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C.B. TUNE-UP MANUAL MASTER EDITION

Volume 6



PHOTO BY TOM FALKER

The Volume You Have Been Waiting For
Covers Standard Radio Tune-up Information
Channel Modification and Repair Tips



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VOLUME 6

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CB TUNE-UP MANUAL MASTER EDITION
VOLUME 6
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FOREWORD

The CB market is changing rapidly. Some older radio models are being phased out while many new and exciting models are being introduced. Many of these new radios incorporate much of the new integrated circuit technology now available.

One of the latest new radios just introduced, is the **EMPEROR TS-5010**. This new model incorporates the best features of the HR-2510 and the RCI-2950, and then adds some new features of its' own. This new radio will prove to be very popular.

Other new models from **DIRLAND** and **YOSAN** are just the tip of the iceberg on what's to come in future models.

INTRODUCTION

Improving CB. performance is often attempted by many without knowing which adjustments to use, or modifications to make. Even more frustrating is trying to remember and/or to compile this information for future use. As new radios arrive on the market it is almost impossible to acquire good easy to understand technical and modification info. It is our goal to supply you with good useful information in an **easy to understand and use MANUAL FORMAT**. We feel that it is very important to supply information that will be useful and profitable for you, the technician.

Included in this volume is a complete **Index** listing covering **CB TUNE-UP MANUALS Volume 1 through Volume 6**. This should be a great time saver for any future reference.

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HOW TO USE TUNE-UP INFORMATION

In COLUMN 1 you will find the MODEL NUMBER of each radio, COLUMN 2 provides MODULATION information, COLUMN 3 provides AM POWER ADJUSTMENTS, and COLUMN 4 lists SSB ADJUSTMENTS if applicable. On some SSB models we have shown 2 adjustments. The first will be for SSB modulation and the second is for the SSB power (ALC). If only one adjustment is shown in the SSB column then it will be for SSB power (ALC).

MANUFACTURER NAME			
MODEL	MODULATION	AM POWER	SSB POWER
MCB-5000 ¹ ←	R268 or Cut D207 or Rem.C273	L202,L204	RV8,RV5
See footnote for more specific information.	Adjust R268 for modulation or cut one end of D207 or remove C273 from the circuit.	Adjust L202 & L204 for Am Power .	Adjust RV8 for SSB modulation & RV5 for SSB power.

Some of the Power Adjustments listed are expandable type coils. These coils can be adjusted by either spreading the coils apart or by moving the coils closer together. These coils can be modified by removing 1 turn in order to allow you to move them closer together if needed, and thus increase tuning range.

ALAN RADIOS			
MODEL	MODULATION	AM POWER	SSB POWER
ALAN 555 ¹	VR14 or Cut R249 or Remove TR53	VR13	VR12
ALAN 560 ²	VR14 or Cut one end of R291	VR15 (Lo Power) VR13 (Hi Power)	VR12

¹ Same basic Radio as the Galaxy Saturn

² Same basic Radio as the Galaxy Saturn Turbo

COBRA® RADIOS			
MODEL	MODULATION	AM POWER	SSB POWER
18 ULTRA	RV501 or Cut D502	L306, L305	
21LTD Classic (China)	VR4 or Cut one end of D7	L10, L8	
25LTD WX CLASSIC ³	VR5 or Cut one end of D9	L14, L10	
29LTD WX CLASSIC ³	VR4 or Cut one end of D11	L14, L13, L12	
148-GTL ¹	Cut R131 ²	VR10	VR11
HH-70	RV4 or Cut one end of D17	L6	

¹ New model made in Malaysia, and is no longer manufactured by Uniden®. This model still utilizes the MB8719 PLL chip.

² R131 is a 10K Resistor located just behind TR26. TR26 is located right in front of L2.

³ New 29LTD Weather model made in China, and is no longer manufactured by Uniden®.

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DIRLAND RADIOS			
MODEL	MODULATION	AM POWER	SSB POWER
77-099	RV-4 or Cut one end of D8	L11,L12	
SS-3900	VR14 or Remove TR53	VR13	VR12
SS-3900B	VR14 or Remove TR53	VR13	VR12

EMPEROR RADIOS			
MODEL	MODULATION	AM POWER	SSB POWER
TS-5010 ¹	VR110 ² or Cut one end of R247	VR111	VR103

¹ New Radio Model just released, with features that surpass many other competitive models. See comparison chart on Page 7.
 * Also see radio Conversion on Page 8 and Alignment Layout on Page 11
² Remove top cover in order to access tune-up adjustments. Bottom cover allows access to the CPU/PLL board.

GALAXY RADIOS			
MODEL	MODULATION	AM POWER	SSB POWER
DX 33HML ¹	VR14 or Remove TR53	VR13 (Hi Pwr) VR16 (Lo Pwr)	
DX 55V ¹	VR14 or Remove TR53	VR13 (Hi Pwr) VR16 (Lo Pwr)	
DX 66V ¹	VR14 or Remove TR53	VR13 (Hi Pwr) ² VR16 (Lo Pwr)	
DX 77HML ¹	VR14 or Remove TR53	VR13 (Hi Pwr) VR16 (Lo Pwr)	VR12
MIRAGE 44 ¹	VR14 or Remove TR53	VR13 (Hi Pwr) ² VR16 (Lo Pwr)	
PLUTO ¹	VR14 or Remove TR53	VR13 (Hi Pwr) VR16 (Lo Pwr)	VR12
SATURN II ¹	VR14 or Remove TR53	VR13 (Hi Pwr) VR16 (Lo Pwr)	VR12

¹ Model using the EPT 360014B Circuit Board.
² Do not adjust dead key to maximum or modulation will be of poor quality.

MAXON® RADIOS			
MODEL	MODULATION	AM POWER	SSB POWER
MCB-25	RV2 or Cut one end of D403	L802 ¹ , RFC 705, RFC709	
MCB-30	RV2 or Cut one end of D403	L802 ¹ , RFC 705, RFC709	

¹ L802: located on the small circuit board.

MIDLAND® RADIOS			
MODEL	MODULATION	AM POWER	SSB POWER
77-285	RV-4 or Cut one end of R179 ¹	L-4, L-5, L-6, L-7	

¹ R179 is located just to the left of the Audio Transformer.

RANGER RADIOS

MODEL	MODULATION	AM POWER	SSB POWER
ST-1000 / HCA818	Cut R60	T9, L4	

SUPERSTAR RADIOS

MODEL	MODULATION	AM POWER	SSB POWER
120	Remove C65 from circuit	L11,L16,L17,L18	
121 ¹	VR12 (Lo Pwr Mod) VR14 (Hi Pwr Mod) ²	VR13 (Hi Pwr) VR16 (Lo Pwr)	
360FM	VR14 or Cut one end of R301	VR13	VR12
3600	VR14 or Cut one end of R249	VR13	VR12
3900	VR14 or Cut one end of R249	VR13	VR12
JA ³	VR12 or Remove TR32	VR11	VR8

¹ SUPERSTAR 121 Model using the EPT120112Z Board.

² Or Remove TR32

³ SUPERSTAR JA Model using the EPT00JA10Z Board.

TRI MAX RADIOS

MODEL	MODULATION	AM POWER	SSB POWER
TRI MAX 220	RV3 or Cut D9	L11, L12, L13	

YOSAN RADIOS

MODEL	MODULATION	AM POWER	SSB POWER
JC-2204 ¹	VR604 or Unsolder and Remove C415 ²	L204, L206	

¹ Model using 15484822 (Rev.B) Circuit Board

² C415 is located just to the left front of VR604. Use caution when unsoldering C415.

Standard 40 Channel Frequency Chart

Channel 1 = 26.965	Channel 11 = 27.085	Channel 21 = 27.215	Channel 31 = 27.315
Channel 2 = 26.975	Channel 12 = 27.105	Channel 22 = 27.225	Channel 32 = 27.325
Channel 3 = 26.985	Channel 13 = 27.115	Channel 23 = 27.255	Channel 33 = 27.335
Channel 4 = 27.005	Channel 14 = 27.125	Channel 24 = 27.235	Channel 34 = 27.345
Channel 5 = 27.015	Channel 15 = 27.135	Channel 25 = 27.245	Channel 35 = 27.355
Channel 6 = 27.025	Channel 16 = 27.155	Channel 26 = 27.265	Channel 36 = 27.365
Channel 7 = 27.035	Channel 17 = 27.165	Channel 27 = 27.275	Channel 37 = 27.375
Channel 8 = 27.055	Channel 18 = 27.175	Channel 28 = 27.285	Channel 38 = 27.385
Channel 9 = 27.065	Channel 19 = 27.185	Channel 29 = 27.295	Channel 39 = 27.395
Channel 10 = 27.075	Channel 20 = 27.205	Channel 30 = 27.305	Channel 40 = 27.405

EMPEROR TS-5010

Comparison Chart of Competitive Models

<i>Features Compared</i>	Emperor TS-5010	Uniden® HR2510	Ranger® RCI-2950
◆ Mode Switch	YES	YES	YES
◆ SWR / Cal	YES	YES	YES
◆ Dimmer	YES	YES	YES
◆ RF Power Control	YES	NO	YES
◆ RIT Control	YES	YES	YES
◆ ON / OFF / Volume	YES	YES	YES
◆ Squelch / Auto Squelch	YES	YES	YES
◆ Loc / DX	YES	NO	NO
◆ RF Gain Control	* Loc / DX RF Gain Settings	YES	YES
◆ PA	YES	YES	ON Mode SW
◆ Channel UP / DOWN	YES	YES	YES
◆ Band SWITCH	YES	YES	YES
◆ Span SWITCH	YES	YES	YES
◆ VFO	YES	YES	YES
◆ Shift SWITCH	YES	NO	NO
◆ NB /ANL	YES	NB Only	YES
◆ Meter SWITCH	S / RF, Mod, SWR	S / RF, Mod, SWR	NO
◆ Frequency Lock	YES	YES	YES
◆ Mic Gain	ON / OFF	ON / OFF	Continuous
◆ Beep SWITCH	YES	YES	YES
◆ Scan	YES	YES	YES
◆ Memory Scan	YES	NO	NO
◆ Memory Capabilities	10 Channel	NO	10 Channel
◆ ENT Button	YES	NO	YES
◆ Manual Button	YES	NO	YES
◆ TX Output Power (AM/FM)	10 Watt	10 Watt	8 Watt
◆ Multifunction Meter	YES	YES	NO
◆ Frequency Display	YES	YES	YES
◆ Meter Mode Display	YES	YES	YES
◆ Band Segment Display	YES	YES	YES
◆ Channel & Memory Display	YES	Channel Only	YES
◆ VFO Step Indicator	YES	YES	NO
◆ Function Indicator	YES	NO	NO
◆ Remote control on Mic	YES	YES	YES
◆ PA / SP Connector	YES	NO	YES
◆ EXT. Speaker Connector	YES	NO	YES

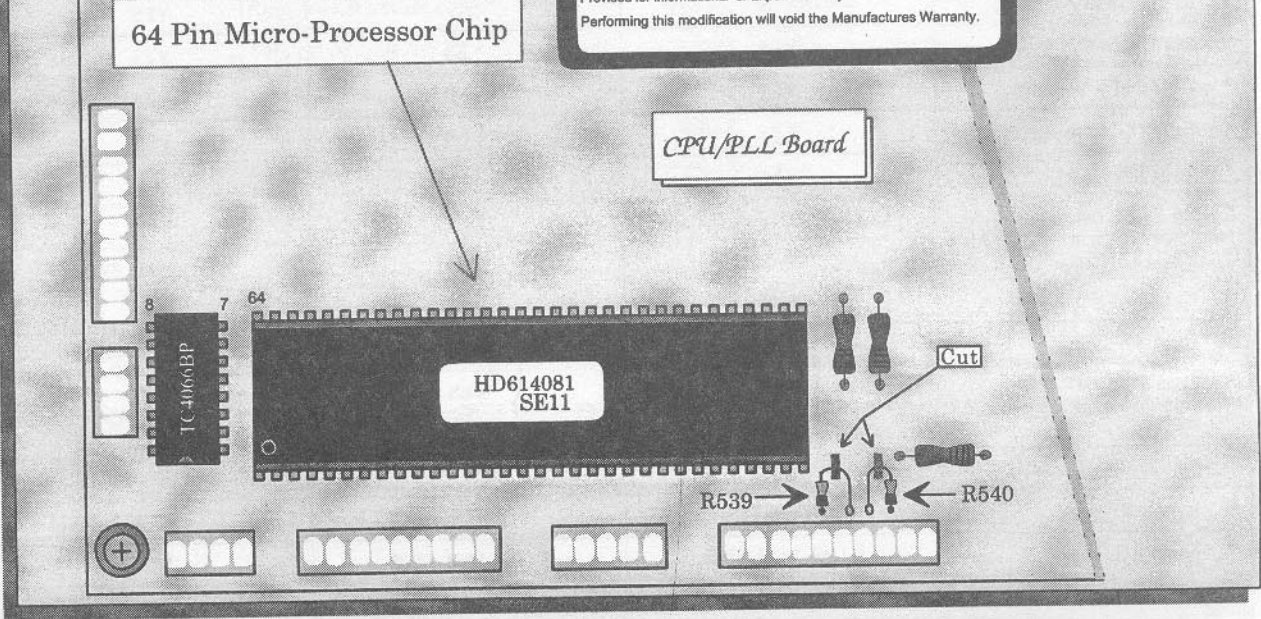
EMPEROR TS-5010

Channel Conversion

Fig. TS-5010CH

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 Performing this modification will void the Manufactures Warranty.

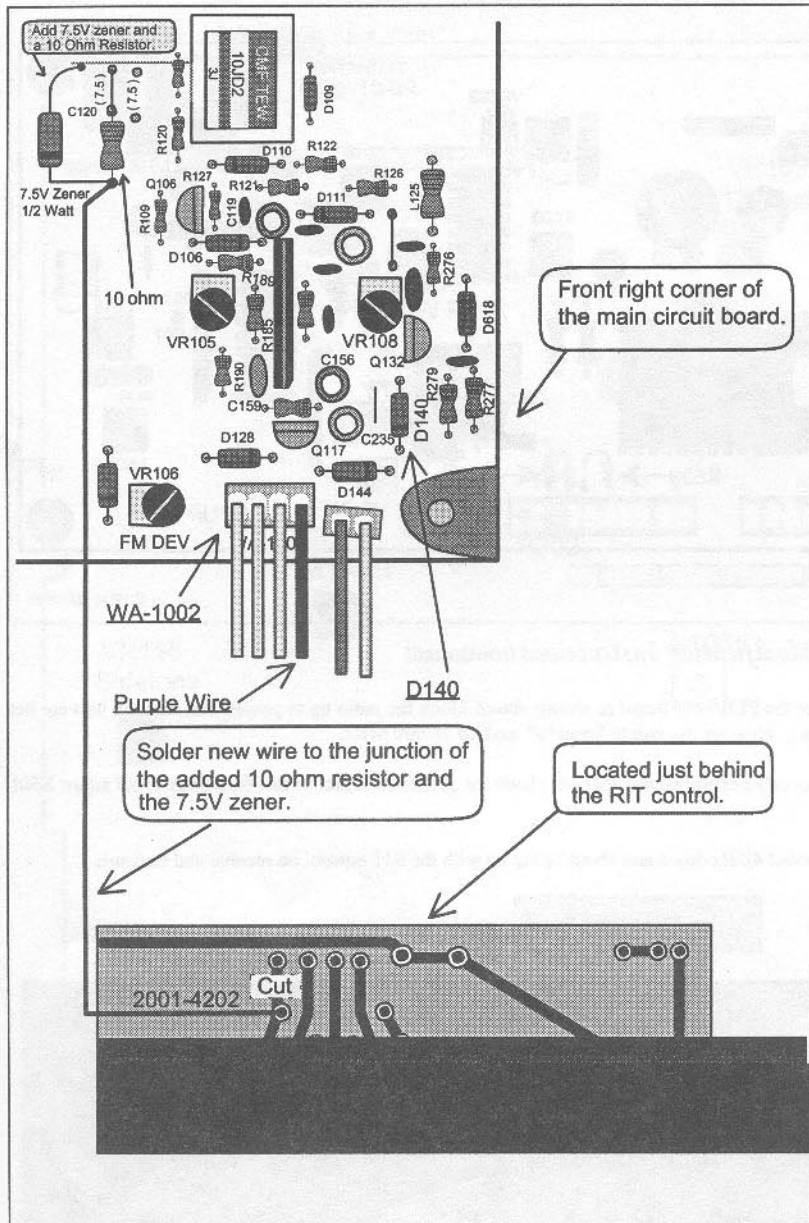


Conversion Instructions

There are actually two options when converting the Emperor TS-5010. First remove the four screws which are holding the bottom cover in place. Next lift the bottom cover just enough to clear the case and slide it to the right, being careful not to pull the speaker wires loose. You now will be viewing the CPU/PLL board located to the front of the radio. Next refer to the diagram above and locate R539 (TP8) and R540 (TP7) as shown. Once located choose the option below you wish to use to convert the TS-5010 for more channels.

