

Professional 87.5 - 108MHz 1 Watt PLL FM Broadcast Transmitter

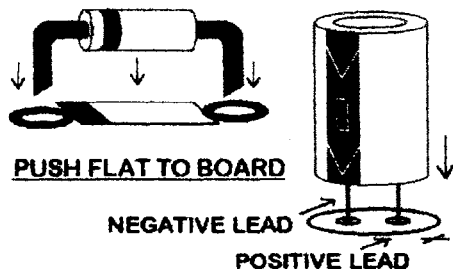


CONSTRUCTION DETAILS

Before attempting any construction, check all the components against the component list. If any of the components are missing or damaged, immediately contact Veronica FM or your supplier before going any further with this kit. If you are unsure about soldering refer to Soldering Tips section.

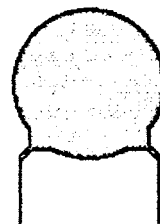
The Circuit Board is printed with a legend showing the component shapes and reference numbers (R1, R2, R3, C1, C2, etc). Use the legend together with the component list to find the correct component for the PCB. Take extreme care when placing the components on the PCB. If a component is incorrectly placed, the circuit will not work properly and may even be damaged.

It's normal to assemble the PCB with the smaller components first, progressing through to the larger components. Using the PCB legend as a positioning aid, solder the components into the PCB and trim back the excess leads in the following order.

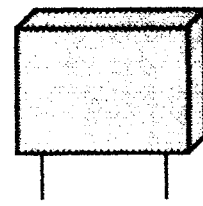


Diode and Electrolytic Capacitor connections to PCB

1. **Resistors, LINKS, Diodes and Zener Diodes** . ZD1 and ZD2 are colour coded with a white mark, be sure to insert these in the correct position. Line up diodes with legend for correct polarity (see diagram). All components flat to PCB with very short leads. R36 to R47 are very close together **do not bridge the adjacent connections with solder**
2. IC1, IC2, IC3, IC4, IC5, IC6, IC7, SW1 and SW2 **CAUTION! SOME ICs ARE STATIC SENSITIVE DEVICES.** (Soldering Iron must have good earth. Avoid touching the IC pins with your fingers). Gently bend the pins with small pliers to allow fit to PCB. Make sure all pins go into PCB and the component is flat down. Line up with legend for correct polarity. The component pins are close together, **do not bridge the adjacent pins with solder**
3. **Variable Resistor, Ceramic Disc Capacitors and Ferrite Bead Chokes.** Leads very short and components close to PCB.



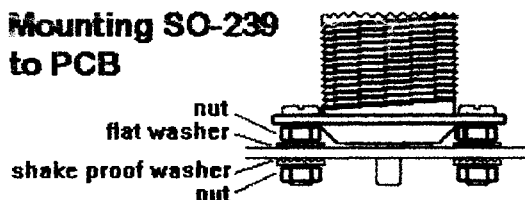
Ceramic Disc Capacitor



Polyester Capacitor

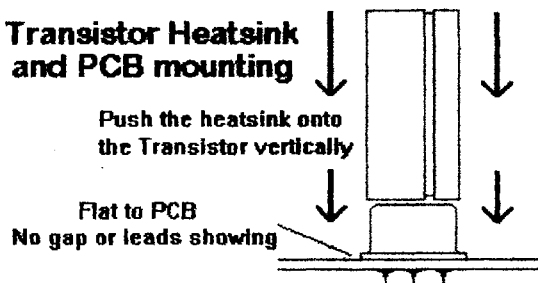
4. TR6 and TR7. Push fully down so transistor case is firm against PCB, then solder. To achieve maximum power and prevent instability of the circuit, this condition is very important (see section 13 diagram).
5. Coils that make up L1, L2, L3, L4, L5 and L6. Coil (L2) is colour coded with a white mark, be sure to insert this in the correct position. Push coils fully down to the board when soldering, keeping leads very short.
6. **Polyester Capacitors.** Some of these components are colour coded with Red, Yellow and White marks, be sure to insert these in the correct positions. All flat to PCB with no leads showing.
7. TR1, TR2, TR3, TR4, TR5, TR8, TR9, TR10 TR11 VCD1 and LEDs . Line up components with legend for correct polarity. LED polarity is shown by a flat section on one side of the plastic body, .The Transistors and Vancap will not push flat to the PCB without damage. As a compromise to keep the leads short, push the components gently, slightly bending the leads until the black casing is 3 mm above the PCB.
8. **Variable Capacitors, Electrolytic Capacitors, and XTAL1.** Line up Electrolytic Capacitors with legend for correct polarity(see diagram). All flat to PCB with no leads showing at all.
9. **Phono Socket.** Flat to PCB
10. **SO-239.** Fix tight to PCB with nuts, bolts and washers (see diagram), then solder centre pin firmly.

