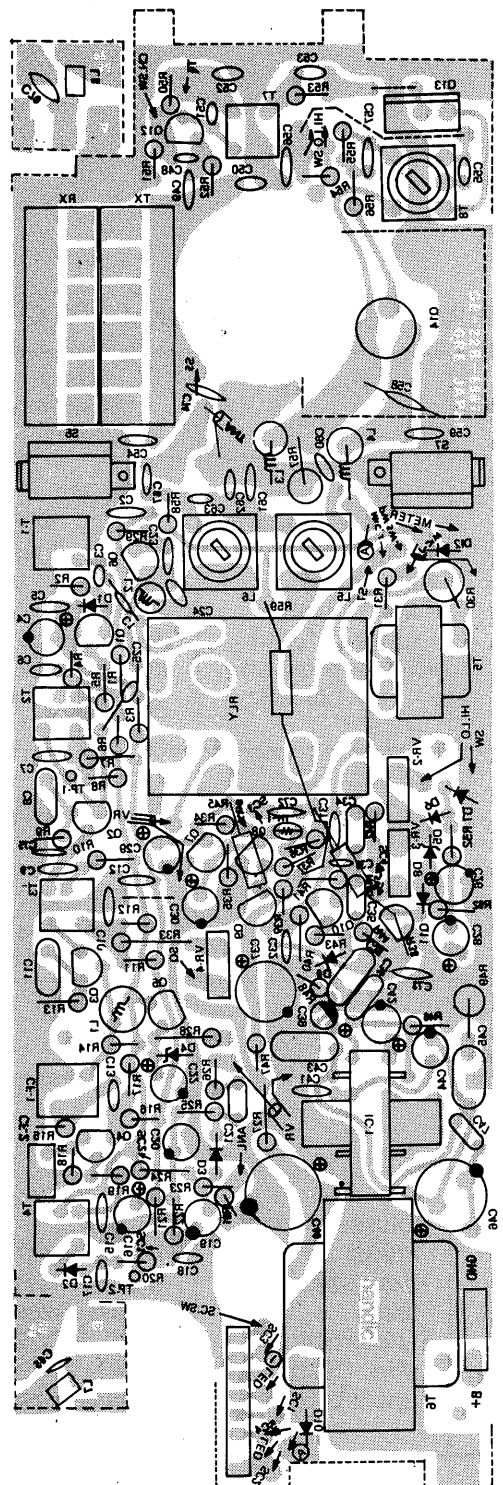
NOTE: Keep the input signal from S.S.G. as low as possible in alignment step 1 to 4.

PRINTED CIRCUIT BOARD

Top view



Bottom view



TROUBLE SHOOTING

Symptom	Possible cause
1) Does not receive	A) Defective crystals. B) Faulty local oscillator or faulty local oscillator circuit component. C) Defective RF amp., IF amp., CF1 or their circuit component. D) Faulty channel switch. E) Defective squelch control or faulty control circuit component F) Defective power switch volume. G) Battery weak. H) Defective push to talk switch. I) Faulty audio amplifier circuit. J) Defective speaker and/or switch S6
2) Does not squelch	A) Defective squelch control. B) Faulty squelch control circuit component.
3) Low sensitivity reception	A) Defective transistor Q1 or faulty RF stage amplifier circuit component. B) Defective IF amplifier or faulty IF amplifier circuit component. C) Defective local oscillator. D) Frequency not covering the correct channel. E) Weak battery and/or crystal. F) Defective external antenna.
4) Mixed reception	A) Wrong crystal for receiving frequency.
5) No sound is audible and no modulation	A) Defective Switch S6 B) Defective or IC-1 or defective associated circuit component. C) Defective transistor Q11 and/or defective associated circuit component. D) Defective squelch control. E) Faulty squelch control circuit component. F) Defective speaker. G) Defective audio output transformer T6
6) Does not transmit.	A) Defective crystal. B) Faulty transmit oscillator or faulty transmit oscillator circuit component. C) Defective transistor Q13 and Q14 and/or defective associated circuit component. D) Defective talk switch or relay. E) Weak battery.
7) Carrier is emitted but not modulation.	A) Defective switch S6 B) Defective MIC. transformer T5. C) Defective relay D) Defective audio output transformer T6
8) Transmit low power and low sensitivity.	A) Weak battery. B) Defective antenna connector. C) Defective antenna.

