

BETA-COM SWITCH INFORMATION COMPLETE WITH SERVICE BULLETINS

40 CHANNELS!

From your 23 Channel Transceiver

The BETA-COM line of switching modules provides a package which replaces the existing channel selector assembly on most transceivers. These modules are complete with necessary hardware and a new 40 channel selector knob which gives factory appearance and on-channel performance. The BETA-COM switch modules provide the most economically time-effective method of upgrading 23 channel transceivers to on-frequency, 40 channel specifications, without giving up the superior performance of your 23 channel equipment.

The model SWM-40 provides all necessary switching circuitry for transceivers which employ two oscillators for frequency synthesis. The SWM-40 adapts to many AM radios.

The model SWM-41 provides switching circuitry for SSB/AM radios where two oscillators are used for synthesis. This model features series tuning capacitors in each of the high oscillator crystal positions. It is specifically designed for such radios as the Cobra 138, Cobra 139, Midland 13-893 and Midland 13-895.

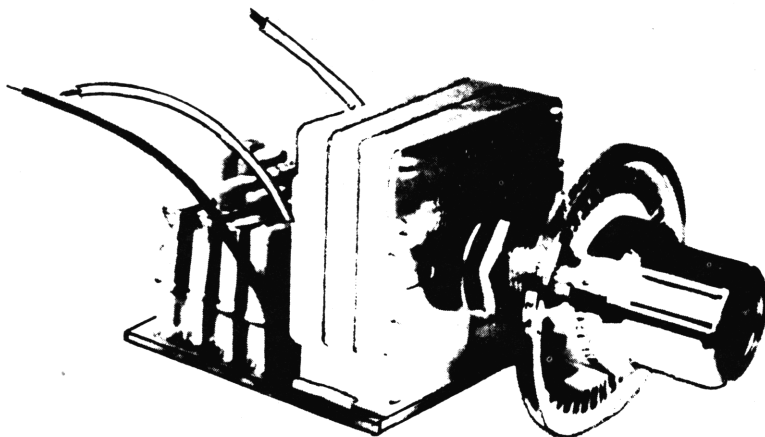
The model SWM-42 utilizes three switching circuits which permits conversion of AM transceivers where a common high oscillator is employed along with separate low frequency transmit and receive oscillator circuits.

The model SWM-53 is a unit specifically designed for SSB/AM transceivers where two oscillator circuits are employed and it is necessary to tune, through individual series tuning capacitors, both the high and low oscillator circuits.

The model SWM-54 delivers complete tuning capability in SSB/AM transceivers employing a single high frequency oscillator circuit, along with individual transmit and receive oscillator circuits requiring the ability to separately tune all crystals.

The SWM-40 and SWM-42 are available as SWA-40 and SWA-42 for use in applications where "soldered in" crystals are employed in the original radio. Sockets are provided only in crystal positions X102, X103, X104, X105, and X106.

Complete conversion reference material is available from your local BETA-COM distributor. BETA-COM also offers a line of PLL modification kits. Consult your distributor for details.



- Replaces existing channel selector switch
- Maintains all the performance features of your 23 channel radio
- Exclusive internal mounting
- Supplied with 40 channel knob
- On-frequency correlated crystal groups
- Detailed installation instructions
- Conversion modules available for most 23 channel transceivers
- Secures your original investment
- Only your technician will know

BETA-COM CORPORATION

BETA-COM 40 CHANNEL SWITCH MODULE & CRYSTAL REFERENCE

No. 4

1-15-78

MANUFACTURER and MODEL	SWITCH MODULE	CRYSTAL GROUP	MANUFACTURER and MODEL	SWITCH MODULE	CRYSTAL GROUP
<u>Aimor</u>			<u>Eico</u>		
CB-7000	42	2H	Sentinel 23, Sentinel Pro	40	E
<u>Alaron</u>			7723	42	2A
B-1025	42	2B	<u>Electronic 2000</u>		
B-1050	40	A	Contact 23	42	2A
B-1150	42	2A	<u>Fannon</u>		
<u>Allstate</u>			Fanfare 120	40	A
7531, 7535	42	2E	<u>Fieldmaster</u>		
6554	40	K	MF-1001	54	3A
6562, 6563	40	G	TR-19, TR-19M, TR-20	42	2A
<u>American Electronics</u>			<u>Fulcomm</u>		
76-501, 76-601	42	2H	2303	54	3E
<u>Amphenol</u>			<u>Gem Marine</u>		
777	42	2B	GB-11935	40	A
<u>Aircastle</u>			GR-11930	42	2A
JE-321	40	E	<u>Gemtronics</u>		
<u>Audiovox</u>			GTX-23, GTX-36	42	2A
MCB-1000, MCB-2000	42	2A	GTX-2300	40	A
<u>Beltek</u>			GTX-3000	42	2D
Enduro 23	42	2H	<u>General Motors</u>		
<u>Browning</u>			CBD-012, 123A, GM-130	42	2E
Eaglette "Y"	42	2C	GM-23B, GM-23C	42	2A
Eaglette "X"	42	2G	CBD-10	23	---
Brownie	40	B	<u>Globe</u>		
LTD	53	1C	9000, 9001	42	2H
SST	42	2H	<u>Granada</u>		
<u>Caltron</u>			CB-6, CB-7, FCB-27	42	2A
CB-7500	42	2A	<u>Grand Prix</u>		
<u>Channel Master</u>			D1125, D1325RF	42	2A
CB-6832	23	---	<u>General Electric</u>		
<u>Claricon</u>			3-5810B	23	---
14-523, Pirate, Privateer, Intruder	42	2A	<u>Great</u>		
30600, 30800, 30500, 30200	42	2A	GT-418	40	A
<u>Cobra</u>			<u>Hallicrafters</u>		
21, 29, 89, Cam 88, 98	40	A	CB-14	40	K
21X	21	---	CB-24	42	2A
23, 27	40	F	<u>Handic</u>		
20, 24, 25, 28	42	2H	235, 2305	42	2A
85	40	B	<u>Hitachi</u>		
132, 135	53	1C	CM-2375H, 2400CH, 4800CH	42	2A
132 (early version)	54	3E	<u>Hy-Gain</u>		
138, 139	53	1D	670B, 671B, 672B, 670, 671, 672, 673, 675	40	A
880	54	2H	674	54	3C
131	54	3E	674B	53	1E
<u>Commando</u>			681, 682	22	---
2310, 2340	42	2A	2681, 2683, 3682, 2680	23	---
2320, 2325	42	2H	<u>Jet-Sounds</u>		
<u>Courier</u>			CB-7000	42	2H
TR-23B, TR-23S, Travelier I, II	42	2A	<u>Johnson</u>		
Classic I, II, Clipper23, Comet, Crusier	42	2A	123, 123B, 123A, 123SJ, 130, 223, 250	42	2E
23, 23Plus, Royale, Ranger 23,	40	E	124, 320	40	G
Conqueror II, Caravelle II, Rebel 23	40	A	351, 352	53	1B
Caronell II, Fanfare 100, Cadet 23	40	A	<u>Knight</u>		
Centurion, Gladiator	54	3B	2569	42	2A
Spartan	54	3D	2533	40	F
<u>Craig</u>			2561, 2564, 2568	42	2H
4101, 4102, 4104	42	2H	Safari I	40	I
4103, 4201	42	2A	<u>Kraco</u>		
<u>Demco</u>			2320B, 2330B	23	---
Super Satellite, Satellite	40	E	2340, 2355	53	1E
<u>Echo</u>			1300, 2310, 2320, 2345	40	A
'49er	42	2A	2310B, 2320A	22	---
'99er	40	A			
Excellence	40	E			

BETA-COM Corporation

SWM- Prefix to Switch Module Model No. indicates that crystal sockets are provided for all crystals.
 SWA- Prefix to Switch Module Model No. indicates that crystal sockets are provided only for added crystals X102 thru X106.
 -25 Suffix indicates that shaft length is 3"

No suffix to model number indicates that standard 1" long, flattened shaft is provided.
 Use SWA module where wired in crystals are supplied with the original radio.

BETA-COM HAS MADE EVERY EFFORT TO INSURE THAT THESE CHARTS ARE CORRECT. AN EXAMINATION OF THE RADIO SHOULD BE MADE TO DETERMINE WHETHER WIRED IN OR SOLDERED IN CRYSTALS ARE EMPLOYED. BETA-COM CANNOT GUARANTEE THE ACCURACY OF THESE CHARTS DUE TO THE FACT THAT MANY MANUFACTURERS CHANGE DESIGNS WHILE USING THE SAME MODEL DESIGNATIONS. BETA-COM SOLICITS YOUR COMMENTS REGARDING ANY ERRORS IN THESE CHARTS.

<u>MANUFACTURER and MODEL</u>	<u>SWITCH MODULE</u>	<u>CRYSTAL GROUP</u>	<u>MANUFACTURER and MODEL</u>	<u>SWITCH MODULE</u>	<u>CRYSTAL GROUP</u>
<u>Kris</u>			<u>Realistic</u>		
23, 23Plus, T23, 99er, Vega, T123	40	A	TRC-24C, 30, 30A, 52, 56	40	A
XL-23, Ventura	42	2A	TRC-23, Navajo, Mini 23	40	E
Victor, Victor II	42	2C	TRC-24, 24B, 25, 50A, 68, Amer23	42	2A
XL-70	54	3E	TRC-55, 101B	42	2D
			TRC-46	54	3C
			TRC-47, 48	54	3I
<u>Lafayette</u>			<u>Regency</u>		
Comphone 23, Comphone Mark II	42	2A	Imperial II	40	K
HB-550, HB-700, Telstat 1000, 1023, B	42	2A	CR-202	40	A
Comphone 23A, HB-750, HB-950	23	---	Sprint 23, 23II, CR-185, 142, 230	42	2A
Telstat 1050, HB-650	23	---	CB-283, GT-523	42	2F
Comstat 25, HB-444	40	C	CR-123B	54	3D
Comstat 25A, 25B, 35, 625A Telstat 23	40	A	CR-240	21	---
HB-525 A thru F	40	A	<u>Robyn</u>		
Comstat 23	42	2H	DG-30, LB-23A, WV-23A, K-123,	42	2A
HB-333	40	E	BB-123, XL-2, TR-123, -123B, 123C	42	2A
HB-400	40	H	SS-747, SX-101, GT-VIIB	42	2A
Telstat SSB 75, SSB-100	53	1E			
			<u>Royce</u>		
<u>Mark</u>			1-602, 602A, 620, 605, 605A, 606, 650	42	2A
SSB-46	54	3E	1-630	54	3C
Invader 23	42	2B	1-631, 640	54	3F
Lancer 23	42	2H			
			<u>Romar</u>		
<u>Midland</u>			ACT-1914	42	2A
13-795	42	2D	CB-7000	42	2H
13-871, 881B, 881	42	2H			
13-765, 686, 875, 890, 882, 882B, 858	40	A	<u>Ross</u>		
13-857, 853, 852, 886, 884, 863B	40	A	CB-1000	42	2A
13-864, 865, 869, 862, 877, 790, 867, 887	42	2A			
13-865B	42	2A	<u>Rydstl</u>		
13-872, 879, 870, 870C, 870D	42	2B	CB-523, CBR-1700, 1800	42	2A
13-895	53	1D			
13-896, 894	53	1C	<u>SBE</u>		
13-892	54	3I	Cortez, Catalina III, Malibu 29CB	42	2H
13-873	54	3E	Trinidad II/30CB, Coronado	42	2H
13-976	53	1E	Console II/16CB, -6CB, SidebanderII	53	1B
13-883B	21	---	11CB, 26CB	42	2A
13-857B, 882C, 888B, 888C 13-955	23	---			
			<u>Sears</u>		
<u>Morse Electropducts</u>			934.367-10500, 934.367-40500	42	2H
CB-700, CB-800, CB-2000	42	2A	934.367-70500, -71500, -72600	54	3C
			<u>Shakespeare</u>		
<u>Multi Products</u>			GBS-1500	42	2A
Citifone 19	42	2A			
			<u>Sharp</u>		
<u>Nuvox</u>			CB-500 UB	40	A
CB-7000	42	2H			
TC-5020	42	2A	<u>Siltronix</u>		
			SSB-23	54	3E
<u>Olson</u>			Apache, Mohawk	42	2H
CB-88, CB-409	42	2A	Albatross SSB-23A	54	3E
<u>Pace</u>			<u>Sonar</u>		
2376, CB-76, 2300(Y), Plus 23(Y)	42	2C	FS-23, FS-3023	40	I
2300(X), Plus 23(X)	42	2G			
CB-130, 133, 143, 144, 113, 162	42	2A	<u>Squires Sanders</u>		
CB-223	42	2D	Skipper	42	2A
CB-1023, 1023B	53	1B			
CBST-23	54	3E	<u>Stereosonic</u>		
CB-145, 146	42	2H	2355, 2360, 2300	42	2A
1000 B, 1000 M	53	1G			
			<u>Surveyor</u>		
<u>Pal</u>			2100	42	2H
Coyote 23	54	3E	2300, 2400, 2600	42	2A
Roadrunner 23	42	2H			
			<u>Teaberry</u>		
<u>Palomar</u>			Mighty T, T Control, Tele T, T Scout	40	A
21	40	A	Model T, T Charlie One	40	A
			Big T, 5 x 5	42	2A
<u>Panasonic</u>			Racer T	23	---
RJ-3200	42	2A			
			<u>Tram</u>		
<u>Pearce Simpson</u>			XL-100	40	J
Alleycat 23, Tomcat 23, Tiger 23	40	A	Diamond 40	42	2H
Director 23, CB-23, Guardian 23, 23B	42	2D	Diamond 60	53	1C
Bearcat 23, 23C, Cougar, Lynx 23,	42	2A	XL-5	53	1B
Bobcat 23, 23C, 23E, Puma 23, 23C	42	2A			
Tiger 23B, Pussycat 23, Super Lynx	42	2A	<u>Truetone</u>		
Bobcat 23D, Tomcat 23B	42	2H	MCC-4635A/67, -4774, 4434A/67	40	A
Simba SSB, Cheetah	54	3B	MCC-4739A/67, 4733A/67, 4672, 4770	40	A
Bengal SSB, Panther	54	3D	DX-4370, MEC-4532A/57	42	2A
Tiger Mark II	23	---	MCC-4434B/67	23	---
			MCC-4760A/67	40	A
<u>J. C. Penney's (Penncrest)</u>					
Pinto, Golden Pinto, Pinto 23, 23B	42	2A	<u>Unimetrics</u>		
981-6075	54	3G	Marlin I, Porpoise I, Dolphin, Mako-I	42	2A
981-6240	54	3C	Sea Horse I	42	2A
981-6213	40	A	Stingray II	53	1E
981-6235	42	2A			
			<u>Utac</u>		
<u>Polytronics</u>			Studio 4000, TRX-30, TR-18M, Mini23	42	2A
SR-23, Pro 23	40	E			
			<u>Vector</u>		
<u>Ray Jefferson</u>			IX, VI	42	2A
CB-705, CB-707, CB-905	42	2H	IV	42	2H
<u>RCA</u>			<u>Xtal</u>		
14T100/200	42	2A	SCB-5, XCB-12, XCB-4, XCB-5, XCB-6	42	2A
			XCB-7, XCB-11	42	2A
<u>Raytheon</u>					
Ray-Com III	42	2H	<u>Zodiac</u>		
			M-5023, M-5026	42	2A