Mounting SO-239 to PCB



12. IC8. Line up with legend for correct polarity Mount the component so that the black casing is about 3mm above the PCB.
13. TR6 and TR7 Tubular Heatsinks. Gently open the diameter of the aluminium tube with a screwdriver until it fits tight on the transistor case. A tight rigid fit is necessary to prevent overheating of the transistor. Push the heatsink onto the transistor with vertical force only. Any side ways force could easily damage the transistor (see diagram).

Transistor Heatsink and PCB mounting



Before applying a power supply to the circuit, check and double check that all the components are in the correct position with the right polarisation. Check all the soldered joints, these should be shiny in appearance and all components should be rigid. When all the checks are complete and okay, test the circuit.

*** POLARISED COMPONENTS TAKE GREAT CARE TO INSERT THE COMPONENT LEADS INTO THE PCB THE CORRECT WAY**

R1	47R	yellow purple black gold	LINK	0R	single black band	C50	100n	u1K63/ 100nK 63
R2	27K	red purple orange gold	LINK	0R	single black band	C51	1n	102
R3	8K2	grey red red gold	LINK	0R	single black band	C52	100p	101J
R4	10K	brown black orange gold	LINK	0R	single black band	C53	33p	33 Orange Top
R5	3K3	orange orange red gold	LINK	0R	single black band	C54	220n	u22K63/ 220nK 63 Red
R6	100K	brown black yellow gold	LINK	0R	single black band	C55	100n	u1K63/ 100nK 63
R7	6K8	blue grey red gold	LINK	0R	single black band	C56	10n	10nK63/ 10nK 100 White
R8	3K3	orange orange red gold	LINK	0R	single black band	C57	220n	u22K63/ 220nK 63 Red
R9	3K3	orange orange red gold	LINK	0R	single black band	C58	4n7	4n7K63/ 4n7K100 Yellow
R10	120R	brown red brown gold	LINK	0R	single black band	C59	10n	103
R11	120R	brown red brown gold	LINK	0R	single black band	C60*	220u	220uF 16V
R12	68K	blue grey orange gold	LINK	0R	single black band	C61*	220u	220uF 16V
R13	68K	blue grey orange gold	LINK	0R	single black band	TR1*	BC558	C558
R14	22K	red red orange gold	LINK	0R	single black band	TR2*	BF494	494
R15	15K	brown green orange gold	LINK	0R	single black band	TR3*	BF494	494
R16	150R	brown green brown gold	LINK	0R	single black band	TR4*	BF494	494
R17	330R	orange orange brown gold	LINK	0R	single black band	TR5*	BF494	494
R18	22K	red red orange gold	LINK	0R	single black band	TR6*	2N4427	2N4427
R19	15K	brown green orange gold	C1	100p	101J	TR7*	2N4427	2N4427
R20	150R	brown green brown gold	C2	1n8	182	TR8*	BC548	C548
R21	330R	orange orange brown gold	C3	100p	101J	TR9*	BC558	C558
R22	150R	brown green brown gold	C4*	10u	10uF 16V	TR10*	BC548	C548
R23	22R	red red black gold	C5*	47u	47uF 16V	TR11*	BC548	C548
R24	6K8	blue grey red gold	C6	68p	68J	VC1	40p	Purple Variable Capacitor
R25	10R	brown black black gold	C7	68p	68J	VC2	65p	Yellow Variable Capacitor
R26	4K7	yellow purple red gold	C8	22p	22J	VC3	65p	Yellow Variable Capacitor
R27	33R	orange orange black gold	C9	15p	15J	VR1	10K	10K Variable Resistor
R28	150R	brown green brown gold	C10	1n	102	VCD1	KV1310	310
R29	1K5	brown green red gold	C11	1n	102	IC1*	74ALS74	74ALS74
R30	270R	red purple brown gold	C12	15p	15J	IC2*	74LS193	74LS193
R31	22R	red red black gold	C13	15p	15J	IC3*	74LS193	74LS193
R32	1K	brown black red gold	C14	22p	22J	IC4*	74LS193	74LS193
R33	1K5	brown green red gold	C15	1n	102	IC5*	74LS76	74LS76
R34	1K5	brown green red gold	C16	22p	22J	IC6*	74LS86	74LS86
R35	1K5	brown green red gold	C17	1n	102	IC7*	4060B	4060B
R36	1K5	brown green red gold	C18	1n	102	IC8*	7805	7805
R37	1K5	brown green red gold	C19	10n	103	D1*	1N4001	4001
R38	1K5	brown green red gold	C20	1n	102	D2*	1N4148	4148
R39	1K5	brown green red gold	C21	10n	103	D3*	1N4148	4148
R40	1K5	brown green red gold	C22	1n	102	D4*	1N4148	4148
R41	1K5	brown green red gold	C23*	220u	220uF 16V	D5*	1N4148	4148
R42	1K5	brown green red gold	C24	1n	102	D6*	1N4148	4148
R43	1K5	brown green red gold	C25	47p	47J	D7*	1N4148	4148
R44	1K5	brown green red gold	C26*	47u	47uF 16V	ZD1*	7V5	7V5 white spot
R45	1K5	brown green red gold	C27	47p	47J	ZD2*	7V5	7V5 white spot
R46	1K5	brown green red gold	C28	100p	101J	LED1*	5mm LED Yellow	
R47	1K5	brown green red gold	C29	1n	102	LED2*	5mm LED Green	
R48	1K5	brown green red gold	C30	10n	103	LED3*	5mm LED Red	
R49	470R	yellow purple brown gold	C31	1n	102	L1	6 x 2 turn coil 6mm i.d.	
R50	100K	brown black yellow gold	C32	10p	10J	L2	4 turn coil 6mm i.d. white spot	
R51	1K5	brown green red gold	C33	47p	47J	L3	4 turn coil 5mm i.d.	
R52	4K7	yellow purple red gold	C34	22p	22J	L4	4 turn coil 5mm i.d.	
R53	1K5	brown green red gold	C35	1p8	1.8C	L5	6 turn coil 6mm i.d.	
R54	10K	brown black orange gold	C36	1p8	1.8C	L6	6 turn coil 6mm i.d.	
R55	22K	red red orange gold	C37	1n	102	XTAL1	6.4MHz xtal 6.40000	
R56	1K5	brown green red gold	C38	100n	u1K63/ 100nK 63	SW1*	6 Way DIP Switch	
R57	5K6	green blue red gold	C39*	220u	220uF 16V	SW2*	6 Way DIP Switch	
R58	12K	brown red orange gold	C40	10n	103	FB1	5 turn ferrite bead	
R59	12K	brown red orange gold	C41	10n	103	FB2	5 turn ferrite bead	
R60	47K	yellow purple orange gold	C42	10n	103	FB3	1 turn ferrite bead	
R61	5K6	green blue red gold	C43	1n	102	FB4	5 turn ferrite bead	
R62	2K2	red red red gold	C44	100n	u1K63/ 100nK 63	FB5	5 turn ferrite bead	
R63	270R	red purple brown gold	C45	100n	u1K63/ 100nK 63	SKT1	PCB Phono Socket	
R64	560R	green blue brown gold	C46	100n	u1K63/ 100nK 63	SKT2	SO-239 with Nuts, Bolts and Washers	
R65	33R	orange orange black gold	C47	100n	u1K63/ 100nK 63		2 x Terminal Pins	
R66	56R	green blue black gold	C48	100n	u1K63/ 100nK 63		2 x 2cm Tubular Heatsinks	
R67	15R	brown green black gold	C49	100n	u1K63/ 100nK 63		1 x PLL PCB	



