

ESSEX REPEATER GROUP

GB3DA

GB3ER

NEWS BULLETIN

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GB3DA IS BACK!

By Hon Sec ERG Dick Merrell G4GUJ

Ever since the new GB3DA unit has been installed, we have never been able to return to the single aerial working of previous years. This was largely blamed on two things,

1. The level of other local transmissions, which having significantly increased, were causing our receiver front end to be overloaded.
2. The Hexilator was considered to have an unsuitable amount of rejection and as such was never fully installed.

Since Christmas the repeater suffered from a form of blocking which manifested itself as an annoying 'chicken' noise being transmitted, the sensitivity of the unit had also gone for a ball of chalk. After two months of general tweaking and twiddling with no end in sight, it was decided to deactivate the whole system and subject it to a full technical investigation.

The receiver colinear aerial had been in service for a number of years and had to be repaired more than once due to wind damage. As we were about to do a complete

equipment service it was decided to replace it with a new Comet dual bander aerial. This type was chosen so that it is compatible with the aerial currently in use on the GB3ER system thus allowing interchange of aerial to be effected if the need arises in the future.

The UR67 feeder was also checked for VSWR and insertion loss when the aerial end was terminated with a 50 ohm load. The results were as expected (1:1 VSWR, IL of 3.2dB), clearly indicating that the feeder is in a 100% serviceable condition.

Attention was then focused on the cavities. Both the Tx and Rx cavities were found to be a long way out of tune with the overall notches only, at best, -40dB. When an attempt was made to tune them a very high level of intermittency was encountered therefore the units were completely stripped for a more detailed investigation.

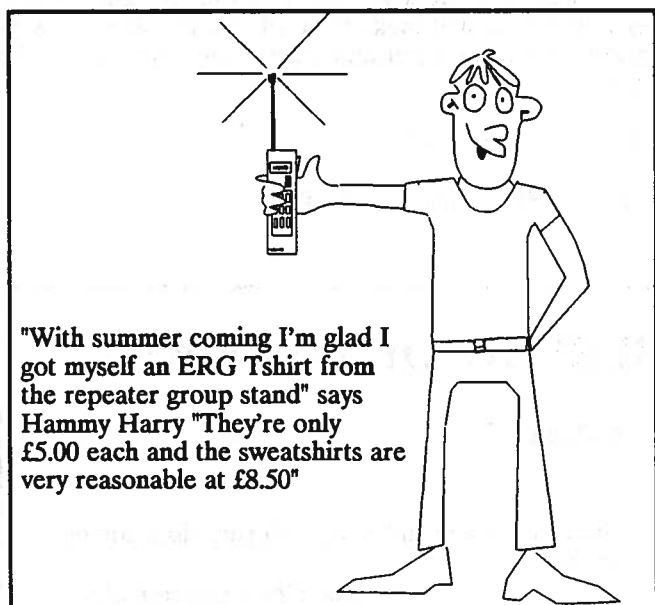
Two main problems were found, firstly in all but two of the six cavities the fixing screws in the top coupling boxes had somehow worked very loose and secondly two of the coupling loops within separate cavity chambers had become unsoldered.

When all the cavities had been examined and where necessary repaired, they were very carefully readjusted to give very good levels of notch and insertion loss in both the Tx and Rx path.

The full system (including the Hexilator) was assembled on the bench for a recheck of system parameters. It was noted that firstly the receiver was extremely deaf, and secondly an element of desense was apparent when the transmitter was operated.

The receiver sensitivity was measured as -106.2dBm for 20dB SINAD @ 2.4KHz deviation - a very poor result, and was found to be due to the death of the front end device, as spares were not immediately available a replacement unit was fitted (and is still fitted), - the receiver sensitivity is now -113dBm for 20dB SINAD.

Correcting the poor sensitivity problem only heightened the desense problem, which was even apparent when the radio was operated on the bench with the Tx output loaded with 50 ohms and the Rx driven from a 50 ohm source, therefore the transmitter output was examined. It was found that the transmitter was producing some very low level spuri spaced 200 KHz +/- a few KHz each side of the carrier.



