P5

The Newsletter of
The Severnside Television Group

June 1995

CHAIRMAN G8YMM

Welcome to Junes issue of P5. Since the last issue you have a new committee see minutes, so please welcome new and old.

GB3XG & GB3ZZ REPEATERS

GB3XG is now on air producing excellent quality pictures. Thank you to all concerned especially Frank Evans (GW8AWH) the owner of the site who has donated materials and time in seeing this project through. **GB3ZZ** on the other hand has the addition of several new text pages I will let you spot them ! and is working well. Should you wish to monitor GB3XG but do not have the equipment at present, it is possible by keying in the following DTMF code via GB3ZZ (*86#).

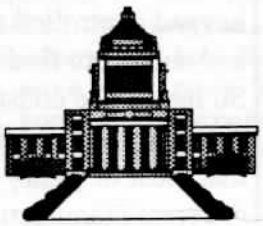
SUMMER COMPETITION JUNE

The summer competition is approaching and we want all the points we can get on the 3 bands. We hope that 10GHz will produce a good result this year due to the increase in activity lately !! so come on the Air, lets see and here those forgotten stations and give us points to **WIN.** On the Saturday night of the competition we will be having a B-B-Q starting at 6.00pm. Please come along with your partner or friend and join in the fun, **PS** don't forget to bring a bottle and some food to help out. If you are unable to attend then perhaps you would like to visit the site or help during the event. The site is located in one of the fields near the Castle Of Comfort Pub and the Microwave tower on the B3134 junction leading to East Harptree on the Mendips. We should be monitoring 144.750 if you require directions.

IMPORTANT NOTICE (BANDS UNDER THREAT)

For those who are not members of the BATC or RSGB may be unaware that proposal are being made by the European Radio Committee to reduce the 430-440 Mhz band to 432-438 Mhz a loss of 4MHz. It has therefore, been recommended that amateur television activities on this band be transferred to bands above 1GHz.
Your committee in response to this, is recommending that there be **NO** changes as many new and old operators still wish to use this excellent band being it their only band in many cases. We will keep you informed about the threat.

LONGLEAT RADIO RALLY

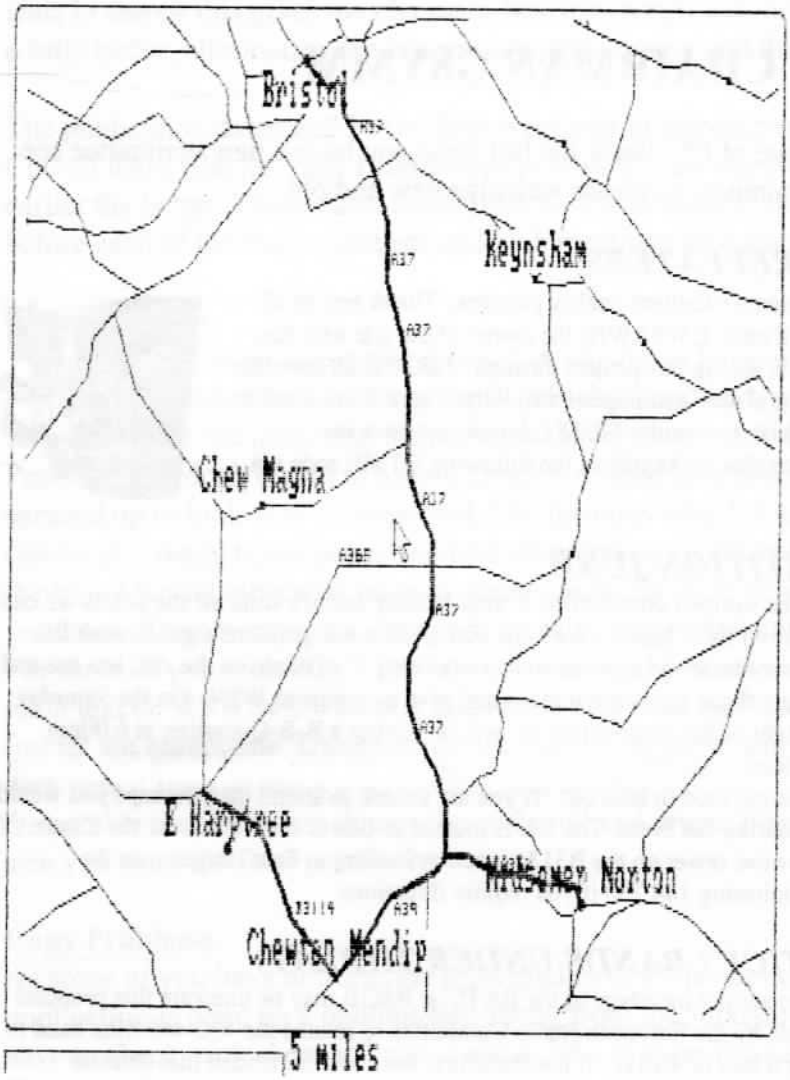


The group will be attending the rally in the bring and buy marquee so pop along and visit us. We will have numerous committee members manning the stand throughout the day with a supply of our excellent quality aerials for sale. I look forward to seeing you there and don't forget you can renew your membership if you have not already done so.

