March 1991

P5

Newsletter of the Severnside Television Group
Edited by Shaun O'Sullivan G8VPG

From our Chairperson ...

Dear Members,

As we approach our Annual General Meeting on Tuesday 9th April, 7.30 pm at Elm Park Parish Pavilion, Filton (Yes, they are a bit of a bore, but our constitution requires it !) I would like to outline some of the Groups achievements in the past year.

GB3ZZ continues to receive world-wide acclaim from the Amateur Radio press.

The GB3ZZ transmitter and receiver have been replaced with, what your committee believe is the very best equipment available at the present. As you are aware, the logic has been continually updated (see enclosed a list of page codes). We have made enquiries in all parts of the world for improved high quality omnidirectional aerials to replace the Alford Slots, so far with no success.

The repeater was only off air for a total of 5 hours during the year. Three hours were due to a fractured mains supply cable to the building. The question has been asked ; why, with such a sophisticated repeater was there no back up power supply ?. The answer is that we did have one, but in four years it was never used and that with the constant need to keep the battery in good condition in a room where the temperature rarely drops below 80 degF, it was felt that the effort was not worth it. Towards the end of November 1990, GB3ZZ experienced a dramatic loss of RF power, owing to a solid state power module failing. This module had been in continuous use for nearly 3 years. A replacement was obtained and fitted as soon as fault was discovered.

I repeat our intention that not withstanding the many present and planned facilities available on GB3ZZ (teletext, 10 GHz, weather satellite pictures etc.) the primary objective will remain to maintain and improve the quality of through video. Subject to the limitations of funds and equipment, this will be as close to commercial standards as possible.

The Group entered 3 ATV contests during 1990, obtaining 2 first places and a second in the Summerfun ... maybe the second was a result of trying to have a barbecue at the same time for all the members at the contest site.

The group had given numerous talks and demonstrations throughout the country. A second award was won for us by Shaun G8VPG with the "Best Lecture of the Year" at the Bristol RSGB Group. Well done Shaun !. On the same evening at the same venue, STG entered and won the Novice Cup for the best project with our mast head power amplifier and transmitter which we use for contests ... it is not everyone who uses an amplifier weighing 44 pounds bolted to the top of a 60 foot portable tower !.

All the positions on the committee are available for re-election. I often wonder why these positions are always filled so enthusiastically when other groups find it such a struggle. Perhaps this is because the members find a friendly atmosphere in the Group, and the challenge every year of some exciting new projects for the future.

Membership continues to increase, mainly due to your recomendations of the Groups social activities, newsletters, plus all the facilities available via GB3ZZ. It is much appreciated when the committee and members give help to the new amateur setting up their ATV stations for the first time. I sincerely hope that all the present members will continue to support us so that, for yet another year the subscription can remain at the current level of £5.00 per annum.

It only remains for me to say a big "Thank You" for electing me as your Chairperson for the past two years. The Group has enjoyed another successful year, and I would be pleased to serve again if requested.

See you soon, maybe at the AGM, or the next social evening on Sunday 12th May 1991.

Regards to you all,

Viv G1IXE, Chairperson.

SEVERNSIDE TELEVISION GROUP
HAPPY FIFTH BIRTHDAY !

As I started to put this edition of "P5" together over the new year holiday, the thought occurred to me that the Group is now 5 years old. It was on 28th February 1986 that Roger Worth G4ZQF and myself called the inaugural meeting of what was then known as the Bristol FM TV Group, in a back room at the North Bristol ARC. At that point, we had no funds, no equipment, no site and no licence. There was a significant amount of ATV activity in and around Bristol, mostly on the 70 cm band. There was just a handful of people pioneering the use of 23 cm for FM ATV in Bristol. Many of us thought that the proposed Bath repeater project GB3UT might be able to provide a service at least for a part of Bristol. However this project was much delayed and our thoughts turned to building our own machine for Bristol. Now it can be told, but the RSGB Repeater Management Group was so dissatisfied by the delays in getting GB3UT on air, that we were informally invited to apply to take over their franchise. Roger and myself didn't think that this was the way to establish good relations with neighbouring groups, and hence we declined the offer.