"With summer coming I'm glad I got myself an ERG Tshirt from the repeater group stand" says Hammy Harry "They're only £5.00 each and the sweatshirts are very reasonable at £8.50"

COMPETITION RESULTS

The winner of the ERG competition at the Canvey Rally was John G1JLJ with the caption "I'm still not sure that your staying up here to hold the antenna will cure the problem Alan"

Investigation showed that the receiver's 8.3 volt supply originated on the transmitter board, and it was along this path that this spuri was travelling. It soon became obvious that to completely eliminate this spuri the supplies to the two boards needed to be completely isolated.

It must be stated at this point that this was not a fault with the Tait unit, as when operated in the manner for which it was designed, the receiver is normally switched off during transmission periods.

An 8.3 volt series regulator was built onto the receiver board and the 12 volt supply was bought in via the connector originally provided for the purpose and some filtration added. This separation and filtering of the supplies was carried out on all three parts of the unit, resulting in only a two wire screen link between the Tx and Rx modules and the logic board.

After this exercise was completed the spuri were totally eradicated and the desense from within the radio system itself was reduced to zero. As a further enhancement and to enable further tests to be carried out both on the bench and at the site without dismantling the unit, the audio and AGC were bought out to two RF type connectors already mounted on the Rx enclosure.

The whole assembly was reconnected and a desense check was made. It was found that the desense level was only 4/5 dB's which is considerably better than we have had before. A triple stub tuner was fitted to the output of the Hexilator and adjusted to give an approximation to the match usually found at the feed point of a colinear aerial and the desense level was still 4/5 dB.

For the record, the system performance figures are now : Sensitivity for 20 dB SINAD @ 2.4 KHz deviation at Hexilator input = -107 dBm (Tx off) and -101 dBm (Tx on), the Power output at the hexilator = 3.5 Watts (the power was reduced from the previously set figure of 6 Watts to allow for the gain of the colinear in a single aerial system.)

When the equipment was reconnected back at the site, it was found that a very severe feedback situation existed. This was investigated and during the next two weeks a special unit was designed and built to compensate for it without degrading the system performance. This done the system was returned to full service on 13th April.

Now that the system is back in operation, reports on its performance, range etc. will be welcomed, so that we can assess the unit's range within the coverage area.

THE WORDS OF CHAIRMAN MIKE

Hi folks its G4ZPE the Chairman of GB3DA (Hey what's happened to ER? - Ed). After many weeks of hard work by Dick G4GUJ and Mike G1WSK and yours truly providing moral support most of the time, we now have a first class repeater back on air. A lot of midnight oil was burnt and Dick G4GUJ has had 5 divorces pending and I myself have reached about 4. It's all come up trumps and to my own personal delight we are back on one antenna again giving us the coverage as it was 4 years ago. This is one hell of an achievement by the lads.

The whole system is like a finely tuned thoroughbred race horse. We are only 3 watts from the hexilator into 150 foot of UR67 up the mast to a dual bander on top of the tower with 6.5 dB gain. The antenna is called a Comet which is first class for our job. It's not as large as the J/Beam colinear so it does not catch the wind so much, also its construction is more suited to our site with its very high winds. The reason behind my thinking was we can switch antennas for test purposes if we find it necessary in future.

Only 3 watts from the hexilator was set to try and get over the problem of overlap with our friends in Hampshire, who are also trying to keep power levels down. Gregg G0KVT, the Chairman of GB3SN and I are in constant contact and are working together on this problem, but we can only go so far.

The main problem seems to be the 45 watt mobile rigs and the owners who forget to reduce power when working a repeater so accessing a number of repeaters on the frequency. I feel that more education is needed so that the stations doing this, sometimes without knowing it!, can be persuaded to turn the power down.

Just one final thing if you are at any of the rallies please give us a look and make yourself known, we are always ready to welcome you and answer any questions, if we can.

All the best for now

Mike G4ZPE Chairman of ERG

APPLICATION FOR MEMBERSHIP OF THE E.R.G.

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Please complete and send, with your donation of £5.00 to :-

The Hon Treasurer ERG
Mrs. Chrissy Merrell, G8OIV
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