DATES FOR YOUR DIARY

- SUMMER COMPETITION FUN — Saturday evening 10 & 11 June 95.
- LONGLEAT RALLY — 25th June 95, Longleat House, Warminster.
- BRISTOL RALLY — 3rd Sept 95, Bristol Templemeads (Brunel Sheds).

Directions to the Competition site



OOPS!

A mistake crept into the 10GHz controller article in the last issue of P5. The sound modulating diode D1, listed in the parts list as MV1208 should read as MV2108. The Maplin code is quoted correctly.

The BD131 Gunn current amplifier transistor is mounted with it's metal face toward the relay. If a heatsink is fitted, put the mounting nut on side nearest the relay so it can be held in pliers while its screw is tightened.

Coming soon in P5:

G6TVJ's 75ohm switched constant impedance attenuator.

GW6BWX's multichannel audio and video switcher.

Group Projects – What would you like to see?

Several of the construction articles in past issues of P5 have proven very popular with readers. Of particular note are the DTMF keypad and Gunn controller board. A prototype keypad controlled signal switcher is currently under test, first results look very promising and subject to finding the time to finalise the design, it will appear in the next newsletter. So far, all the construction articles have been inspired by the needs of their respective designers and published by their willingness to share their project with others. I imagine that most of us have similar station set-ups, the units all look different and are from different manufacturers but their functions and connections must basically be the same. It follows that we would probably all like a similar selection of items to add to out present kit. How about letting me know exactly what you would like to see developed and published to give the designers amongst us a guide to what would be popular.
Ideally the projected cost of a construction project should be about £30 with a ceiling figure of about £40 and all parts must be easily available.....*over to you*

Converting the RKU10 LNB's

By Ken Stevens G4BVK

These are the large white LNB's being offered around the rallies; rather old comparing to present-day LNB's but nice and simple for conversion to 10Ghz. When you remove the lid of the LNB you will be pleasantly surprised with the quality of the unit, which has plenty of room inside.

In the RF side of the unit you will find a small metal cover with an adjusting screw in the top face. This covers the Puck oscillator. Removing this cover will reveal the old 10Ghz puck, which must be removed and replaced by a 9.1Ghz puck. When fitting the new puck it must be located between the tune lines (see fig 1) and not in the same position as the old puck.

To make the puck oscillate at the desired frequency you must mount it clear of the surface of the PCB, otherwise the puck will oscillate at the wrong frequency. I found that a small sliver of mica glued onto the underside of the puck about 1mm or so thick will encourage the puck to oscillate at the desired frequency. I also found that clear nail lacquer was excellent for fixing the puck, and I would advise against using superglue. In the case of having to adjust the position, the lacquer is soft and the puck can be removed without damage. Also make sure that any excess mica and/or glue is removed so the diameter of the mica washer is the same as the puck. Before replacing the cover make sure that the adjusting screw is fully screwed out, otherwise it will pull the frequency high when reinstated. It is possible to make the puck run slightly low in frequency, which will enable you to bring the frequency back up to 9.1Ghz by simply screwing the frequency adjusting screw further in.

If you find that after fitting the new puck into your LNB it appears not to work, this is probably due to the puck not oscillating. Relocating the puck slightly or reducing the thickness of the mica washer should encourage it to work. This can be a bit tricky, and can take some time to get right.

Verifying the frequency of your local oscillator (puck) can be accomplished by using a known frequency as a yardstick, and it so happens that some of the channels on Astra "D" are within the tuning range of your LNB. You will need to set up a dish aligned on the Astra satellite, and I would also recommend you do this to confirm (1) that the LNB is working OK before modification and (2) that the dish is then left lined up on Astra ready to test the unit after the conversion. After fitting the new puck, and remounting the LNB in your dish, you can proceed with the testing of the unit. Ascertaining the frequency at which the local oscillator (puck) in your LNB is running can be achieved by simply tuning in channel 49 (10,714Mhz) on Astra "D", then referring to the readout on a synthesised satellite receiver. Simply subtracting the frequency of the readout on the receiver from the known frequency of channel 49 (10,714Mhz) will give you the frequency of the local oscillator. If it is found that the frequency is too high then you must either increase the thickness of the mica washer or move the puck slightly further from the tune lines or, a combination of both. If it is too low, decreasing the thickness of the mica will increase its frequency. On testing the unit with a 60cm dish I found that all the channels on Astra "D" were virtually noise free.

