

REPEATER OF THE MONTH – GB3PA GM4COX

In the last issue of the FM NEWS I discussed the evolution of GB3LG and the development of wind power. This proved to be a blessing in GB3PA's chequered career.

In the early 80's PA started its life as a project within the West of Scotland Amateur Radio Society (the 'Glasgow Club') through the inspiration of Gordon GM4LFA, Tom GM4FDM (yes he of Dx fame) and myself all members of the club. In discussion with the Committee of the CSFMG it was intimated that the coverage of CS was poor in the Paisley/Greenock/Dumbarton area. It was also thought that it would prove beneficial to provide coverage in the Loch Lomond and Helensburgh areas. Now, as it turned out Tom had a local contact within the building industry who just happened to have his own two-way radio system and radio site located on moor some 700' above Paisley. It had a good outlook over Loch Lomond and NW towards the Helensburgh area. Tom came to a very favourable deal with the owner (like '0' pounds on the understanding that we 'amateurs' would keep an eye on the site on his behalf). In the interim Gordon had been dabbling in programming the Zilog Z80 through a Nascom kit and in discussion at the club he had taken on the task of developing a suitable set of routines that would control a repeater.

Following on from my work on GB3FF using the Storno CQF600 series of base stations for the amateur service, I had been looking at the use of a portable repeater for use on R8 (145.200/800) for Raynet applications. I had found that with suitable filtering the Storno mobile 600 series, the CQM could cope with the 2M 600KHz split. Considering the location of the site (accessible only by Land Rover or by foot - especially in the winter) it defined the specifications of **GB3PA MkI**. Basically all the kit had to be removable by foot.

Tom proved a great asset to the project in his fund raising ability. A certain amount of the

funding for the project came from the club but the bulk came from Tom's sponsored transmissions from the site in 1983, and individual donations (checkout the .mpg file on the website). From these transmissions the site looked promising with encouraging reports from as far as Edinburgh, Dunfermline, Stirling, Irvine and of course from the greater Glasgow area.

Early 84 saw **MkI** become operational and right from the off it was credit to our hobby with, I am right in thinking, the first microprocessor based repeater in Scotland, both amateur or professional.



GB3PA-MkI – Installation circa 1984

The hardware specification consisted of Z80 repeater control, modified Storno - running 10W, two aerial working consisting of dipoles at 120' and 90' with single notch cavities in each line. It ran off a 12V feed with battery back-up.

This was an interesting feature. If the unit went into back-up it reduced its power to 1 watt and signalled that it was on back-up with a 'B' instead of the usual 'K' at the end of an over. (users of the present day PA will notice that is the on-going situation. This will be explained later, it is also a feature of all CSFMG repeaters whether they have standby battery capability or not with the exceptions of KA & CS).

Now it is all very well having a free site in a fairly remote location but if your located fairly close to a notorious 'housing scheme' and the site has no security protection it was just a matter of time before problems arose. This manifested in the break into the site and removal the Storno but the logic had been left (in a somewhat vadalised state) along with some other stations. We had our suspicions to the culprit's and there was rumors going around the CB community that certain individuals had the remains of **MkI**.

The logic was quickly repaired with a few mods to the programme and hardware. A new CQM was fabricated and installed. This combination was run as **GB3PA - MkII**.



Gordon GM4LFA Installing the 3 Element for GB3PA-MkIII on the new mast. Circa 1987

Vandalisation continued with the demolition of the 160' tower by sawing through the metal support guys - a very dangerous activity - pity it didn't take the culprits heads off. The erection of a new tower gave the Group the opportunity of installing a new aerial right at

the very top. This consisted of a heavy duty 3 ele yagi optimised towards the WNW. It was also at the time when we were standardising our repeaters and logic, basing the RF units on Storno CQF600 series cabinets and the logic was now based on the Rockwell 6500 series of chips. This was due to a change in the logic development being taken over by Jon GM0HY from Gordon, and Jon had really cut his teeth on this micro-controller. In tandem with the RF units there was a big programme to convert the repeaters to single aerial working with the design of the CSFMG/QST based duplexers (now in use at PA, FF & AY). This project was handled by Mike GMOETC. This new configuration became **GB3PA-MkIII**.

Unfortunately the damage to the site did not abate, with **PA** now being in the middle of a taxi war. It appeared that there were a number of rival taxi companies of dubious legitimacy operating around the Paisley area. Two of companies had their base stations located on the site and one of their rivals decided to give them a hard time and break into the site by demolishing the wall on which PA was located. PA's cabinet was smashed and number of other bases where also damaged, however we were fortunate that the duplexer had not been touched as this would have been hard to replace. After this episode we decided call it a day at this location.

