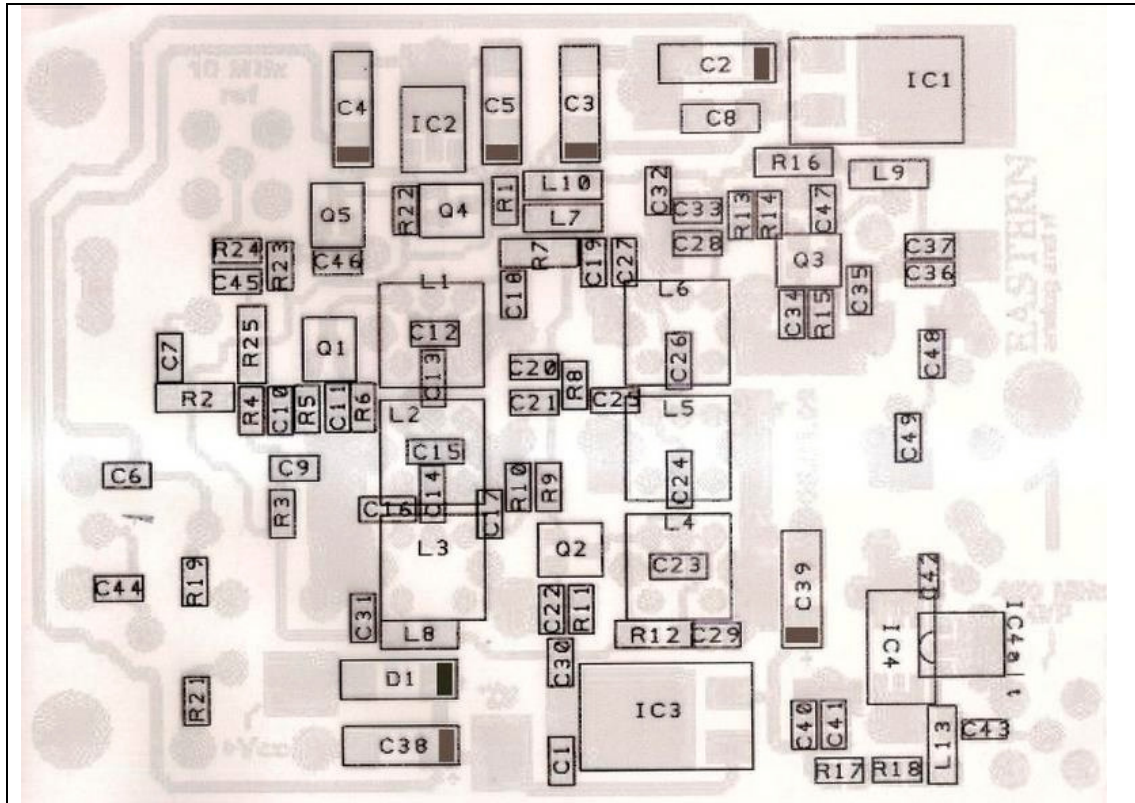


Parts-list and sma placement for the '450MHz 15dBm multiplier pcb' assy



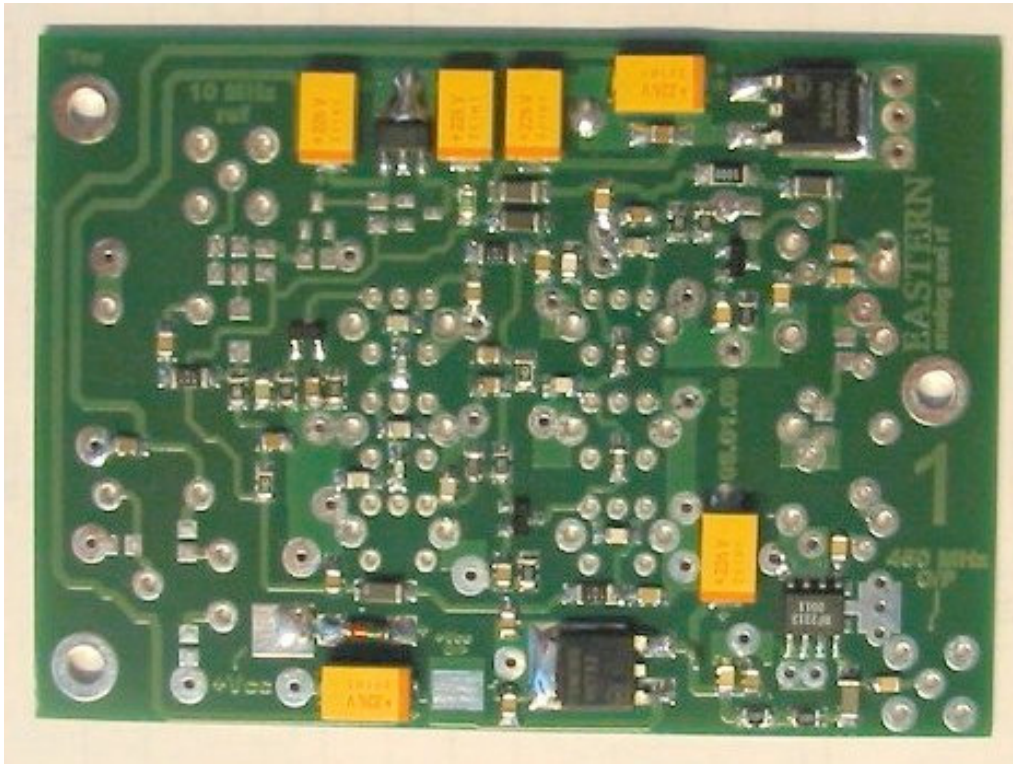
C1	0.1uF 0805	C28	82pF 0805	R5	2k2 0805	IC4	RF2312 * see note
C2	22uF tant	C29	10nF 0805	R6	220R 0805	IC4alt	BGA6489 * see note
C3	22uF tant	C30	0.1uF 0805	R7	100R 1206		
C4	22uF tant	C31	0.1uF 0805	R8	1k 0805	Q1	BFR93
C5	22uF tant	C32	1nF 0805	R9	12k 0805	Q2	BFR93
C6	0.1uF 0805	C33	0.1uF 0805	R10	2k2 0805	Q3	BFR93
C7	10nF 0805	C34	1nF 0805	R11	100R 0805	Q4	Not fitted
C8	0.1uF 0805	C35	1nF 0805	R12	100R 1206	Q5	Not fitted
C9	0.1uF 0805	C36	1nF 0805	R13	12k 0805		
C10	39pF 0805	C37	1nF 0805	R14	2k2 0805	D1	LLSD103A-07
C11	0.1uF 0805	C38	22uF tant	R15	100R 0805		
C12	82pF 0805	C39	22uF tant	R16	100R 1206	TCXO1	ATO-8351
C13	2p2 0805	C40	1nF 0805	R17	10R 0805 * see note		