CIRCUIT TESTING

1. Plug in 50 ohm dummy load (resistor soldered inside PL-259) **DO NOT POWER THE CIRCUIT WITHOUT A 50 ohm LOAD CONNECTED TO THE SO-239.**
2. Apply 13.8 volts to the PCB position marked +13.8V (+) and GND (-). **DO NOT EXCEED 16V DC.**
3. Choose a frequency from the attached LOOK-UP table and select the appropriate code on the transmitter DIP switches.
4. Adjust VC1 slowly until the RED LED starts to dim. Continue adjusting VC1 even more slowly, the RED LED will dim further or flicker, then the GREEN LED will illuminate. The GREEN LED indicates a locked condition.
5. Experiment with the adjustment of VC1 to find centre lock repeating step 4.
6. The coils of L1 may need adjustment if lock is difficult to achieve at the low or high frequencies. Gently squeeze the turns of L1 together for centre lock at the lower frequencies. Gently open the turns of L1 for centre lock at the higher frequencies.
7. Tune up the 1 watt power amp. Adjust VC2 and VC3 for maximum brightness on the YELLOW LED or maximum FWD deflection on an SWR meter.
8. Apply audio at line level to the phono socket. Adjust the VR1 for correct FM deviation.
9. Switch off. Remove dummy load and connect a 50 ohm matched antenna to the SO-239. Switch on and you're now on air.