Option #1: Cutting only R540 yields the following channels			Option #2: Cutting R540 & R539 yields the following channels		
Band Display	" a "	CH 1 28.000MHz to CH 50 28.490MHz	Band Display	" a "	CH 1 28.000MHz to CH 50 28.490MHz
Band Display	" b "	CH 1 28.500MHz to CH 50 28.990MHz	Band Display	" b "	CH 1 28.500MHz to CH 50 28.990MHz
Band Display	" c "	CH 1 29.000MHz to CH 50 29.490MHz	Band Display	" c "	CH 1 29.000MHz to CH 50 29.490MHz
Band Display	" d "	CH 1 29.500MHz to CH 50 29.690MHz	Band Display	" d "	CH 1 29.500MHz to CH 50 29.690MHz
Band Display	" C "	CH 1 26.965MHz to CH 40 27.405MHz	Band Display	" E "	CH 1 26.500MHz to CH 50 26.990MHz
<p><i>Note:</i> CB MASTER EDITION Volume 7 will include the complete alignment procedure for the EMPEROR TS-5010 & any other technical information that becomes available.</p>			Band Display	" F "	CH 1 27.000MHz to CH 50 27.490MHz
			Band Display	" G "	CH 1 27.500MHz to CH 50 27.990MHz
			Band Display	" h "	CH 1 29.700MHz to CH 50 30.190MHz
			Band Display	" C "	CH 1 26.965MHz to CH 40 27.405MHz

EMPEROR TS-5010 RIT Modification



RIT Modification Instructions

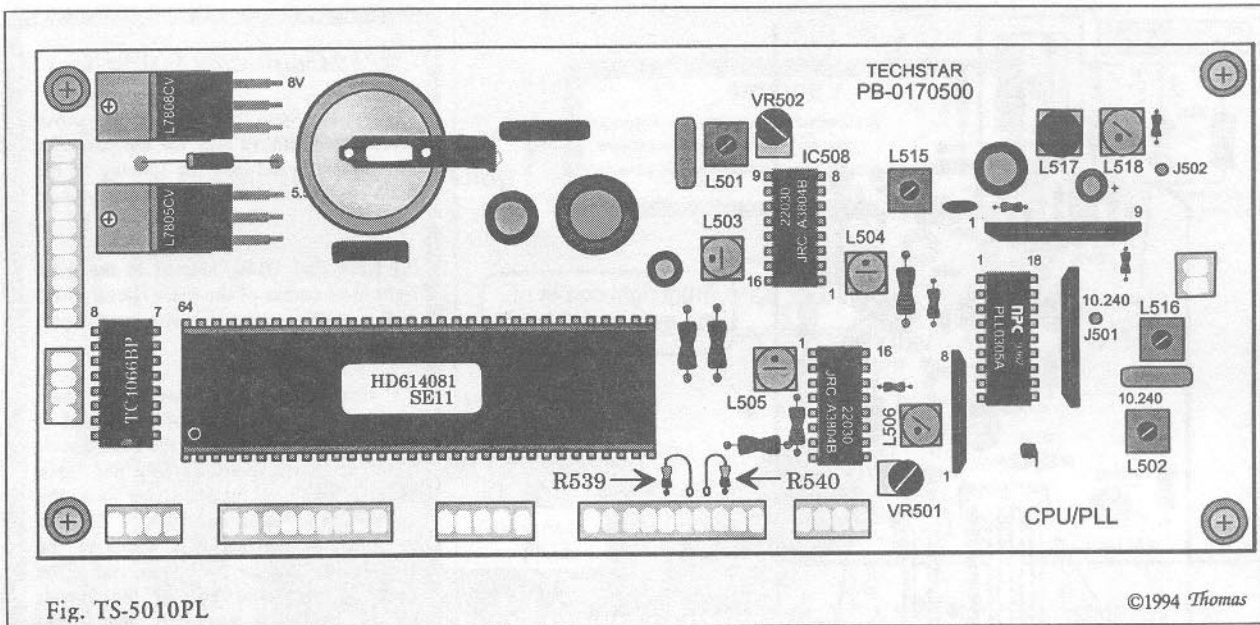
- 1.) Remove both bottom and top cover screws, and remove only the top cover for now. You should now be looking at the main circuit board with the component side up.
- 2.) Next find D140, located in the front right hand corner of the main circuit board and carefully cut one end with a small pair of sidecuts.
- 3.) Next obtain a 7.5V ½ watt zener and a 10 Ohm ½ watt resistor. Solder one end of the resistor to the point on the main circuit board as shown (constant 8V), and leave the other end loose for now. Now solder the unbanded end (anode) of the 7.5V Zener to the brass shield that is attached to the 10JD2 filter. Solder the banded end of the zener to the loose end of the 10ohm resistor. Be sure to leave only enough lead length on the resistor and zener as necessary and that they do not touch any other components.
- 4.) Next, turn the unit over and lift the bottom cover just enough to slide the cover aside. Be careful not to pull the speaker wires loose. Now locate the rectangular circuit board directly behind the RIT control as shown in the diagram to the left. This board is labeled 2001-4202.
- 5.) Once located, make the cut as shown using an x-acto knife. Be sure that the circuit board has been totally separated at this point before continuing.
- 6.) Next solder a new 8" piece of hook-up wire from the point on the 2001-4202 board as shown. Now feed this wire through to the main circuit board. Turn the unit over and solder the other end of this wire to the junction of the 10 ohm resistor and 7.5V zener added in step 3.

NOTICE !

Not drawn to scale. For illustrative purposes only.
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 Performing this modification will void the Manufactures Warranty.

--Go to Step 8 on next page --

EMPEROR TS-5010 RIT Modification



RIT Modification Instructions (continued)

- 8.) Next turn the unit over so that you are looking at the PLL/CPU board as shown above. Hook the radio up to power, and turn the unit on. Set the RIT control at dead center (12:00 o'clock position). Now set the unit to Band "a" and to 28.000 MHz.
- 9.) Place your frequency counter probe at J502 (gray cable center conductor) and check for $38.695 \pm 100\text{Hz}$.. If this frequency is off adjust L501 until the desired frequency is observed.
- 10.) Reassemble radio. Your unit should now slide about 4KHz down and about 2KHz up with the RIT control on receive and transmit.

Mike Wiring Chart

EMPEROR TS-5010	ASTATIC 400 Dynamic Lo-Z 575M-6, 636L D104M6, M6B 1104C & CM T-UG9, T-UP9 Diamond Eagle Golden Eagle, Night Eagle, K Silver Eagle, K Road Devil	ASTATIC 575M D104M T-UG8 Stand COLT DM-62 DM-63	SADELTA Bravo Plus Echomaster + Echomaster Pro ME-3 MB-4/R. Beep	GALAXY DC-521S (4-Wire)	GALAXY CB-660E1 CB-660E1R	TURNER Expander 500 Road King 56 RK 76	VALOR PDC66 / Echo	DAIWA EM-500 COBRA CA-70 CA-71 CA-72 CA-79 CA-80 RF LIMITED EC-2018TB EC-2029
<i>Standard Mike Wiring</i>	<i>Color Code</i> White-Audio Shield-Ground Red-Transmit Black-Receive Blue-Common Yellow-Audio Sw.	<i>Color Code</i> White-Audio Shield-Ground Red-Transmit Black-Receive	<i>Color Code</i> White-Audio Shield-Ground Brown-Transmit Green-Receive	<i>Color Code</i> Yellow-Audio Shield-Ground Red-Transmit Black-Receive	<i>Color Code</i> White-Audio Shield-Ground Red-Transmit Blue-Receive Black-Common	<i>Color Code</i> White-Audio Shield-Ground Blue-Transmit Black-Receive Red-Common Yellow-Audio Sw	<i>Color Code</i> White-Audio Shield-Ground Red-Transmit Black-Receive	<i>Color Code</i> Red-Audio Shield-Ground White-Transmit Blue-Receive Black-Common
1-Audio 2-Shield 3-Transmit 4-Ch Ctrl Up 5-Ch Ctrl Dn	1-White 2-Shield & Blue 3-Red 4-N/C 5-N/C Yellow-N/C Black-N/C	1-White 2-Shield 3-Red 4-N/C 5-N/C Black-N/C	1-White 2-Shield 3-Brown 4-N/C 5-N/C Green-N/C	1-Yellow 2-Shield 3-Red 4-N/C 5-N/C Black-N/C	1-White 2-Shield & Black 3-Red 4-N/C 5-N/C Yellow-N/C Blue-N/C	1-White 2-Sh & Red 3-Blue 4-N/C 5-N/C Yellow-N/C Black-N/C	1-White 2-Shield 3-Red 4-N/C 5-N/C Black-N/C	1-Red 2-Sh & Black 3-White 4-N/C 5-N/C Blue-N/C

EMPEROR TS-5010

Variable Alignment Layout

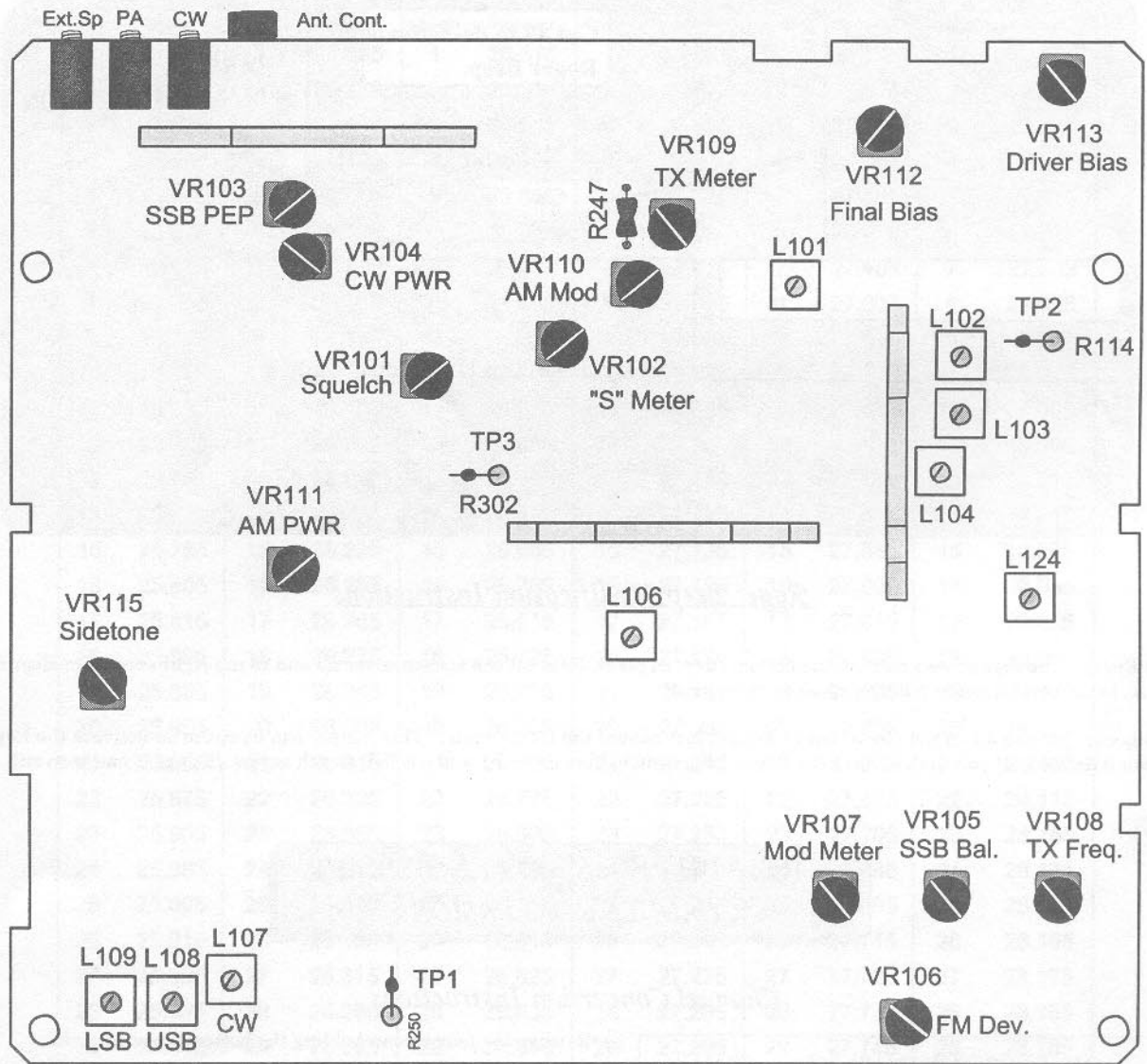


Fig. TS-5010BD

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Variable Adjustments

VR101 = Squelch Range Adjust

VR102 = RX "S" Meter Adjust

VR103 = SSB PEP ALC

VR104 = CW Power Adjust

VR105 = SSB Carrier Balance Adjust

VR106 = FM Deviation

VR107 = Modulation Meter Adjust

VR108 = Transmit Frequency Adjust

VR109 = Transmit Meter Adjust

VR110 = AM Modulation AMC Adjust

VR111 = AM Power Adjust

VR112 = Final Bias Adjust ((60mA)

VR113 = Driver Bias (60mA)

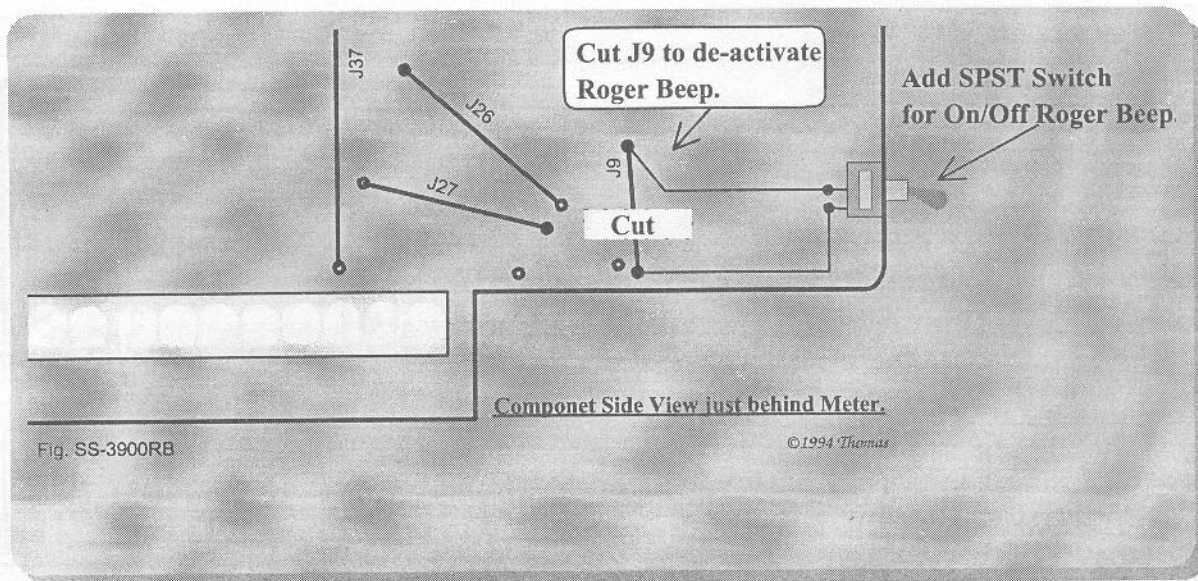
VR115 = Sidetone Adjust

Receive Adjust = L101, L102, L103, L104, L106

Transmit Adjust = Variable Power Adjust Only. Cans are factory Set.

