6RMX6

Hands Electronics

Tegryn Llanfyrnach Dyfed
SA35 0P[illegible] Tel 023977 427

Thank you for purchasing one of our kits. We hope it will give you many hours of service once built. Our aim is to provide satisfaction and service. If you have any problems with the construction or use of the equipment, please ring, or write to us. We will do all we can to help.If you are new to construction we suggest you read carefully the about part identity and soldering contained in the tools and construction section.

Sheldon Hands

Tools and Construction Practice

We recommend the following tools to make your HANDS kit

15/25w soldering iron
small electrical screwdriver
4inch phillips screwdriver
small side cutters
electricians pliers
snipe nosed pliers
small half round file
multimeter

Below are some notes on construction practice with a heavy emphasis on soldering.

You must use solder with a non-corrosive flux. Acid cored solder MUST NOT be used. A 60/40 type will be ideal. The secret of good soldering is to have the correct temperature at the joint. Make sure the tip of the iron is clean, if necessary clean it on a damp sponge. Do not carry solder on the iron to the joint, by the time you get it there the flux will have burnt or vaporised.

Although it seems to contradict the above, do lightly tin the iron before making a joint. This will aid the heat transfer and lessen the chance of damage to the track or component through prolonged application of the iron.When you are ready to make the joint, apply the iron and the solder at the same time. Do not apply too much solder, a thin gauge helps in this respect. Humps of solder on a joint either means you did not leave the iron on the joint long enough or you used too much solder.

Try to get a medium coating over the track and the component lead. If you use too much heat you may damage the track or the component. We suggest you try some test joint on scrap wire, you will find it inspires confidence! When the board is complete check for solder bridges and dry joints, an Ohmmeter can be used for checks.

Most large parts in the kit are readily identifiable, but value identification systems are varied and may pose a problem. For wire ended resistors (ie not SMD) a colour code chart is included at the back of the manual. Most supplies of resistors are coded with 3 bands for the value , i.e. 1st fig, 2nd fig, 3rd multiplier. But we increasingly receive resistors with a 4 band code this then becomes 1st fig, 2nd fig, 3rd fig, 4th multiplier e.g 1k5 = brown, green, black, brown = 1 5 0 0 .

Capacitor identification for electrolytics is straight forward but ceramic caps may pose a problem. Where n values are used n10 = 100pf and 1n = 1000pf, those with just a 3 digit number use the first 2 numbers as figures and the 3rd indicating the number of zeros, i.e. 102 = 1000pf. For those with a 3 digit number followed by letters treat as a 3 digit number, where only 2 digits and a letter are used this indicates the value is less then 100pf i.e. 82J = 82pf and 4.7C = 4.7pf.

Inductor value systems are as varied as capacitors but generally there are two common types. The first uses coloured bands with the same colour values as resistors, the inductors are the same length as a 0.25w resistor but much thicker with flat ends where the lead exits the body.

If checked with an ohmmeter they will show very low resistance values. The second type have the value marked on them with an alpha-numeric code in uh e.g. 2R2K = 2.2uh and 220J = 22uh.

Circuit Description

Signals are routed from the RX ANT pin to one of 6 bandpass filters. The filter is selected by applying 12v from the bandchange switch to the relevant select pin A-F. The select line biases ON the input output switching diodes D1,2. The amount of bias is determined by R1,2,3 and 4. The 3 pole bandpass filters are formed by C1-6 suffix a-f, and L3-4 suffix a-f. The input and output impedance of the filters are 50Ω. T1 is a trifilar wound transformer and matches the filter to the mixer input.

The VFO is coupled to the mixer by C13. T2 another trifilar transformer couples the mixer to the output. The mixer transformers T2/3 are broad band and will accommodate both 9 and 10.7 mhz IF frequencies.

The EXT IN pin allows extra bandpass filter sets to be added and routed to the mixer.

Construction.

- Fit the PCB pins listed below by pressing the pins home from the TRACK side with a hot iron and then soldering to the track. Always support the board around the circumference of the pin with an old cotton or solder reel.

- PCB PINS -: RX IN, VFO ,IF OUT, 12VR, BPF A-F.