SPECIFICATIONS

Freq Range:	100KHz steps from 87.5 to 108MHz
Freq Generation:	Crystal ref. Phase Locked Loop
Freq Stability:	+/- 1 KHz max., typ. +/-500Hz
Lock Time:	3 sec
Spurious Emissions:	Better than -45dB rel. to carrier
RF Power Output:	900mW min
RF Output Connector:	SO239
Power Supply:	13.8v DC regulated
Audio Input Sensitivity:	0.775 V rms for +/- 75 KHz dev.
Signal To Noise Ratio: -	75 dBu
Audio Freq Response:	Flat from 20 Hz to 76 KHz
Pre-emphasis:	None or 50 uS
Audio Distortion:	Better than 0.2 % THD
Audio Input Connector:	Phono socket



SOLDERING TIPS

For good soldered joints it is vital that the circuit board is clean and free of grease. If the board has become dirty or greasy, clean it down with meths or some other suitable electrical cleaning solvent before starting construction.

Keep everything clean, that's the answer to successful soldering. The iron tip always needs be clean and shiny, if the iron looks all grey, black and burnt, the solder will not flow properly. A small piece of sponge dampened with water is ideal for cleaning the iron. After a few soldered joints, wipe the tip of the iron on the damp sponge to remove the dirt build up.

Always apply the iron to the joint first, this heats the joint up, then apply the solder. This will give the joint a shiny and cone shaped appearance, which is correct. Never put a blob of solder on the iron and then apply this blob of solder to the joint. This will not work because the blob of solder will not bond to the cold joint



PRE EMPHASIS

If the 1 watt PLL is connected to a Veronica Limiter Compressor or a Stereo Coder, pre-emphasis is not required. To disable the pre-emphasis, remove C2 from the PCB.



TROUBLE SHOOTING

No LEDs illuminated. Check:

1. *Power supply is working and polarity.*

No or poor audio. Check:

1. *Check audio source is connected to circuit properly.*
2. *Set VR1 to mid position.*
3. *Check joints, polarity and for shorts around components SKT1 R1 VR1 R2 R3 C4 TR1 C5 R5 R4 R7 and VCD1.*

'Buzz' on the Audio.

1. *In the presence of a strong RF signal 'Buzz' may be generated in audio source. Unplug the audio source to establish whether that is the cause. If this cures the problem, try another audio source or move the audio source further away from the transmitter.*
2. *Strong RF often generates a 'buzz' on some receivers. Try a receiver at a further distance away from the transmitter.*
3. *Is the power supply regulated?*

RF Unstable.