CRYSTAL REFERENCE CHART

for use with **BETA-COM** Switch Modules

CRYSTAL GROUP	-----SWITCHING MODULE CRYSTAL POSITION -----				
	X102	X103	X104	X105	X106
A	23.590	23.640	23.690	14.980	
B	12.005	12.055	12.105	7.490	
C	41.200	41.250	41.300	7.705	
D					
E	37.900	37.950	38.000	4.605	
F	33.465	33.515	33.565	10.470	
G	33.145	33.195	33.245	10.150	
H	16.900	16.950	17.000	4.395	
I	16.500	16.550	16.600	4.795	
J	16.610	16.660	16.710	4.430	
K	11.150	11.200	11.250	8.645	
1A	7.8777	7.8943	7.9110	14.934	
1B	12.000	12.050	12.100	7.4925	
1C	16.265	16.315	16.365	6.030	
1D	8.459	8.509	8.559	11.0335	
1E	23.630	23.680	23.730	14.937	
1F	15.382	15.3987	15.4154	10.605	
1G	12.040	12.090	12.140	7.4525	
2A	37.900	37.950	38.000	10.605	10.150
2B	37.900	37.950	38.000	10.605	10.060
2C	35.271	35.321	35.371	7.976	8.431
2D	33.300	33.350	33.400	6.005	6.460
2E	33.000	33.050	33.100	5.705	6.160
2F	19.305	19.355	19.405	7.990	7.535
2G	18.813	18.863	18.913	8.482	8.937
2H	17.265	17.315	17.365	10.030	9.575
3A	46.1515	46.2015	46.2515	10.605	10.608
3B	11.300	11.350	11.400	8.1955	8.1935
3C	7.8766	7.8933	7.910	14.937	14.934
3D	12.105	12.155	12.205	7.3915	7.3885
3E	12.005	12.055	12.105	7.4915	7.4885
3F	7.8792	7.8958	7.9125	14.937	14.934
3G	37.900	37.950	38.000	11.0585	10.1515
3H					
3I	23.630	23.680	23.730	14.937	14.940

INSTALLATION INSTRUCTIONS
MODEL SWM-42

1. The Model SWM-42 and SWA-42 BETA-COM Switching Modules are designed to replace the 23 channel selector switch assembly in Citizens Band Transceivers employing three separate oscillator circuits. Typically, these oscillator circuits are utilized in the Transmit and Receive functions to synthesize the necessary output frequencies. Typical circuits employ one highfrequency oscillator coupled with two separate low frequency oscillators, one for the receive function and the second for the transmit function.
2. Remove the transceiver housing so as to have full access to both the bottom of the printed circuit board and the top side. Always make certain that the transceiver to be modified is operating in both transmit and receive functions before starting the conversion.
3. Before commencing with the conversion examine the radio to make certain that the SWM Module will physically fit into the transceiver in place of the existing 23 channel selector switch assembly. The SWM Switch Module generally mounts "up-side down" in the radio but may vary depending upon the model and space available. Always mount so the leads from the Module will be as short as possible when wired into the circuit.
4. After determining that the Switch Module can be accommodated within the enclosure of your transceiver, locate the switch output leads which feed the three oscillator circuits. One will be the high frequency oscillator and the second will be the low frequency transmit oscillator. The third will be the low frequency receive oscillator. These leads should be cut at the switch end and not at the PC board as this will facilitate their proper location in further steps.
5. Remove all remaining switch leads at the PC board end by carefully unsoldering from the printed circuit board. Remove the old selector switch and set aside.
6. If your radio employs plug-in crystals carefully remove them from your transceiver and plug them into the proper sockets on the SWM-42 Switch Module. If your radio uses soldered in crystals it is recommended that you use the SWA-42 Switch Module since it has sockets for only the added crystals, X102, X103, X104 X105 and X106. It is then not necessary to remove the other sockets in order to install the soldered in crystals removed from your radio. If your radio does have soldered in crystals be very careful in removing the crystals. It is recommended that you use "solder-wik" or some type of solder removal tool.
7. Ream the channel selector mounting hole to 3/8" diameter to permit mounting the Switch Module. Install the Module with the hardware included. Locate the high frequency oscillator input. This will be one of the wires you left on the PC board. Connect the YELLOW lead from the switch Module to this point. Locate the lead which is the transmitter low frequency oscillator input and connect the WHITE lead to this point. Connect the GREEN lead to the low frequency receive oscillator input. Connect the BLACK lead from the Module to a convenient PC board common ground point.
8. Install the knob and align as instructed in knob assembly sheet.
9. Reassemble your transceiver. It is not ready to transmit and receive on all 40 CB Channels.

MODEL SWM-41 SWITCH MODULE

DETAILED INSTALLATION INSTRUCTIONS FOR MIDLAND MODEL 13-895,
COBRA MODEL 138 AND COBRA MODEL 139

NOTE: BEFORE PROCEEDING WITH THE INSTALLATION OF THE BETA-COM MODEL SWM-41 SWITCHING MODULE MAKE CERTAIN THE TRANSCEIVER IS OPERATING CORRECTLY ON AM & SSB FUNCTIONS ON EXISTING 23 CHANNELS.

1. Remove Knobs and front panel escutcheon. Remove the existing switch and carefully unsolder all leads from the PC board. The leads which run from the switch to the two oscillator inputs should be noted as the leads from the new switch module will be connected to these PC Board points. One lead, supplying the 11 Mhz oscillator, connects to the junction of D23 and R69 (and L301 in some models). The other lead, supplying the 8 Mhz oscillator, connects to the junction of L2, and R82.
2. After removing all existing crystals and unsoldering all leads from the old switch ream the switch mounting hole to 3/8" diameter.
3. Install all crystals into the appropriate sockets.

X1- 8.1590 Mhz.	X6- 8.4090 Mhz.	X102- 8.4590 Mhz.
X2- 8.2090	X7- 11.0035	X103- 8.5090
X3- 8.2590	X8- 11.0135	X104- 8.5590
X4- 8.3090	X9- 11.0235	X105- 11.0335
X5- 8.3590	X10- 11.0435	
4. Mount the SWM assembly into the front panel bracket and fasten with the hardware supplied. The module mounts into the transceiver upside down and it may be necessary to dress the wires in the shielded compartment to permit mounting the module parallel with the main PC board and perpendicular to the front panel.
5. Solder the leads from the new switch module to the main PC board as follows. The leads should be cut to the minimum length before soldering. All leads should be firmly anchored after the module has been installed. A small amount of wax or hot stick glue may be used.
 - Black- Connect to any convenient PC Board ground Point.
 - White- Connect to the junction of L3, D26, C74 and C75 thru C80. This is the common of the 8 Mhz crystal bank.
 - Green- Output of the 8 Mhz crystal bank. Connect as in step 1
 - Blue- Output of the 11 Mhz crystal bank. Connect as in step 1
6. Alignment- Connect the transceiver to a 12VDC power supply and connect a counter to TP-4. This is the output measuring point for the 8 Mhz oscillator circuit. Set the AM/USB/LSB selector to the USB position. Locate Channel 1 on the selector switch. The counter should read approx. 8.1590. Adjust trimmer capacitor adjacent to crystal X1 so that the counter reads 8.159000 plus or minus 30 cycles. proceed as follows -

<u>Set Channel selector to channel</u>	<u>Adjust Trimmer Capacitor</u>	<u>Set frequency for</u>
5	X2	8.209000
9	X3	8.259000
13	X4	8.309000
17	X5	8.359000
21	X6	8.409000
26	X102	8.459000
31	X103	8.509000
36	X104	8.559000

This completes the alignment of the 8 Mhz. oscillator circuit.

7. Alignment of the 11 Mhz circuit is accomplished as follows.

Connect the counter to TP3,

Adjust the Voice Lock or Clarifier front panel control to Mid Point of its range. Set the switch module to Channel 40. The counter should now read approx. 11.043 Mhz. Adjust the Voice Lock Range control, VR5 so that the counter reads exactly 11.043500 Mhz. Set the selector switch to channel 39, the counter should read 11.033500, set the selector to channel 38 and the counter should read 11.023500. Set the selector to channel 37 and the counter should read 11.013500 and set the selector to channel 36 and the counter should read 11.003500. With the channel 40 crystal reading 11.043500 Mhz all other 11 Mhz crystals should read within plus or minus 1000 Hz.

8. The transceiver may now be reassembled and is ready for 40 channel operation.

SWM-41 BETA-COM, WHEELING, ILL. USA
COBRA 138
COBRA 139
MIDLAND 13-895

BETA-COM CORPORATION

The BETA-COM CRYSTAL SWITCHING MODULE, Model SWM-41 is designed to extend the frequency capability of transceivers to a full 40 channels. A 40 channel switch, along with the necessary tuning capacitors are mounted to an epoxy-glass printed circuit board permitting rapid update of the transceiver.

The switch provides two separate circuits, one of which has included a series trimmer capacitor to permit precise tuning of the individual crystals.

INSTALLATION

1. Remove the top and bottom covers of the transceiver. Remove any knobs, panels or brackets necessary to permit easy removal of the existing 23 channel switch. It is recommended that you first locate the leads connecting the switch to the two synthesizer oscillators. Note these leads and cut them but do not remove them from the board until you are ready to connect the SWM-41 into the circuit.