- Fit and solder R1-R5 . Check the appendix for the correct way to fit components. Where you see a ground legend on a resistor this end is soldered to the top foil of the pcb termed GROUNDPLANE. The groundplane acts as a large heat sink so always tin the pcb with solder around the area of the connection first. Cut the ground side resistor lead back to about 3mm before fitting. If the connections are too long and obstruct another pad angle the component or its lead to a free area of groundplane.

- Install the ground links between the track and grounplane side of the board for L1A-F adjcent to R1A-F, using the tinned wire links.

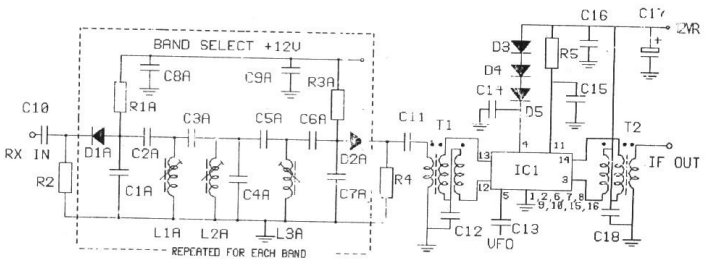
- Fit and solder diodes D1,6 suffix A-F make sure that the cathode band on the diode agrees with the band on the board component outline.

- Fit and solder diodes D3,4,5. Make sure that the cathode band on the diode agrees with the band on the board component outline.

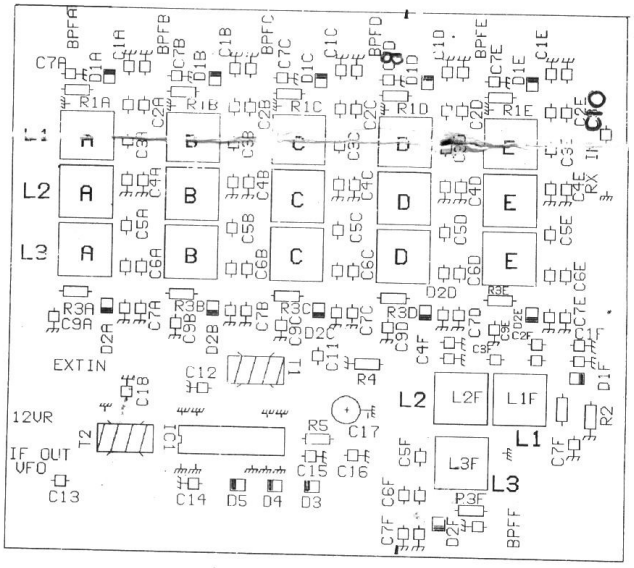
- Fit and solder the ceramic disc capacitors.

- Fit and solder the electrolytic capacitor C17. The negative lead is made off to the groundplane, bend the lead at a right angle immediately under the body

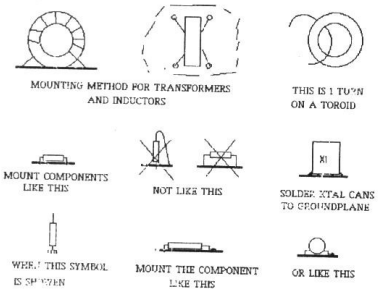
CIRCUIT DIAGRAM



PCB LAYOUT



COMPONENT MOUNTING



Parts List

R1A-F,R3A-F	1k	C17	**4.7MFD**
R2,4	1k	D1A-F,D2A-F	**BA243**
R5	330R	D3,4,5	**1N4148**
		IC1	**SL6440**
C10,11,12,13,14,15,16,17	10N	T1,2	**K37X830**

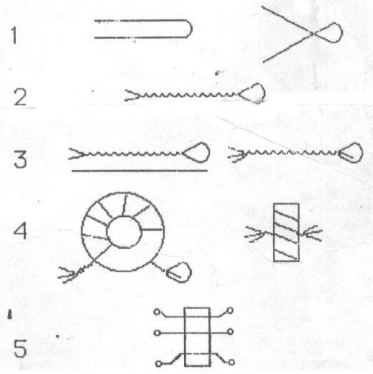
Coil Winding Data

T1,2 K37X830 8 turns trifiliar 32swg

Resistor Colour Code

Colour	Band 1 1st fig	Band 2 2nd fig	Band3 multiplier
Black		0	X 1
Brown	**1**	**1**	**X10**
Red	2	2	X 100
Orange	3	3	X 1000
Yellow	4	4	X 10,000
Green	5	5	X 100,000
Blue	6	6	X 1,000,000
Violet	7	7	X 10,000,000
Grey	8	8	
White	9	9	

T1,2 WINDING



- Check with a frequency counter or general coverage receiver that the VCO oscillator is functioning. The frequency will not be stable but should be close to the required output. Adjust the core of L3a to bring it as close as possible. VR1 will need to be at mid range to get a reliable signal.