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DIRLAND SS-3900 & SS-3900 B
ROGER BEEP MODIFICATION

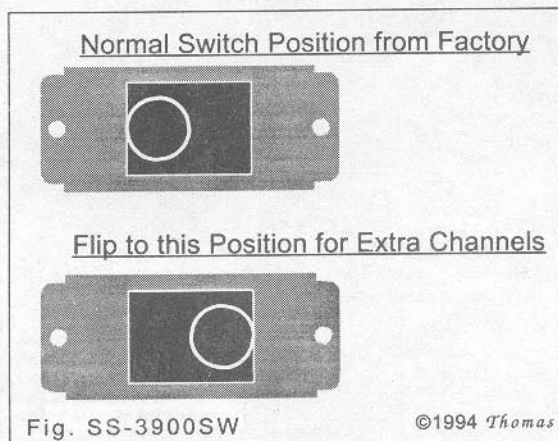


Roger Beep Modification Instructions

- 1.) Remove the four screws holding the bottom cover in place. Next lift the bottom cover up and to the right enough to clear the case, being careful not to pull the speaker wires loose.
- 2.) Locate jumper J9 on the circuit board located just behind the S / RF meter. This jumper can be cut to de-activate the Roger Beep if desired. If you wish to have the Roger Beep switchable (on / off), add a SPST switch across J9 once it has been cut.

DIRLAND SS-3900 & SS-3900 B
CHANNEL CONVERSION

Channel Conversion Instructions

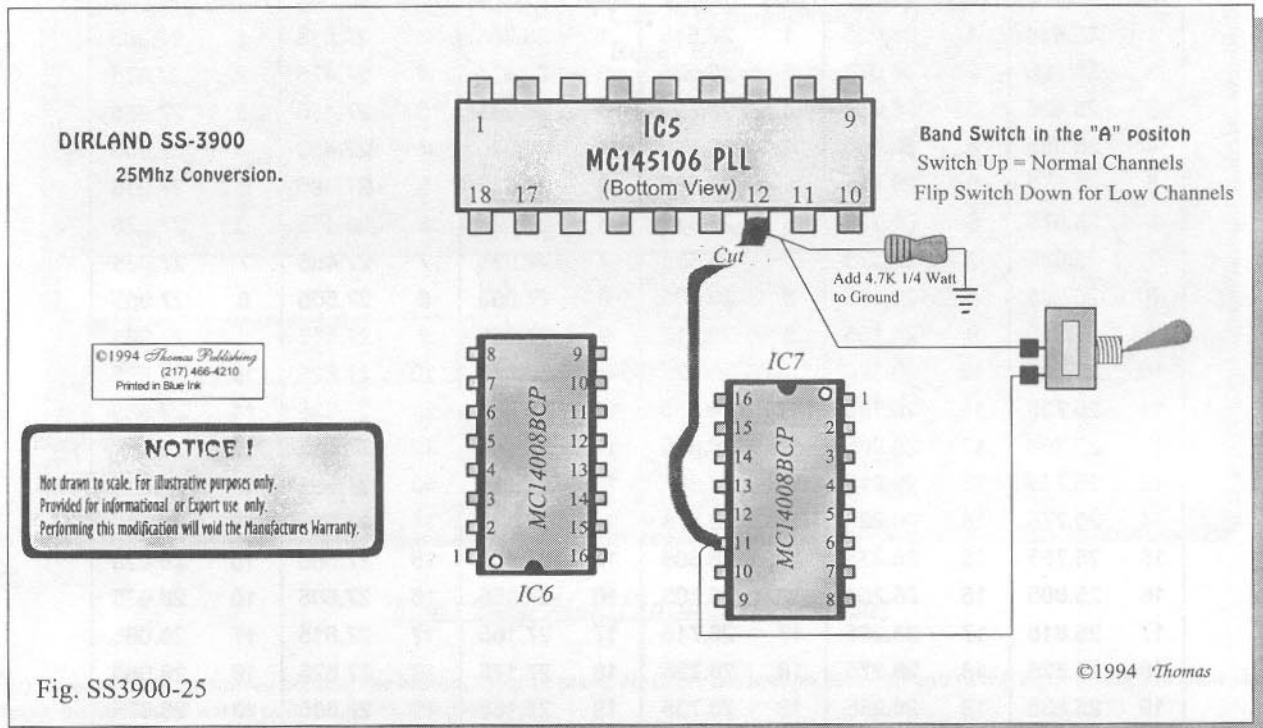


- 1.) Remove the four screws holding the bottom cover in place. Next lift the bottom cover up and to the right enough to clear the case, being careful not to pull the speaker wires loose.
- 2.) Locate the large switch mounted to the left side of the radios' case.
- 3.) Normal position from the factory for this switch is to the left. Slide this switch to the right position to activate all bands and channels as shown on the channel chart on the following page.

DIRLAND SS3900 FREQUENCY CHANNEL CHART
EPT 360014B Circuit Board

LOW BAND						HIGH BAND					
A		B		C		D		E		F	
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	25.615	1	26.065	1	26.515	1	26.965	1	27.415	1	27.865
2	25.625	2	26.075	2	26.525	2	26.975	2	27.425	2	27.875
3	25.635	3	26.085	3	26.535	3	26.985	3	27.435	3	27.885
4	25.655	4	26.105	4	26.555	4	27.005	4	27.455	4	27.905
5	25.665	5	26.115	5	26.565	5	27.015	5	27.465	5	27.915
6	25.675	6	26.125	6	26.575	6	27.025	6	26.475	6	27.925
7	25.685	7	26.135	7	26.585	7	27.035	7	27.485	7	27.935
8	25.705	8	26.155	8	26.605	8	27.055	8	27.505	8	27.955
9	25.715	9	26.165	9	26.615	9	27.065	9	27.515	9	27.965
10	25.725	10	26.175	10	26.625	10	27.075	10	27.525	10	27.975
11	25.735	11	26.185	11	26.635	11	27.085	11	27.535	11	27.985
12	25.755	12	26.205	12	26.655	12	27.105	12	27.555	12	28.005
13	25.765	13	26.215	13	26.665	13	27.115	13	27.565	13	28.015
14	25.775	14	26.225	14	26.675	14	27.125	14	27.575	14	28.015
15	25.785	15	26.235	15	26.685	15	27.135	15	27.585	15	28.025
16	25.805	16	26.255	16	26.705	16	27.155	16	27.605	16	28.035
17	25.815	17	26.265	17	26.715	17	27.165	17	27.615	17	28.055
18	25.825	18	26.275	18	26.725	18	27.175	18	27.625	18	28.065
19	25.835	19	26.285	19	26.735	19	27.185	19	27.635	19	28.075
20	25.855	20	26.305	20	26.755	20	27.205	20	27.655	20	28.085
21	25.865	21	26.315	21	26.765	21	27.215	21	27.665	21	28.105
22	25.875	22	26.325	22	26.775	22	27.225	22	27.675	22	28.115
23	25.905	23	26.355	23	26.805	23	27.255	23	27.705	23	28.155
24	25.885	24	26.335	24	26.785	24	27.235	24	27.685	24	28.135
25	25.895	25	26.345	25	26.795	25	27.245	25	27.695	25	28.145
26	25.915	26	26.365	26	26.815	26	27.265	26	27.715	26	28.165
27	25.925	27	26.375	27	26.825	27	27.275	27	27.725	27	28.175
28	25.935	28	26.385	28	26.835	28	27.285	28	27.735	28	28.185
29	25.945	29	26.395	29	26.845	29	27.295	29	27.745	29	28.195
30	25.955	30	26.405	30	26.855	30	27.305	30	27.755	30	28.205
31	25.965	31	26.415	31	26.865	31	27.315	31	27.765	31	28.215
32	25.975	32	26.425	32	26.875	32	27.325	32	27.775	32	28.225
33	25.985	33	26.435	33	26.885	33	27.335	33	27.785	33	28.235
34	25.995	34	26.445	34	26.895	34	27.345	34	27.795	34	28.245
35	26.005	35	26.455	35	26.905	35	27.355	35	27.805	35	28.255
36	26.015	36	26.465	36	26.915	36	27.365	36	27.815	36	28.265
37	26.025	37	26.475	37	26.925	37	27.375	37	27.825	37	28.275
38	26.035	38	26.485	38	26.935	38	27.385	38	27.835	38	28.285
39	26.045	39	26.495	39	26.945	39	27.395	39	27.845	39	28.295
40	26.055	40	26.505	40	26.955	40	27.405	40	27.855	40	28.305

DIRLAND SS-3900 & SS-3900 B
25 MHz CHANNEL CONVERSION



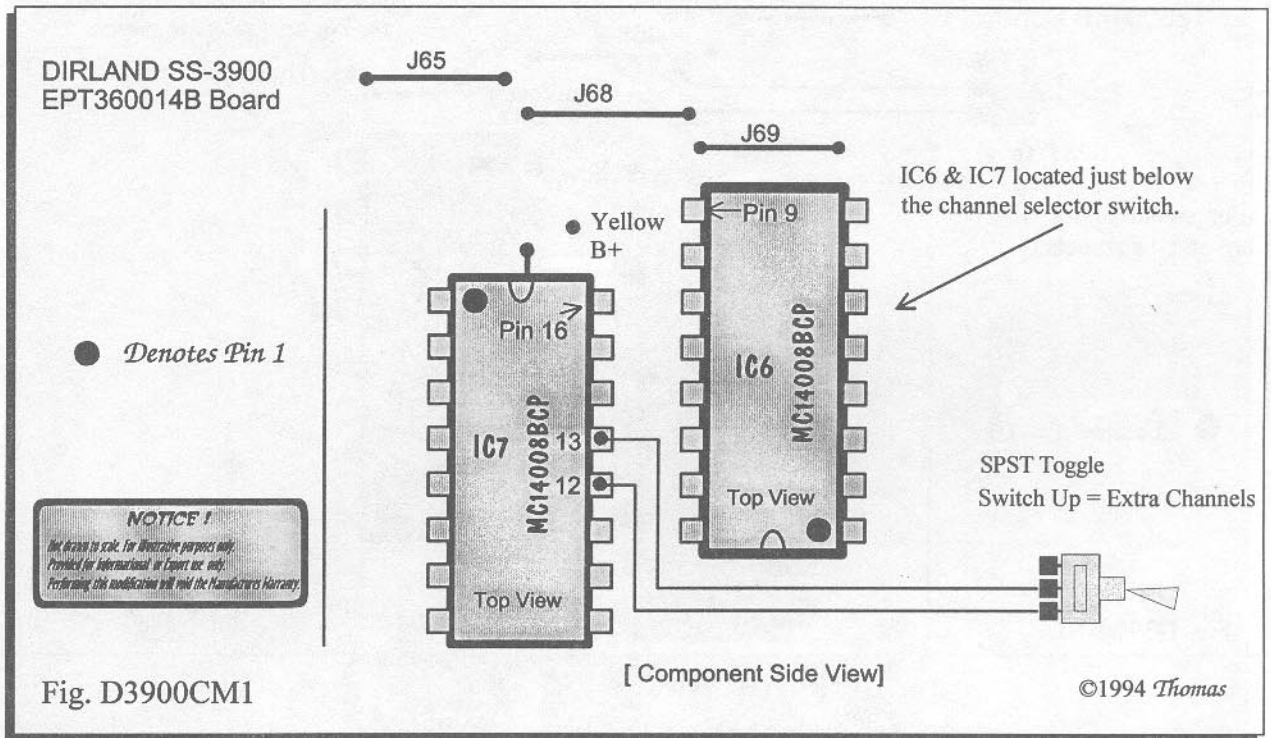
Instructions

- 1.) Remove both radio covers and unplug the speaker wires from the circuit board. Next locate the circuit board run that connects Pin 11 of IC7 to Pin 12 of IC5 (MC145106 PLL). Using an x-acto knife, carefully cut and isolate Pin 12 of IC5 as shown in the diagram above.
- 2.) After you have completely isolated Pin 12 of IC5, solder a 4.7K 1/4Watt resistor from Pin 12 of IC5 to circuit board ground as shown above. Next mount a SPST toggle switch in any convenient location and wire as shown above.
- 3.) Re-check all connections and plug speaker wire in before applying power. See the chart below for your new 25MHz channels.

Flip switch down and Band Switch in the "A" position =

5 = 25.345	11 = 25.415	17 = 25.495	23 = 25.585
6 = 25.355	12 = 25.435	18 = 25.505	24 = 25.565
7 = 25.365	13 = 25.445	19 = 25.515	25 = 25.575
8 = 25.385	14 = 25.455	20 = 25.535	26 = 25.595
9 = 25.395	15 = 25.465	21 = 25.545	27 = 25.605
10 = 25.405	16 = 25.485	22 = 25.555	28 = 25.615