1986 was a year of frenetic activity for BFMTVG. Thanks to Rogers contacts with Filton Parish Council, by May we had found the site that we continue to occupy. By the end of June, we had submitted our complete licence application to the RSGB. This was quite a task by itself, and Roger and myself spent several long evenings filling in about 20 pages of forms. With the site and paperwork complete, we could now concentrate on building the repeater. In those far off days, most people generated 23 cm signals by tripling up from 70 cm. Devices to generate 10 or 20 W of RF at 1300 MHz just weren't available at prices we could afford, and our licence application seriously put forward a varactor tripler based transmitter. We eventually chose not to go this way, but it was a close run argument at the time.

The original GB3ZZ was designed by me, whilst I was also acting as Secretary. I built most of the RF side of things, and Roger dealt with the aerials. Ian G8XZD built the logic board. Warwick G8CLS built the

PSU, and still continues to supply us with his famous high current PSU's for various applications. Ted G3JMY built the inter-digital filters, and assembled the various modules built by me and others into complete units. He also modified the logic for ATV use, since it was originally designed to operate a speech repeater. Ivor G1IXF looked after the site installation work, erecting the mast, running cables, laying on light and power and carrying out decoration work where necessary. Over the past 5 years, Ivor has made the repeater site almost his second home, with literally hundreds of hours working at various tasks. Turning out in all weathers and at all hours, we all owe him a great debt for keeping ZZ going despite all the various problems.

The first GB3ZZ was built into 2 small 19" cases, and located on a high shelf in the caretakers cupboard. Access was quite difficult, and the move to the current situation in the roof was a great relief to all concerned. I wonder how many people remember the first site trials in November/December 1986 ?. A small aerial system was erected, and about 3 mobile teams toured Bristol and its environs, reporting back on 2 m. I remember going out in my car with Peter GØDRX, and Viv and Ivor ended up in South Wales, still getting good pictures. There was tremendous excitement that day, and much talk on 144.750 MHz for several evenings after. We did several more days of manned trials, which kept the "pot on the boil" amongst our members as we waited for the licence. By early 1987, we were getting favourable noises from the RSGB and DTI about our licence. It eventually arrived in May 1987, the day before the BATC Convention. It was a proud moment for us all as we waved the vital piece of paper to everyone up at Crick.

What some of you may not know is that this was the start of 3 weeks of great activity to get ZZ on air. Roger, always with an eye for a good publicity opportunity, booked the local MP Michael Stern and the Chairman of Filton Parish Council Bill Brown, to officially switch on the repeater on 2nd June. It was the lead up period to the general election, and the MP was keen to be anywhere where there was press publicity, and this was also laid on by Roger. Ted G3JMY and myself, ever the more cautious engineering types, were worried because the repeater was not ready. Although substantially built, there was a lot of debugging to do before it was reliable. There were some very long evenings spent in Teds shack, the logic in particular giving us a lot of trouble. We just about made the deadline, with engineering trials commencing a few days before the official switch on. The switch on ceremony was a great success, the repeater obediently springing to life as the remote switch was turned on, and for the rest of the evening it relayed live coverage of the ensuing party.

Since that start, GB3ZZ has developed out of all recognition. Very little of the original repeater is still in use now, and many parts have been replaced 2 or 3 times as we strive to improve performance. The repeater has benefited enormously from the efforts of some of the professionals now on the committee, like Steve G8KUW, Brian GW6BWX and Ken G4BVK. It is they who have turned ZZ into the world beating box that it now is. None the less it is worth remembering that it was initially put on air by a handful of "real amateurs". It is also worth remembering that all of this was made possible by the efforts of a much wider team. Whilst a small team of "boffins" have been able to spend several thousands of pounds over the past 5 years, other members have been raising the funds. Just think of all the visits to clubs, the demonstrations and lectures, and the stands at rallies that we have manned. We have sold some 300 of our famous wide band 18 element aerials, many satellite receivers and other items to raise funds. Although a bit erratic in the early days, "P5" is now a quarterly newsletter which I think goes a bit beyond the average repeater group effort. Then there are the 3 or 4 social evenings each year and the

special fund raising raffles and draws. Our contest team has been very successful, and helps to keep the profile of the Group high. Much time and help has been given to members with reception problems, or who need support to get started. There are several video programmes of our activities, which have been viewed literally from one end of the world to the other, with groups in America, Australia and New Zealand watching. All of this keeps the subscriptions and donations rolling in, and has resulted in our membership continuing to grow against a national trend of falling club membership. Our present Chairperson Viv G1IXE has worked very hard at keeping the Groups name at the forefront of the ATV world in the UK, and I don't suppose that there are many active ATVers in the country today who haven't heard of Viv and the GB3ZZ/G7ATV team in Bristol.