- Disconnect the temporary supply to TP1 and fit a wire link across the pins

- Connect a 5-5.5mhz vfo to the VFO input pin.

- Connect the +12v pin to a maximum of a 13.8v dc supply via a multimeter on its current range . Check that the current drawn is less than ma. If the current greatly exceeds this check for an incorrectly fitted diode, transistor or ic.

- Set VR1,2,3 to full range above ground.

- Attach normaly to the 12v pin and now meter the voltage at TP1

- Set the VFO to 5.25mhz and adjust the core of L3a for 5v at TP1. The output frequency at the SYN OUT pin should in band with the khz portion at 250khz.

- Set the vfo to its upper and lower limits and check that the TP1 voltage is in the range 3-9 volts.

- This compleats the alignment of the A band pack and the next pack may now be fitted and tested.

Band Pack Parts List

BAND	C20	L3	C25	C26	C27	L4	X1	D7
1.8	0	9444	0	39P	CTG	KANK3334	16	
3.5	0	9445	0	47P	CTG	KANK3335	18	Y
7.0	0	9448	0	47P	CTG	KANK3335	21.5	Y
10	27	9452	0	27P	CTG	KANK3335	24.5	
14.0	56P	8.5T WHITE	2P2	18P	CTG	KANK3335	28.5	Y
18	39	7.5T VILOT					32.5	
21.0	27	7.5T VIOLET	2P2	33P	CTG	8.5T WHITE	35.5	Y
24.5	22	6.5T BLUE					39.0	
28.5	22	5.5T GREEN	0	22P	CTG	8.5T WHITE	43.0	N

CTG = 30 PF GREEN TRIMMER (NOT REQUIRED ON DDS SYSTEM)

Test And Alignment

The method of test and alignment will depend upon the equipment available. In the absence of a suitable IF strip and pre-mix vfo [RTXIF/RTX6BMX], a general coverage receiver at 9 mhz and a signal generator will allow suitable tests to be carried out.

- Check the completed PCB for solder splashes, bridged tracks or pads and dry joints. If you suspect a dry joint use a multimeter to carry out a resistance check between the track and the component lead on the ground plane side.

- Connect the 12VR line and ground connection to suitable supply via a multimeter on its current range . Check that the current drawn is less than 110ma. If the current greatly exceeds this check that IC1 and D3-5 are correctly installed.

- Connect the pre mix vfo or a signal generator to the vfo input pin and the IF output to an IF strip or a receiver tuned to 9 mhz.

- Connect an aerial or signal source to the RX IN pin . Switch on the correct BPF by making a temporary 12v connection to the BPF* pin.

- Tune the vfo at (SIGNAL + IF)mhz, until a signal is resolved. Using a trim tool adjust L3,4,5 for best signal strength. The cores of the inductors are very brittle, a metallic screwdriver MUST NOT be used for adjustment. In the absence of the proper tool an old plastic knitting needle with its end filed may be used.

- This completes the alignment and the module may now be installed.

FILTER TABLE

BAND	**C1,7**	**C2,6**	**C3,5**	**C4**	**L1,2,3**
MHZ	*Pf*	*Pf*	*Pf*	*Pf*	*type*
1.8	1000 + 1000	1000 + 680	180	1000	KANK3334[YEL]
3.5	1000 + 100	390	33	390	KANK3334 [YEL]
7.0	1000	100	3P9	100	KANK3334 [YEL]
10.0	470	47	1P8	39	KANK3334[YEL]
14.0	1000	100 + 12	6P8	82 + 12	KANK3335 [PINK]
18.0	680	100 + 68	5P6	100 + 33	MC120 E526HN-10010 WHITE
21.0	470	120	6P8	82	MC120 E526HN-100109 [WHITE]
24.0	330	82	4P7	68	MC120 E526HN-100109 [WHITE]
28.0	270	68	3P9	56	MC120 E526HN-100109 [WHITE]