DIRLAND SS-3900 & SS-3900 B
29 MHz CHANNEL CONVERSION

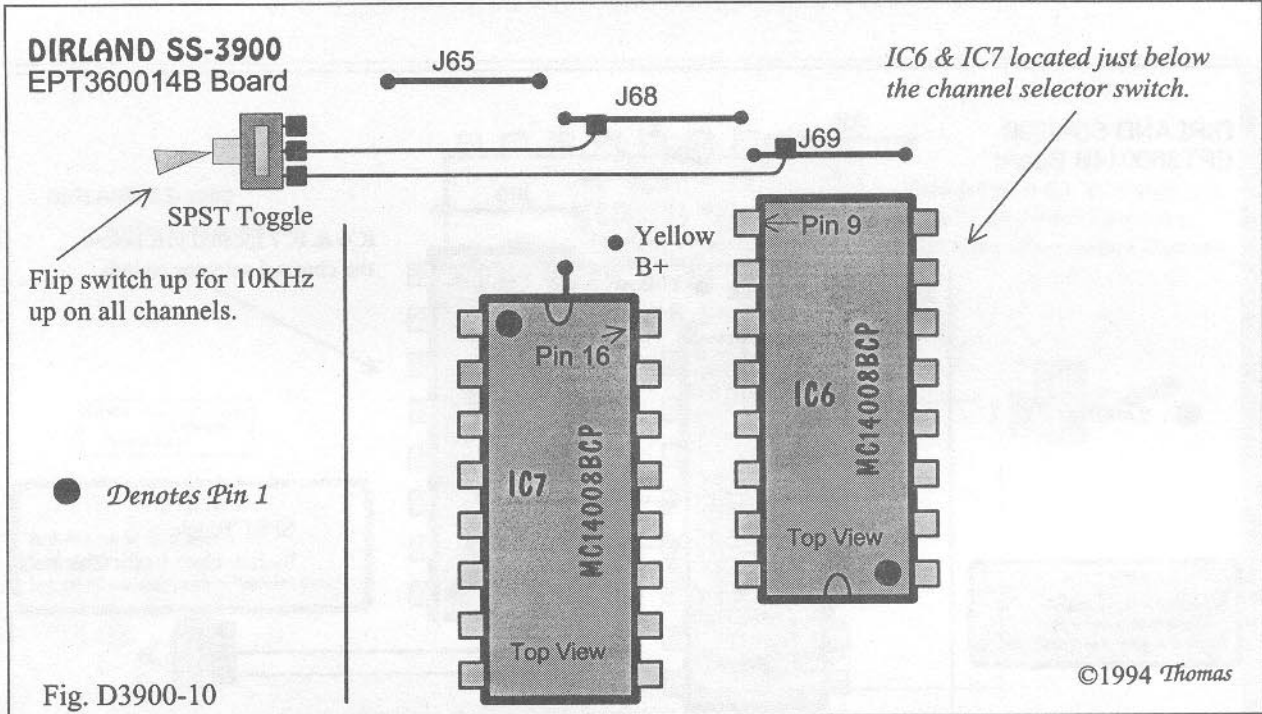


Instructions

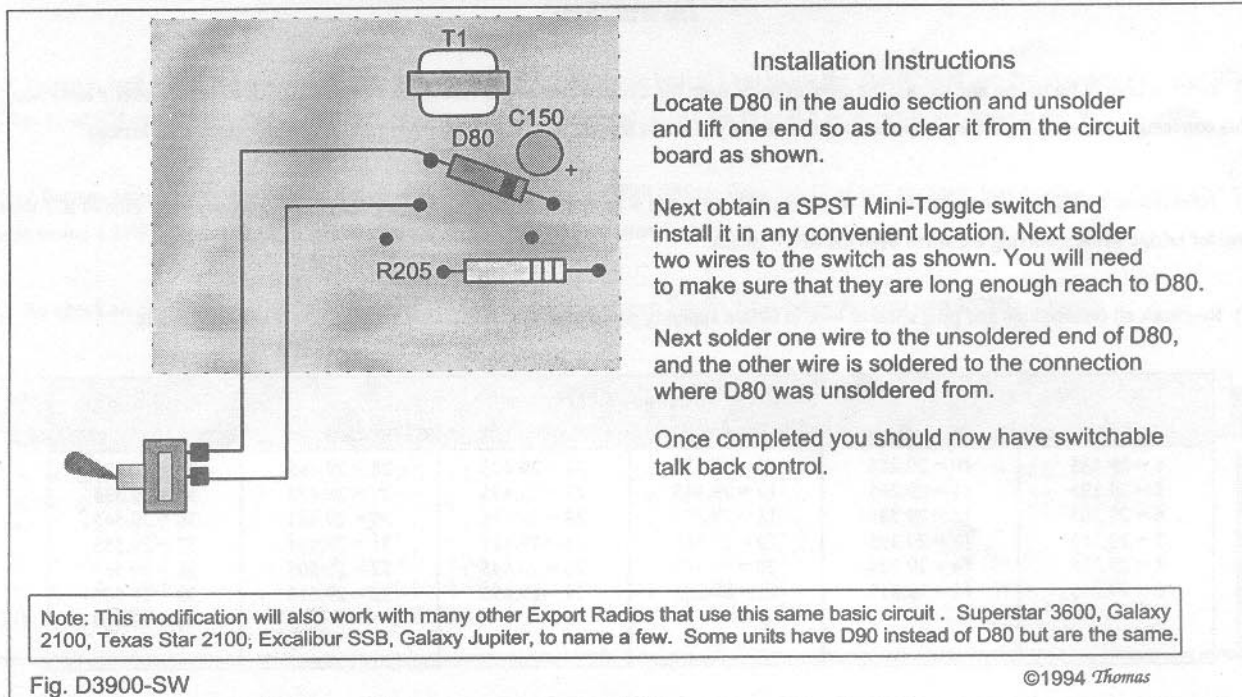
- 1.) Remove both radio covers and unplug the speaker wires from the circuit board. Next locate Pin 12 and Pin 13 of IC7 (MC1408BCP adder chip). This conversion is shown from the component side, however you could also perform this conversion from the circuit board side instead.
- 2.) Next mount a SPST toggle switch in any convenient location and wire as shown above, being careful not to short any other pins of IC7 with a solder bridge while soldering the wires from the SPST switch.
- 3.) Re-check all connections and plug speaker wire in before applying power. See the chart below for your new 29MHz channels.

Channel Chart					
Set Radio in "HI" and 'F Band' -added Switch in the Up Position					
4 = 29.185	10 = 29.255	16 = 29.335	22 = 29.405	28 = 29.465	34 = 29.525
5 = 29.195	11 = 29.265	17 = 29.345	23 = 29.435	29 = 29.475	35 = 29.535
6 = 29.205	12 = 29.285	18 = 29.355	24 = 29.415	30 = 29.485	36 = 29.545
7 = 29.215	13 = 29.295	19 = 29.365	25 = 29.425	31 = 29.495	37 = 29.555
8 = 29.235	14 = 29.305	20 = 29.385	26 = 29.445	32 = 29.505	38 = 29.565
9 = 29.245	15 = 29.315	21 = 29.395	27 = 29.455	33 = 29.515	39 = 29.575
					40 = 29.585

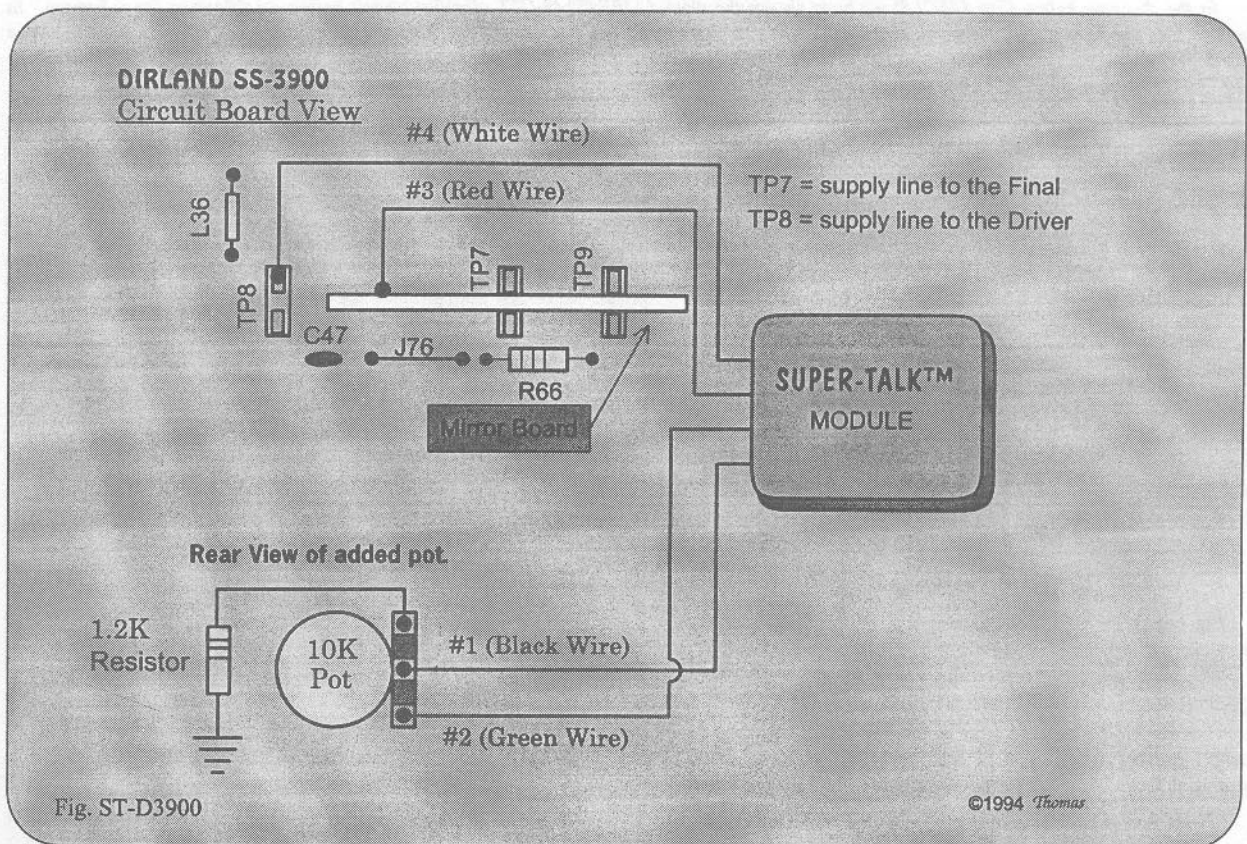
DIRLAND SS-3900 & SS-3900B
+10 KHz Frequency Jump Modification



DIRLAND SS-3900
Adding Switchable Talk Back Capabilities



DIRLAND SS-3900 & SS-3900B SUPER-TALK™ Installation Instructions



Installation Instructions

1. Locate the mirror board that connects TP9, TP8, and TP7 in the final section. Next slide this board to the right until it no longer makes a connection with TP8. Then solder the #4 white wire to the TP8 terminal and solder the #3 red wire directly to the side of the mirror board. Make sure that your solder connections are good and solid.

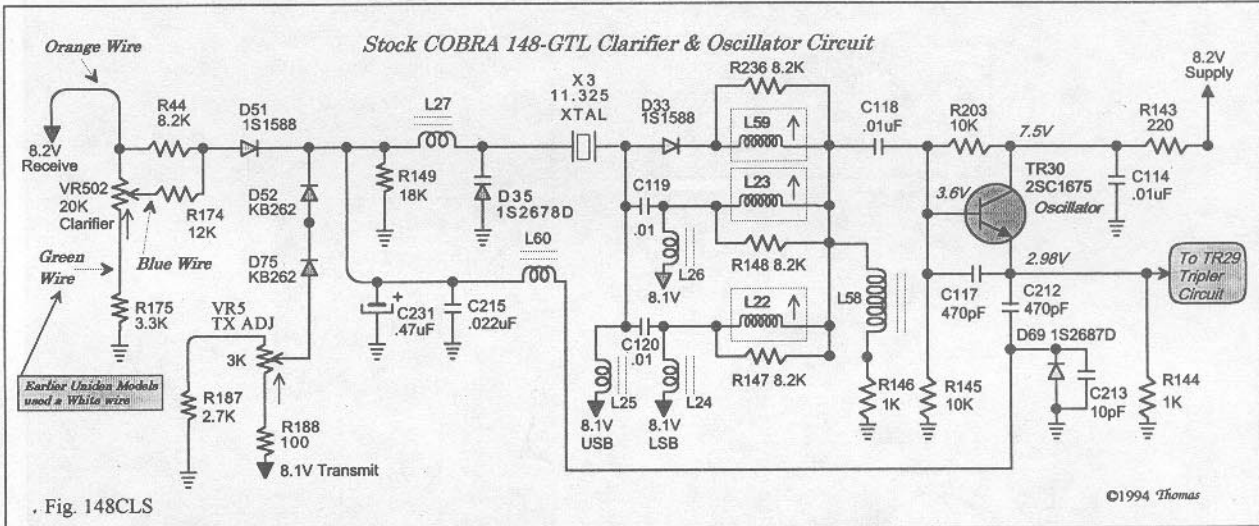
2. Next mount a 10K miniature pot in a convenient location and solder the other two wires of the SUPER-TALK module as shown and add the 1.2K resistor.

Note: This SUPER-TALK installation is basically the same for many other Export and Domestic CB radios with the removable mirror board. It is important however that when you slide the mirror board over that it does not short against any other components. If you find that this is the case, insulate the end of the board with some electrical tape before proceeding with the installation.

COBRA® 148-GTL

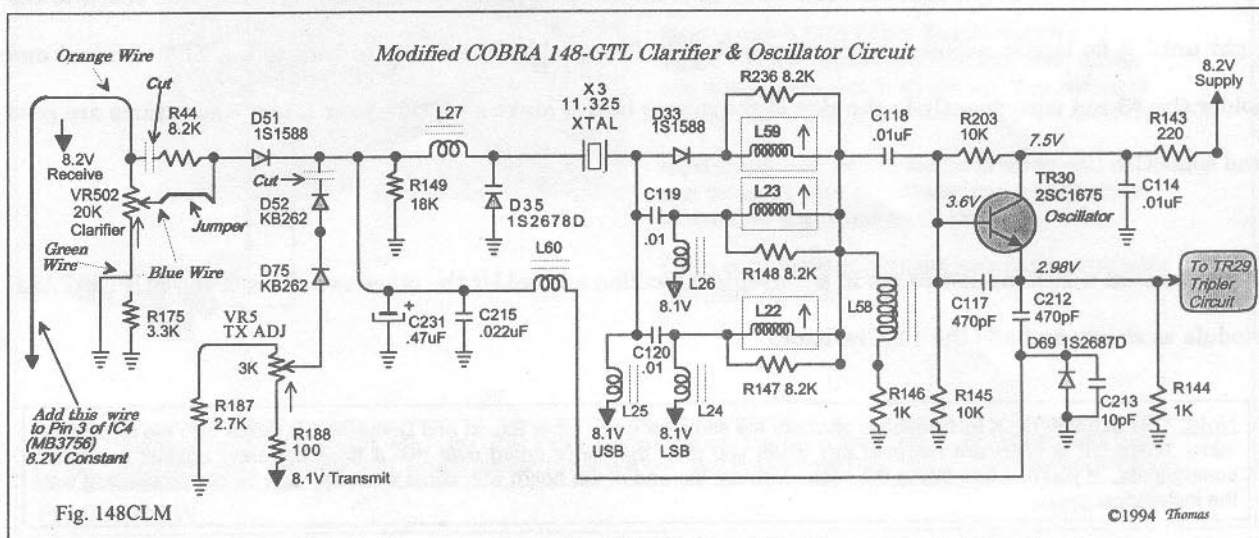
Clarifier Modification

In the diagram below (Fig 148CLS) we have shown the stock COBRA®148-GTL clarifier circuit before modification for reference. In Fig. 148CLM we have shown the same circuit after the clarifier circuit has been modified. This circuit is somewhat different than previous models. This New Version is made in Malaysia and is no longer manufactured by Uniden. Although the circuit is basically the same as the older Uniden version, some parts and wire colors are different.



Modification Instructions

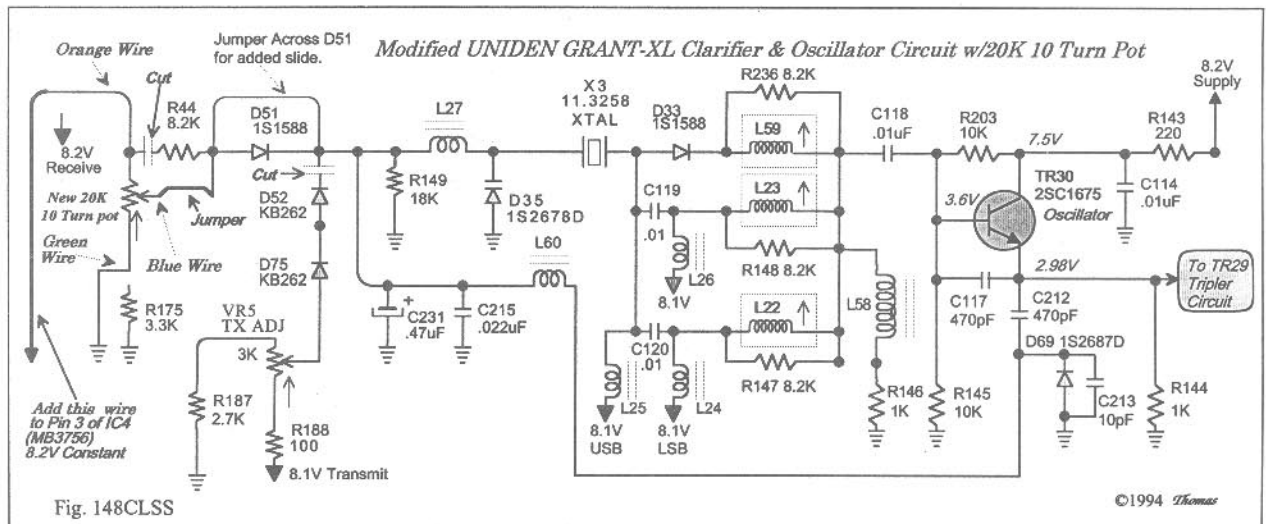
1. Locate D52 and R44 just to the right of the large 11.325 xtal in the clarifier circuit and cut one end as shown below. It doesn't matter which end of R44 and D52 you cut. Next locate R174 (12K Resistor) directly behind R44 and unsolder and remove it from the circuit. Next solder a jumper wire in place of R174.
2. Next trace the Green wire from the clarifier control to where it is soldered to the circuit board near C110, and cut it loose. Resolder the Green wire to the circuit board ground.
3. Next trace the Orange wire from the clarifier control and unsolder it from the circuit board. At this point you will need to add a small amount of wire to the orange wire in order to make it long enough to reach pin 3 of IC4 (MB3756 Regulator IC). IC4 is mounted to the side of the radio case about two inches back from the MIC socket. Now solder this wire to pin 3 IC4. Pin 3 of IC4 (3rd pin from the back of the radio) has no other connections. Your clarifier will now track on receive and transmit.



COBRA® 148-GTL

Super Slide Clarifier Modification

In most cases once the clarifier circuit has been modified, the stock clarifier control is just not adequate for all practical purposes. Not only is it difficult to clarify, the unit will also tend to drift off frequency due to the lack of clarifier control stability. The cure for this problem is to install a 10-Turn Precision Potentiometer in place of the stock clarifier control. This will allow you cover the same range in 10 complete turns versus 1 turn with the stock control. Your clarifier will then operate like a FINE TUNE clarifier control and will have much improved stability, with very little or no frequency drift. Below we have shown what the above circuit should look like once modified and how to wire your new 20k-10 turn pot in place of the stock clarifier control for the COBRA 148-GTL.



