

Specifications:	Audio I/P	1v P-P Max ( Pre-emphasis 50uS )
	Audio Subcarrier	5.5MHz tuneable FM modulated +/- 50kHz
	Subcarrier O/P	Up to 3v p-p @ 5.5MHz

**DESCRIPTION:** The complete Audio/Subcarrier circuitry is built on a single 62 X 36mm size PCB & will take around 30 minutes to construct. The circuitry consists of Audio Pre-emphasis / Preamplifier / and a Subcarrier generator. The kit is designed as an add on option to the Mini 1250MHz FM ATV transmitter kit VK5EME36. The circuitry is well proven and is based on previous designs used in both the 426/444MHz and 1250MHz ATV kits.

**AUDIO PROCESS:** Refer to the circuit diagram. The Audio signal up to 1v p-p is fed via a 10kohm trimpot and 50uS Pre-emphasis network to an input preamplifier TL071 which is variable in gain by adjusting the resistor value between pins 2 and 6. The Audio signal from pin 6 of the TL071 drives a BB212 Varicap diode which FM Modulates the 5.5MHz oscillator consisting of the MPF102 JFET and surrounding components. The 9 - 60pF Trimmer adjusts the frequency of the oscillator for 5.5MHz. The oscillator provides up to 3 volts p-p output at 5.5MHz which is more than is necessary, and is adjustable in output with the Subcarrier level Pot. The Pot is set so the level from the oscillator is 0.5 volts p-p which is all that is required to achieve the proper Video carrier to sound carrier ratio of 10:1.

### CONSTRUCTION:

1. The PCB supplied is a professionally made board, which makes it easier to construct the kit & gives the finished project a professional appearance. The boards, components spacings & drilled hole sizes were designed around the components that are used in the kit, so no drilling or modifications to the PC board will be required. The single earth pad connections on the bottom of the PC board are plated through holes & only have to be soldered on the track side of the board. **However when soldering in the 9-60pF trimmer capacitor you will have to solder it on both sides of the board as the pads are not plated through.**
2. Follow the PCB overlay diagrams and circuits carefully, by checking the components and placing them onto the PC board. When soldering in the trimpots allow a slight gap between the wide part of the legs of the trimpot & the top groundplane of the PC board. This will stop the trimpots legs shorting out on the groundplane. L1 is made by winding 38 turns of 0.315mm ECW tightly closewound on the T37/2 Toroid. The earth end connection of the Toroid is soldered to the top groundplane of the PC board.
3. Check your construction carefully, that you have no shorts, solder dags etc as they are a lot more difficult to repair later on when the PCB is mounted in a box.
4. Wire up the PCB to the connectors, switches etc. Use shielded cable when connecting to the audio input and audio subcarrier output connections.
5. Connect the audio/subcarrier to the Mini 1250MHz transmitter with shielded cable by soldering the connection to the A terminal on the transmitter board.

### ALIGNMENT:

1. You should now be at a stage that you are ready to test the kit. First make sure that there are no shorts across the power rail to earth with a multimeter, then you can turn on the power to the board.
2. Connect a frequency counter onto the output of the Subcarrier Level Pot. Adjust the 9 - 60pF Trimmer capacitor for a frequency of 5.5MHz. If you cannot achieve this you may be loading the oscillator down so you might have to use a 10:1 probe. Next adjust the Subcarrier Level Pot for an output of 0.5 volts p-p ( the Pot should be about mid position). The Audio subcarrier level is specified as being 1/10 th the power of the Video carrier signal, due to the Audio carrier having a narrower bandwidth (50KHz), than Video bandwidth ( up to 18MHz). Adjustment of the Subcarrier level pot will pull the 5.5MHz oscillator slightly because the oscillator is not buffered, so you will have to readjust the 5.5MHz adjustment after you have got enough Subcarrier output.
3. Connect a Microphone to the Audio input on the PCB and adjust the 10kohm Audio level pot until the audio level is acceptable on a 1250MHz FM receiver. The Deviation required is 50KHz the same as normal AM VSB Television. If the PCB is to be mounted in a box and the Audio level needs to be adjusted, it is suggested that an external 10kohm Pot be connected in place of the 10kohm trimpot on the audio/subcarrier PCB. If the gain of the TL071 needs to be changed adjust the value of the 270kohm feedback resistor on the board.

### PARTS LIST:

1 x IN4007 Diode ( Black \ Silver Band )	Trim Pots: 1kohm, 10kohm
1 x BB212 Dual 500pF AM Varicap Diode	Resistors: 47ohm, 470ohm, 2k2ohm, 2x10kohm, 3x100kohm
1 x MPF102 JFet	270kohm, 1Mohm
1 x TL071 or LF351N O/P Amp IC	Caps Miniplate: 10pF, 2x68pF, 2x1nF ( 5.01mm )
1 x 78L08 Regulator	Caps Mono: 2x0.1uF ( 5.01mm )
1 x T37/2 Toroid ( Red 9.4mm dia )	Caps Electro: 1uF, 2x47uF ( 25v )
1 x VK5EME38 PCB board	Caps Tant: 1uF, 10uF ( 16v )
1 x Instructions	Trim Cap: Yellow 9 - 60pF DAU
	1 x 40cm 0.315mm ECW
	3 x 1mm PCB Pins

L1 38Turns 0.315mm ECW wound on a T37/2 Toroid

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