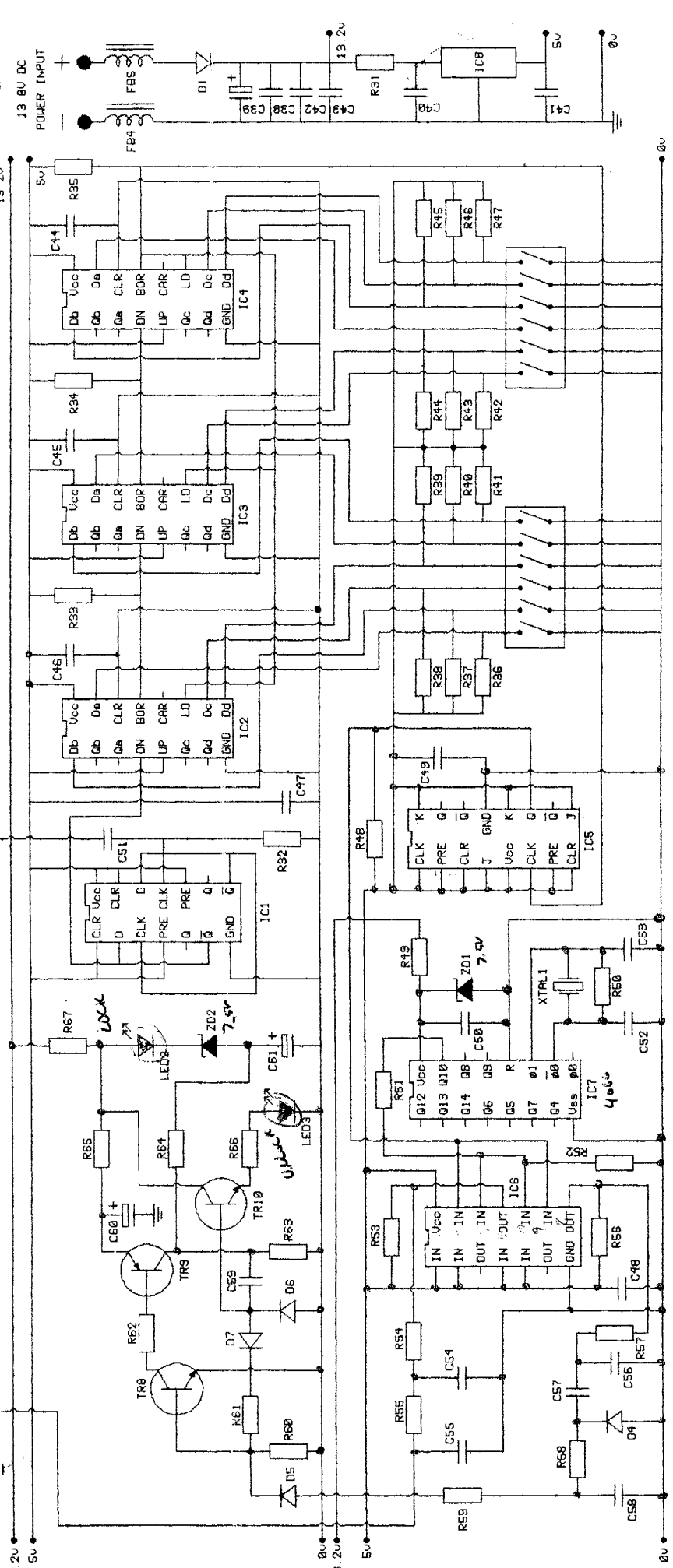
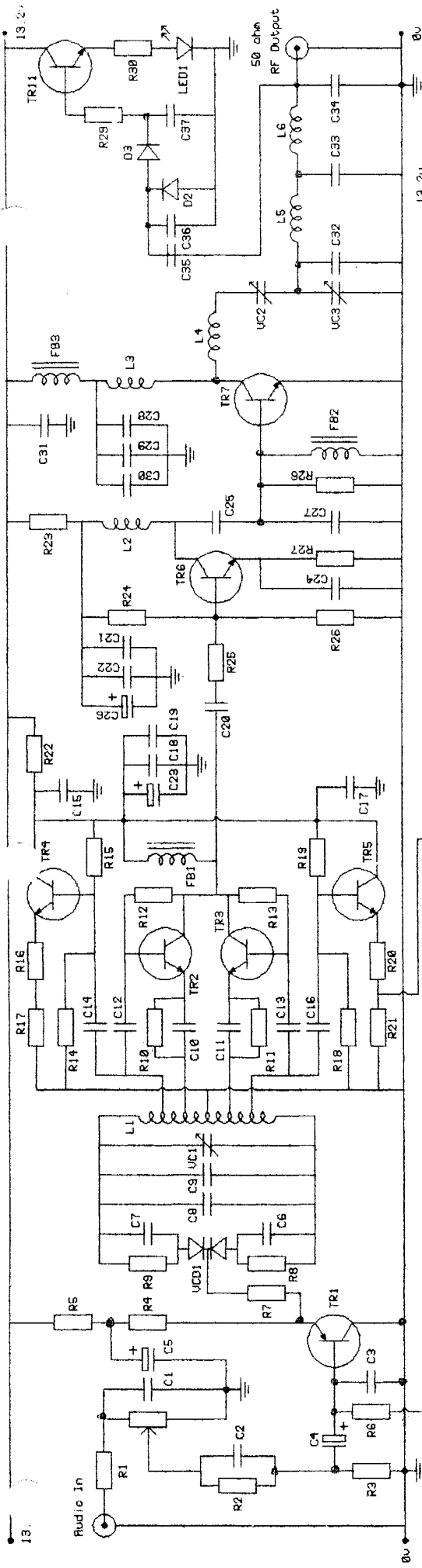
1. *Is TR6 and TR7 flat down to PCB as shown in the construction details diagram of section 13?*
2. *Is the SO-239 connected to a 50 ohm load?*
3. *Are the coils soldered properly and fully down to the PCB?*
4. *Check nuts and bolts are tight and soldered joint is okay on SO-239*
5. *Check joints, polarity and for shorts on all of the components around TR6 and TR7.*
6. *Re-tune the variable capacitors as described in paragraph 6 of 'Circuit Testing' section.*

Due to the complexity of the circuit, other faults are more difficult to locate without test equipment. All of the components in the kit are high quality and brand new, it's very likely that a fault is down to the construction. Using the PCB legend and Component List, check that all 201 components are in the correct positions and have the correct polarity.