20K-10 Turn Pot Diagram & Installation Instructions

1. First perform the standard clarifier modification on the previous page.
2. Next unsolder the Orange Wire, Blue Wire, and the Green Wire from the stock clarifier control. At this point you will need to remove the old clarifier control and install the new 20K-10 turn pot in its place. Once that you have mounted the new pot, resolder the Orange Wire, Blue Wire, and the Green Wire to the new 10 turn pot as shown in the diagram to the right.
3. You may also want to add a jumper either across or in place D51 for

20K-10 TURN POT.

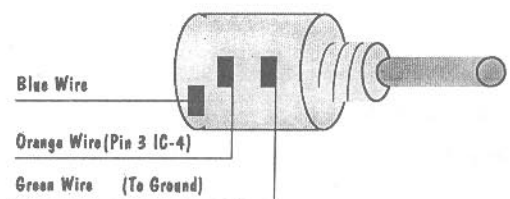
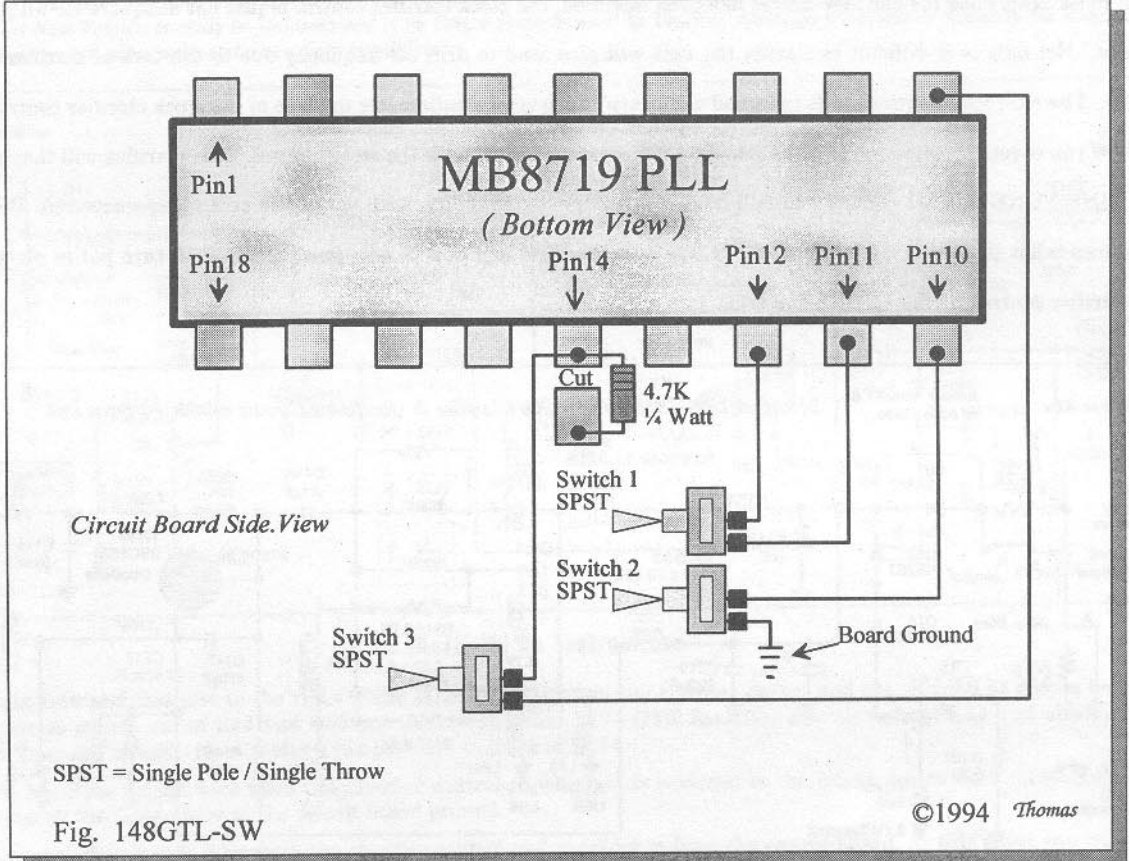


Fig. Pot-GTL

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increased slide. Once completed, your unit should now slide anywhere from 10 to 20 KHz with precision control.

COBRA® 148-GTL
(New Malaysia Model)
Switch Channel Conversion



148-GTL Channel Conversion Instructions

1. First locate Pin 14 of the MB8719 PLL chip on the bottom side of the circuit board. Using an ex-acto knife, carefully cut and isolate Pin 14 away from the circuit board run. Next solder a 4.7K 1/4 Watt resistor across this cut as shown in the diagram above.

2. Next mount 3 SPST Toggle switches in a convenient location . Be sure to wire the switches up as shown , and to solder each wire carefully. Once all the wires have been soldered to the switches and to the circuit board as shown, check all solder joints before proceeding.

3. Now with all three switches in the down position you will still have the normal channels. Refer to the Cobra 148-GTL Channel chart on the following page for the switch positions and their associated channels.

COBRA 148-GTL

(New Malaysia Model)

Switch Channel Chart

POSITION #1 SWITCH-1 DOWN and SWITCH-2 DOWN and SWITCH-3 DOWN =

Normal Channels

POSITION #2 SWITCH-1 UP and SWITCH-2 DOWN and SWITCH-3 DOWN =

15 = 26.815	20 = 26.885	25 = 26.925	30 = 26.985 (Ch3)
16 = 26.835	21 = 26.895	26 = 26.945	31 = 26.995 (3A)
17 = 26.845	22 = 26.905	27 = 26.955	32 = 27.005 (Ch4)
18 = 26.855	23 = 26.935	28 = 26.965 (Ch1)	
19 = 26.865	24 = 26.915	29 = 26.975 (Ch2)	

POSITION #3 SWITCH-1 DOWN and SWITCH-2 DOWN and SWITCH-3 UP =

37 = 27.415	38 = 27.425	39 = 27.435	40 = 27.445
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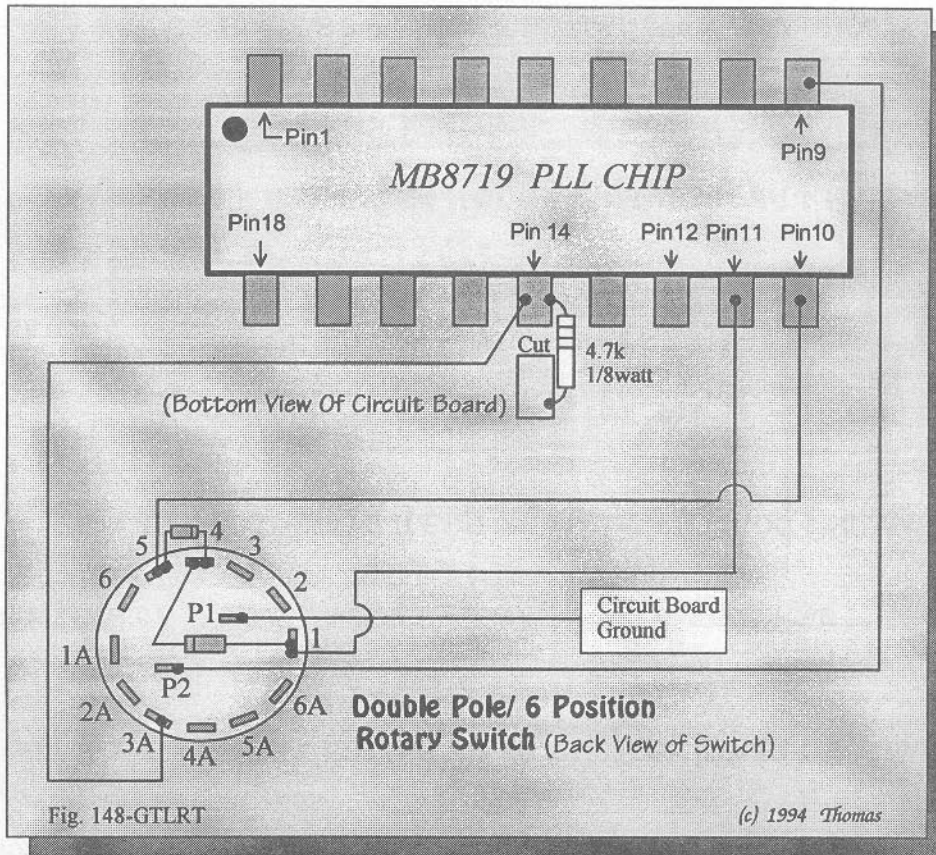
POSITION #4 SWITCH-1 UP and SWITCH-2 UP and SWITCH-3 DOWN =

1 = 27.605	6 = 27.505	10 = 27.555	14 = 27.605
2 = 27.455	7 = 27.515	11 = 27.565	16 = 27.475
3 = 27.465	8 = 27.535	12 = 27.585	20 = 27.525
4 = 27.485	9 = 27.545	13 = 27.595	23 = 27.575
5 = 27.495			

POSITION #5 SWITCH-1 DOWN and SWITCH-2 UP and SWITCH-3 DOWN =

1 = 27.605	11 = 27.725	21 = 27.855	31 = 27.955
2 = 27.615	12 = 27.745	22 = 27.865	32 = 27.965
3 = 27.625	13 = 27.755	23 = 27.895	33 = 27.975
4 = 27.645	14 = 27.765	24 = 27.875	34 = 27.985
5 = 27.655	15 = 27.775	25 = 27.885	35 = 27.995
6 = 27.665	16 = 27.795	26 = 27.905	36 = 28.005
7 = 27.675	17 = 27.805	27 = 27.915	37 = 28.015
8 = 27.695	18 = 27.815	28 = 27.925	38 = 28.025
9 = 27.705	19 = 27.825	29 = 27.935	39 = 28.035
10 = 27.715	20 = 27.845	30 = 27.945	40 = 28.045

COBRA® 148-GTL
(New Malaysia Model)
Rotary Switch Channel Conversion



Rotary Switch Channel Conversion Instructions

1. Obtain a Double Pole / 6 Position Rotary Switch. Be sure to get the Break Before Make type. You will also need 2 small signal diodes (1N914, 1N4148 or Equivalent), a piece of 5 wire ribbon cable long enough to reach from the switch to the PLL chip connections, and 1 / 4.7k 1/4 watt resistor. Next solder the diodes to the switch as shown in the diagram above. Be sure that the cathode ends (Banded) are as shown once you have completed this step. The diode that connects between Pin 4 & Pin 5 should have the banded end to Pin 4 and the diode the connects between Pin 1 & Pin 4 should also have the banded end to Pin 4.

2. Next locate Pin 14 of the PLL and using an ex-acto knife carefully isolate Pin 14 as shown above. Next solder the 4.7k resistor across this cut in order to allow Pin 14 to operate at its normal state. Once this has been done you may connect the ribbon cable to switch - prior to mounting in its permanent location. Be sure that the wires are connected as shown in the above diagram. Once that you have mounted the switch you may then make the connections to the PLL chip as shown above. Re-check all your connections before turning the unit on. The channel chart on the next page shows your new frequencies. Check all positions of the switch for these channels. Some adjustment of the VCO coil (L19) may be necessary in some cases for full channel coverage.

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COBRA® 148-GTL

(New Malaysia Model)

Rotary Switch Channel Chart

POSITION #1 =

15 = 26.815	20 = 26.885	25 = 26.925	30 = 26.985(Ch3)
16 = 26.835	21 = 26.895	26 = 26.945	31 = 26.995(3A)
17 = 26.845	22 = 26.905	27 = 26.955	32 = 27.005(Ch4)
18 = 26.855	23 = 26.935	28 = 26.965(Ch1)	
19 = 26.865	24 = 26.915	29 = 26.975(Ch2)	

POSITION #2 = Normal Channels

POSITION #3 =

37 = 27.415	38 = 27.425	39 = 27.435	40 = 27.445
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POSITION #4 =

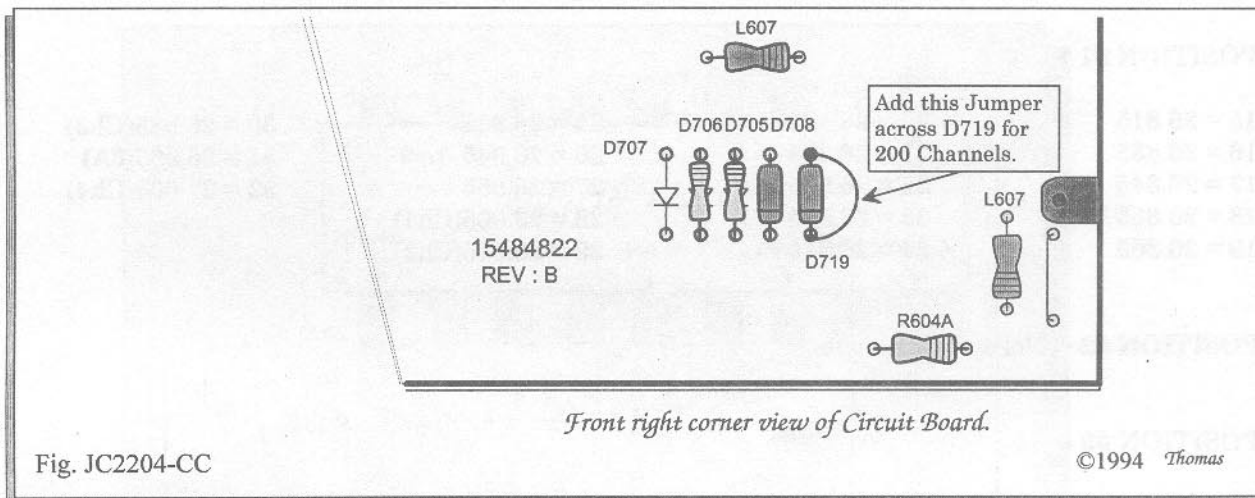
15 = 27.455	22 = 27.545	29 = 27.615	36 = 27.685
16 = 27.465	23 = 27.575	30 = 27.625	37 = 27.695
17 = 27.475	24 = 27.555	31 = 27.635	38 = 27.705
18 = 27.495	25 = 27.565	32 = 27.645	39 = 27.715
19 = 27.505	26 = 27.585	33 = 27.655	40 = 27.725
20 = 27.525	27 = 27.595	34 = 27.665	
21 = 27.535	28 = 27.605	35 = 27.675	

POSITION #5 =

1 = 27.605	11 = 27.725	21 = 27.855	31 = 27.955
2 = 27.615	12 = 27.745	22 = 27.865	32 = 27.965
3 = 27.625	13 = 27.755	23 = 27.895	33 = 27.975
4 = 27.645	14 = 27.765	24 = 27.875	34 = 27.985
5 = 27.655	15 = 27.775	25 = 27.885	35 = 27.995
6 = 27.665	16 = 27.795	26 = 27.905	36 = 28.005
7 = 27.675	17 = 27.805	27 = 27.915	37 = 28.015
8 = 27.695	18 = 27.815	28 = 27.925	38 = 28.025
9 = 27.705	19 = 27.825	29 = 27.935	39 = 28.035
10 = 27.715	20 = 27.845	30 = 27.945	40 = 28.045

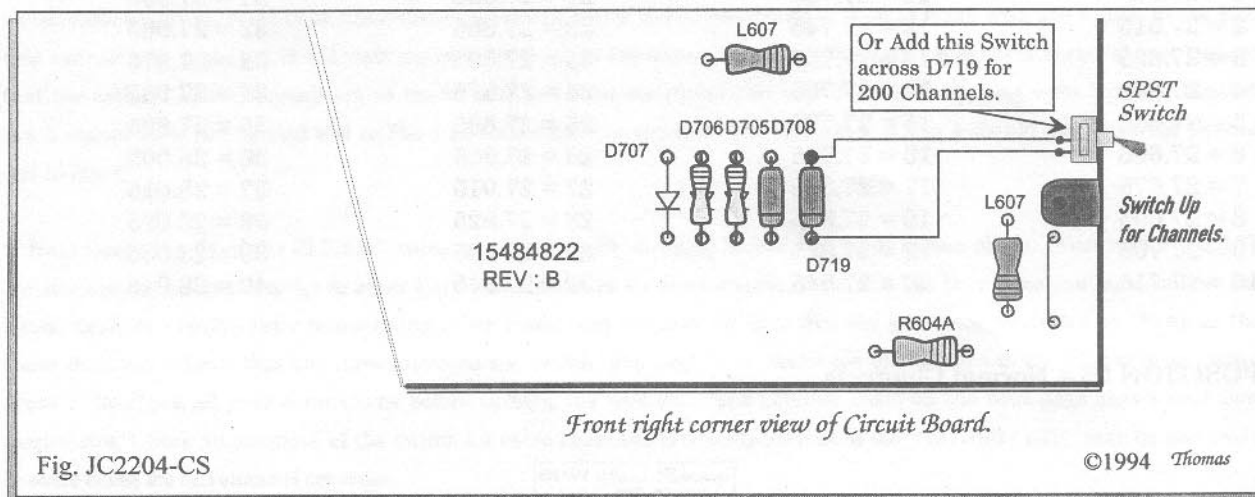
POSITION #6 = Normal Channels

YOSAN JC-2204 CHANNEL CONVERSION



Channel Conversion Instructions

- 1.) Remove the four screws holding the bottom cover. Carefully lift the bottom cover and set aside. Locate D719 as shown in the diagram above.
- 2.) There are two ways that you may convert the YOSAN JC-2204. One is to add a jumper across D719, which will allow the radio to be in the converted mode constantly. However this may not be desirable, due to the way that this radio selects the new 200 channels. There are no band switches to use. The YOSAN JC-2204 uses only the channel selector switch for selecting your new channels and bands. The bands A to E will be displayed above the channel display read-out. Each complete *clockwise* revolution of the channel selector will yield 40 new higher channels. (See chart on the following page.) Once you have reached Band "E" channel 40 will equal "28.305". If you start a new revolution from this point you will start all over again on Band "A" and channel 1 will now equal "26.065". Of course turning the channel selector in a *counter-clockwise* direction will yield the same channels only in reverse.
- 3.) So with that in mind you may find it more desirable to convert the unit using a SPST toggle switch as shown below instead. Using a toggle will allow you to instantly revert back to your normal 40 channels, thus eliminating the hassle of turning the channel selector switch an excessive amount of times just to reach your normal 40 channels.