RESISTORS

R1	1K	1/4W Carbon film	R33	33K	1/4W Carbon film
R2	470	1/4W Carbon film	R34	10K	1/4W Carbon film
R3	3.3K	1/4W Carbon film	R35	560K	1/4W Carbon film
R4	220K	1/4W Carbon film	R36	5.6K	1/4W Carbon film
R5	100	1/4W Carbon film	R37	10K	1/4W Carbon film
R6	1K	1/4W Carbon film	R38	68K	1/4W Carbon film
R7	4.7K	1/4W Carbon film	R39	82K	1/4W Carbon film
R8	220K	1/4W Carbon film	R40	6.8K	1/4W Carbon film
R9	1K	1/4W Carbon film	R41	6.8K	1/4W Carbon film
R10	470	1/4W Carbon film	R42	150K	1/4W Carbon film
R11	15K	1/4W Carbon film	R43	180	1/4W Carbon film
R12	82K	1/4W Carbon film	R44	15K	1/4W Carbon film
R13	1K	1/4W Carbon film	R45	2.2M	1/4W Carbon film
R14	3.3K	1/4W Carbon film	R46	33K	1/4W Carbon film
R15	2.2K	1/4W Carbon film	R47	220	1/4W Carbon film
R16	27K	1/4W Carbon film	R48	15	1/4W Carbon film
R17	220K	1/4W Carbon film	R49	2.2	1/2W Metal film
R18	220	1/4W Carbon film	R50	12K	1/4W Carbon film
R19	100	1/4W Carbon film	R51	2.2K	1/4W Carbon film
R20	470	1/4W Carbon film	R52	100	1/4W Carbon film
R21	10K	1/4W Carbon film	R53	220	1/4W Carbon film
R22	10K	1/4W Carbon film	R54	150	1/4W Carbon film
R23	3.3K	1/4W Carbon film	R55	100	1/4W Carbon film
R24	470K	1/4W Carbon film	R56	1.2	1/4W Carbon film
R25	10K	1/4W Carbon film	R57	470	1/2W Metal film
R26	10K	1/4W Carbon film	R58	150	1/4W Carbon film
R27	22	1/4W Carbon film	R59	15K	1/4W Carbon film
R28	2.2K	1/4W Carbon film	R60		1/4W Carbon film
R29	270K	1/4W Carbon film	R61		1/4W Carbon film
R30	3.9	1 W Metal film	R62	33K	1/4W Carbon film
R31	22	1/4W Carbon film	R63	220	1/4W Carbon film
R32	1K	1/4W Carbon film			