The other useful point to remember is that once you have confirmed that the puck is oscillating on 9.1Ghz and you are using a synthesised satellite receiver, you can very easily determine where you are in the 10Ghz band by simply adding these two frequencies together to determine where you are. I.e. 9,100Mhz (Local oscillator) + 1,178 (Satellite receiver readout) = 10,278Mhz

After modifying the unit, I found that there were two further modifications that could be carried out to improve the unit's overall performance. These mod's are not essential to make the unit work on 10GHz, but do improve its performance.

Modification to the RF amplifier:

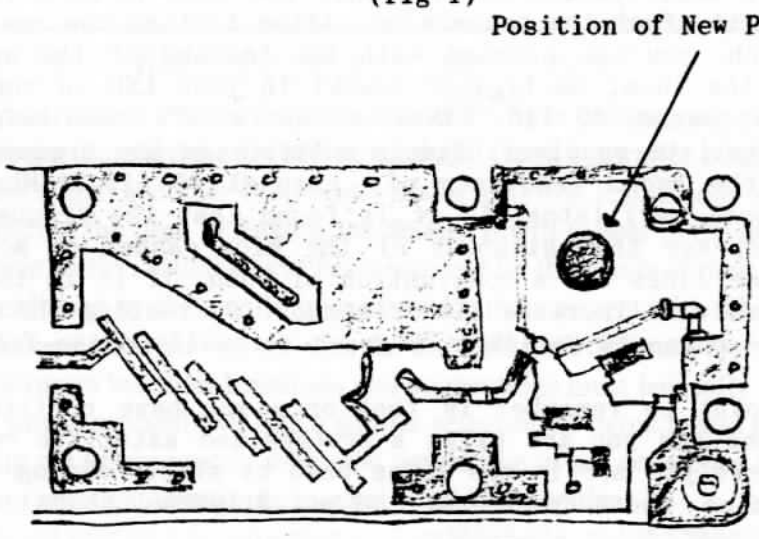
The three-stage RF amplifier appears to give good results at 10GHz. However, a small improvement to its performance can be achieved by simply fixing a small piece of brass shim (approximately 4mm x 2mm) at the centre point of the coupling line between the first two stages, thus improving the inter-stage matching. Before soldering the brass shim in place, it is worthwhile adjusting the position of the shim for best results. This can be achieved by carefully moving the shim up and down the line (with the aid of a plastic trimming tool), to find the optimum position.

Modification to the strip-line filter:

The unit's performance can also be improved by a small modification to the strip line filter. This can be accomplished by simply adding capacitance to the ends of the filter lines to modify its response. Firstly, fit three small trimming screws (2.5mm screws) drilled and tapped into the oscillator cover positioned directly over the ends of the three centre strip lines of the filter. These trimming screws are then peaked for best performance. I would also advise that you glue a piece of PTFE onto the top of the filter lines to prevent the tuning screws shorting these lines.

If you are considering either of these modifications you will need an extremely low power 10GHz source with some form of variable attenuation for alignment purposes. Unfortunately you will find that a gunn oscillator is unsuitable for this purpose as it will emit far too much RF, making it almost impossible to attenuate the signal sufficiently. One point to remember is that all LNB's have a certain amount of RF energy which is being emitted from the unit, due to break-through from the local oscillator. As you can imagine, the level of this signal is extremely low. However, it is possible to use this RF leakage from another standard LNB, and use the signal as a low power 10GHz source, which is around the level required. It is then possible to realign your converted LMB by simply monitoring the AGC level on your satellite receiver when making any adjustments.

(fig 1)



NE592 vs EL2020 Video Op-Amp Group Test

By Ian F Bennett G6TVJ

The NE592 video operational amplifier has been around now for a number of years and is most commonly found in older satellite receivers. The NE592 can also be found in many amateur TV designs. I have spent some time with amateur equipment using these devices and in some cases I have found shortcomings with the NE592 which gave it a somewhat poor reputation compared to more modern ICs, in my mind anyway.

A more modern device is the EL2020 video operational amplifier manufactured by Elantec, it belongs to a family of high performance video devices and is available from Maplins. I have used these devices very successfully perhaps at the expense of the poor old NE592. Against this background I decided to test these two devices back to back with some interesting results.