C14	2p2 0805	C41	0.1uF 0805	R17a	22R 0805 * see note		
C15	82pF 0805	C42	1nF 0805	R18	10R 0805 * see note	L1	Leaded - green
C16	100pF 0805	C43	1nF 0805	R18a	22R 0805 * see note	L2	Leaded - green
C17	470pF 0805	C44	Not fitted	R19	Not fitted	L3	Leaded - green
C18	0.1uF 0805	C45	Not fitted	R20	Not fitted	L4	Leaded - red
C19	10nF 0805	C46	Not fitted	R21	Not fitted	L5	Leaded - red
C20	0.1uF 0805	C47	Not fitted	R22	Not fitted	L6	Leaded - red
C21	0.1uF 0805	C48	Not fitted	R23	Not fitted	L7	10uH
C22	0.1uF 0805	C49	Not fitted	R24	Not fitted	L8	10uH
C23	15pF 0805			R25	Not fitted	L9	10uH
C24	1pF 0805	R1	0R 0805			L10	10 uH
C25	15pF 0805	R2	100R 1206	IC1	78M08	L11	1550 93474 - yellow
C26	1pF 0805	R3	1k 0805	IC2	TS78L05ACY	L12	1550 93474 - yellow
C27	22pF 0805	R4	12k 0805	IC3	78M08	L13	10uH

Notes: There are two case sizes of 100R used.