2. Remove all leads from the existing switch at the PC board end. The old switch and leads will be discarded. Make certain that no solder is splashed on the PC board which may cause shorts. It is generally not necessary to remove the existing PC board crystal sockets or trimmer capacitors.

3. The SWM-41 switching circuit #1 is designed to add 150 Khz to the range capability of the synthesizer circuit in 50 Khz steps. The second section provides the necessary switching to accomplish 10 Khz steps to the appropriate oscillator circuit.

OSCILLATOR CIRCUIT #1 PROVIDES 50 KHZ STEPS
COMMON- WHITE
SWITCHED- GREEN

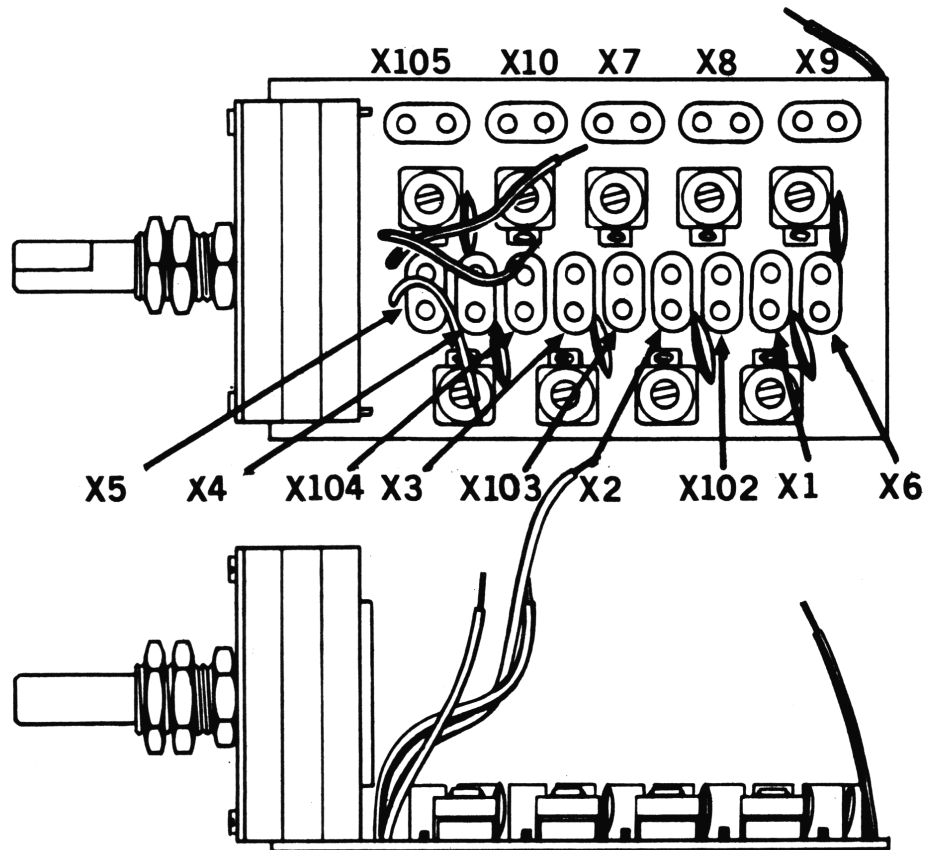
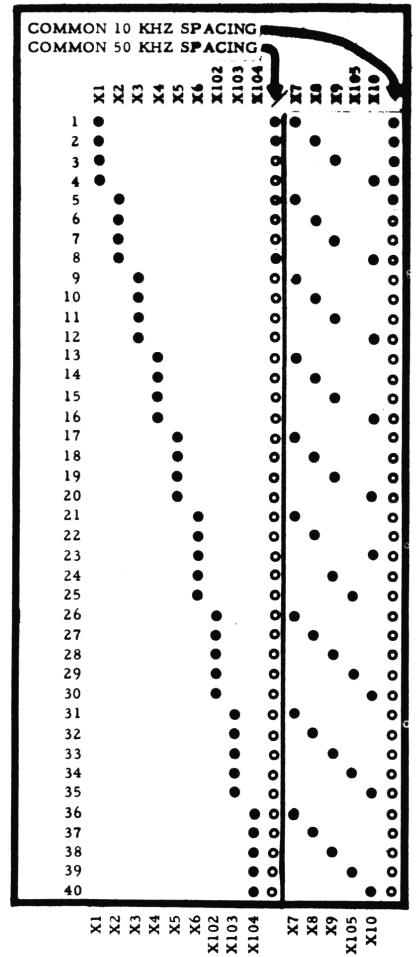
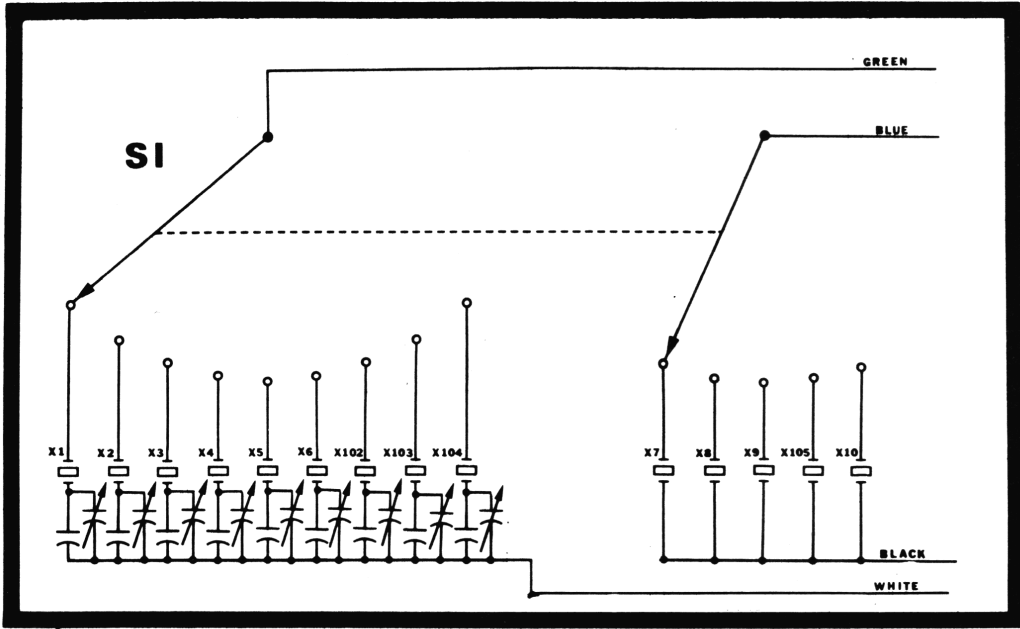
OSCILLATOR CIRCUIT #2 PROVIDES 10 KHZ STEPS *
COMMON- BLACK
SWITCHED- BLUE

* In switch positions 4, 8, 12, 16, & 20 the steps are in 20 khz increments.

4. Separate the crystals removed from the transceiver into the groups spaced at 50 khz and the group spaced at 10, 10, 10 & 20 khz. The lowest frequency in the 50 khz group is assigned the X1 designation, with X2 thru X6 being assigned the higher frequencies, in order. The lowest frequency in the second group is assigned the number X7 with the remaining crystals in the group being assigned X8, X9 & X10 in order. Integrate the additional crystals into the scheme as shown on the thruth table for X102, X103, X104 & X105. INSTALL ALL CRYSTALS AS INDICATED ON SKETCH.

5. Mount the SWM assembly using the hardware supplied. The additional nut is provided to permit adjustment of the switch mounting, as necessary. In equipment utilizing a millimeter type shaft bushing on the original switch it may be necessary to ream the shaft opening to 3/8". The switch normally mounts upside down to provide bottom access to the crystal trimmer adjustments.

6. Connect the switch leads to the appropriate circuit board connection points. Adjust the individual trimmers in accord with manufacturers data.



BETA-COM CORPORATION

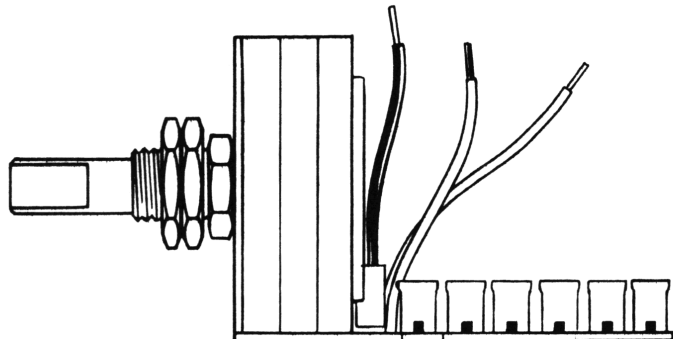
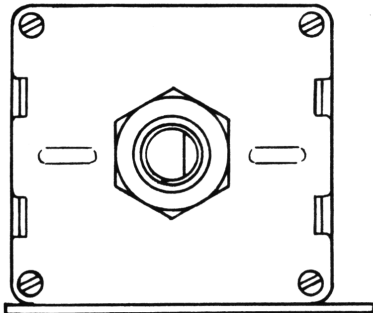
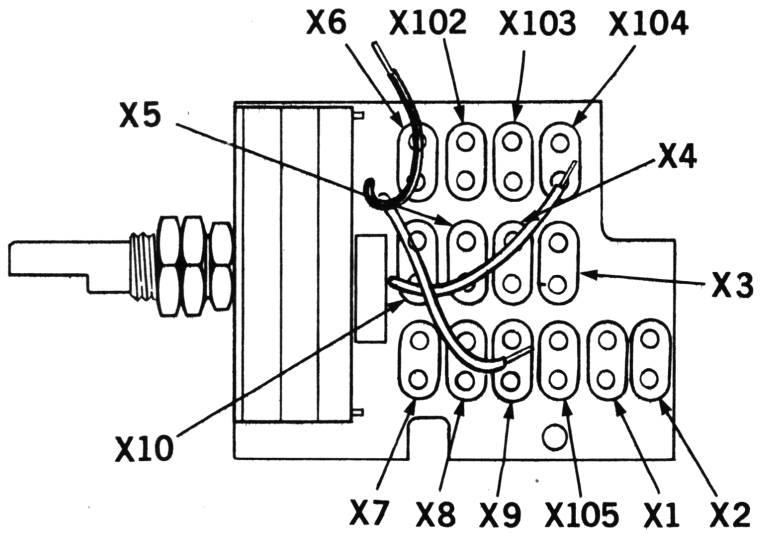
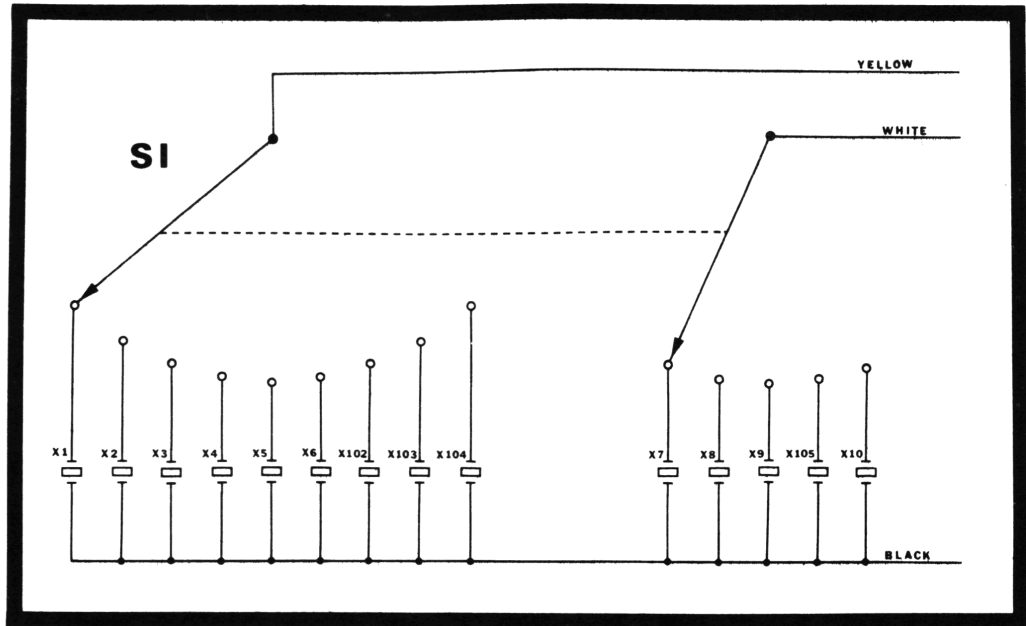
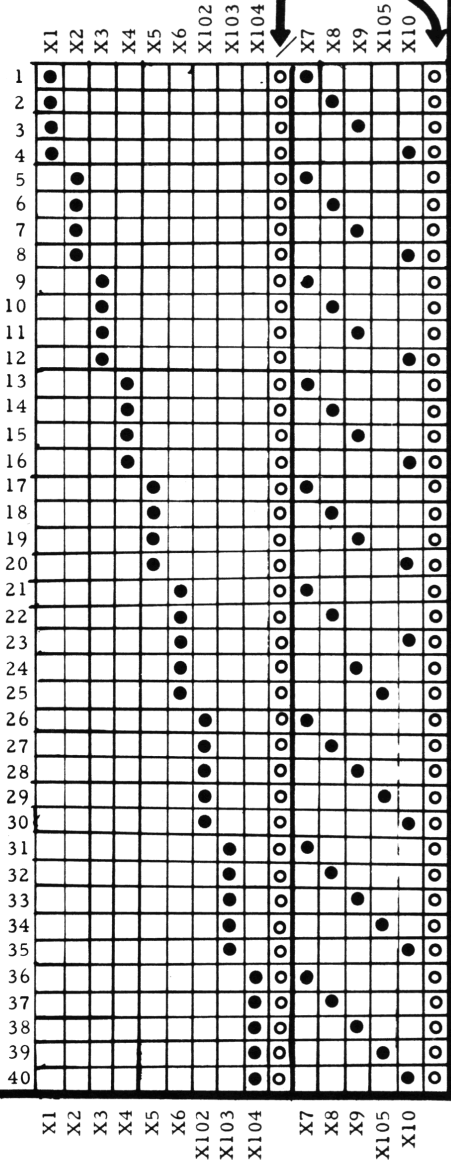
INSTALLATION INSTRUCTIONS