The past 5 years have been a great start for the Group. However, we haven't run out of steam yet and there are some really exciting plans for the future. We are already experimenting with 10 GHz manned trials to test propagation from the site. Ted G3JMY and Roy G3FYX are doing some valuable work on this project, which many people think could be the next great ATV band. In 1991, I hope that we will be able to introduce another first for GB3ZZ, live 24 hour weather satellite pictures direct from Meteosat on 1691 MHz. You will simply call up the latest picture by keying in a special DTMF code. The hardware for this is now being built and tested. We are also carrying out trials for repeater interlinking. Several sites have been identified which might give us the opportunity to relay into the Midlands. In 1991, we will be out and about doing signal strength surveys to see what is feasible. Is it too much to expect that when we celebrate our tenth birthday in 1996, you will be able to access GB3ZZ in Bristol, key in a special DTMF code, and be connected straight into the Midlands and maybe even further?.

Continue with your support and enthusiasm, and we will have a try !.

Keep watching this space !.

Shaun G8VPG, Honorary Secretary.

SEVERNSIDE TELEVISION GROUP
NOMINATION FORM FOR OFFICERS & COMMITTEE 1991/92.

We wish to nominate ..... (name) ..... (call)
for the post of : Chairman
Chief Engineer & Vice Chairman
Honorary Secretary
Honorary Treasurer
Committee Member.

Proposer ..... (signed) ..... (call)

Seconder ..... (signed) ..... (call)

I agree to serve in the capacity indicated if elected,

..... (nominees signature) ../../1991.

This from must be returned to the Secretary no later than 26th March 1991.

Pop...Pop...Pop...Pop...

by Brian Kelly GW6BWX

Not a reference to my car this time but to the pop caused by an over-deviated sound subcarrier. Lets look at what causes the pop and then see what can be done to cure it.

The Cause

There are several causes of pop all giving the same symptoms.

Simplest of all is the pop noise when the letter "P" is spoken close to the microphone. The diaphragm which picks up the sound inside the microphone only responds to CHANGES in air pressure between the front and back sides caused by the sound waves. It does not give an output proportional to absolute air pressure because normally both sides of the diaphragm are vented to outside air and therefore at about the same pressure.
When the "P" is spoken there is a sudden change in air pressure because of the way the lips are held together until air is exhaled. The resulting "explosive" sound is caused by the fast rise in air pressure which is converted to an abnormally large voltage by the microphone transducer.

Simply feeding too much audio to the transmitter will cause popping, this time because either the modulator in the transmitter is being over-driven or because the repeaters receiver cannot handle the deviation level.
It can be difficult to equalise the audio level if several sources are used. A source switch with individual controls for each input will help tremendously in this case. Most sources from VCRs or other recording equipment *are* at equal level but only when terminated in a standard impedance. For professional equipment this is 600Ω but sometimes higher for domestic units. If the audio line is left unterminated the levels are usually higher and undefined.

Pops from modulator overdriving are relatively rare but caused when the 6MHz subcarrier oscillator objects to being frequency shifted. Typically the oscillator is tuned by a varicap (varactor) diode which behaves rather like a tuning capacitor across a fixed inductor. If audio is applied across the diode its effective capacitive value changes and the oscillator is tuned higher or lower in frequency giving the desired frequency modulation. It happens sometimes that the oscillator stops on peaks of audio or exhibits a shift of centre frequency particularly on lower audio pitches which can detune the 6MHz sufficiently to upset the receiver. The resulting intermittence of subcarrier makes the popping noise. A correctly designed and adjusted modulator should not suffer this problem.

ANNUAL GENERAL MEETING
7.30 pm TUESDAY 9th APRIL 1991
ELM PARK PARISH PAVILION
ALL MEMBERS ARE ASKED TO ATTEND
FOLLOWED BY A GATHERING IN THE KEY RING BAR

At the repeater there is a steep sided bandpass filter centred on 6MHZ. Its purpose is to allow the sound content of the received signal to reach the FM discriminator but hold back the many frequencies present in the picture and sync information. It has sufficient bandwidth to let a fully modulated subcarrier pass through but block any adjacent signals. If presented with an over deviated subcarrier it will clip off the modulation peaks completely and no signal will reach the discriminator causing a pop.