To test these devices I built up a simple video amplifier using a single 12V supply rail (most popular with amateur designs) and AC coupled 75R input and output impedances. I fed the amplifiers with various test signals via a constant impedance attenuattor to determine gain, frequency response, and linearity. The units were built up on plain copper clad board used as a ground plain for stability, strip board is not really suitable if reasonable performance is to be realized. The results where displayed on an oscilloscope and not a picture monitor, never judge a video signal on a picture monitor as half a dozen tellies will do half a dozen different things when presented with a distorted video signal!

NE592 Circuit

Fig 3 shows a circuit using a NE592 used as a non-inverting amplifier. One advantage with a NE592 is that it provides an inverted output on another pin. A potential divider sets the bias voltage on the input pins and intern the output pins. Something to note is that the voltage on the output pins is different from that on the input unlike most op-amps at low offsets, this is not a problem due to the AC coupling but it does have a performance implication. The gain is set by a single resistor between pins 3 and 12, this makes varying the gain rather awkward as one side of it cannot be earthed. I have found that soldering a 5K pot across the top of the IC works well, the lead lengths and stray reactances must be kept to a minimum. A frequency compensating capacitor can be added between pin 3 and ground its value depending on the gain setting, although I actually found it wasn't realy necessary and the manufacturer does claim frequency comp is not required. The coupling and decoupling electrolytics are chosen to give good video low frequency performance, there values shouldn't be reduced, at 75R a 1000uf is really a good value to use if rolling and pulling pictures are to be avoided particularly if several bits of equipment are "daisy chained" together.

EL2020 circuits

Fig 1 Shows an EL2020 video op-amp configured as a non-inverting amplifier producing a terminated gain of 14DB. EL2020s are much similar to more ordinary op-amps such as the 741 than the NE592 is. The 2020 can be virtually wired up in the same way as the 741 except the resistor values are much lower due to the low impedances associated with video circuitry. The gain is set by a conventional feedback network and the output potential is similar to the non-inverting input for low DC offsets. Frequency compensation can be added between the inverting input and ground. As with the NE592 the values of the coupling and decoupling capacitors should not be skimped on.

Fig 2 shows an EL2020 wired as an inverting amplifier producing a terminated gain of 14DB, it is basically similar to the non-inverting configuration except that the input video is fed to the inverting input on the op-amp partially via the feedback network. The impedance of the source feeding the amplifier forms part of the feedback network so care must be exercised to maintain this at 75R otherwise the gain will be effected.

Performance compared.

Gain:

According to the manufacturers data a NE592 can manage up to 50DB, I settled for about 30DB which is all that should be required for amateur applications. The EL2020 is somewhat beaten at a voltage gain of 10 (the maximum quoted by the manufacturer but higher gains might be possible at reduced bandwith) this is translated into a terminated video gain of 14DB less than half that of the NE592.

Frequency Response:

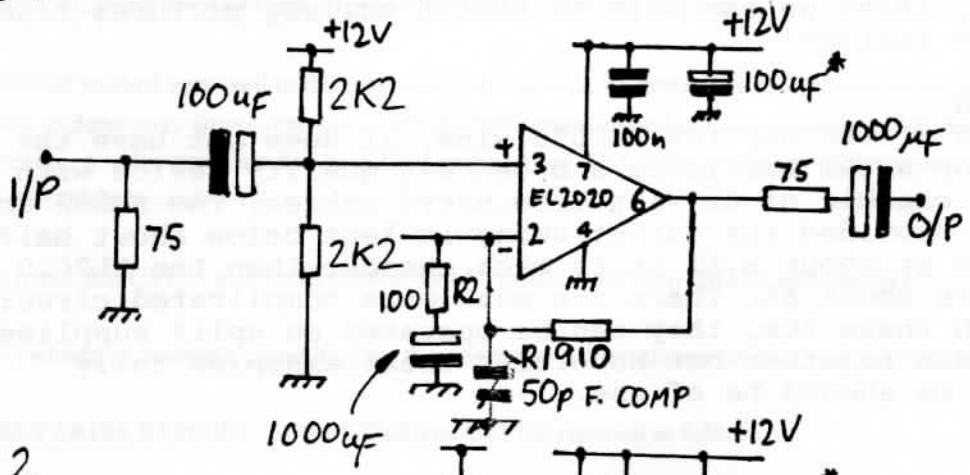
This is the area where I expected the NE592 to do badly but it actually works well its pulse and bar response and crominance response is as good the EL2020. Frequency comp can be applied to both chips as shown in the diagrams to sharpen up the response by a few % and also compensate for circuit losses elsewhere such as cables and other video stages. The value of compensating capacitor for the NE592 does increase with gain but the actual loss remains more constant with gain.