YOSAN JC-2204 FREQUENCY CHANNEL CHART

154848822 REV : B Circuit Board

<i>Band "A"</i>		<i>Band "B"</i>		<i>Band "C"</i>		<i>Band "D"</i>		<i>Band "E"</i>	
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	26.065	1	26.515	1	26.965	1	27.415	1	27.865
2	26.075	2	26.525	2	26.975	2	27.425	2	27.875
3	26.085	3	26.535	3	26.985	3	27.435	3	27.885
4	26.105	4	26.555	4	27.005	4	27.455	4	27.905
5	26.115	5	26.565	5	27.015	5	27.465	5	27.915
6	26.125	6	26.575	6	27.025	6	26.475	6	27.925
7	26.135	7	26.585	7	27.035	7	27.485	7	27.935
8	26.155	8	26.605	8	27.055	8	27.505	8	27.955
9	26.165	9	26.615	9	27.065	9	27.515	9	27.965
10	26.175	10	26.625	10	27.075	10	27.525	10	27.975
11	26.185	11	26.635	11	27.085	11	27.535	11	27.985
12	26.205	12	26.655	12	27.105	12	27.555	12	28.005
13	26.215	13	26.665	13	27.115	13	27.565	13	28.015
14	26.225	14	26.675	14	27.125	14	27.575	14	28.015
15	26.235	15	26.685	15	27.135	15	27.585	15	28.025
16	26.255	16	26.705	16	27.155	16	27.605	16	28.035
17	26.265	17	26.715	17	27.165	17	27.615	17	28.055
18	26.275	18	26.725	18	27.175	18	27.625	18	28.065
19	26.285	19	26.735	19	27.185	19	27.635	19	28.075
20	26.305	20	26.755	20	27.205	20	27.655	20	28.085
21	26.315	21	26.765	21	27.215	21	27.665	21	28.105
22	26.325	22	26.775	22	27.225	22	27.675	22	28.115
23	26.355	23	26.805	23	27.255	23	27.705	23	28.155
24	26.335	24	26.785	24	27.235	24	27.685	24	28.135
25	26.345	25	26.795	25	27.245	25	27.695	25	28.145
26	26.365	26	26.815	26	27.265	26	27.715	26	28.165
27	26.375	27	26.825	27	27.275	27	27.725	27	28.175
28	26.385	28	26.835	28	27.285	28	27.735	28	28.185
29	26.395	29	26.845	29	27.295	29	27.745	29	28.195
30	26.405	30	26.855	30	27.305	30	27.755	30	28.205
31	26.415	31	26.865	31	27.315	31	27.765	31	28.215
32	26.425	32	26.875	32	27.325	32	27.775	32	28.225
33	26.435	33	26.885	33	27.335	33	27.785	33	28.235
34	26.445	34	26.895	34	27.345	34	27.795	34	28.245
35	26.455	35	26.905	35	27.355	35	27.805	35	28.255
36	26.465	36	26.915	36	27.365	36	27.815	36	28.265
37	26.475	37	26.925	37	27.375	37	27.825	37	28.275
38	26.485	38	26.935	38	27.385	38	27.835	38	28.285
39	26.495	39	26.945	39	27.395	39	27.845	39	28.295
40	26.505	40	26.955	40	27.405	40	27.855	40	28.305

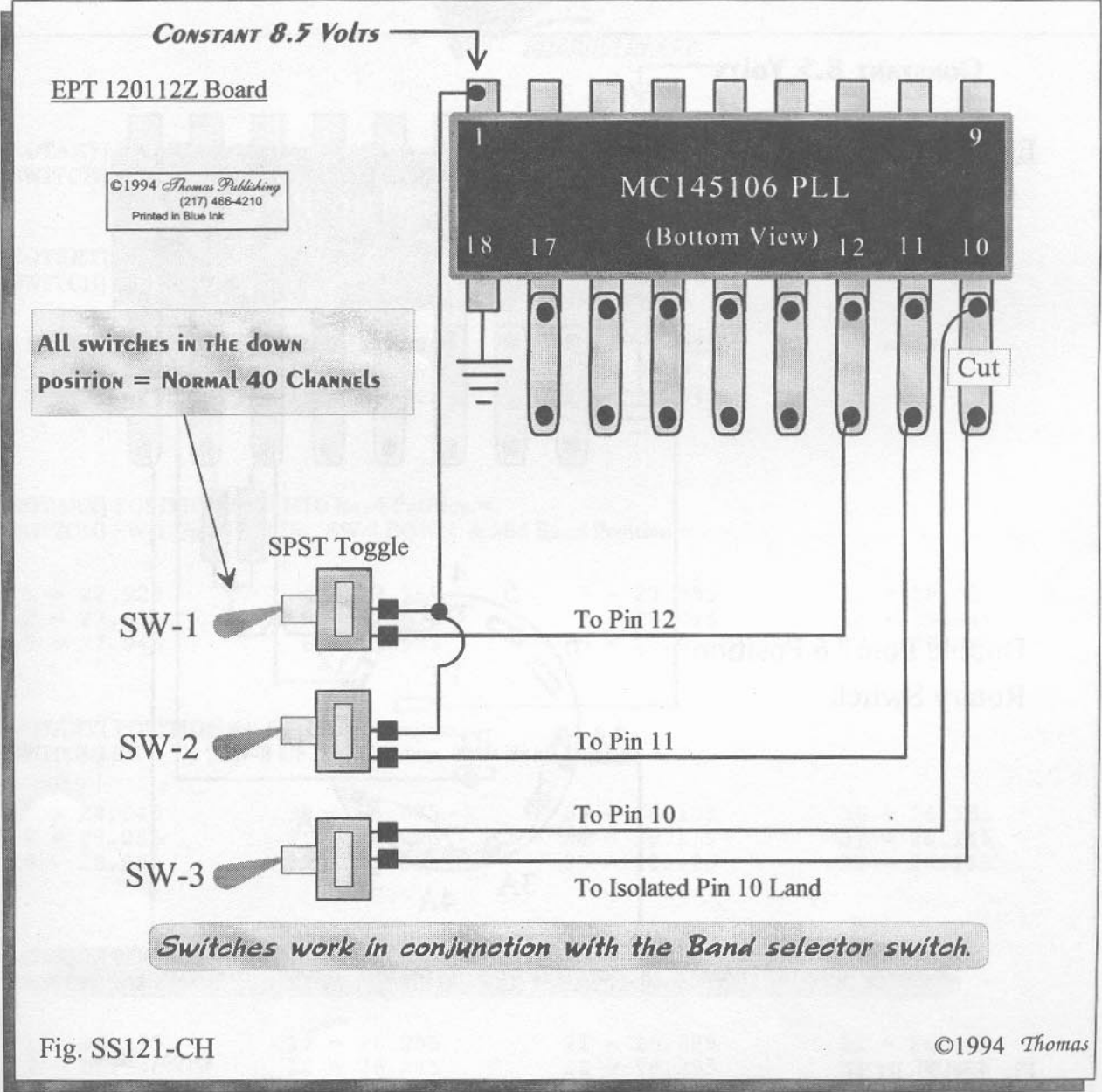
GALAXY DX 66V

CHANNEL CONVERSION

1. Remove the radio case and locate the small circuit board connected to the left side of the radios case.
2. Once you have located this small circuit board, locate the wire (*usually a green wire*) that is soldered to the back of this board. Either unsolder or cut this wire loose from the board and seal the end of this wire with some small heat shrinkable tubing. This needs to be done in order to prevent this wire from ever causing a short, or possibly other damage to your radio.
3. Next reconnect the connector that is unplugged from the small circuit board. Be sure the plug is plugged in properly and well seated. That's it. Your radio will now cover all channels & all bands as shown in the channel chart below.

GALAXY DX 66V FREQUENCY CHANNEL CHART															
LO BAND						HI BAND									
A		B		C		D		E		F		G		H	
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	25.165	1	25.615	1	26.065	1	26.515	1	26.965	1	27.415	1	27.865	1	28.315
2	25.175	2	25.625	2	26.075	2	26.525	2	26.975	2	27.425	2	27.875	2	28.325
3	25.185	3	25.635	3	26.085	3	26.535	3	26.985	3	27.435	3	27.885	3	28.335
4	25.205	4	25.655	4	26.105	4	26.555	4	27.005	4	27.455	4	27.905	4	28.355
5	25.215	5	25.665	5	26.115	5	26.565	5	27.015	5	27.465	5	27.915	5	28.365
6	25.225	6	25.675	6	26.125	6	26.575	6	27.025	6	26.475	6	27.925	6	28.375
7	25.235	7	25.685	7	26.135	7	26.585	7	27.035	7	27.485	7	27.935	7	28.385
8	25.255	8	25.705	8	26.155	8	26.605	8	27.055	8	27.505	8	27.955	8	28.405
9	25.265	9	25.715	9	26.165	9	26.615	9	27.065	9	27.515	9	27.965	9	28.415
10	25.275	10	25.725	10	26.175	10	26.625	10	27.075	10	27.525	10	27.975	10	28.425
11	25.285	11	25.735	11	26.185	11	26.635	11	27.085	11	27.535	11	27.985	11	28.435
12	25.305	12	25.755	12	26.205	12	26.655	12	27.105	12	27.555	12	28.005	12	28.455
13	25.315	13	25.765	13	26.215	13	26.665	13	27.115	13	27.565	13	28.015	13	28.465
14	25.325	14	25.775	14	26.225	14	26.675	14	27.125	14	27.575	14	28.015	14	28.475
15	25.335	15	25.785	15	26.235	15	26.685	15	27.135	15	27.585	15	28.025	15	28.485
16	25.355	16	25.805	16	26.255	16	26.705	16	27.155	16	27.605	16	28.035	16	28.505
17	25.365	17	25.815	17	26.265	17	26.715	17	27.165	17	27.615	17	28.055	17	28.515
18	25.375	18	25.825	18	26.275	18	26.725	18	27.175	18	27.625	18	28.065	18	28.525
19	25.385	19	25.835	19	26.285	19	26.735	19	27.185	19	27.635	19	28.075	19	28.535
20	25.405	20	25.855	20	26.305	20	26.755	20	27.205	20	27.655	20	28.085	20	28.555
21	25.415	21	25.865	21	26.315	21	26.765	21	27.215	21	27.665	21	28.105	21	28.565
22	25.425	22	25.875	22	26.325	22	26.775	22	27.225	22	27.675	22	28.115	22	28.575
23	25.455	23	25.905	23	26.355	23	26.805	23	27.255	23	27.705	23	28.155	23	28.605
24	25.435	24	25.885	24	26.335	24	26.785	24	27.235	24	27.685	24	28.135	24	28.585
25	25.445	25	25.895	25	26.345	25	26.795	25	27.245	25	27.695	25	28.145	25	28.595
26	25.465	26	25.915	26	26.365	26	26.815	26	27.265	26	27.715	26	28.165	26	28.615
27	25.475	27	25.925	27	26.375	27	26.825	27	27.275	27	27.725	27	28.175	27	28.625
28	25.485	28	25.935	28	26.385	28	26.835	28	27.285	28	27.735	28	28.185	28	28.635
29	25.495	29	25.945	29	26.395	29	26.845	29	27.295	29	27.745	29	28.195	29	28.645
30	25.505	30	25.955	30	26.405	30	26.855	30	27.305	30	27.755	30	28.205	30	28.655
31	25.515	31	25.965	31	26.415	31	26.865	31	27.315	31	27.765	31	28.215	31	28.665
32	25.525	32	25.975	32	26.425	32	26.875	32	27.325	32	27.775	32	28.225	32	28.675
33	25.535	33	25.985	33	26.435	33	26.885	33	27.335	33	27.785	33	28.235	33	28.685
34	25.545	34	25.995	34	26.445	34	26.895	34	27.345	34	27.795	34	28.245	34	28.695
35	25.555	35	26.005	35	26.455	35	26.905	35	27.355	35	27.805	35	28.255	35	28.705
36	25.565	36	26.015	36	26.465	36	26.915	36	27.365	36	27.815	36	28.265	36	28.715
37	25.575	37	26.025	37	26.475	37	26.925	37	27.375	37	27.825	37	28.275	37	28.725
38	25.585	38	26.035	38	26.485	38	26.935	38	27.385	38	27.835	38	28.285	38	28.735
39	25.595	39	26.045	39	26.495	39	26.945	39	27.395	39	27.845	39	28.295	39	28.745
40	25.605	40	26.055	40	26.505	40	26.955	40	27.405	40	27.855	40	28.305	40	28.755

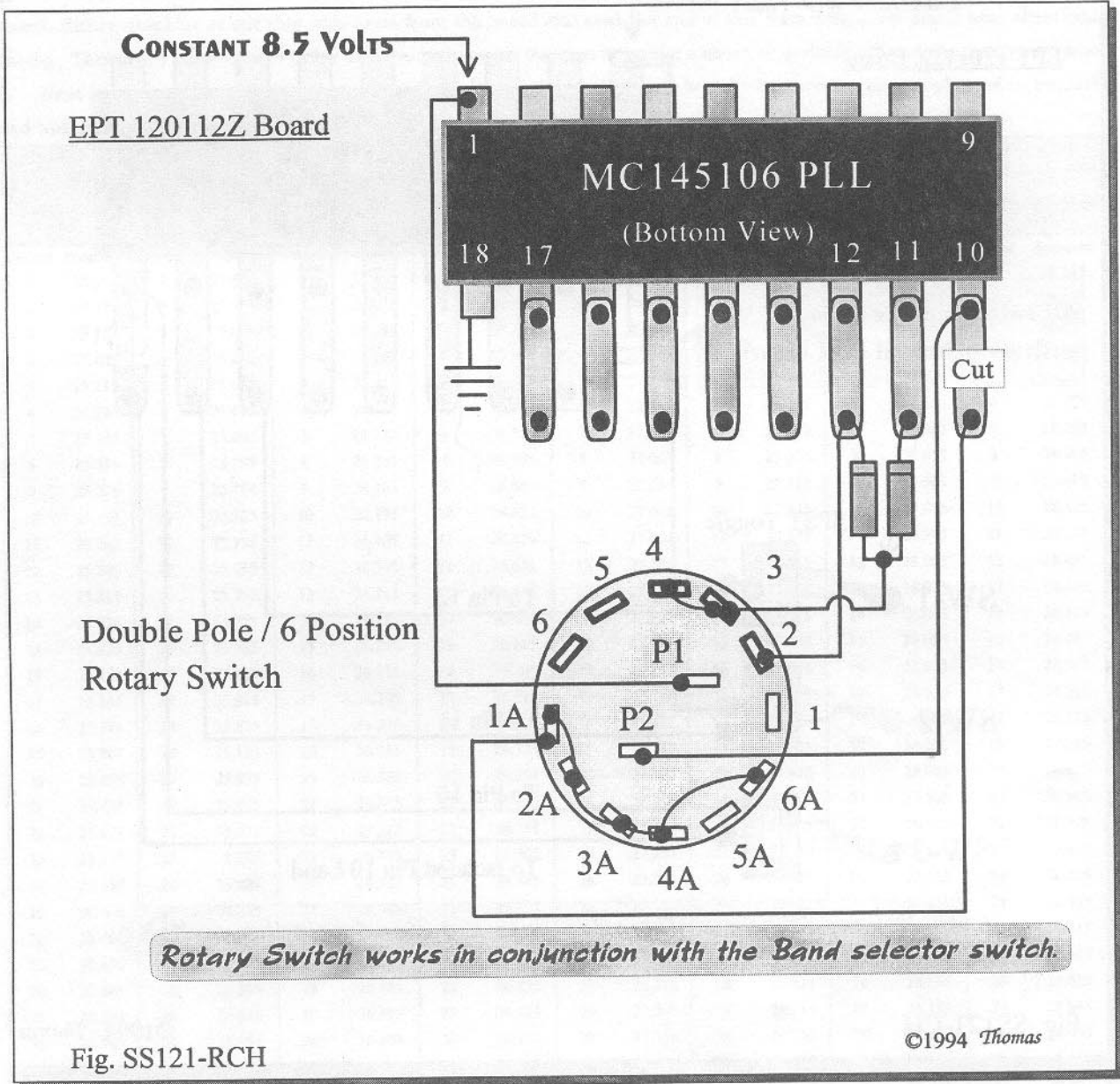
SUPERSTAR 121
EPT 120112Z Board
Switch Channel Conversion



NOTICE !