Carefully check the PCB soldering. Excessive soldering may have shorted out adjacent tracks on the PCB. Solder splashing from the iron could have shorted out adjacent tracks. A magnifying glass or multimeter may help to find any small hairline short circuits not visible to the naked eye. All soldered joints should be shiny in appearance. Any dull looking soldering may be a 'dry joint', causing the circuit to malfunction. Re-solder dull looking joints.

If the circuit still has a fault after double checking everything, contact your supplier or Veronica FM via Post or Email. Describe in writing or with a diagram the exact problem and we will take steps to get you working

Veronica Kits, 18 Victoria Street, Queensbury
BRADFORD, BD13 1AR, UK
Tel/Fax 01274 816200 Email veronica@legend.co.uk
Website <http://www.legend.co.uk/~veronica/>

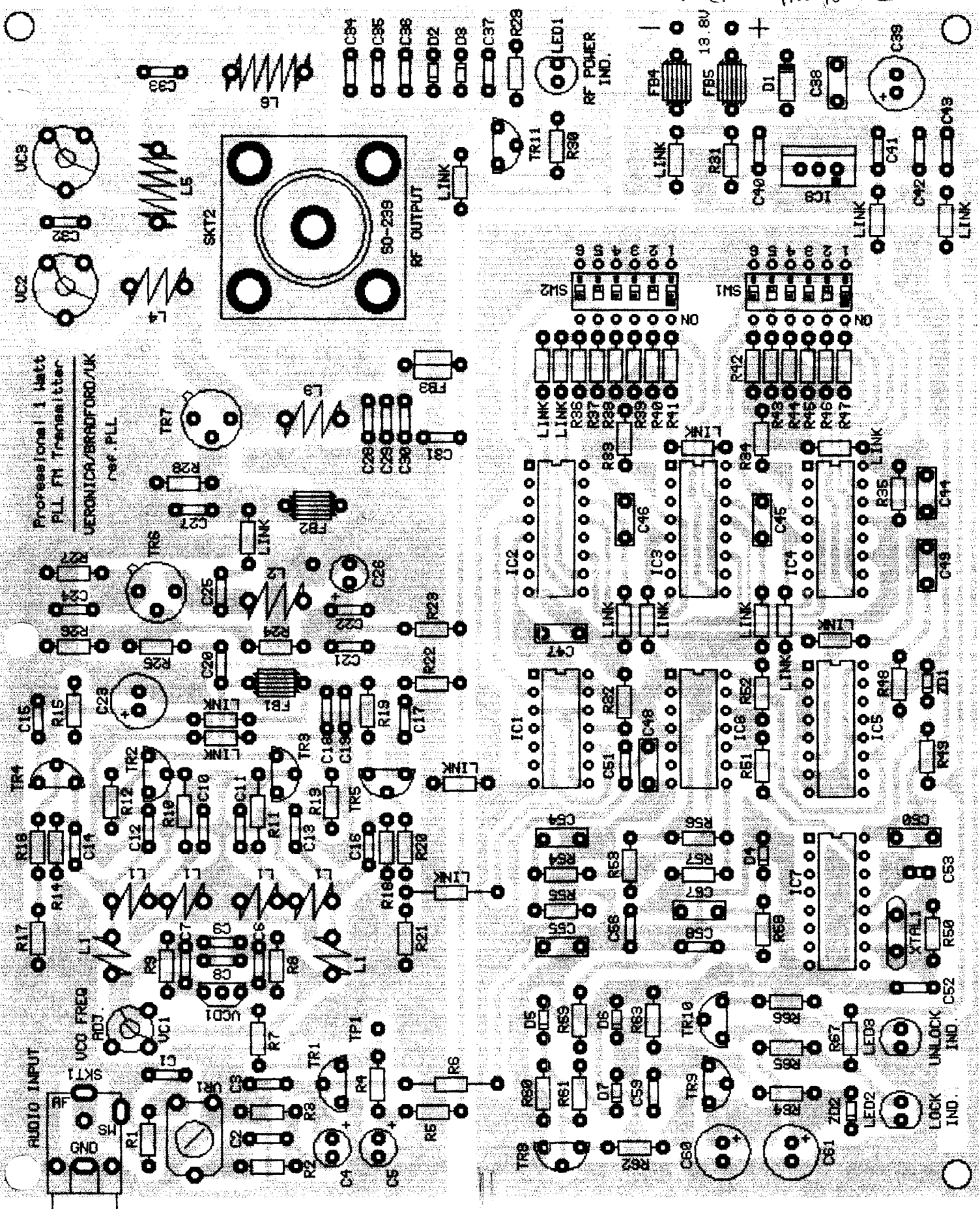


6.4AHC

4096-X-104

4096-X = 887
+X = 3209
X = 3209
EAS CM

887 OF 2
C 1100 1001 1000
C 1100 1000 1001





DIP SWITCH (SW1 and SW2) FREQUENCY LOOK UP TABLE

MHz	1	2	3	4	5	6	1	2	3	4	5	6
87.5	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	OFF	ON
87.6	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	OFF	OFF
87.7	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	ON	ON
87.8	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	OFF
87.9	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	ON
88.0	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
88.1	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	ON	ON
88.2	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	ON	OFF
88.3	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	OFF	ON
88.4	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	OFF	OFF
88.5	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	ON	ON
88.6	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	ON	OFF
88.7	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	ON
88.8	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
88.9	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	ON	ON
89.0	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	ON	OFF
89.1	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	ON
89.2	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
89.3	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	ON
89.4	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF
89.5	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
89.6	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
89.7	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
89.8	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	OFF
89.9	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	ON
90.0	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	OFF
90.1	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	OFF	ON	ON
90.2	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	OFF	ON	OFF
90.3	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	ON
90.4	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF
90.5	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON	ON	ON
90.6	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON	ON	OFF
90.7	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON	OFF	ON
90.8	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON	OFF	OFF
90.9	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	ON	ON
91.0	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	ON	OFF
91.1	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	ON
91.2	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
91.3	ON	ON	OFF	OFF	OFF	ON	ON	OFF	ON	ON	ON	ON
91.4	ON	ON	OFF	OFF	OFF	ON	ON	OFF	ON	ON	ON	OFF
91.5	ON	ON	OFF	OFF	OFF	ON	ON	OFF	ON	ON	OFF	ON
91.6	ON	ON	OFF	OFF	OFF	ON	ON	OFF	ON	ON	OFF	OFF
91.7	ON	ON	OFF	OFF	OFF	ON	ON	OFF	ON	OFF	ON	ON
91.8	ON	ON	OFF	OFF	OFF	ON	ON	OFF	ON	OFF	ON	OFF
91.9	ON	ON	OFF	OFF	OFF	ON	ON	OFF	ON	OFF	OFF	ON
92.0	ON	ON	OFF	OFF	OFF	ON	ON	OFF	ON	OFF	OFF	OFF
92.1	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	ON	ON
92.2	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF
92.3	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	ON
92.4	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	OFF
92.5	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	ON	ON
92.6	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	ON	OFF
92.7	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	ON
92.8	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
92.9	ON	ON	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON	ON
93.0	ON	ON	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON	OFF
93.1	ON	ON	OFF	OFF	OFF	ON	OFF	ON	ON	ON	OFF	ON
93.2	ON	ON	OFF	OFF	OFF	ON	OFF	ON	ON	ON	OFF	OFF
93.3	ON	ON	OFF	OFF	OFF	ON	OFF	ON	ON	OFF	ON	ON
93.4	ON	ON	OFF	OFF	OFF	ON	OFF	ON	ON	OFF	ON	OFF
93.5	ON	ON	OFF	OFF	OFF	ON	OFF	ON	ON	OFF	OFF	ON
93.6	ON	ON	OFF	OFF	OFF	ON	OFF	ON	ON	OFF	OFF	OFF