CAPACITORS

C2	.04μF	C10SJZF-393Z	C40	100μF	16WV EL-LYT
C3	22pF	FCC 60	C41	.04μF	C10SJZF-393Z
C4	1μF	50WV EL-LYT	C42	10μF	16WV EL-LYT
C5	.01μF	C60SJZF-103Z	C43	.022μF	50WV MYLAR
C6	.01μF	"	C44	10μF	16WV EL-LYT
C7	.01μF	"	C45	.1μF	50WV MYLAR
C8	.039μF	50WV MYLAR	C46	220μF	16WV EL-LYT
C9	.04μF	C10SJZF-393Z	C47	.0047μF	50WV MYLAR
C10	.04μF	"	C48	22pF	FCC60
C11	.039μF	50WV MYLAR	C49	100pF	FC70
C12	.01μF	C60SJZF-103Z	C50	.01μF	E50SJYB-102K
C13	150pF	FC80	C51	15pF	FCC60
C14			C52	.04	C10SJZF-393Z
C15	.04μF	C10SJZF-393Z	C53	560pF	E50SJYP 561K
C16	10μF	16WV EL-LYT	C54	0.01	E50SJYB-102K
C17	.01μF	C60SJZF-103Z	C55	15pF	FCC60
C18	.01μF	"	C56	.01μF	C60 SJZF-103Z
C19	1μF	50WV EL-LYT	C57	560pF	E50 SJYP 561K
C20	3.3μF	25WV "	C58	39pF	FCC80
C21	.01μF	50WV MYLAR	C59	.04μF	C10SJZF 393Z
C22	1μF	50WV EL-LYT	C60	62pF	FCC100
C23	47pF	FCC80	C61	270pF	FC90
C24	100pF	FC70	C62	33pF	FCC80
C25	10pF	FCC50	C63	47pF	FCC80
C26	22μF	6.3 TANTAL	C64	220pF	FC80
C27	.04	C10SJZF-393Z	C65	22pF	FCC60
C28	1μF	50WV EL-LYT	C66	150pF	FC80
C29	1μF	"	C67	8pF	FCC50
C30	1μF	"	C68	39pF	FCC80
C31	.04μF	C10SJZF-393Z	C69	.04μF	C10SJZF-393Z
C32	.001μF	E50SJYB-102K	C70	.04μF	C10SJZF-393Z
C33	.001μF	"	C71	.04μF	C10SJZF-393Z
C34	.002μF	50WV MYLAR	C72	.04μF	C10SJZF-393Z
C35	.01μF	"	C73	220pF	FC80
C36	.01μF	"	C74	82pF	FCC100
C37	47μF	16WV EL-LYT	C75	33pF	FCC80
C38	.033μF	50WV MYLAR			
C39	15μF	6.3V TANTAL			

SEMICONDUCTORS

Q1	2SC784 (O)	D1	IN60
Q2	2SC1815 (O)	D2	IN60
Q3	2SC1815 (Y)	D3	IN60
Q4	2SC1815 (Y)	D4	EQA01-09S ZENER
Q5	2SC1815 (GR)	D5	EQA01-05S ZENER
Q6	2SC372 (O)	D6	IN60
Q7	2SC1815 (GR)	D7	IN60
Q8	2SC1815 (GR)	D8	IS1555
Q9	2SC1815 (GR)	D9	IN60
Q10	2SC1815 (GR)	D10	ISB01-02
Q11	2SC1815 (GR)	D11	
Q12	2SC1634	D12	IN60
Q13	2SC1018	D13	TLR-103 L.E.D
Q14	2SC756A	TH1	Termistor M-10K

COILS/TRANSFORMERS/FILTER

L1	RF Choke coil	2.2mH FL7H-222K	T1	RX RF Coil	74XN-2229AO2
L2	RF Choke coil	2.2uH LF4-2R2K	T2	RX RF Coil	1624B
L3	RF Choke coil	0.84uH 4LNC-027	T3	IF Transformer	M353 203N
L4	RF Choke coil	0.84uH 4LNC-027	T4	Detector Transformer	4202
L5	Net coil	8SNF-057	T5	Mic transformer	E7337
L6	RF Choke coil	4LNC-092	T6	Modulation transformer	AE5254B
L7	RF Choke coil	4LNC-092	T7	TX JSC Coil	74XN-2229AO2
L8	RF Choke coil	4LNC-092	T8	Driver Coil	8SND061
L9	Choke coil	3B037			
			CF-1	Ceramic filter	LF-B6S
			CF-2	Ceramic filter	BFU-455L

VOLUMES

VR1	Volume control	15F4 50KA
VR2	AMC ADJ	10KB
VR3	AMC ADJ	10KB
VR4	SQ ADJ	50KB
VR5	Squelch control	15FH 50KA

SWITCHES/RELAY

	Channel switch	S18-1-2-6
	Microswitch Push talk	WM101-1-2
	Microswitch Sel Call	WM101-1-2
	Power switch iW-5W	S-JO235
	Relay	NF-4-00-12V