MODEL SWM-40

MODEL SWA-40

1. The model SWM-40 and SWA-40 BETA-COM Switching Modules are designed to replace the 23 channel selector switch assembly in Citizens Band transceivers employing two separate oscillator circuits. Typically these circuits are utilized in the Transmit and Receive functions to synthesize the necessary output frequencies. These circuits employ one high frequency oscillator which is mixed with a low frequency oscillator to provide the desired operating output frequency.
2. remove the transceiver housing so as to have full access to both the bottom of the printed circuit board and the top side. Always make certain that the transceiver to be modified is operating in both the transmit and receive functions before starting with the conversion.
3. Before commencing with the conversion examine the radio to make certain that the SWM module will physically fit into the transceiver in place of the existing 23 channel selector switch assembly. The SWM Switch Module generally mounts "up-side-down" in the radio but may vary depending upon the model and space available. Always mount so the leads from the Module will be as short as possible when wired into the circuit.
4. After determining that the Switch Module can be accommodated within the enclosure of your transceiver, locate the switch output leads which feed the 2 oscillator circuits. One will be the high frequency oscillator and the second will be the low frequency oscillator. These leads should be cut at the switch end and not at the PC board end as this will facilitate their proper location in further steps.
5. Remove all remaining switch leads at the PC board end by carefully unsoldering from the printed circuit board. Remove the old selector switch and set aside.
6. If your radio employs plug-in crystals carefully remove them from the transceiver and plug them into the proper sockets on the SWM-40 Switch Module. If your radio uses soldered-in crystals it is recommended that you use the SWA-40 Switch Module since it has sockets for only the added crystals, X102, X103, X104 and X105. The SWM-40 Switch Module may be used with soldered-in crystals but it is then necessary to remove the sockets for X1 thru X10 so that the crystals removed from the radio can be soldered directly to the SWM-40 PC board. If your radio does employ soldered-in crystals be very careful in removing the crystals. It is recommended that you use "solder-wick" or some type of solder removal tool.
7. Ream the channel selector mounting hole to 3/8" diameter to permit mounting the Switch Module. Install the Module with the hardware included. Locate the high frequency oscillator input. This will be one of the wires you left on the PC board. Connect the YELLOW lead from the switch module to this point. Locate the lead which connects to the low frequency oscillator and connect the WHITE lead to this point. Connect the BLACK lead from the switch module to a convenient PC board common ground point. Keep all leads as short as possible.
8. Install the knob and align as instructed in knob assembly sheet. Reassemble radio.

COMMON 10 KHZ SPACING
COMMON 50 KHZ SPACING



BETA-COM CORPORATION

INSTALLATION INSTRUCTIONS
MODEL SWM-53

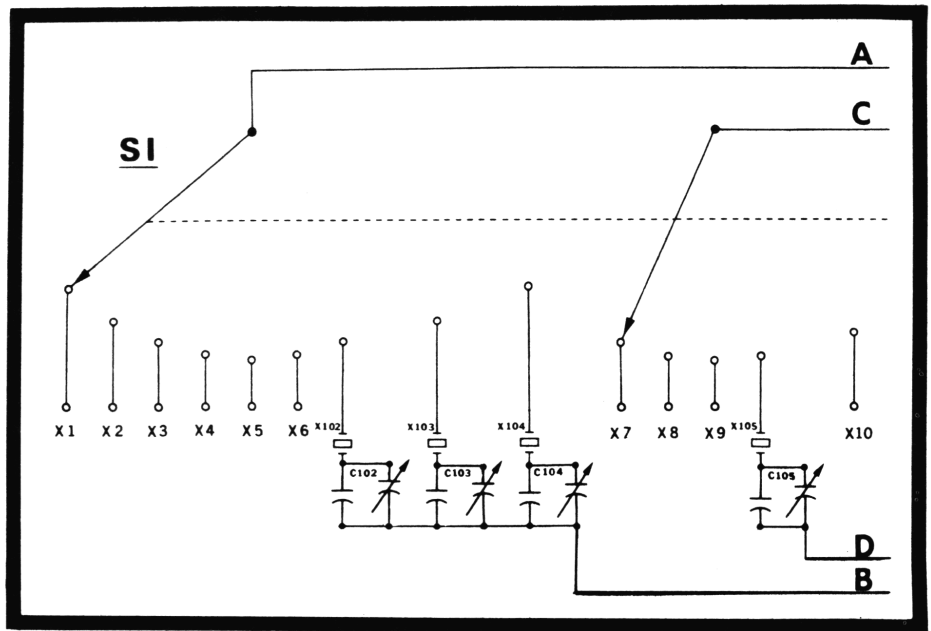
1. The Model SWM-53 switch module is designed to replace the 23 channel selector switch assembly in Citizens Band Transceivers. This improved model provides individual tuning capacitor adjustments on all crystals added to the synthesizer system while providing small size and the advantage of utilizing the existing crystals and trimmer capacitors in their original place in the transceiver.
2. Remove the transceiver housing so as to have full access to both the top and bottom of the transceiver. Always make certain that the transceiver to be modified is operating in both the transmit and receive modes before starting the conversion.
3. Refer to the Schematic Diagram, Top and Bottom Views of the Printed Circuit Board and the Switching Truth Table before proceeding.
4. The Model SWM-53 is so designed to permit use with transceivers employing two separate oscillator circuits in the frequency synthesizer. The SWM-53 also provides for wiring into circuits where the low, or common side of the two oscillators are either common to each other or connected to different points. Before proceeding, examine the schematic diagram of the transceiver and determine which type of circuitry is employed.
 - A. In transceivers where the low side of each oscillator is common to each other proceed as follows-
 1. Clean hole B adjacent to capacitor C105A and install lead D of capacitor C105A into hole B and solder.
 2. Connect a short piece of wire from the tab D of trimmer capacitor C105 and into hole B where the tabs of trimmer capacitors C102, C103 and C104 are connected. Solder.
 3. Proceed with the installation of the SWM-53.
 - B. In transceivers where the low side of each oscillator is not common to each other proceed as follows-
 1. Bend the lead D of discap C105A towards tab D of trimmer capacitor C105 and wrap around tab. Connect a short length of wire to tab D of the trimmer capacitor C105 and solder. This lead will be connected to the low side of the 10 kHz spaced oscillator circuit.
 2. Proceed with the installation of the SWM-53.
5. Remove the existing selector switch from the transceiver. Unsolder or cut the leads running from the crystal circuitry to the selector switch, at the switch end. It is helpful if a sketch is made identifying each lead with reference to its appropriate crystal. This will make wiring of the SWM-53 switch module more convenient. In cases where the existing leads are not long enough to reach the solder pads on the SWM-53 it may be necessary to use the longer leads provided with the module. Use caution when replacing the leads so as to prevent solder splashes or delaminating of the main PC board.
6. Mount the SWM-53 and connect each of the leads from the crystals to the appropriate solder pads on the switch module. The lead from crystal X1 should be soldered to the pad identified as 1; the lead from crystal X2 should be soldered to the pad identified as 2, etc.
7. The lead connected to the high side of the 50 kHz spaced oscillator should be soldered to pad A. The lead connected to the low side of the 50 kHz spaced oscillator should be soldered to pad B. The lead connected to the high side of the 10 kHz spaced oscillator should be soldered to pad C while the lead from the low side of the 10 kHz spaced oscillator should be connect to the lead D. In some cases, as noted above, B and D are the same points.
8. The transceiver should now be ready for final alignment. It will probably not be necessary to realign all channels but good practice dictates that the manufacturers recommendations be followed. Sams Photofacts generally provides detailed alignment instructions and care in the installation and alignment will insure stable, on frequency operation across the band,

SWITCHING TRUTH TABLE

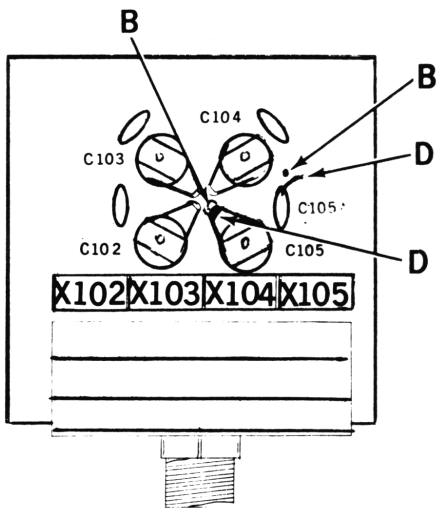
COMMON 10 KHZ SPACING
COMMON 50 KHZ SPACING

	X1	X2	X3	X4	X5	X6	X102	X103	X104	X7	X8	X9	X105	X10
1	●													
2	●													
3	●													
4	●													
5		●												
6		●												
7		●												
8		●												
9			●											
10			●											
11			●											
12			●											
13				●										
14				●										
15				●										
16					●									
17					●									
18						●								
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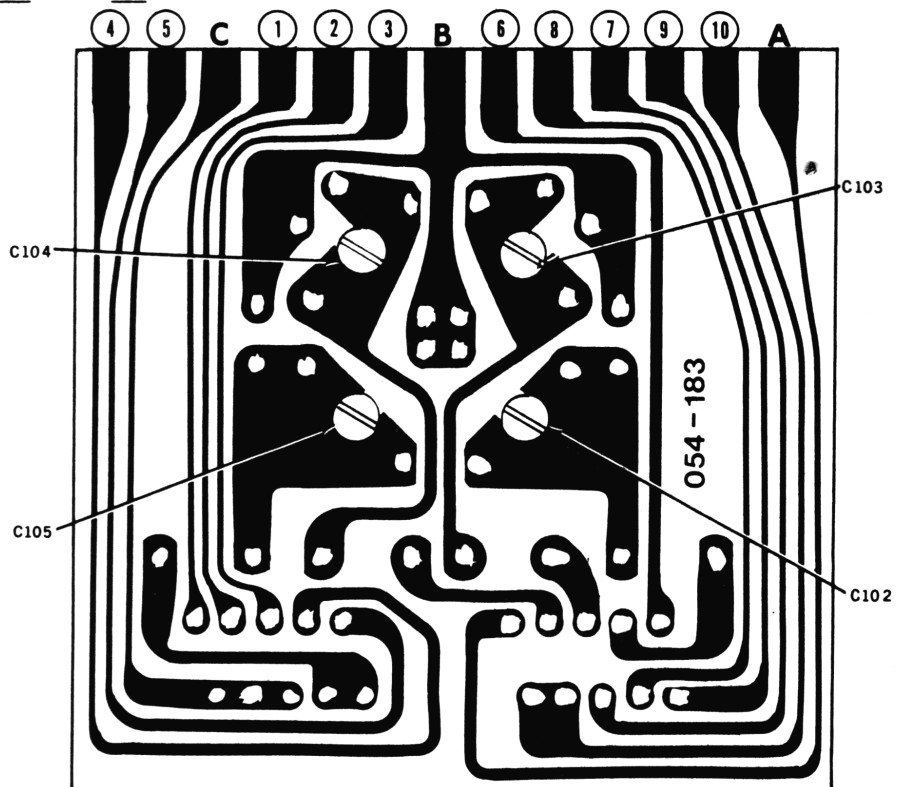
SWM-53 SCHEMATIC DIAGRAM



CONNECT A LEAD FROM EACH OF THE TERMINALS NUMBERED 1 THROUGH 10 TO THE CORRECT CRYSTAL CIRCUIT CONNECTION, AS INDICATED ON THE SCHEMATIC DIAGRAM AND SWITCHING TRUTH TABLE REFER TO DETAILED INSTALLATION INSTRUCTIONS FOR INFORMATION ON CONNECTING TERMINALS A, B, C AND D.