Not drawn to scale. For illustrative purposes only.
 Provided for informational or Export use only.
 Performing this modification will void the Manufactures Warranty.

SUPERSTAR 121
EPT 120112Z Board
Rotary Switch Channel Conversion



NOTICE !

Not drawn to scale. For illustrative purposes only.
 Provided for informational or Export use only.
 Performing this modification will void the Manufactures Warranty.



[ROTARY] POSITION #1 = Normal Channels
[SWITCH] SW-1 Down , SW-2 Down & SW-3 Down = Normal Channels

[ROTARY] POSITION #2 & HI Band Position =
[SWITCH] SW-1 Up & SW-2 Down & SW-3 Down & Hi Band Position =

10 = 27.845	13 = 27.885	16 = 27.925	19 = 27.955
11 = 27.855	14 = 27.895	17 = 27.935	
12 = 27.875	15 = 27.905	18 = 27.945	

[ROTARY] POSITION #3 & MID Band Position =
[SWITCH] SW-1 Up , SW-2 Up , SW-3 DOWN & Mid Band Position =

1 = 27.925	4 = 27.965	7 = 27.995	10 = 28.035
2 = 27.935	5 = 27.975	8 = 28.015	11 = 28.045
3 = 27.945	6 = 27.985	9 = 28.025	12 = 28.065

[ROTARY] POSITION #4 & HI Band Position =
[SWITCH] SW-1 Up , SW-2 Up , SW-3 Down & Hi Band Position =

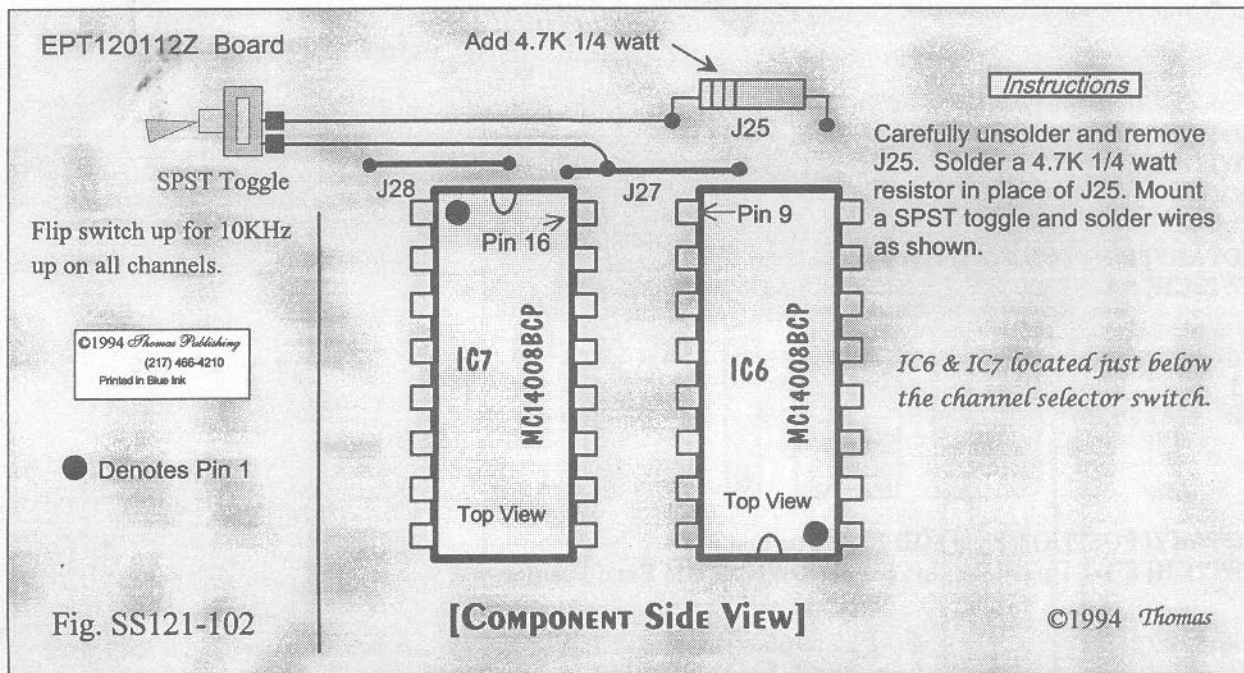
27 = 28.045	30 = 28.075	33 = 28.105	36 = 28.135
28 = 28.055	31 = 28.085	34 = 28.115	37 = 28.145
29 = 28.065	32 = 28.095	35 = 28.125	38 = 28.155

[ROTARY] POSITION #5 & HI Band Position =
[SWITCH] SW-1 Down , SW-2 Down , SW-3 Up & Hi Band Position =

1 = 26.135	11 = 26.255	21 = 26.385	31 = 26.485
2 = 26.145	12 = 26.275	22 = 26.395	32 = 26.495
3 = 26.155	13 = 26.285	23 = 26.425	33 = 26.505
4 = 26.175	14 = 26.295	24 = 26.405	34 = 26.515
5 = 26.185	15 = 26.305	25 = 26.415	35 = 26.525
6 = 26.195	16 = 26.325	26 = 26.435	36 = 26.535
7 = 26.205	17 = 26.335	27 = 26.445	37 = 26.545
8 = 26.225	18 = 26.345	28 = 26.455	38 = 26.555
9 = 26.235	19 = 26.355	29 = 26.465	39 = 26.565
10 = 26.245	20 = 26.375	30 = 26.475	40 = 26.575

SUPERSTAR 121

EPT 120112Z Board
+10 KHz Frequency Jump Modification



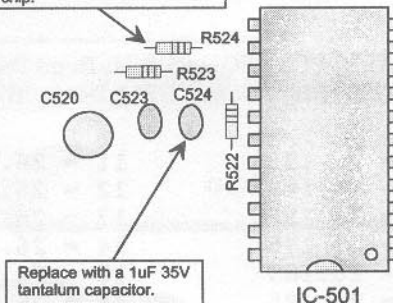
REPAIR TIP

Radio : REGENCY INFO CB-2

Problem: Transmit and receive come and go. Sometimes receive will stay in but transmit does not function at all times. Radio acts as if it has a loose connection.

Cure : Locate C524 just to the left of IC501 PLL chip. This is a small orange 1 μ F 20V tantalum capacitor. Remove and replace C524 with a new 1 μ F 35V tantalum capacitor. Some adjustment of the VCO may be necessary if the unit does not lock in and function on Channel 1 and Channel 40.

DC Voltmeter to this point and adjust the VCO for 1.9V on Channel 20 RX. VCO adjustment is inside the metal wax filled compartment located behind the PLL chip.



VARIABLE ALIGNMENTS

COBRA® RADIOS

18 ULTRA (New Weather Model made in Thailand.)

VR101 = RX "S" Meter Adjust VR301 = TX Meter Adjust VR501 = Modulation AMC Adjust
VR102 = Receive "IF" Gain Adjust VR102¹ = Squelch Range Adjust

Receive Adjust = L101, L102, L103, L104, L105
Transmit Adjust = L301, L302, L303, L304, L306, L305

¹ The 18 Ultra has two VR102 adjustments. The Squelch VR102 is located in the front left corner of radio board.

21LTD CLASSIC (New Model made in China. No longer manufactured by Uniden)

VR1 = TX Meter Adjust VR3 = Squelch Range Adjust TC1 = 10.240 Xtal Adjust
VR2 = RX "S" Meter Adjust VR4 = Modulation AMC Adjust

Receive Adjust = L1, L2, L3, L4, L5
Transmit Adjust = L12, L11, L10, L8

25LTD WX CLASSIC (New Weather Model made in China. No longer manufactured by Uniden)

VR1 = RX "S" Meter Adjust VR3 = TX Meter Adjust VR5 = Modulation AMC Adjust
VR2 = Receive "IF" Gain Adjust VR4 = Squelch Range Adjust VC1 = 10.240 Xtal Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7
Transmit Adjust = L18, L14, L10

29LTD WX CLASSIC (New Weather Model made in China. No longer manufactured by Uniden)

VR1 = Receive "IF" Gain Adjust VR3 = Squelch Range Adjust VR5 = TX Meter Adjust
VR2 = RX "S" Meter Adjust VR4 = Modulation AMC Adjust VR6 = Ant. Warning Indicator Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7, L8, L9
Transmit Adjust = L20, L21, L17, L14, L13, L12

HH-70

RV1 = RX "S" Meter Adjust RV3 = Squelch Range Adjust RV4 = Modulation AMC Adjust
RV2 = TX Meter Adjust

Receive Adjust = L1, L2, L3
Transmit Adjust = L5, L6, L801

CRAIG RADIOS

L101

R128 = RX "S" Meter Adjust R319 = TX Meter Adjust R226 = Modulation AMC adjust
R501 = Dim Adjust (Minimum) R117 = Squelch Range Adjust

Receive Adjust = T107, T106, T105, T104, T103, T102, T101
Transmit Adjust = T301, L302, L303, T302, L305

L102

R308 = TX Meter Adjust R376 = RX "S" Meter Adjust R501 = SWR Meter
R348 = Modulation AMC Adjust R415 = Squelch Range Adjust

Receive Adjust = T305, T304, T302, T301, T307, L302, L301, R306, R313
Transmit Adjust = L306, L307, L308, L309, L311, L313, L314, L315, L316

L103

VR1 = Squelch Range Adjust VR2 = RX "S" Meter Adjust VR3 = TX Meter Adjust

Receive Adjust = L1, L2, L3, L4, L6, L7, L8
Transmit Adjust = L10, L12, L13, L16

CRAIG RADIOS

L104

VR1 = RX "S" Meter Adjust
VR2 = RX IF GAIN Adjust

VR3 = TX Meter Adjust
VR4 = Squelch Range Adjust

VR5 = Modulation AMC adjust

Receive Adjust = L1, L2, L3, L4, L6, L7
Transmit Adjust = L18, L17, L14, L10

L131

R106 = TX Meter Adjust
R130 = ALC SSB Power
R229 = AM RX "S" Meter Adjust
R240 = SSB RX "S" Meter Adjust

R307 = RF GAIN Range Adjust
R309 = RX AGC Adjust
R315 = Squelch Range Adjust

R401 = SSB Carrier Balance (1)
R414 = SSB Carrier Balance (2)
R605 = Modulation AMC Adjust

Receive Adjust = T206, T205, T204, T203, T202, T201, T301, T302, T303
Transmit Adjust = T103, T102, T101, L111, L109, L106

L231

R106 = TX Meter Adjust
R130 = ALC SSB Power
R229 = AM RX "S" Meter Adjust
R240 = SSB RX "S" Meter Adjust

R307 = RF GAIN Range Adjust
R309 = RX AGC Adjust
R315 = Squelch Range Adjust

R401 = SSB Carrier Balance (1)
R414 = SSB Carrier Balance (2)
R605 = Modulation AMC Adjust
R711 = Dimmer Adjust

Receive Adjust = T206, T205, T204, T203, T202, T201, T301, T302, T303
Transmit Adjust = T103, T102, T101, L111, L109, L106

DIRLAND RADIOS

77-099

RV3 = Squelch Range Adjust

CT1 = 10.240 Xtal Adjust

Receive Adjust = L1, L3, L4, L5, L2
Transmit Adjust = L7, L8, L9, L11, L12

SS-3900 & SS-3900B

VR1 = AM/FM "S" Meter
VR2 = SSB/CW "S" Meter
VR3 = SSB Squelch Range
VR4 = AM Squelch Range
VR5 = FM Deviation

VR7 = Carrier Balance
VR8 = RF Transmit Meter
VR10 = Final TX Bias Adjust (1)
VR11 = Driver TX Bias Adjust
VR12 = ALC SSB Power

VR13 = AM Power Adjust
VR14 = AM Modulation AMC
VR16 = CW Tone Level
VR20 = Final TX Bias (2)
VR21 = Transmit Frequency Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7, L8
Transmit Adjust = L44, L43, L42, L40, L33

EMPEROR RADIOS

TS-5010 (Main Board)

VR101 = Squelch Range Adjust
VR102 = RX "S" Meter Adjust
VR103 = SSB PEP ALC
VR104 = CW Power Adjust
VR105 = SSB Carrier Balance Adjust

VR106 = FM Deviation
VR107 = Modulation Meter Adjust
VR108 = Transmit Frequency Adjust
VR109 = Transmit Meter Adjust
VR110 = AM Modulation AMC Adjust

VR111 = AM Power Adjust
VR112 = Final Bias Adjust ((60mA)
VR113 = Driver Bias (60mA)
VR115 = SideTone Adjust

Receive Adjust = L101, L102, L103, L104, L106
Transmit Adjust = Variable Power Adjust Only. Cans are factory Set.