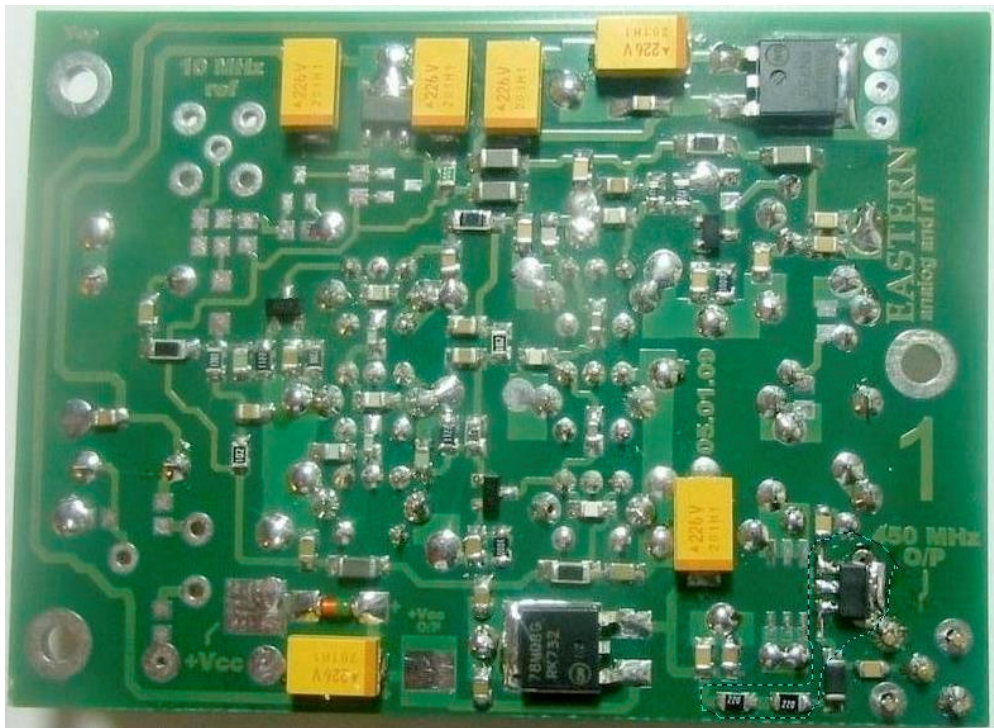
*IC4 may be one of two types, and the value of R17 and R18 depend on which it is.

The green band on D50 is the +ve end.

Board with RF2312 fitted at IC4

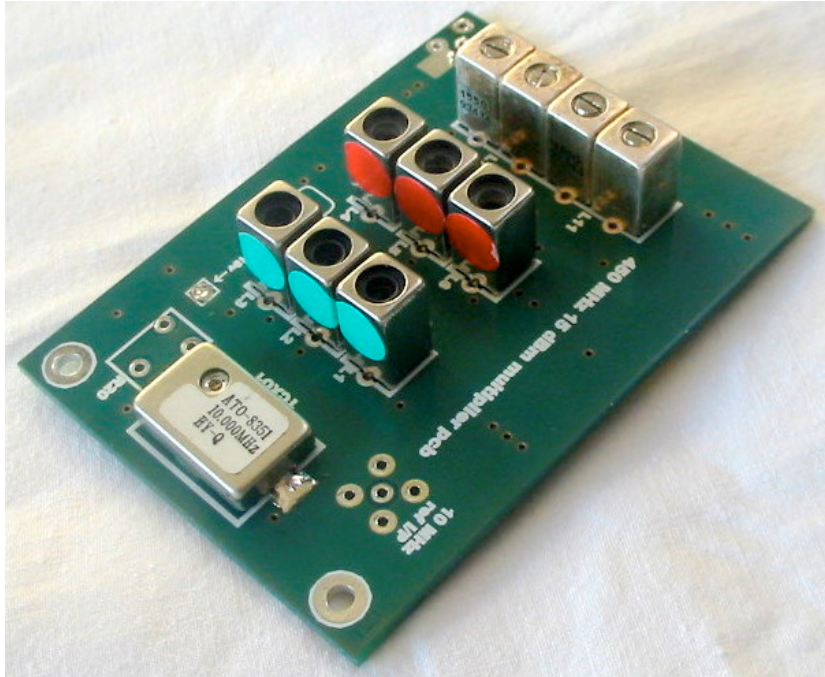


Board with BGA6489 fitted at IC4 (bottom right-hand corner)