Linearity:

Now this is when a problem comes to light with the NE592, its output stage appears not capable of delivering a 2V pp signal into 150R that is a 1v pp video signal terminated in 75R. I found the maximum undistorted amplitude possible was about 0.4v pp into 75R before the onset of distortion which manifests itself as sync crushing at high average picture levels. No such problems exist with the EL2020 which will actually drive two terminated loads with 1V pp. It may be possible to increase the supply voltages or play around with the biasing to improve things with the NE592. I would be

EL2020 vs NE592 TWIN TEST by Ian F Bennett

FIG 1



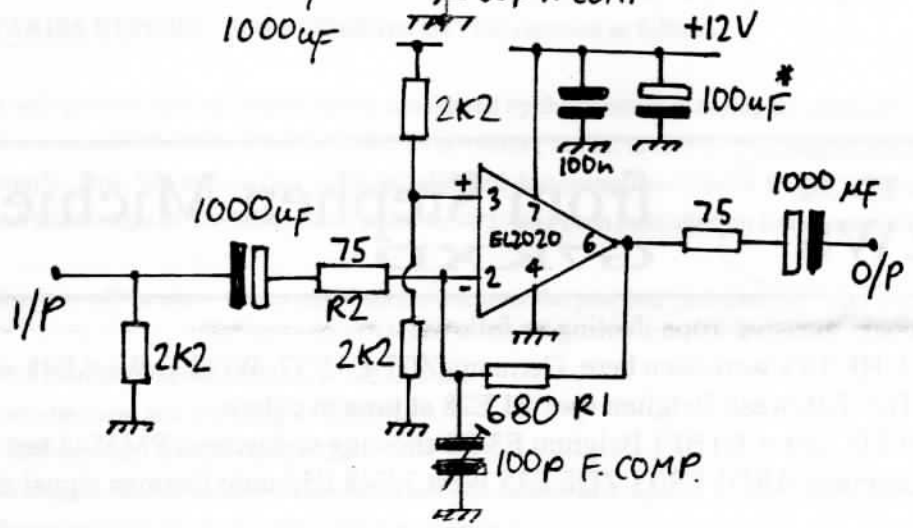
TERMINATED VOLTAGE GAIN

$$= \frac{R1+R2}{2R2}$$

$R1 \leq 4.7K$

* LARGER CAP NEEDED IF DISTANT FROM PSU.

FIG 2

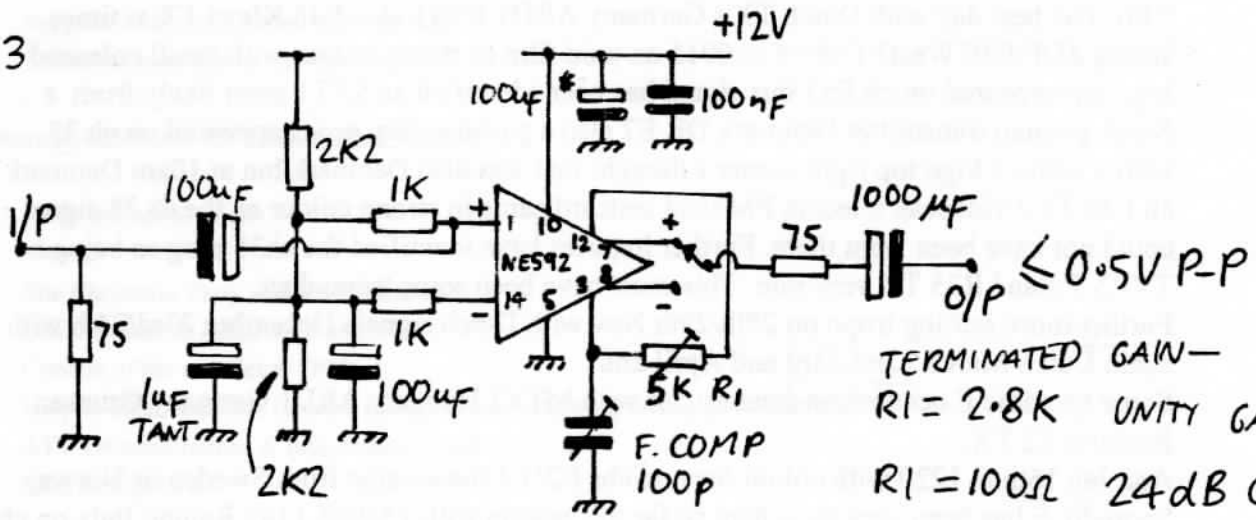


TERMINATED VOLTAGE GAIN

$$= \frac{R1}{2R2}$$

$R2 = 75$

FIG 3



$\leq 0.5V$ P-P

TERMINATED GAIN—

$R1 = 2.8K$ UNITY GAIN

$R1 = 100\Omega$ 24dB GAIN

interested to here from anyone experiencing similar problems with this device.

