

## G1SLE Mk2+ Repeater Controller Builders instructions.

The Mk2 controller consists of one double sided PCB and provides all the functions expected of a repeater controller including onboard CTCSS encode/decode and DTMF remote control.

Once the controller is built and fitted to the repeater the keeper may configure it by connecting any standard RS232 terminal, such as Windows™ Hyperterm™

The controller is supplied as an resist masked, tinned, drilled, and through plated PCB with upper silk-screen. These features combine to make assembly of the MK2+ PCBs considerably easier than earlier revisions.

First visually inspect the PCB for any manufacturing defects, occasionally flecks of copper will fail to etch properly, rarely the tinning process will result in some undesired whiskers shorting tracks.

Any such minor defects can be removed with suitable tools.

The vast majority of passive components are 1206 and 0805 surface mounted parts. You should now fit these, the 7480 filter and the 12027 eeprom/rtc as per the 8&9 overlay.pdf provided.

1206, 0805 and 8 pin SOIC parts are easily manipulated with either tweezers or very small needle nosed pliers. Solder with a 15 watt (or better a 45 watt thermostatic) iron. The RoHS directive suggests that you should use a lead free solder with none hazardous flux. I suspect that you have better experience in soldering than the committee that drew up RoHS, so feel free to make your own choice of which solder to use!

Now turn over and look at the upper side of the PCB.

Options are provided for either mute input polarity and either network key input polarity, fit diodes for active low or the transistor and resistor for active high.

Next fit the 5 (3) x 1N4148 diodes, observing the orientation indicated on the overlay. Now fit the IC sockets. Use of IC sockets is a matter of choice, I suggest that the 89XX processor should always be socketed, I prefer to use sockets for all ICs myself, however if you are using sockets I would strongly advise that you use the best quality turned pin and gold plated types.

Next you should fit the 7805 including a small heat sink if desired, you will need to bend the 7805 legs quite close to the case using small needle nose pliers, don't bent them at the point where they join the case as they will very likely break off if you do. Now fit the 3 crystals, spacing them slightly above the PCB surface to avoid shorting the crystal case to the PCB pads. Next fit the 5 (7) NPN transistors, then the 7 (9) 22turn presets. The uncommitted opamp can optionally be fitted with a 22turn preset in the feedback path to set the gain, similarly the discriminator input amplifier may also be fitted with a 22turn preset in the feedback path if required.

Provision is also made for DC blocking capacitors on the spare amp input if required. An option is provided to bring an RS232 level 'network busy output' to pin 24 of the 25 way D connector, this option is enabled by fitting the option jumper.

Now fit the 2 electrolytic capacitors (observing polarity) and the 220nF oscillator capacitor for the NE567 1750Hz burst detector. Finally fit the 9 and 25 way D connectors.

Congratulations, you've just built a repeater controller!

Before you get too excited and definitely before you plug in any expensive IC's apply some voltage (8 to 25 volts ) to the DC input and check for +5v on the supply pins of all the IC's.

Now plug in the IC's, again being careful to observe the correct orientation on the overlay and being careful not to bend any of the legs.

You may now apply power again, current drain should be around 50mA, if it's significantly more than that disconnect the power and check again for solder flecks and incorrectly fitted or oriented parts.

Once you have assembled your controller and are happy that it is drawing a reasonable amount of current you can move on to fitting it to your repeater.