TOP VIEW



BOTTOM VIEW

BETA-COM CORPORATION

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MODELS
SWM-42 & SWA-42

READ ACROSS

IF YOUR RADIO HAS THE FOLLOWING CRYSTAL COMPLEMENT

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14
2A	37.600	37.650	37.700	37.750	37.800	37.850	10.635	10.625	10.615	10.595	10.180	10.170	10.160	10.140
2B	37.600	37.650	37.700	37.750	37.800	37.850	10.635	10.625	10.615	10.595	11.090	11.080	11.070	11.050
2C	34.971	35.021	35.071	35.121	35.171	35.221	8.006	7.996	7.986	7.966	8.461	8.451	8.441	8.421
2D	33.000	33.050	33.100	33.150	33.200	33.250	6.035	6.025	6.015	5.995	6.490	6.480	6.470	6.450
2E	32.700	32.750	32.800	32.850	32.850	32.900	5.735	5.725	5.715	5.695	6.1904	6.1804	6.1704	6.1504
2F	19.005	19.055	19.105	19.155	19.205	19.255	7.960	7.970	7.980	8.000	7.505	7.515	7.525	7.545
2G	18.513	18.563	18.613	18.653	18.713	18.763	8.452	8.462	8.472	8.492	8.902	8.917	8.927	8.947
2H	16.965	17.015	17.065	17.115	17.165	17.215	10.000	10.010	10.020	10.040	9.545	9.555	9.565	9.585

THEN USE THE CORRESPONDING GROUP TO ADD CHANNELS 24 THRU 40.

	X102	X103	X104	X105	X106
2A	37.900	37.950	38.000	10.605	10.150
2B	37.900	37.950	38.000	10.605	10.060
2C	35.271	35.321	35.371	7.976	8.431
2D	33.300	33.350	33.400	6.005	6.460
2E	33.000	33.050	33.100	5.705	6.1604
2F	19.305	19.355	19.405	7.990	7.535
2G	18.813	18.863	18.913	8.482	8.937
2H	17.265	17.315	17.365	10.030	9.575

INSTALL THE CRYSTALS INTO THE SWITCH MODULE AS SHOWN ON THE CHART ENCLOSED WITH YOUR MODULE.....

MODEL SWM-53

IF YOUR TRANSCEIVER EMPLOYS CRYSTALS
X1 through X10 THEN ADD X102, X103, X104
and X105 SHOWN ON THE SAME LINE.....

GROUP	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X102	X103	X104	X105
1A	7.7777	7.7943	7.8110	7.8277	7.8443	7.8610	14.9040	14.9140	14.9240	14.9440	7.8777	7.8943	7.9110	14.9340
1B	11.7000	11.7500	11.8000	11.8500	11.9000	11.9500	7.4625	7.4725	7.4825	7.5025	12.0000	12.0500	12.1000	7.4925
1C	15.9650	16.0150	16.0650	16.1150	16.1650	16.2150	6.0000	6.0100	6.0200	6.0400	16.2650	16.3150	16.3650	6.0300
1D	8.1590	8.2090	8.2590	8.3090	8.3590	8.4090	11.0035	11.0135	11.0235	11.0435	8.4590	8.5090	8.5590	11.0335
1E	23.3300	23.3800	23.4300	23.4800	23.5300	23.5800	14.9070	14.9170	14.9270	14.9470	23.6300	23.6800	23.7300	14.9370
1F	15.2820	15.2980	15.3154	15.3320	15.3487	15.3654	10.6350	10.6250	10.6150	10.5950	15.3820	15.3987	15.4154	10.6050
1G	11.7400	11.7900	11.8400	11.8900	11.9400	11.9900	7.4225	7.4325	7.4425	7.4625	12.0400	12.0900	12.1400	7.4525

EXAMINE THE CHART ABOVE AND DETERMINE THE FREQUENCY GROUP WHICH YOUR TRANSCEIVER USES.
CRYSTALS X1 THROUGH X10 SHOULD BE IDENTIFIED SO THAT THE CORRECT LEAD CAN BE IDENTIFIED
FOR EACH CRYSTAL. THESE WILL BE SOLDERED TO THE CORRECT PAD ON THE SWITCH MODULE PC
BOARD.



068-116C

BETA-COM

SERVICE BULLETIN

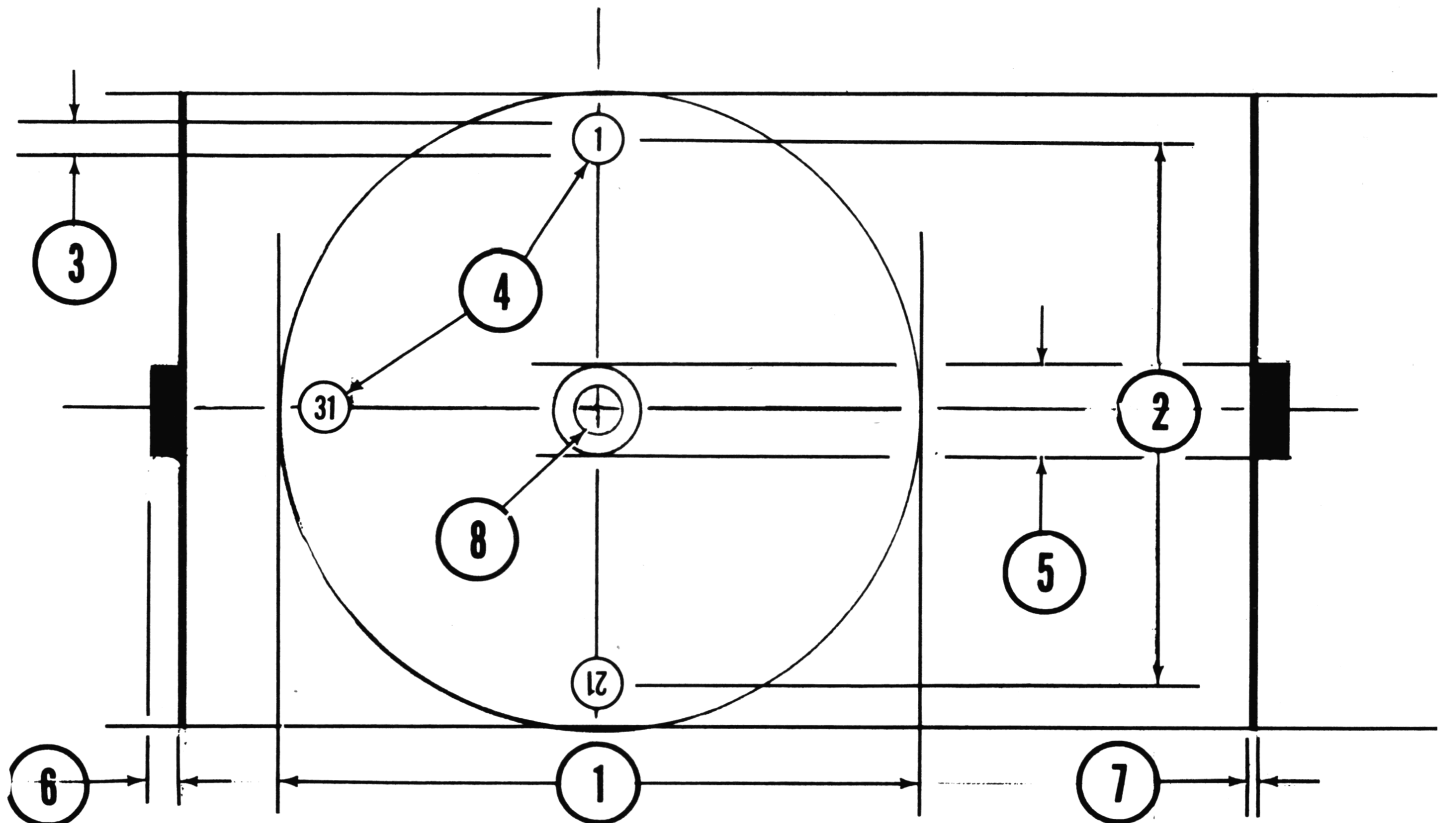
#K1

Subject: Detailed Knob Questionnaire
Showing measurements of original 23 channel knob.

Product SWITCH MODULE
Model ALL Stock No. -----
Issue Date DECEMBER 20, 1977

MANUFACTURER _____ MODEL _____ BASE MOBILE

KNOB DETAILS-----



1. WHAT IS OUTSIDE DIAMETER OF KNOB (TO NEAREST .032") _____
2. WHAT IS DISTANCE BETWEEN NUMBERS, CENTER TO CENTER _____
3. WHAT IS HEIGHT OF NUMBERS _____
4. DO NUMBERS READ CORRECTLY AT 12 O'CLOCK OR 9 O'CLOCK _____
5. WHAT IS OUTSIDE DIAMETER OF BUSHING _____
6. WHAT IS THICKNESS OF BUSHING (EXCLUDING DIAL PLATE) _____
7. WHAT IS THICKNESS OF DIAL PLATE _____
8. WHAT IS INSIDE DIAMETER OF BUSHING (OR DIAL IF NO BUSHING) _____
9. IS DIAL FLAT YES NO
10. IS DIAL ---- CLEAR WHITE BLACK
11. IS LETTERING WHITE BLACK

BETA-COM

SERVICE BULLETIN

10

Subject: PRODUCTION CHANGE

Product SWITCH MODULE

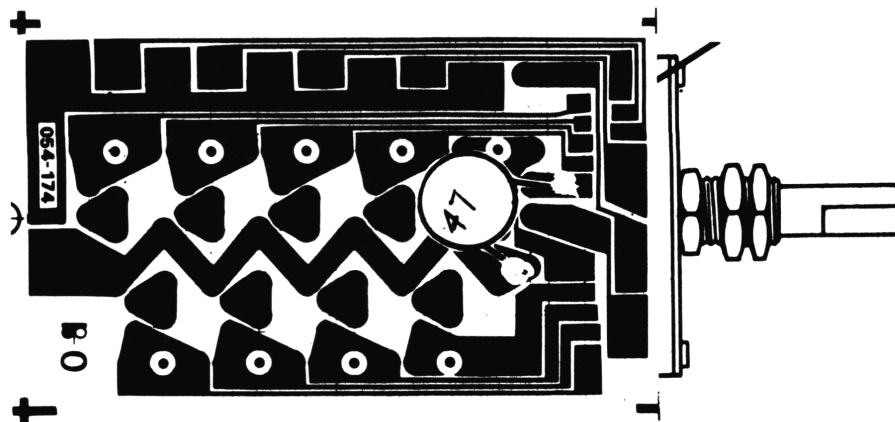
Model SWM-41 Stock No. 100-248

Issue Date May 1, 1977

All Model SWM-41 Switch Modules produced after May 1, 1977 utilize lower values of series capacitors and trimmers. The original production on the SWM-41 used a 47 pf disc type capacitor in shunt with a 4-50 pf trimmer. This parallel combination, used in series with each of the 50 KHz spaced crystals, provided a total capacity variable from 50 to 95 pf.