GALAXY RADIOS

DX 33HML (EPT 360014B Board)

VR1 = AM "S" Meter

VR4 = AM Squelch Range

VR5 = FM Deviation

VR8 = RF Transmit Meter

VR12 = N/A

VR13 = AM High Power Adjust

VR14 = AM Modulation AMC Adjust

VR16 = AM Lo Power Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7, L8

Transmit Adjust = L44, L43, L42, L40, L33

DX 55V (EPT 360014B Board)

VR1 = AM "S" Meter

VR4 = AM Squelch Range

VR5 = FM Deviation

VR8 = RF Transmit Meter

VR13 = AM High Power Adjust

VR14 = AM Modulation AMC Adjust

VR16 = AM Lo Power Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7, L8

Transmit Adjust = L44, L43, L42, L40, L33

DX 66V (EPT 360014B Board)

VR1 = AM "S" Meter

VR4 = AM Squelch Range

VR5 = FM Deviation

VR8 = RF Transmit Meter

VR13 = AM High Power Adjust

VR14 = AM Modulation AMC Adjust

VR16 = AM Lo Power Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7, L8

Transmit Adjust = L43, L42, L40, L33

DX 77HML (EPT 360014B Board)

VR1 = AM "S" Meter

VR2 = SSB/CW "S" Meter

VR3 = SSB Squelch Range

VR4 = AM Squelch Range

VR5 = FM Deviation

VR7 = Carrier Balance

VR8 = RF Transmit Meter

VR10 = Final TX Bias Adjust (1)

VR11 = Driver TX Bias Adjust

VR12 = ALC SSB Power

VR13 = AM High Power Adjust

VR14 = AM Modulation AMC Adjust

VR16 = AM Lo Power Adjust

VR20 = Final TX Bias (2)

VR21 = Transmit Frequency Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7, L8

Transmit Adjust = L44, L43, L42, L40, L33

MIRAGE 44 (EPT 360014B Board)

VR1 = AM "S" Meter

VR4 = AM Squelch Range

VR5 = FM Deviation

VR8 = RF Transmit Meter

VR13 = AM High Power Adjust

VR14 = AM Modulation AMC Adjust

VR16 = AM Lo Power Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7, L8

Transmit Adjust = L44, L43, L42, L40, L33

PLUTO (EPT 360014B Board)

VR1 = AM "S" Meter

VR2 = SSB/CW "S" Meter

VR3 = SSB Squelch Range

VR4 = AM Squelch Range

VR5 = FM Deviation

VR7 = Carrier Balance

VR8 = RF Transmit Meter

VR10 = Final TX Bias Adjust (1)

VR11 = Driver TX Bias Adjust

VR12 = ALC SSB Power

VR13 = AM High Power Adjust

VR14 = AM Modulation AMC Adjust

VR16 = AM Lo Power Adjust

VR20 = Final TX Bias (2)

VR21 = Transmit Frequency Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7, L8

Transmit Adjust = L44, L43, L42, L40, L33

SATURN II (EPT 360014B Board)

VR1 = AM "S" Meter

VR2 = SSB/CW "S" Meter

VR3 = SSB Squelch Range

VR4 = AM Squelch Range

VR5 = FM Deviation

VR7 = Carrier Balance

VR8 = RF Transmit Meter

VR10 = Final TX Bias Adjust (1)

VR11 = Driver TX Bias Adjust

VR12 = ALC SSB Power

VR13 = AM High Power Adjust

VR14 = AM Modulation AMC Adjust

VR16 = AM Lo Power Adjust

VR20 = Final TX Bias (2)

VR21 = Transmit Frequency Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7, L8

Transmit Adjust = L44, L43, L42, L40, L33

LAFAYETTE RADIOS

SSB 140

RV1A = Final Bias Adjust	RV6 = AM RX "S" Meter Adjust	RV11 = SSB Mike Gain Adjust
RV2 = SSB TX ALC (Power) Adjust	RV7 = SSB RX "S" Meter Adjust	RV12 = AM Modulation AMC Adjust
RV3 = TX Meter Adjust	RV8 = Receive AGC Adjust	RV501 = SWR Meter Calibrate
RV4 = Carrier Balance (1)	RV9 = AM Squelch Range Adjust	RV511 = Ant. Warning Ind. Adjust
RV5 = Carrier Balance (2)	RV10 = SSB Squelch Range Adjust	RV521 = Modulation Meter Calibrate
		VR4 = AM Power Adjust

Receive Adjust = T14, T15, T13, T10, T9, T8, T7, T12, T11

Transmit Adjust = T4, T5, T6, L7, L11, L13 (*Adjust these coils for Maximum power on USB*)

MAXON® RADIOS

MCB-25

RV1 = Squelch Range Adjust	RV2 = Modulation AMC	CT1 = 10.240 Xtal Adjust
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Receive Adjust = L903, L902, L901

Transmit Adjust = L701, L702, L802, RFC705, RFC709

MCB-30

RV1 = Squelch Range Adjust	RV2 = Modulation AMC	CT1 = 10.240 Xtal Adjust
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Receive Adjust = L903, L902, L901

Transmit Adjust = L701, L702, L802, RFC705, RFC709

MIDLAND® RADIOS

63-445 (*AM/FM Radio w/CB*)

VR1 = Receive AGC Adjust	VR3 = Squelch Range Adjust	VR5 = Modulation AMC adjust
VR2 = TX Meter Adjust	VR4 = RX "S" Meter Adjust	

Receive Adjust = L106, L105, L104, L103, L102, L101

Transmit Adjust = L114, L113, L112, L109

77-200 (200M)

VR2 = RX "S" Meter Adjust	VR4 = Modulation AMC adjust	VR7 = AWI (<i>Ant. Warning Indicator</i>)
VR3 = Squelch Range Adjust	VR6 = TX Meter Adjust	

Receive Adjust = L1, L2, L3, L4, L6, L7

Transmit Adjust = L8, L9, L10, L11, L14

78-574

RV1 = Carrier Balance #1	RV6 = SSB AGC	RV201 = SSB Transmit ALC
RV2 = Carrier Balance #2	RV7 = AM Squelch Adj.	RV202 = Transmit Meter
RV3 = SSB Mike Gain	RV8 = SSB Squelch Adj.	RV206 = TX Final Bias'
RV4 = SSB Receive "S" Meter	RV9 = AM Modulation AMC	CT201 = 10.240 Xtal Adj.
RV5 = AM Receive "S" Meter	RV10 = RF Gain Range	VR1 = AM Transmit Power

Note: Adjust RV206 for .70 Volts on the base of Q208

AM Receive Adjust = T1, T2, T204, T205, T206, T207, T208

SSB Receive Adjust = T4, T3

Transmit Adjust = T204, T205, T3, T209, L209, L212, L214 (*Adjust in USB Mode*)

7001 (79-007)

RV1 = Final Bias Adjust	RV5 = Squelch Range Adjust	RV9 = AM Modulation AMC Adjust
RV2 = TX Meter Adjust	RV6 = Carrier Balance (1)	RV10 = SSB TX ALC (Power) Adjust
RV3 = RX "S" Meter Adjust	RV7 = Carrier Balance (2)	RV501 = Ant. Warning Ind. Adjust
RV4 = Receive AGC Adjust	RV8 = SSB Modulation Adjust	VR1 = AM Power Adjust

Receive Adjust = T8, T9, T10, T11(10.3965 Level Adj.), T12

Transmit Adjust = T1, T2, T3, T11(10.3965 Level Adj.), T4, T5, T6, T7, L10, L14, L16 (*Adjust these coils for Maximum power on USB*)

RANGER RADIOS

ST-1000 / HCA818

RV-2 = RX "S" Meter Adjust

RV-3 = Squelch Range Adjust

CT1 = 10.240 Xtal Adjust

Receive Adjust = T1, T2, T3, T4, T5

Transmit Adjust = T7, T8, T9, L4

SUPERSTAR RADIOS

121 (EPT 120112Z Board)

VR1 = AM "S" Meter

VR4 = AM Squelch Range

VR5 = FM Deviation

VR8 = RF Transmit Meter

VR12 = Lo Pwr Modulation Adjust

VR13 = AM High Power Adjust

VR14 = Hi Pwr Modulation Adjust

VR16 = AM Lo Power Adjust

Receive Adjust = L1, L2, L3, L4, L5, L6, L7, L8

Transmit Adjust = L44, L43, L42, L33

JA (EPT 00JA10Z Circuit Board)

VR1 = AM "S" Meter

VR2 = AM Squelch Range

VR4 = Carrier Balance

VR5 = FM Deviation

VR6 = Transmit Frequency Adjust

VR8 = ALC SSB Power

VR9 = Final TX Bias Adjust (1)

VR10 = Driver TX Bias Adjust

VR11 = AM High Power Adjust

VR12 = AM Modulation AMC Adjust

Receive Adjust = L3, L5, L6, L7, L8, L9

Transmit Adjust = L44, L43, L41, L42, L40, L33, L31, L30

TRI MAX RADIOS

220

RV1 = RX "S" Meter Adjust

RV2 = Squelch Range Adjust

RV3 = AM Modulation AMC Adjust

Receive Adjust = T1, T2, T3, T4, T5

Transmit Adjust = T8, T9, T10, L10, L11, L12, L13

TRS CHALLENGER RADIOS

730

VR1 = Modulation AMC adjust

VR2 = Receive AGC Adjust

VR3 = RX "S" Meter Adjust

VR4 = TX Meter Adjust

VR5 = Squelch Range Adjust

VR6 = Transmit Power Adjust

Receive Adjust = T204, T205, T206, T207, T208, T209, T210, T211

Transmit Adjust = T214, L204, CV101, L205

YOSAN RADIOS

JC-2204

VR501 = FM Deviation

VR502 = Transmit Meter Adjust

VR602 = RX "S" Meter Adjust

VR603 = Squelch Range Adjust

VR603 = AM Modulation AMC Adjust

VR701 = Modulation Meter Adjust

Receive Adjust = T301, T302, T303, T304, T305

Transmit Adjust = T201, L203, L204, L206

GALAXY DX 44V & MIRAGE 44 FREQUENCY CHANNEL CHART

LO BAND								HI BAND							
A		B		C		D		E		F		G		H	
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	25.165	1	25.615	1	26.065	1	26.515	1	26.965	1	27.415	1	27.865	1	28.315
2	25.175	2	25.625	2	26.075	2	26.525	2	26.975	2	27.425	2	27.875	2	28.325
3	25.185	3	25.635	3	26.085	3	26.535	3	26.985	3	27.435	3	27.885	3	28.335
4	25.205	4	25.655	4	26.105	4	26.555	4	27.005	4	27.455	4	27.905	4	28.355
5	25.215	5	25.665	5	26.115	5	26.565	5	27.015	5	27.465	5	27.915	5	28.365
6	25.225	6	25.675	6	26.125	6	26.575	6	27.025	6	26.475	6	27.925	6	28.375
7	25.235	7	25.685	7	26.135	7	26.585	7	27.035	7	27.485	7	27.935	7	28.385
8	25.255	8	25.705	8	26.155	8	26.605	8	27.055	8	27.505	8	27.955	8	28.405
9	25.265	9	25.715	9	26.165	9	26.615	9	27.065	9	27.515	9	27.965	9	28.415
10	25.275	10	25.725	10	26.175	10	26.625	10	27.075	10	27.525	10	27.975	10	28.425
11	25.285	11	25.735	11	26.185	11	26.635	11	27.085	11	27.535	11	27.985	11	28.435
12	25.305	12	25.755	12	26.205	12	26.655	12	27.105	12	27.555	12	28.005	12	28.455
13	25.315	13	25.765	13	26.215	13	26.665	13	27.115	13	27.565	13	28.015	13	28.465
14	25.325	14	25.775	14	26.225	14	26.675	14	27.125	14	27.575	14	28.015	14	28.475
15	25.335	15	25.785	15	26.235	15	26.685	15	27.135	15	27.585	15	28.025	15	28.485
16	25.355	16	25.805	16	26.255	16	26.705	16	27.155	16	27.605	16	28.035	16	28.505
17	25.365	17	25.815	17	26.265	17	26.715	17	27.165	17	27.615	17	28.055	17	28.515
18	25.375	18	25.825	18	26.275	18	26.725	18	27.175	18	27.625	18	28.065	18	28.525
19	25.385	19	25.835	19	26.285	19	26.735	19	27.185	19	27.635	19	28.075	19	28.535
20	25.405	20	25.855	20	26.305	20	26.755	20	27.205	20	27.655	20	28.085	20	28.555
21	25.415	21	25.865	21	26.315	21	26.765	21	27.215	21	27.665	21	28.105	21	28.565
22	25.425	22	25.875	22	26.325	22	26.775	22	27.225	22	27.675	22	28.115	22	28.575
23	25.455	23	25.905	23	26.355	23	26.805	23	27.255	23	27.705	23	28.155	23	28.605
24	25.435	24	25.885	24	26.335	24	26.785	24	27.235	24	27.685	24	28.135	24	28.585
25	25.445	25	25.895	25	26.345	25	26.795	25	27.245	25	27.695	25	28.145	25	28.595
26	25.465	26	25.915	26	26.365	26	26.815	26	27.265	26	27.715	26	28.165	26	28.615
27	25.475	27	25.925	27	26.375	27	26.825	27	27.275	27	27.725	27	28.175	27	28.625
28	25.485	28	25.935	28	26.385	28	26.835	28	27.285	28	27.735	28	28.185	28	28.635
29	25.495	29	25.945	29	26.395	29	26.845	29	27.295	29	27.745	29	28.195	29	28.645
30	25.505	30	25.955	30	26.405	30	26.855	30	27.305	30	27.755	30	28.205	30	28.655
31	25.515	31	25.965	31	26.415	31	26.865	31	27.315	31	27.765	31	28.215	31	28.665
32	25.525	32	25.975	32	26.425	32	26.875	32	27.325	32	27.775	32	28.225	32	28.675
33	25.535	33	25.985	33	26.435	33	26.885	33	27.335	33	27.785	33	28.235	33	28.685
34	25.545	34	25.995	34	26.445	34	26.895	34	27.345	34	27.795	34	28.245	34	28.695
35	25.555	35	26.005	35	26.455	35	26.905	35	27.355	35	27.805	35	28.255	35	28.705
36	25.565	36	26.015	36	26.465	36	26.915	36	27.365	36	27.815	36	28.265	36	28.715
37	25.575	37	26.025	37	26.475	37	26.925	37	27.375	37	27.825	37	28.275	37	28.725
38	25.585	38	26.035	38	26.485	38	26.935	38	27.385	38	27.835	38	28.285	38	28.735
39	25.595	39	26.045	39	26.495	39	26.945	39	27.395	39	27.845	39	28.295	39	28.745
40	25.605	40	26.055	40	26.505	40	26.955	40	27.405	40	27.855	40	28.305	40	28.755

GALAXY DX-77 HML FREQUENCY CHANNEL CHART

A		B		C		D		E		F	
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	25.615	1	26.065	1	26.515	1	26.965	1	27.415	1	27.865
2	25.625	2	26.075	2	26.525	2	26.975	2	27.425	2	27.875
3	25.635	3	26.085	3	26.535	3	26.985	3	27.435	3	27.885
4	25.655	4	26.105	4	26.555	4	27.005	4	27.455	4	27.905
5	25.665	5	26.115	5	26.565	5	27.015	5	27.465	5	27.915
6	25.675	6	26.125	6	26.575	6	27.025	6	26.475	6	27.925
7	25.685	7	26.135	7	26.585	7	27.035	7	27.485	7	27.935
8	25.705	8	26.155	8	26.605	8	27.055	8	27.505	8	27.955
9	25.715	9	26.165	9	26.615	9	27.065	9	27.515	9	27.965
10	25.725	10	26.175	10	26.625	10	27.075	10	27.525	10	27.975
11	25.735	11	26.185	11	26.635	11	27.085	11	27.535	11	27.985
12	25.755	12	26.205	12	26.655	12	27.105	12	27.555	12	28.005
13	25.765	13	26.215	13	26.665	13	27.115	13	27.565	13	28.015
14	25.775	14	26.225	14	26.675	14	27.125	14	27.575	14	28.015
15	25.785	15	26.235	15	26.685	15	27.135	15	27.585	15	28.025
16	25.805	16	26.255	16	26.705	16	27.155	16	27.605	16	28.035
17	25.815	17	26.265	17	26.715	17	27.165	17	27.615	17	28.055
18	25.825	18	26.275	18	26.725	18	27.175	18	27.625	18	28.065
19	25.835	19	26.285	19	26.735	19	27.185	19	27.635	19	28.075
20	25.855	20	26.305	20	26.755	20	27.205	20	27.655	20	28.085
21	25.865	21	26.315	21	26.765	21	27.215	21	27.665	21	28.105
22	25.875	22	26.325	22	26.775	22	27.225	22	27.675	22	28.115
23	25.905	23	26.355	23	26.805	23	27.255	23	27.705	23	28.155
24	25.885	24	26.335	24	26.785	24	27.235	24	27.685	24	28.135
25	25.895	25	26.345	25	26.795	25	27.245	25	27.695	25	28.145
26	25.915	26	26.365	26	26.815	26	27.265	26	27.715	26	28.165
27	25.925	27	26.375	27	26.825	27	27.275	27	27.725	27	28.175
28	25.935	28	26.385	28	26.835	28	27.285	28	27.735	28	28.185
29	25.945	29	26.395	29	26.845	29	27.295	29	27.745	29	28.195
30	25.955	30	26.405	30	26.855	30	27.305	30	27.755	30	28.205
31	25.965	31	26.415	31	26.865	31	27.315	31	27.765	31	28.215
32	25.975	32	26.425	32	26.875	32	27.325	32	27.775	32	28.225
33	25.985	33	26.435	33	26.885	33	27.335	33	27.785	33	28.235
34	25.995	34	26.445	34	26.895	34	27.345	34	27.795	34	28.245
35	26.005	35	26.455	35	26.905	35	27.355	35	27.805	35	28.255
36	26.015	36	26.465	36	26.915	36	27.365	36	27.815	36	28.265
37	26.025	37	26.475	37	26.925	37	27.375	37	27.825	37	28.275
38	26.035	38	26.485	38	26.935	38	27.385	38	27.835	38	28.285
39	26.045	39	26.495	39	26.945	39	27.395	39	27.845	39	28.295
40	26.055	40	26.505	40	26.955	40	27.405	40	27.855	40	28.305