93.7	ON	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	ON	ON
93.8	ON	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	ON	OFF
93.9	ON	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	ON
94.0	ON	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
94.1	ON	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	ON	ON
94.2	ON	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	ON	OFF



DIP SWITCH (SW1 and SW2) FREQUENCY LOOK UP TABLE

MHz	1	2	3	4	5	6	1	2	3	4	5	6
94.3	ON	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	ON
94.4	ON	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
94.5	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	ON
94.6	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	OFF
94.7	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	ON
94.8	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	OFF
94.9	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	ON
95.0	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	OFF
95.1	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	ON
95.2	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
95.3	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	ON
95.4	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	OFF
95.5	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	ON
95.6	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
95.7	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	ON
95.8	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF
95.9	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON
96.0	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
96.1	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
96.2	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF
96.3	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	ON
96.4	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF
96.5	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	ON	ON
96.6	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	ON	OFF
96.7	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	ON
96.8	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
96.9	ON	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	ON	ON
97.0	ON	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	ON	OFF
97.1	ON	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	OFF	ON
97.2	ON	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	OFF	OFF
97.3	ON	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	ON
97.4	ON	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF
97.5	ON	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
97.6	ON	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
97.7	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON
97.8	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON	OFF
97.9	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	OFF	ON
98.0	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	OFF	OFF
98.1	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	ON
98.2	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
98.3	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	ON
98.4	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
98.5	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON
98.6	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	OFF
98.7	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
98.8	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
98.9	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
99.0	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
99.1	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON
99.2	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
99.3	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON
99.4	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF
99.5	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	ON
99.6	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
99.7	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	ON
99.8	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	OFF
99.9	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	ON
100.0	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
100.1	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON
100.2	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	OFF
100.3	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	ON
100.4	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF
100.5	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	ON
100.6	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF
100.7	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
100.8	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
100.9	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON
101.0	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF
101.1	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	ON