All new production of the SWM-41 Switch Module will employ a 33 pf disc capacitor, in shunt with a 2-20 pf trimmer capacitor. This permits the module to be used in many models where the lower value of series crystal capacity is necessary to properly tune the crystal. The new values provide a capacity range of from 35 to 55 pf.

Some models, such as the Cobra 138 and 139 and the Midland 13-895 require the addition of extra capacity to accurately tune the 8 Mhz crystals. The addition of a single 47 pf disc capacitor will provide the necessary added capacity to properly tune the crystals. This capacitor must be added from the arm of the 8 Mhz switching circuit to the 8 Mhz common point. A convenient placement for this discap is shown in the sketch below. Make certain, in soldering the disc to the PC board, that no solder splashes or bridges are caused which would interfere with circuit operation.



BETA-COM

SERVICE BULLETIN

12

Subject: MODEL LISTINGS FOR
SWX SWITCH MODULES

Product SWITCH MODULE

Model SWX **Stock No.** SERIES

Issue Date JULY 13, 1977

SWX-21 PLL SWITCH MODULE FOR USE IN TRANSCEIVERS UTILIZING THE
UPD-857/858 PHASE LOCK LOOP INTEGRATED CIRCUITS:

Standard Communications
Cobra
Regency

Horizon 29A
21X
CR240

SWX-22 PLL SWITCH MODULE FOR USE IN TRANSCEIVERS UTILIZING THE
PLL/01A PHASE LOCK LOOP INTEGRATED CIRCUITS:

Kraco
HyGain

KCB-2310A
681, 682

SWX-23 PLL SWITCH MODULE FOR USE IN TRANSCEIVERS UTILIZING THE
PLL/02A PHASE LOCK LOOP INTEGRATED CIRCUITS:

General Motors
Truetone
Pearce-Simpson
HyGain
Midland

CBD-10
MCC4434B-67
Tiger Mark 2
2681
13-881C

NOTE: Many models not shown in the above listings utilize the
PLL chips which our series of SWX switches is designed to
update. A physical examination of your transceiver will
allow you to determine which SWX model to use.

BETA-COM CORPORATION

BETA-COM

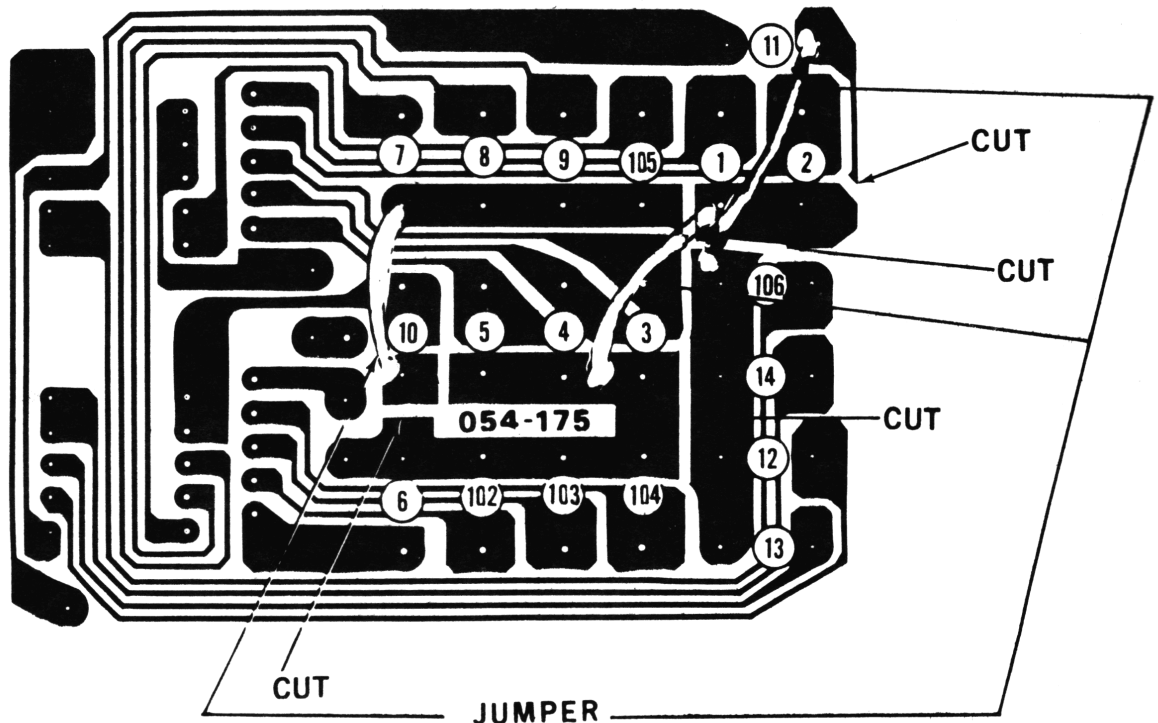
SERVICE BULLETIN #20

Subject: PRINTED CIRCUIT BOARD
CHANGES NECESSARY IN
TRANSCEIVERS WHERE THE
LOW SIDE OF CRYSTAL
CIRCUITS ARE NOT COMMON

Product SWITCH MODULE
Model SWM-42 **Stock No.** 100-251
Issue Date OCTOBER 3, 1977 (rev.)

Certain transceivers in which the low side of the oscillator circuits are not common will require certain PC board changes to permit use of the SWM-42 and SWA-42 Switch Modules.

1. Cut the foil of the PC board as shown in the sketch below. Use a razor blade or sharp knife.
2. Add a jumper to connect the ground side of X11 to the ground side of X106, X14, X12 and X13. Connect a lead to this point. This lead will then be connected to the circuit where the low side of the receiver oscillator crystals had been connected.
3. Add a jumper to connect the ground side of crystals X1 & X2 to the ground side of X3, X4, X5, X6, X102, X103 and X104. Connect a lead to this point. It will be wired to the same point as the low side of the 50 Khz spaced crystals were originally connected in the unmodified radio.
4. Add a jumper to connect the ground side of crystals X10 to X7, X8, X9 and X105. Connect a lead to this point. This lead will then connect to the circuit point which had been the low side of the transmit oscillator circuit.
5. Refer to the detailed installation instructions for the SWM-42/SWA-42 Switch Module



BETA-COM CORPORATION

SB20

BETA-COM

SERVICE BULLETIN #21

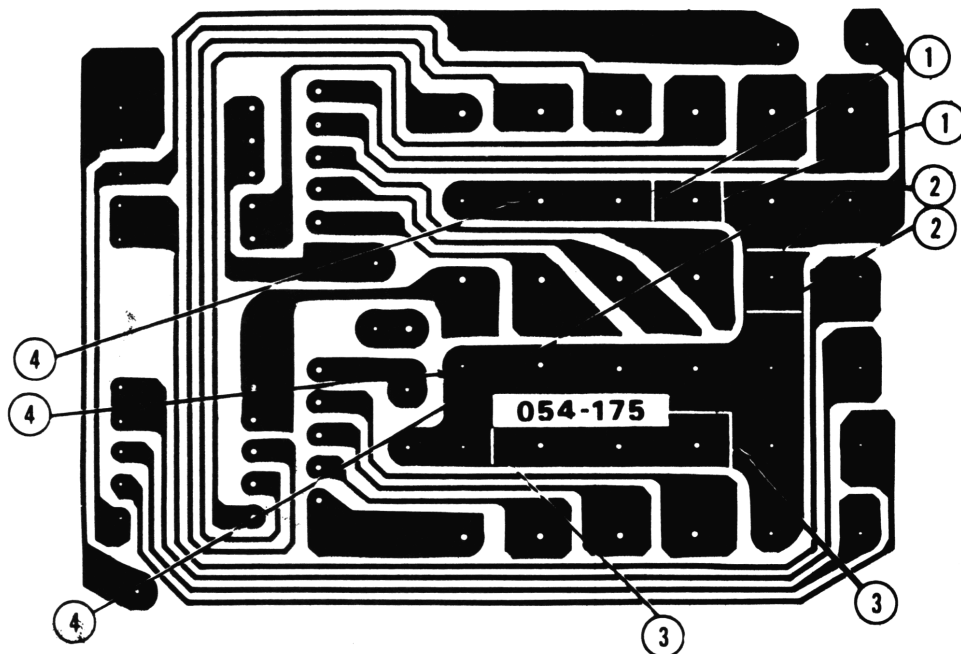
Subject: PRINTED WIRING BOARD
CHANGES REQUIRED TO
BRING X102 thru X106
CRYSTALS TO CORRECT
FREQUENCY

Product SWITCH MODULE
Model SWM-42 **Stock No.** 100-251
Issue Date 1-15-78

Beta-Com makes every effort to insure that our crystal correlation provides "on-frequency" performance of the finished Switch Module installation. In many instances the original transceiver manufacturer has made production changes which may affect the frequency of crystals supplied by Beta-Com. In the event that the frequencies generated by crystals X102, X103, X104, X105, and X106 are higher than they should be a small capacity placed across each crystal can generally bring them into the correct frequency. A good counter of known accuracy should be used to monitor both the original crystal frequencies as well as those of the added crystals.

In some installations it may be necessary to raise the frequency of crystals X102, X103, X104, X105, and X106. In this case it is necessary to place a small series capacity in the ground lead of each of the crystals. The sketch below shows the most convenient method of opening the ground return for these crystals so that a series capacitor can be inserted.

1. Carefully cut the PC board copper foil with a razor blade or sharp knife where shown at points 1, 2, and 3.
2. Connect a short jumper of insulated wire to land areas 4 so as to tie all ground areas for crystals X1 thru X14 together.
3. Connect a small capacitor, of appropriate value from isolated ground for X105 between points indicated at "1" and ground area "4".
4. Connect a small capacitor from isolated ground for X106 between points indicated at "2" and ground area "4".
5. Connect a small capacitor from isolated ground for X102, X103 and X104 indicated at "3" and ground area "4".
6. Remember the best method of determining the correct value of these series capacitors is to temporarily solder in a low value, measure the frequency and if it is too high add more capacity until the correct total value is determined. Then remove the capacitors and replace them with a single capacitor of approx. the same total value.



Subject: GENERAL INSTALLATION
INSTRUCTIONS- SWITCH
MODULE, MODEL SWX-23

Product SWITCH MODULE

Model SWX-23 **Stock No.** 100-255

Issue Date December 12, 1977

The Model SWX-23 40 channel selector switch assembly is designed to replace the existing 23 channel selector switch assemblies in PLL transceivers manufactured by Cybernet Electronics of Japan. These radios are marketed by a number of US companies including Midland, Hy-Gain, Colt, GM, Pearce-Simpson, Truetone as well as a number of others. This radio can be identified either by examining the transceiver or the schematic diagram. The Integrated Circuit employed in the Phase Lock Loop system is identified as "PLL-02".

Two different printed circuit boards have been used in these transceivers. The basic difference is in the board layout in the area of the selector switch. The most popular layout is shown on the reverse side of this sheet. Examine the sketch carefully. In the event that your transceiver is not exactly the same as the sketch it will be necessary to rewire the board to conform to the sketch.

REFER TO FIGURE #1

1. Carefully cut PC board conductors at ①, ②, & ③.
2. Connect a jumper on the bottom of the PC board from ④ to ⑤.
3. Connect a jumper on the bottom of the PC board from ⑥ to ⑦.

REFER TO FIGURE #2

1. Remove jumper J-104 from PC board. The hole vacated by removing J-104, toward the front of the board will be used for switch wire GRAY. ⑨
2. Solder the BROWN/BLACK lead from the switch to the vacant hole adjacent to C135 and D102. (8)
3. Solder BLUE/BLACK lead into hole ①
4. Solder BLUE lead into hole ②
5. Solder YELLOW lead into hole ③
6. Solder ORANGE lead into hole ④
7. Solder ORANGE/BLACK lead into hole ⑤
8. Solder BROWN lead into hole ⑥
9. Hole ⑦ is not used.

Mount the new switch using the hardware supplied. It will be necessary to remove the old 23 channel dial from the knob assembly and replace it with the new 40 channel dial plate supplied with the SWX-23. Generally two small screws attach the dial plate to the dial assembly.