MISCELLANEOUS

Speaker/Microphone	C060A20N1310	Din Cap	GE-19D-4645
Din jack (Monophone)	D6-702P-01	VR Masking Plate	GE-19D-4748
Din jack W Switch	D5-703 B-19	Din Jack	GE-19D-4744
Connector sel call	5048-07A	Battery Cover Assembly (Rear)	GA-69D-0019
Connector battery	5048-03A	Rear Label	GE-19D-4625
Crystal socket	SB-101B-10	Channel Label	GE-19D-4678
Meter	P-202-1165	Battery Screw	GE-19D-4743
Antenna connector	Y-R	Battery Cover	GE-19B-4638
Front Case Assembly	GA-9D-0017		
Front Case	GE-19B-4637	P.C Board Assembly	GA-79D-0021
Case Label	GE-19D-4624		
Side Panel	GE-19D-4642	Battery Case Assembly	GE-23D-7657
Talk Panel	GE-19D-4630	Battery Case	310-2
Sel-call Panel	GE-19D-4779B	Battery Connector Socket	GE-23D-7730
Speaker Himelon	GE-19D-4720	Channel Knob	GE-19D-4631
Slide Panel	S-J0235	Volume Knob	GE-19D-4632
		Talk Knob	GE-19D-4643
Top Escutcheon Assembly	GA-79D-0018	Earth Lug (M Type)	GE-19D-4646
Escutcheon	GE-19C-4639	Micro Switch	GE-19D-4749
Top Panel (A)	GE-19D-4640	Speed Nut	ASPN-24
Top Panel (B)	GE-19D-4641	Mic Dunber	GE-19D-4811

SELECTIVE CALL

If **handic** PTRM selective call unit is used then selective call operation is possible.
It is constructed to fit into the cabinet.

handic PTRM should be hold in place by using 2-side adhesive tape between the tuning forks and the front cabinet.

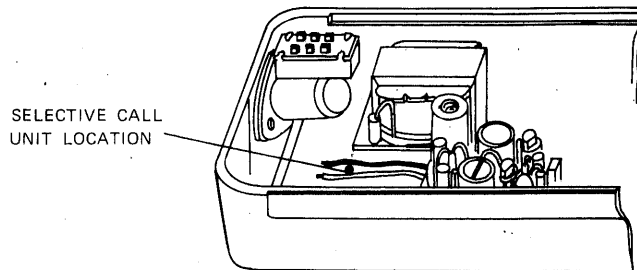
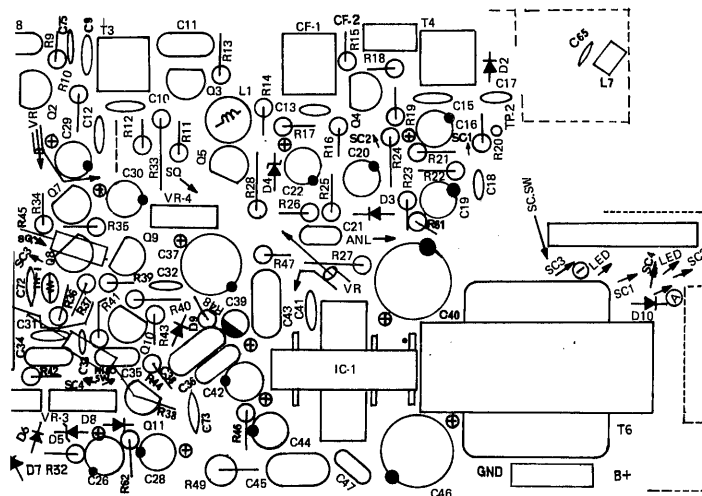


