

## G1SLE Repeater control system features.

The G1SLE repeater control board was designed and built to replace the old GB3US board in use on the Chesterfield repeater GB3EE.

A number of points were borne in mind when designing the new system. It was desirable that the new controller should be very easy to use whilst discouraging abuse. This is a very difficult balance to strike!

Persistent blipping up or kerchunking of the repeater can be very irritating for genuine users monitoring for real traffic, however a requirement to so precisely control tone burst frequency and duration that an atomic clock would be handy does little to encourage real traffic and little to deter kerchunkers. A requirement for a few seconds of speech seems like a good way to stop this silliness but can also be difficult to implement without causing irritation to genuine users.

After some careful thought I came up with the idea of 'giving the kerchunker his own back' ! As soon as 1750Hz+carrier or CTCSS is detected the transmitter is keyed and the talkthrough path enabled however if carrier and CTCSS are lost after say 1 second then the transmitter will give 1 'pip' and hold on TX for 1 second after loss of signal,

if 2 seconds of signal is detected then the transmitter will hold for 2 seconds with a 'pip' every second. This continues up to 5 seconds when the repeater has been 'properly accessed' giving a signal report after each over (if signal strength meter is implemented) and a beacon and repeater status report before dropping TX.

I have already made mention of the signal strength report this feature was implemented because the Tait base used for GB3EE had a signal strength output and I thought it could be handy for a user to know if he needed more (or less!) power. Some base stations provide an indication of offset from the RX center frequency only a minor change to the software is required to use this to report H or L for high or low instead of S or W for strong or weak. If neither feature is required omit the LM324 quad op amp from the board.

You will notice that the board is rather small and simple looking this is due to most of the work being done by the 87c51 MCU , this also allows for many changes to be made in operational parameters by simple changes to software.

A second advantage of using a single chip MCU rather than an MPU plus EPROM plus latches etc is that the controller generates almost no RF noise.

An external CTCSS decoder is required and if it is desirable to use off air control of the various functions an external controller of some sort will be required (I use DTMF)

So in summary the G1SLE controller gives:-

- Easy interface to most radio hardware.
- Simple design with low component count.
- All tones and timers under software control.
- Single chip MCU gives very low CPU generated noise.
- Keeper programmable 'time-out' and beacon timers.
- Full support for CTCSS.
- Beacons silent to CTCSS users.
- Input to switch to beacon only mode.(beacon reports 'OFF')
- Input to select TX power level.
- Automatic switching to low power on mains failure (beacon reports 'BATT').
- Novel operation during first 5 seconds after initial access deters 'kerchunkers'
- Watchdog automatically resets CPU in the unlikely event of a 'crash'
- On air reporting of signal strength as 'S'trong , 'I'ntermediate or 'W'eak
- Onboard 1750Hz. burst decoder.
- Engineers mode for easy setting of tone levels.
- What more do you want!