Reassemble your radio and it is now ready for "On-frequency" operation on all 40 channels.....

SWITCHING TRUTH TABLE

	BROWN	ORANGE/BLACK	ORANGE	YELLOW	BLUE/BLACK	BLUE	GRAY	BROWN/BLACK
1								
2	•							
3		•						
4			•					
5	•		•	•				
6		•	•	•				
7	•	•	•	•				
8	•	•	•	•				
9	•	•	•	•				
10	•	•	•	•				
11								
12		•	•	•				
13	•	•	•	•				
14	•	•	•	•				
15	•				•	•		
16	•	•			•	•		
17			•	•	•	•		
18	•		•	•	•	•		
19		•	•	•	•	•		
20			•	•	•	•		
21	•				•	•		
22		•			•	•		
23			•		•	•		
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20330C

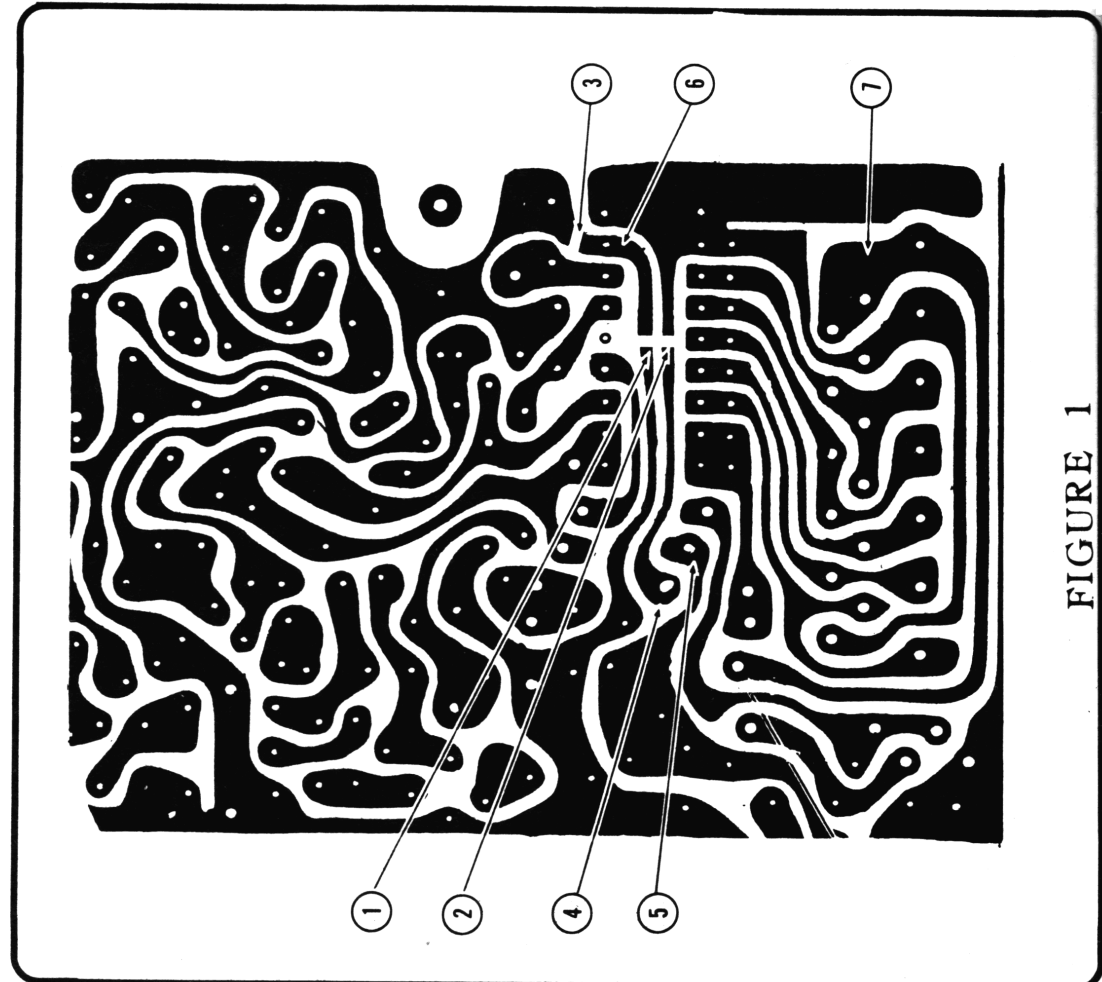


FIGURE 1

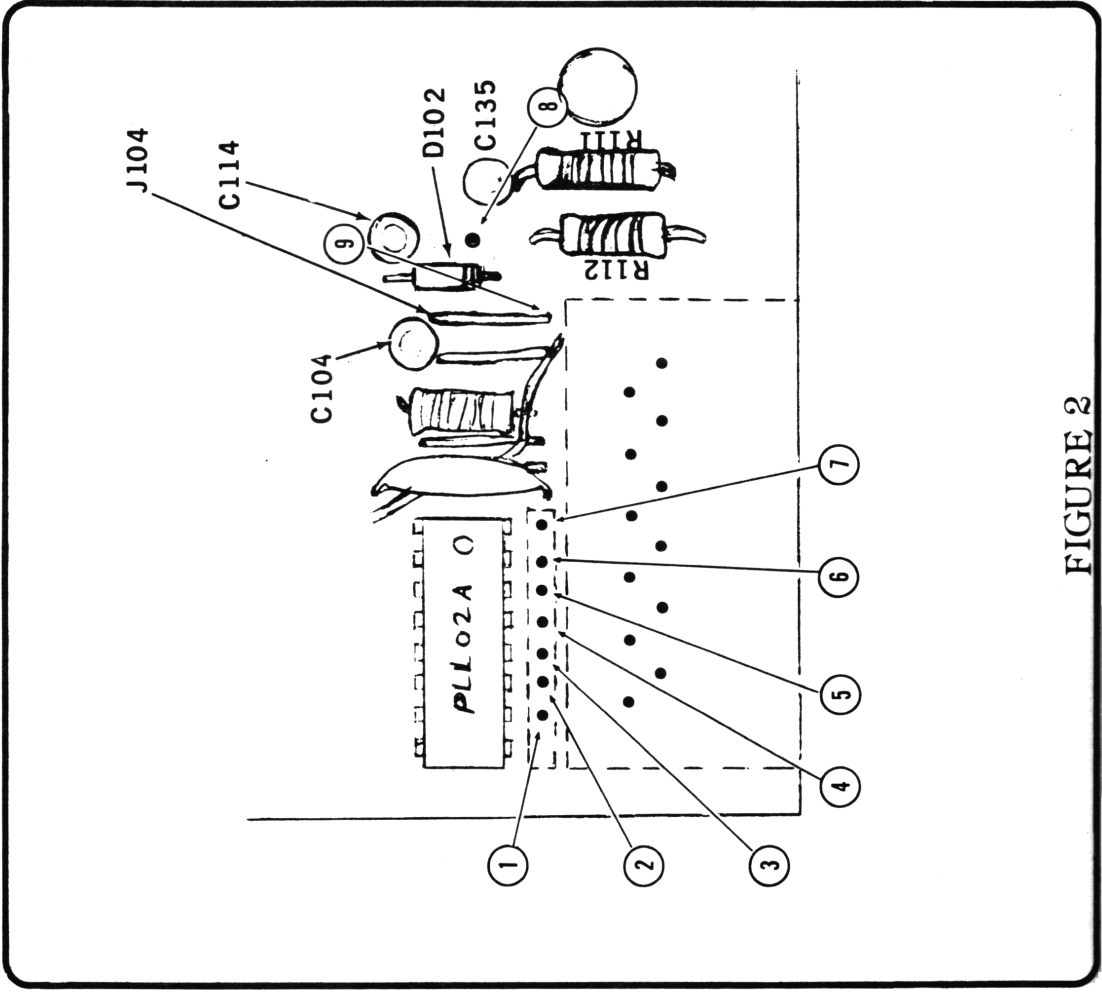


FIGURE 2

Product SWITCH MODULE

Model SWM-53 Stock No. 100-252

Issue Date 12-2-77

Subject: Detailed instructions for installing Beta-Com Switch Module Model SWM 53 in Pace 1000 B and 1000 M Transceivers.

Refer to Sams photofact #94, Pg. 31 thru 68 and #104, pg. 27 thru 62.

1. Remove cabinet from transceiver after checking to make certain that the unit is operating properly in both receive and transmit modes.
2. The Pace Sidetalk models 1000 B and M use the 24th position of the 23 channel selector switch to disable certain functions of the transmitter and receiver. Remove the pink lead which connects the 23 channel switch to the Junction of R218, C218 and the Collector of Q11 (Shown in Sams manual as point 51).

PROCEED AS FOLLOWS.

- A. Carefully cut each lead connected to the 23 channel switch at the switch end.
 - B. Remove the 23 channel selector switch from the front panel.
 - C. Locate and solder a lead, supplied with kit, to the Junction of L201 & R217 (Identified in Sams manual as point 70). This will be connected to SWM - 53 Pad C.
 - D. Locate and solder a lead to C222 and Junction of C241 - 245 (Shown in Sams as point 59). This will be connected to Pad B on the SWM 53.
3. Prepare SWM - 53 Switch Module so as to provide for isolated low side of the 10 KHZ spaced crystals. Connect the lead D of C105A to Tab D of C105 and connect lead to this junction. Solder. This is point D as shown in the Schematic diagram.
 4. Mount the SWM 53 switch module.
 5. Locate and identify each of the leads from crystals X1 thru X6 and X7 thru 10.
 6. Remove capacitor C228 (56PF) from the circuit. It is not used with SWM 53 switch.
 7. Solder the center lead of the shielded cable running from the junction of L202 & R225 (Shown in Sams as point 52) to pad A on SWM 53.
 8. Solder the lead from junction of L201 & R217 (Step 2C above) to pad C on SWM 53.
 9. Solder the lead from C222 and junction of C241-245 (Step 2D above) to Pad B on SWM - 53.
 10. Solder the lead from SWM 53 point D (Step 3 Above) to Junction of CR204, C225, L204 and C247 - 250 (Shown in Sams as point 68).
 11. Connect the leads from each of the crystals, X1 thru X10 to the appropriate pads on the SWM 53 module.
 12. The transceiver is now ready for alignment. Sams instructions should be followed and used for reference.

11A) Dress & Tie all leads to prevent movement.

13. Align per instructions in Sams manual.

After checking thru Channel 23 turn Selector switch to each of the following channels and adjust as indicated. All frequencies should be $\pm 50\text{HZ}$, mode switch LSB, clarifier to center detent. Measure from TPI with counter.

<u>Set Selector to Channel</u>	<u>Adjust</u>	<u>Indicated Frequency at TPI</u>
40	C204 *	19.6025
39	C205 *	19.5925
35	C203 *	19.5525
30	C202 *	19.5025

* On SWM 53 Module

14. Install knob. Check performance to insure on-frequency operation. Remove counter and install case. The unit should now be ready for operation on all 40 channels.

SB 35B

Subject: Detailed Instructions for Installing Beta-Com Switch Module, Model SWM-53 in SBE Sidebander II

Product SWITCH MODULE
Model SWM-53 Stock No. 100-252
Issue Date 12-12-77

Refer to Sams Photofact #50, Pages 97 to 126

1. Remove cabinet from transceiver after checking to make certain that the unit is operating properly in both receive and transmit modes.
2. The Sidebander II uses the 24th position of the 23 channel selector switch to disable certain functions of the transmitter and receiver. This requires that certain wiring presently connected to the 23 channel switch be rewired before commencing with the 40 channel conversion.