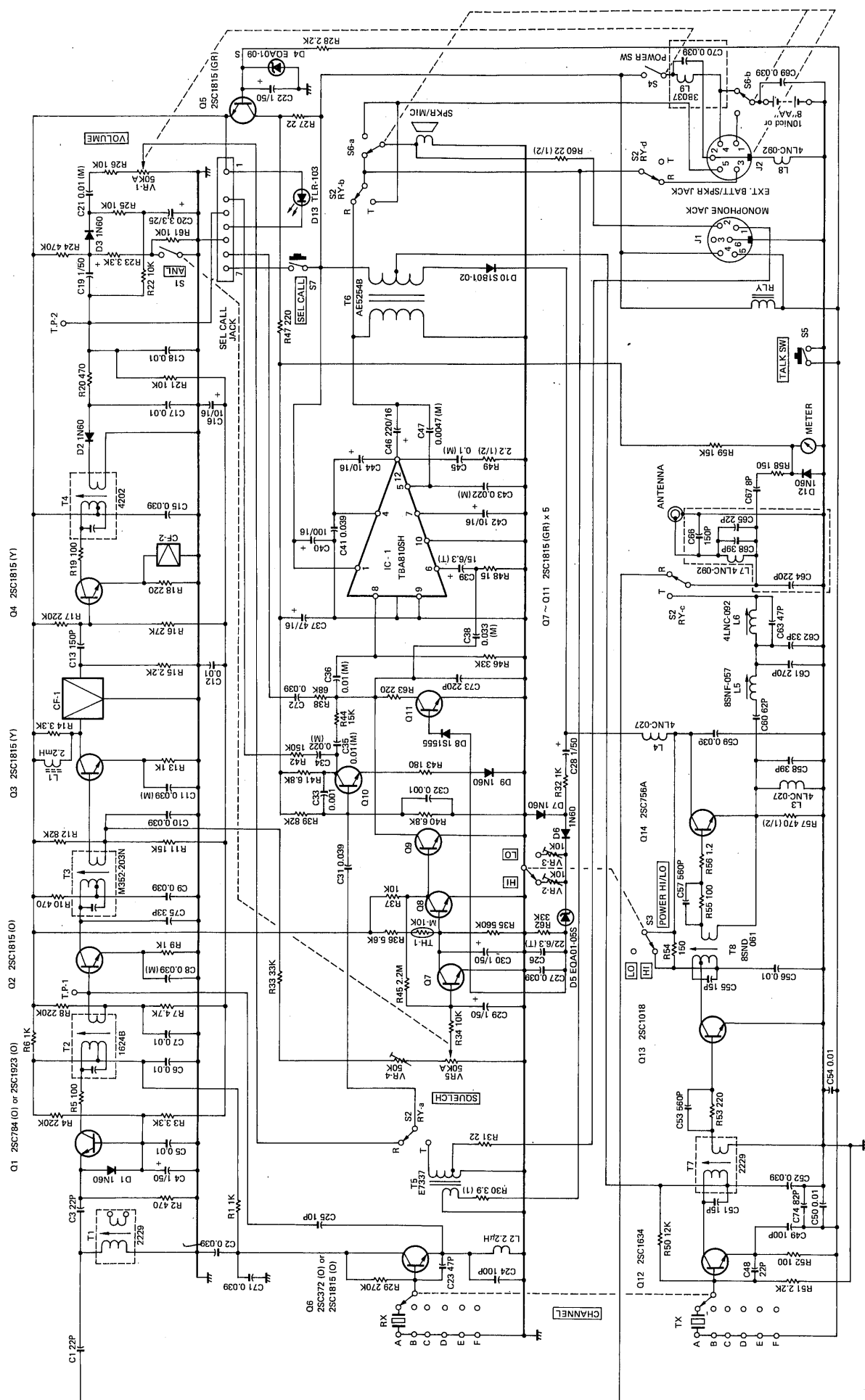
FIGURE 6

WIRING

Connect the wires from **handic** PTRM as follows:

1. BRN wire to pin 3
2. RED wire to pin 1
3. ORG wire to pin 2
4. YEL wire to pin 6
5. GRN wire to pin 5
6. BLU wire to pin 7
7. Wire from solder pin on PTRM to pin 4





- REMARKS:
1. VR-1 VOLUME CONTROL
 2. VR-5 SQUELCH CONTROL
 3. S1 ANL SWITCH
 4. S3 POWER HI/LO SWITCH
 5. S4 POWER SWITCH
 6. S5 TALK SWITCH
 7. S6 SEL CALL SWITCH
 8. RESISTANCE VALUES IN OHMS (K=1000 OHMS, M=1000000 OHMS).
 9. CAPACITANCE VALUES IN MICROFARADS (P=PICTO-MICROFARADS).
 10. (T) TANTALUM CAPACITOR
 11. (M) MYLAR CAPACITOR
 12. ALL VALUES AND RATINGS ARE SUBJECT TO CHANGE FOR IMPROVEMENT WITHOUT NOTICE.