Low Frequency Response
This is not strictly a test of the ICs but of the rest of the circuitry. All of the circuits shown are reasonable at LF and do not produce any appreciable distortion of the field syncs. Its is advisable not to reduce the values of electrolytics, a nice big fat 1000uf is needed to properly couple 75R video, together I think we can work to banish rolling pictures from amateur TV forever!

Conclusion
At the end of the day the EL2020 wins, it does not have the gain of the NE592 but it is a broadcast quality device with an output capable of driving terminated cables. The NE592 does work well provided its output swing is kept below about half a volt, also at about a £1 it is much cheaper than the EL2020 which costs about £5. There are many more complicated circuits using both these ICs, they can be operated on split supplies and cascaded together but hopefully these examples fully tested by me should be of use.

TV-DX NEWS from Stephen Michie G7KXD

Starting with Octobers massive tropo ducting as follows:
12th. Most Dutch UHF Tx's were seen here, Germany ZDF E35/37 WDR C West E48 at times strongest RTL+ E36 weak Belgium sport21 E28 at time in colour.
13th. Dutch VHF/UHF Tx's + RTBF1 Belgium E3/E8 showing widescreen PM5544 test card BRTN E43 Germany ARD1 E9/11 ZDF E35 West 3 E48 E55 unid German signal also on E52.
14th. The best day with Dutch TX's Germany ARD1 E9/11 also E45 Kleve TX at times strong ZDF E35 West3 E48/55 at 0915 an unid film in strong colour with small coloured logo top appeared on ch E52 this signal has been identified as SAT1 most likely from a North german transmitter Denmark DR E7 also a parlimentary progs appeared on ch 35 with a white 2 logo top right corner I thought that was also Denmark but at 10am Denmark ch E40 TV2 videpeak telecom PM5534 testcard came in strong colour so the ch 35 signal could not have been from there. Further inquries have identified the ch35 prog as being a TVP2 Poland R35 TX very rare. This must have been some tropo duct.
Further more routing tropo on 28th/29th Nov with Dutch signals December 23rd/24th with again Dutch March 22nd 23rd and April 2nd.
Some sporadic E occured on January 5th with MTV1 Hungary ARD1 Germany Grunsen Bautaria E2 TX.
And Jan 16th at 1220 with colour bars on chs E2/3/4 these came from Sweden or Norway.
Sporadic E has been very slow here so far this season with 25/4/95 1145 Raiuno Italy on ch 1A/1B
12 May 1423 unid ch E4 progs.
15 May 1723 TVE1 E2 Spain.

How about a description of your receiver and antenna Stephen.....

AGM REPORT

by Shaun O'Sullivan G8VPG

The following is an abridged version of the minutes of our 1995 AGM, and includes the major reports from the Officers of the Group. The full minutes are held by the Secretary and will, of course, be read at the next AGM in April 1996.

CHIEF ENGINEERS REPORT : Ian Bennett G6TVJ reported as follows ;

GB3ZZ had worked very well in the past year, with virtually no down time at all. Some of the text pages need to be updated : this will be done soon. Improvements to GB3ZZ had centred upon the video processing circuitry, in a bid to stop rolling pictures etc. A video equaliser had been built and installed. The output frequency of the repeater had been changed to 1316 MHz with the help of G4BVK.

It was noted that G6TVJ now holds the Notice of Variations for both GB3ZZ and GB3XG.

G6TVJ wished to thank the committee for their help and support during his first year as Chief Engineer.

SECRETARIES REPORT : Shaun O'Sullivan G8VPG reported as follows ;

My report will give an outline of the matters considered by the committee during the past year. The committee had met on a total of six occasions. The Group had attended three rallies (BATC at Coventry, Longleat and Bristol) and had entered one ATV Contest in June. We had carried out three talks and demonstrations (North Bristol ARC Open Day, JOTA station at Nailsea and Trowbridge & DARC). Our newsletter "P5" had been published on four occasions and sent to all members.