Although the site proved to be an excellent for the west side of Loch Lomond and the Dumbarton area, Greenock and Gourock proved poor. So we decided to look for a site that would provide better coverage in these areas. Now as it turned out there was just such a site located in a position that would give us enhanced coverage in both the Helensburgh and Greenock areas operated by a large (and to become larger) cellular operator (and to become bigger). Hearing that they were not adverse to amateur equipment sharing some on some of their sites an approach was made. From that initial approach and after almost 2 years of getting the 'run-around' with the organisation it was decided to push on an develop our own site. This is where our experience with LG came to the fore.

Having been sickened by the delay of dealing with this organisation and reporting back to our members the lack of progress we decided to develop our own site - quickly. At the time Archie GMOBFW was the keeper and he decided to take on the task of locating a suitable site. Since the commercial site was in an ideal location for our needs it made sense to locate a site in the same vicinity. There were a number of farms fairly close to this site so Archie approached a few explaining our requirement. Fortunately for, an annual rent, one offered us a location on a ridge overlooking Langbank and across to Dumbarton. The only problem was there was no infrastructure so we had to start from scratch. For a start to provide electricity to the site would have costs thousands so this is where our experience with wind power came into play and was the starting point for the design of the site. A suitable tower was bought for a reasonable cost from a local Glasgow commercial aerial company and fabricated by Norrie GM4VHZ of Tennamast fame to accommodate the Marlec 910 wind charger (the same model as used at LG). A cabinet was designed to accommodate the 300+AH battery bank, Storno, duplexer and charge control units and again this was built by Norrie. Although you may think the west of Scotland is a fairly windy place, we indeed have quiet spells even at an elevated and exposed site like LG as we found out. So to overcome the potential lack of wind at PA, two 12V solar panels were added to the design. In ideal sun and properly mounted at the correct angle these panels would be able to provide about 18W each, however in our design they were mounted vertically on the side of the tower which we knew was going to be a compromise (as it turned out the most I have seen being delivery by both panels at the same time is about 24W). PA's aerial was going to be an old and well used Phelps Dodge/Andrew antenna which had seen service in the early days of CS at Blackhill and latterly at AY. The collinear was refurbished, tested and proved to be working as good as ever.

With all the hardware accumulated, the end of June 1996 saw a number of us rendezvous' at

the site. Preparations had already been made to the rock outcrop to accommodate the tower and with aid of the farmer's tractor-trailer and mechanical arm we were able to manoeuvre the tower sections, charger and collinear into position. Once in position the equipment cabinet was abutted against the tower and all the relevant power and aerial cables fed into it. The whole operation took two days with the second day mainly involved in the installation of the panels and fine-tuning the RF kit.

On switch on we were highly impressed by the performance of **GB3PA-MkIV** and the site, with stations calling in from as far afield as Edinburgh, Dumfries, Ayrshire, and the big bonus, the east side of Loch Lomond which was always poor from the original PA site. On the down side coverage into Gourrock proved not as good as we would have liked as this was due to rising ground to the west of the site – but a guess you can't win them all – hi! To date the site and the station has proved to be a great asset to the Group, however in the last couple of years the repeater has been starting to suffer and a series of work has been scheduled under the auspices of the keeper Alex GM7OAW. Unfortunately this has proved hard to implement, but by the time you read this article the refurbishment programme should be well underway so once complete I look forward to working some of you though the rejuvenated 'box on the hill' – wind & sun permitting!

Checkout:

For more pictures of the various PA's, use Easy Link www.csfm.org/GB3PAhist.htm on the CSFMG website.



GB3PA MkIV – Specifications

RF Platform – Storno CQF612

Tx Power – 10W into duplexer

Tx Power – 6W out of duplexer

Duplexer – QST/CSFMG

Receiver – u-Tec Pre-amp + Storno

Logic – CSFMG - 6502 based

Aerial – Collinear 5dBD

Feeder – Andrew’s LDF450

Talk-thru time – 3.5Mins

Ident – ‘GB3PA’ in morse every 6 mins if not in use or 12 mins if in use.

Access – 1750 for greater than 0.5 secs but no greater than 4 secs. 103.5Hz

Power – 12V ~ 300AH capacity

Generator – Marlec FM910 – 72Watt

Solar Panels – 2 x 18 Watt

GB3PA-MkIV – Circa 1996 to Present