PROCEED AS FOLLOWS:

- A- Carefully cut each lead connected to the 23 channel switch, at the switch end.
 - B- Remove 23 channel switch from front panel.
 - C- Locate each of the following leads, skin and connect together, solder and insulate with tape. Violet lead from RF Gain Control; Violet lead from relay; Violet lead from PC Board adjacent to C507; Gray lead from PC Board adjacent to C115.
 - D- Remove yellow lead connected to PC Board adjacent to crystal filter. It is not required.
3. Prepare SWM-53 switch module so as to provide for isolated low side of the 10 kHz spaced crystals. Connect lead D of C105A to Tab D of C105 and connect lead to this junction. Solder. This is point D as shown on the Schematic Diagram.
 4. Mount SWM-53 switch module. Run one nut onto bushing so as to mount the switch back from the panel far enough to provide space for the transmit indicator lamp.
 5. Locate and identify each of the leads from crystals X1 thru X6 and X7 thru X10.
 6. Remove capacitor C247. Install and solder a wire provided with switch kit into the vacated hole which is common with all trimmer caps associated with X1 thru X6 and C212 (shown in Sams manual as point 130). This lead is connected to Pad B on SWM-53.
 7. Connect a lead from the junction of L17 and R202 (identified by Sams as point 117). This lead connects to Pad A on SWM-53.
 8. Connect a lead from the junction of L16 and R701 (identified by Sams as point 142). This lead connects to Pad C of SWM-53.
 9. Connect the lead from point D of SWM-53 (this is the lead connected in step 3 above) to the junction of D22, C701, & R201 (Sams reference point 133).
 10. Connect the leads from each of the crystals, X1 thru X10 to the appropriate pads on the SWM-53 module.
Dress and tie all leads so as to make certain that the crystal leads do not move.
 11. The transceiver is now ready for alignment. Proceed as follows. Sams instructions for alignment should be used for reference.

ALIGNMENT

Set function switch to LSB position.

1. Connect counter to G1 of Q14; connect lead from ground to pad C on SWM-53. This will disable 7MHZ oscillator and permit accurate measurement of 11MHZ oscillator. Adjust all frequency ± 50 HZ. Set clarifier for center.

<u>Set Selector to Channel</u>	<u>Adjust</u>	<u>For Indicated Frequency Of</u>
1	CV6	11.700
5	CV7	11.750
9	CV8	11.800
13	CV9	11.850
17	CV10	11.900
21	CV11	11.950
26	C102*	12.000**
31	C103*	12.050**
36	C104*	12.100**

* On SWM-53 module.

** Necessary to add capacity across C102A, C103A, & C104A

2. Remove counter from Q14 and grounding lead from pad C of SWM -53.
3. Connect counter to G2 of Q14.

<u>Set Selector to Channel</u>	<u>Adjust</u>	<u>For Indicated Frequency Of</u>
40	CV5	7.5025
39	C105 *	7.4925 **
38	CV4	7.4825
37	CV3	7.4725
36	CV2	7.4625

The unit should now be ready for On-frequency operation on all 40 channels. Check and install case. Install knob as shown on knob instruction sheet.

SB36B

Subject: Detailed Instructions for Installing Beta-Com Switch Module Model SWM-53 in Cobra Model 132

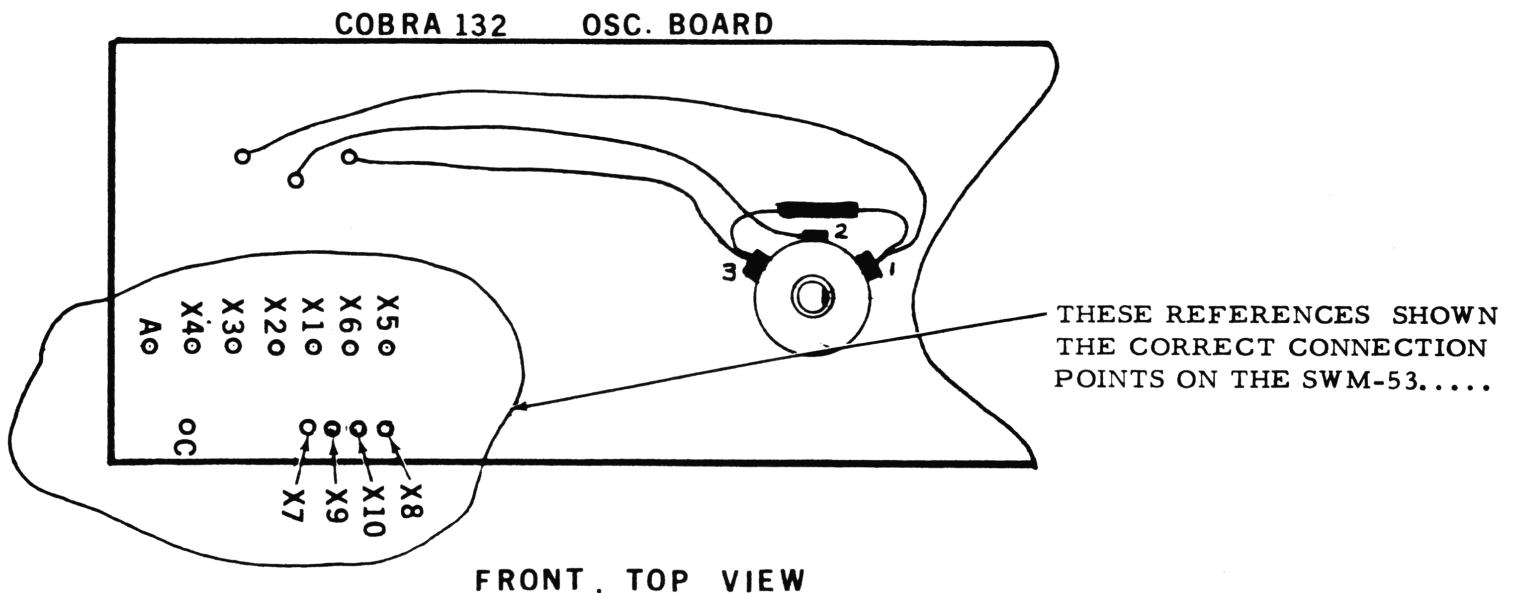
Product SWITCH MODULE
Model SWM-53 Stock No. 100-252
Issue Date 12-13-77

Refer to Sams Photofact # 73, pages 5 to 40

1. Remove cabinet from the transceiver after checking to make certain that it is operating properly in both transmit and receive modes. The Cobra 132 is slightly more difficult to modify to 40 channel operation due to the fact that the Clarifier control is mounted in the center of the 23 channel selector switch assembly. Modification, using the Beta-Com Model SWM-53 can easily be accomplished if the Mic Gain control is used as the Clarifier control.
2. Remove the existing 23 channel selector switch from the Cobra 132 oscillator board along with the clarifier control. It is recommended that some type of solder removal tool or "solder wik" be used so as to prevent delamination of the copper from the PC board.
3. Remove the leads connected to the Mic Gain control. (rear section of the Mic Gain/RF gain control) The yellow and white wires should be carefully soldered together and insulated with tape. Remove R-115, a 1000 ohm resistor which is connected to terminal 3 of R47B, the Mic Gain control. This control is now ready to be used as the Clarifier control.
4. Connect a lead to each of the holes previously occupied by the 23 channel selector switch and Clarifier control. Wire as shown in the sketch below.
5. Enlarge the switch mounting hole to 3/8" dia. and mount the SWM-53 module. Carefully dress all leads and cement the Oscillator PC Board to the bottom of the SWM-53 module. Care should be taken since this is the only support which is provided for this end of the PC board. A silastic type cement has been found to be most effective in this application.
6. Align the radio following the steps outlined in the Sams manual or the manufacturers instruction book. It may be necessary to add capacity, in the form of additional discaps, across the SWM-53 trimmer capacitors. Alignment should provide the readings shown in the manuals 50 Hz.
7. Reassemble the radio. It is now ready for operation on all 40 channels.

MAKE CERTAIN THAT THE SWM-53 SWITCH MODULE HAS BEEN MODIFIED IN ACCORDANCE WITH THE INSTRUCTIONS DETAILED IN STEP 4A ON SHEET 068-116

CONNECT A LEAD FROM PC BOARD
COMMON GROUND POINT TO SWM-53
PAD B



BETA-COM

SERVICE BULLETIN

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Subject: CRYSTAL FREQUENCY

Product SWITCH MODULES

Model ALL **Stock No.** -----

Issue Date January 3, 1978

The Beta-Com Switch Modules which employ series capacitors to allow adjustment for crystal frequency are supplied with a 20 pf discap in shunt with a 20 pf trimmer capacitor. This provides a total adjustment of from 20 pf to 40 pf series capacity.

Many transceivers employ higher series capacity circuits and it may be necessary to add more circuit capacity to insure that the crystals are "on-frequency". The exact capacity which must be added is best determined in the field by testing after the module is installed.

We are sending each of our dealers a small supply of some of the more common values of discaps which may be necessary. Additional capacitors may be purchased from the factory at a cost of .05 each. We regret that we will only be in a position to supply the values shown below.

<u>Part Number</u>	<u>Value</u>
020-030	.01 mfd.
020-101	100 pfd.
020-104	330 pfd.
020-106	68 pfd.
020-111	20 pfd.
020-112	33 pfd.

In the event that the measured crystal frequency is higher than that shown on our reference sheet add the necessary additional capacity in shunt with the trimmer capacitors associated with the particular crystal found to be high in frequency.

BETA-COM

SERVICE BULLETIN

40

Subject: GENERAL INSTALLATION INSTRUCTIONS

SWM-54-25

Product SWITCH MODULE

Model SWM5425 **Stock No.** 100-257

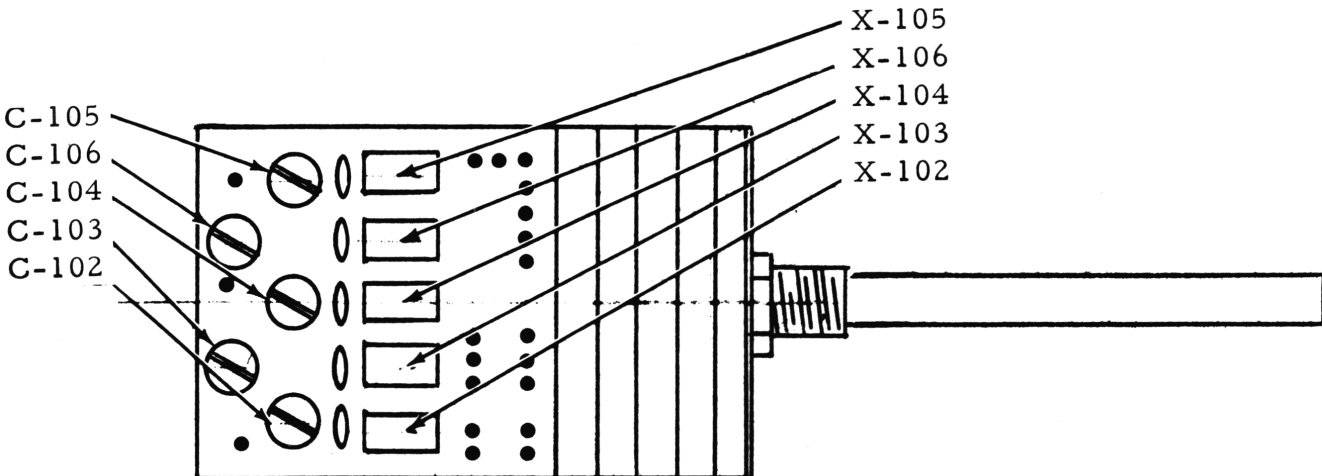
Issue Date January 15, 1978

The Beta-Com Model SWM-54 Switch Module is designed for use in transceivers which employ three separate oscillators for frequency synthesis.

1. Remove the existing 23 channel selector switch. It is generally recommended that the leads from the old switch be cut at the switch end to facilitate locating the correct connection points for the new switch module.
2. Install the switch module after cutting the shaft to the same length as the original switch. Connect the leads from the SWM54-25 to the appropriate PC board points.
3. Install the necessary crystals as indicated on the attached sheet. Use the Beta-Com crystal reference numbers rather than those in the radio to insure that the leads are connected to the proper points.
4. Align the transceiver as directed in the manufacturers specifications. Refer to Sams manual for detailed alignment information.

X1 Brown	X7 White/Brown	X11 White/Green
X2 Red	X8 White/Red	X12 White/Blue
X3 Orange	X9 White/Orange	X13 White/Violet
X4 Yellow	X10 White/Yellow	X14 White/Black
X5 Green		
X6 Blue		

Common, Low Side- X1 thru X6, X102, X103, X104	Black
Common, Low Side- X7 thru X10, X105	Orange/Blk
Common, Low Side- X11 thru X14, X106	Yellow/Blk
Common, High Side- X1 thru X6, X102, X103, X104	Violet
Common, High Side- X7 thru X10, X105	Grey
Common, High Side- X11 thru X14, X106	White



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