Some of the "one off" matters discussed in committee over the past year included the following;

- The Mercury Paging problem at GB3ZZ site
- Development and licensing of GB3XG
- The frequency change for GB3ZZ
- Arrangements for an American visitor and production of a video
- Personnel matters, as members left the committee
- Supplies of boxes for mail order aerials
- Technical problems at the GB3XG site

These were in addition to the usual matters, such as ;

- Sales and aerial stocks
- Finance
- The Christmas Party and other socials
- Development & refinement of GB3ZZ
- Content of the newsletter "P5"
- Help to other Repeater Groups, mostly through the kind offices of GW6BWX
- ATV Demonstrations & talk, stands at rallies
- Insurance policies

The Secretary stated that as a result of business pressures, he was standing down from the committee after this meeting. He wished to thank those who had gradually started to take on some of his duties over the past six months, and in particular ;

- G0ECM : aerial sales and mail order
- GW6BWX : Newsletter Editor
- G0UMP : preparing minutes of meetings that G8VPG missed.

TREASURERS REPORT : Mrs. Jean Fletcher G0AWX reported as follows ;

I hope you have all had time to study the balance sheet. As you will see the Group has not been quite so profitable during 1994/95 year owing to the drop in sales, though the subscriptions and the result of the Christmas Raffle/Auction has increased, which is very pleasing. We have not spent quite so much money on the repeaters as in previous years and yet it has been the year that GB3XG has come into its own.

I feel, on the whole, the Group has to endeavour to concentrate on plugging away at the sale of aerials, this being our only revenue of any great importance.

It is my task to recommend to the Group that the subscription stays the same as last year, and after my report the Chairman will ask for a vote on this matter. Should you have any questions I will do my best to answer them.

My sincere thanks go to Shaun G8VPG for all his help every year, and the Groups Auditor, Bryan G4YQR, with his signature to allay any fears of my taking a golden handshake !

This is my last year as Treasurer. I have really enjoyed my years in office, many friendships have been cemented and I wish to thank all my associates, very sincerely, for the help I have been given, but now feel it is time to let the younger generation take over the reins while the Group is "still ahead", with the will to go forward as the fine Group we have always been.

CHAIRMANS REPORT : Paul Stevenson G8YMM reported as follows ;

The Chairman explained that part of his report overlapped that of the Secretaries. It had been a difficult year, with lots of work that needed to be done. It also took some time and effort for him to familiarise himself with his role as Chairman.

Early in the year, a major problem arose with the installation of a Mercury paging transmitter at the GB3ZZ site. This was running 100 W of power close to the repeater. However, Mercury had been most co-operative and with a lot of help from Ivor G1IXF, the problem had been satisfactorily resolved.

It was a pity that John G3RFL could not attend tonight, since he had done so much work in the past year to get GB3XG on the air. This had been a very challenging project. On the site, we had to work within strict guide lines laid down by the site owner. The site was uncomfortable at times, with bad weather on the exposed hill top and lots of mud! The repeater had been off air for some time as a result of technical problems at the site. However, these problems were not caused by GB3XG, and the Chairman asked for members patience in this matter - it was hoped that the repeater would be switched back on very soon.

The Chairman had prepared a book about our activities during 1994. This was at the request of our GB3ZZ Landlords, Filton Parish Council. This will be put into an archive that they are creating, which will contain similar books from all of the organisations that use the Parish facilities. The Chairman had been invited to a function where all of these will be handed over. He hoped that a similar book will be prepared for the Groups own archives and use.

The Chairman also acted as the Groups Membership Secretary and was pleased to report that there were in excess of 70 paying members in addition to honorary members.

The Group has run the customary JOTA station at Nailsea. This was poorly attended, but those that came enjoyed it. The Christmas Social went well, with all present having a most enjoyable time. Last week we gave a talk to the Trowbridge & DARC, and were gratified to note that 29 out their membership of 35 attended.

We had attended three rallies during the year. The BATC Rally at Coventry was our major sales event of the year.

We had entered the Summerfun Contest last June and it was hoped to enter further contests this year. We had purchased the aerial tower that we used to borrow from the Gordano ARG and it was now stored at the Farm on the Mendips.

The Chairman referred to three of the committee members who will be retiring after the AGM. Shaun G8VPG is retiring as Secretary, but will continue to help out the Group on particular matters. Jean G0AWX, our Treasurer is retiring and will be much missed. John G3RFL is taking some time off to catch up on home and family matters, after having spent so much time preparing GB3XG during the past few years. The Chairman was sad to see them leaving, but hoped that now they would all have less paperwork to do, they would have some time to enjoy ATV and get back on the air !

Other committee members had taken on some of the Secretaries duties, and in particular, thanks were due to Matthew G0ECM who was now in charge of aerial sales, and Brian GW6BWX who had taken on the Editorship of our Newsletter "P5".

Finally, the Chairman thanked all members, both on and off of the committee, who had helped the group in any way during the past year.