DIP SWITCH (SW1 and SW2) FREQUENCY LOOK UP TABLE

MHz	1	2	3	4	5	6	1	2	3	4	5	6
101.2	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF
101.3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON
101.4	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF
101.5	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON
101.6	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
101.7	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
101.8	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF
101.9	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON
102.0	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
102.1	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
102.2	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
102.3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
102.4	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
102.5	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
102.6	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF
102.7	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON
102.8	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF
102.9	ON	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	ON	ON
103.0	ON	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF
103.1	ON	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	ON
103.2	ON	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF
103.3	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	ON	ON	ON
103.4	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	ON	ON	OFF
103.5	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	ON
103.6	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF
103.7	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	ON	ON
103.8	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	ON	OFF
103.9	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	ON
104.0	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF
104.1	ON	OFF	ON	ON	ON	ON	ON	OFF	ON	ON	ON	ON
104.2	ON	OFF	ON	ON	ON	ON	ON	OFF	ON	ON	ON	OFF
104.3	ON	OFF	ON	ON	ON	ON	ON	OFF	ON	ON	OFF	ON
104.4	ON	OFF	ON	ON	ON	ON	ON	OFF	ON	ON	OFF	OFF
104.5	ON	OFF	ON	ON	ON	ON	ON	OFF	ON	OFF	ON	ON
104.6	ON	OFF	ON	ON	ON	ON	ON	OFF	ON	OFF	ON	OFF
104.7	ON	OFF	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF	ON
104.8	ON	OFF	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF	OFF
104.9	ON	OFF	ON	ON	ON	ON	ON	OFF	OFF	ON	ON	ON
105.0	ON	OFF	ON	ON	ON	ON	ON	OFF	OFF	ON	ON	OFF
105.1	ON	OFF	ON	ON	ON	ON	ON	OFF	OFF	ON	OFF	ON
105.2	ON	OFF	ON	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF
105.3	ON	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	ON	ON
105.4	ON	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	ON	OFF
105.5	ON	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON
105.6	ON	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
105.7	ON	OFF	ON	ON	ON	ON	OFF	ON	ON	ON	ON	ON
105.8	ON	OFF	ON	ON	ON	ON	OFF	ON	ON	ON	ON	OFF
105.9	ON	OFF	ON	ON	ON	ON	OFF	ON	ON	ON	OFF	ON
106.0	ON	OFF	ON	ON	ON	ON	OFF	ON	ON	ON	OFF	OFF
106.1	ON	OFF	ON	ON	ON	ON	OFF	ON	ON	OFF	ON	ON
106.2	ON	OFF	ON	ON	ON	ON	OFF	ON	ON	OFF	ON	OFF
106.3	ON	OFF	ON	ON	ON	ON	OFF	ON	ON	OFF	OFF	ON
106.4	ON	OFF	ON	ON	ON	ON	OFF	ON	ON	OFF	OFF	OFF
106.5	ON	OFF	ON	ON	ON	ON	OFF	ON	OFF	ON	ON	ON
106.6	ON	OFF	ON	ON	ON	ON	OFF	ON	OFF	ON	ON	OFF
106.7	ON	OFF	ON	ON	ON	ON	OFF	ON	OFF	ON	OFF	ON
106.8	ON	OFF	ON	ON	ON	ON	OFF	ON	OFF	ON	OFF	OFF
106.9	ON	OFF	ON	ON	ON	ON	OFF	ON	OFF	OFF	ON	ON
107.0	ON	OFF	ON	ON	ON	ON	OFF	ON	OFF	OFF	ON	OFF
107.1	ON	OFF	ON	ON	ON	ON	OFF	ON	OFF	OFF	OFF	ON
107.2	ON	OFF	ON	ON	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
107.3	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	ON
107.4	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	OFF
107.5	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	ON	OFF	ON
107.6	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	ON	OFF	OFF
107.7	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	OFF	ON	ON
107.8	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	OFF	ON	OFF
107.9	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF	ON
108.0	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF	OFF