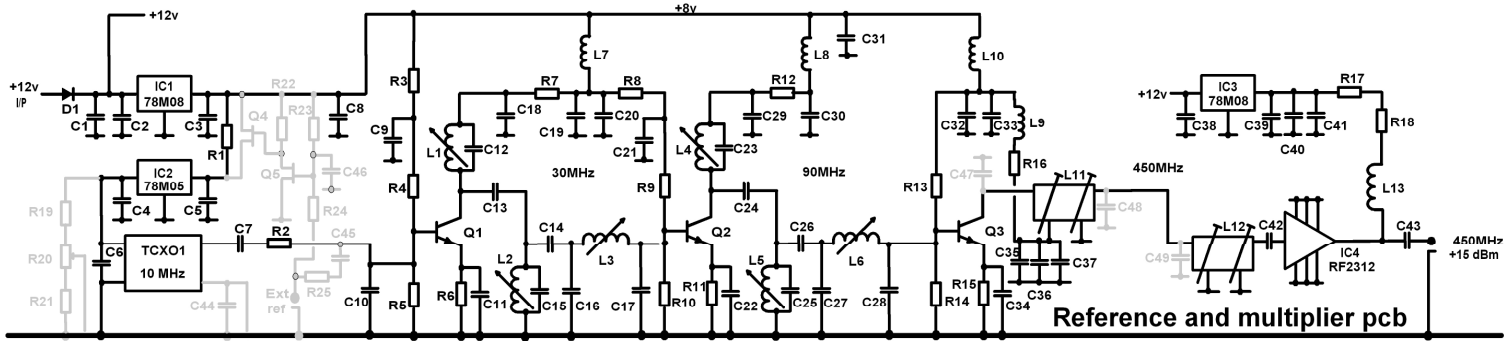
Before fitting top side components, apply volts and check that all three voltage regulators are working (2 x 8v, and 1 x 5v)

Pcb top side

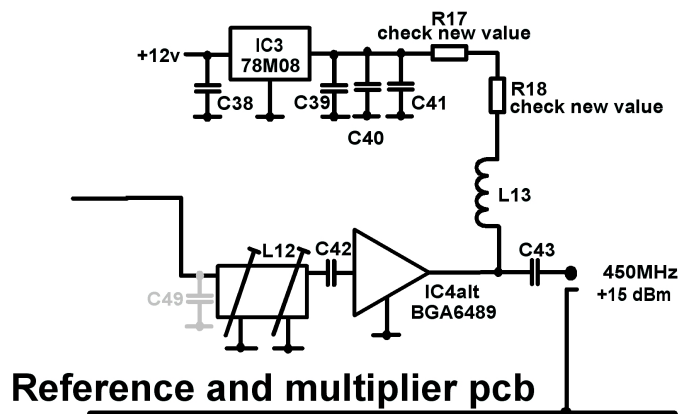


Note colour coding of coils (helicals L11 and L12 coded yellow). One of the four mounting holes for L11 was incorrectly positioned on issue 1 pcbs, so an extra hole has been drilled. You may find that the can tags on L11 have to be 'persuaded' to fit as a result of this.

Note also the correct orientation of the TCXO module TCXO1.



Circuit detail at IC4 when fitted with BGA6489



Alignment

The board should be aligned prior fitting into the converter housing. Adjustment to the six ferrite cored coils (L1 – L6) should be made with a copper small bladed screwdriver. I have no spare cores, and they are fragile so please please adjust carefully.

The helical coils (L11 – L12) are best adjusted using a small steel bladed jewelers screwdriver.

Use a spectrum analyser fitted with a coax lead that has the free end inner uncovered by about half inch to act as a probe. With this placed close to L1, some signal at 30 MHz (3rd harmonic) should be visible. Adjust L1 for max signal. Move on to L2 and do the same. Likewise, move the probe to L3 and adjust for max 30 MHz signal.

Move the probe across to L4. Signal at 90 MHz (9th harmonic) should be visible. Adjust L4 for max. With the probe close to L5 adjust for max, and do the same at L6.

Temporarily solder a coax lead to the '450 MHz O/P' socket pads on the board and feed into the spectrum analyser via a 10 dB attenuator. Alternatively, push an sma or smb socket into the board holes and interconnect with a suitable lead to the analyser. There should be signal present at 450 MHz. Adjust L11 and L12 for max reading, and then peak all coils L1 – L6 once more. A final tweak of L11 and L12 should result in an output power of at least 15 dBm.

This completes board alignment, and it can now be fitted into the housing.

External 10 MHz reference option

This option is not part of the standard build. However, it is possible to operate the board from an external 10 MHz reference source. If the following components are fitted, the on-board TCXO can be made to switch off automatically when the external source is fitted. For this to work, the external source must present a low (less than 1k) dc resistance to ground.

Circuit and parts-list

	R1	remove
	R22	12k 0805
	R23	100k 0805
	R24	12k 0805
	R25	100R* 1206
	C45	10nF 0805
	C46	10nF 0805
	Q4	FDN338P
	Q5	2N7002
	<p>*The value of R25 may have to be increased if too great an input signal from the external reference is present (or attenuators added to ext ref).</p> <p>Nominal input: 0 – 5 dBm</p>	

It is important to ensure that R1 (0R), which is part of the 'standard' build is removed.

These components are shown towards the top left hand corner in the following picture (see also the layout drawing at the beginning of this section):