NEW OFFICERS & COMMITTEE FOR 1995/96:

The following were elected to the committee for 1995/96 ;

Chairman : Paul Stevenson G8YMM,
Chief Engineer & Vice-Chairman : Ian Bennett G6TVJ,
Honorary Secretary : Malcolm Parker G0UMP,
Honorary Treasurer : Alan Tink G7DRU.

Committee members posts : Ivor Green G1IXF, Ken Stevens G4BVK, Matthew Bell G0ECM, Phil Smith G1HIA & Mike Stevens G7GTN.

It was agreed to appoint Bryan Collins G4YQR as Auditor for the following year.

PRESENTATIONS TO RETIRING MEMBERS :

The Chairman stated that three long serving committee members were retiring tonight. John Hudson G3RFL was not present and a separate presentation would be made to him later.

Mrs. Jean Fletcher G0AWX had been our Treasurer for the past five years. Paul had first met Jean when she was newly licensed and not an ATV enthusiast. She had helped him run a JOTA station at the Scout Troop that he used to run, at St.Aidans Church Scout Hut. Jean had given five years of most professional support in charge of our finances, to mention nothing of her enthusiastic support of our "Fancy Dress on the Air" events. Jean was presented with a fountain pen and a bouquet of flowers. Jean expressed her most sincere thanks to the Group.

Shaun O'Sullivan G8VPG was retiring as Secretary, having been on the committee since the foundation of the Group over nine years ago. Paul and Shaun had first met on air when they were licensed in 1980. In the early days, the main interest was 2m SSB, then Sporadic E DX-TV and black & white ATV on 70 cm. There was a very active early Group of ATV enthusiasts, including G8UUE, G4ZQF, G0DRX, G4BVK and many others.

Shaun had been one of the early driving forces behind the Group, and had built much of the early GB3ZZ repeater, had acted as Secretary for seven years, had written a book for the Group (which it was hoped he might now have time to update !), had designed our Trough Reflector aerial and run the mail order aerial business since its start, and for many years had been the Newsletter Editor. Paul reminisced over some amusing episodes that Shaun had been involved with, and then presented him with a framed certificate conferring Honorary Membership of the Group on him.

Shaun thanked all present for this honour, which he stated would take pride of place in his shack. He explained that he was retiring due to business pressures, but hoped to still help out with Group activities as necessary.

P5 Publication dates.

Getting P5 ready and in the post has always been a traumatic experience. Typically, the article needed by yesterday turns up tomorrow, the glue for the paste-up has gone solid in the bottle and if there are 90 copies to send there will only be 89 envelopes. I'm going to try to make life a little easier for myself by fixing cut-off and publication dates in advance. At least in theory this gives me chance to buy the stamps and stationary and organise my time a little better, eliminating the last minute panic typing and the sprint to the post box.

The publication dates will be the **first weekend of December, March, June and October.** Cut-off dates (the last date I can accept articles by) are one week before publication but the earlier the better. These dates allow time for the newsletter to reach your doormat just before each of the major contests and club meetings take place.

Article Format.

You don't need to be an expert typist/artist/linguist to have articles published. Us computer buffs have wonderful facilities called "spell-checkers" and "grammar checkers" to hide the many misteaks we make and the same can be applied to articles written by other people. Provided you don't object to a little creative editing here and there, your writings can be spruced up to look very professional, like the ones what I does do.
Obviously, ready typed pages and neat diagrams are preferred because they save much of the time I would otherwise have to spend preparing them myself but I would rather have a few lines of handwriting or a diagram on scrap paper than nothing at all.
For those of you with PCs, I can accept most word processor documents although DOS plain text or WSWIN 2.0 format makes life easier for me. Graphics in BMP, PCX or GIF format are acceptable. Diagrams or illustrations on paper can be submitted but please use dark pencil lines or black ink, shading and colours will be lost in the duplicating process. Remember that I can not change the scale of hand drawn illustrations so prepare them at the size you want the final print to be.

Copy Problems.

As some of you have noticed, the print quality of P5 is not perfect. At the moment all the duplicating is done on a photocopier dating from the Jurassic period. On each print run I have to check each sheet and reject about 10% of them because of feint print or smudging. The cost of a new machine is far more than I can afford and the supply of toner for the present one is becoming a problem. Ink printing is out of the question because of the setting-up costs and long delivery times. Laser printing is the most economical option open but this will still cost more than the present photocopy method. Excellent, almost photograph quality pictures can be produced by laser but only from electronically stored images, drawings on paper would have to be "scanned" into the computer before they could be used. The copier will not last long but laser may involve higher costs which would have to be recouped by increasing subscriptions. Let me know your feelings on which way to go.

Brian. GW6BWX