The Cure

Assuming that the modulator is properly designed and does not suffer from the problems already mentioned, the way to prevent popping is to precondition the audio before transmission.

Most people confuse "audio sensitivity" with "audio deviation", the two are completely independent. Sensitivity is governed by the microphone output and amount it is amplified. Deviation is how much frequency modulation results from a given audio voltage. Its true that reducing the sensitivity will often lessen the deviation but the opposite is not necessarily true. The best setting for the deviation control is that which gives the optimum modulation level when the transmitter is driven with maximum audio voltage. The optimum sensitivity setting is that which gives maximum audio voltage out for the given input level. The front panel control on most transmitters sets the sensitivity while the internal preset adjusts the deviation.

Imagine the worst cases of maladjustment and their effect:

1) the sensitivity is too low and the deviation is to low
received volume is very low even if a large signal is fed into the transmitter.
2) the sensitivity is too high and the deviation is too low
high audio levels become distorted, background noise picked up excessively, received volume is low.
3) the sensitivity is too low and the deviation is too high
probably will sound OK at normal levels but will pop badly on louder sounds.
4) both are set too high
received sound will pop badly at all audio levels and may also carry distortion.

Case 3 is the one that most people suffer from.

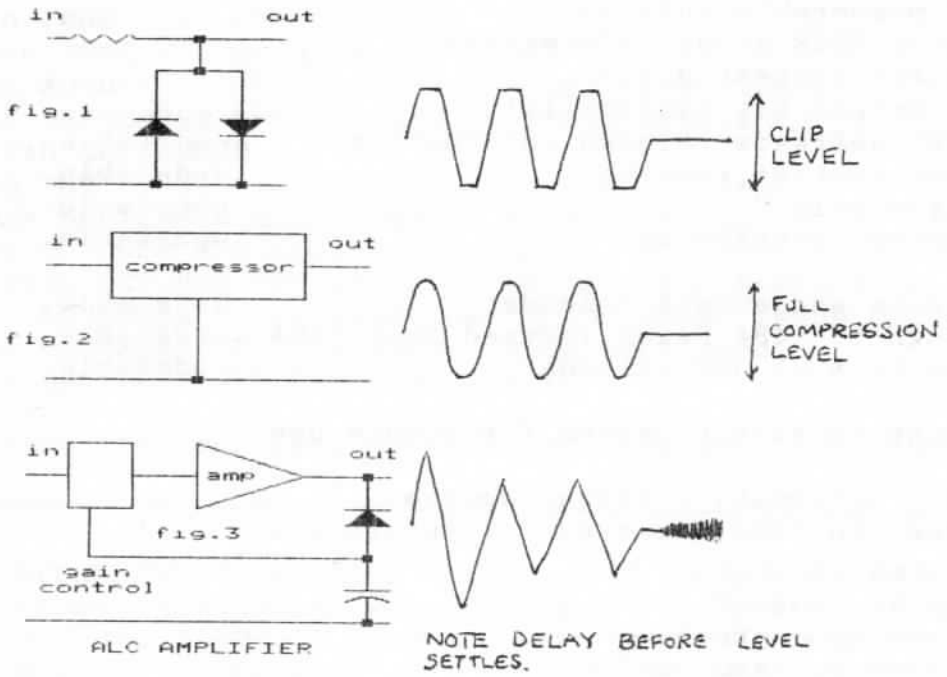
The way to prevent over deviation is to put a clipping (or better still a compressing) circuit at the input of the audio modulator. The output of this circuit will be prevented from rising above a fixed level. The deviation control is then set to give 100% modulation at that level. Because the level cannot rise higher it becomes impossible to over deviate and pop. The sensitivity can then be adjusted so that the audio source just reaches clipping point and *Hey Presto* full audio without any popping sounds.

NEXT SOCIAL EVENING
7.30 pm SUNDAY 12th MAY 1991
ELM PARK PARISH PAVILION
ALL MEMBERS AND GUESTS WELCOME
DON'T FORGET TO BRING SOME REFRESHMENT !

A clipper circuit is very simple to build, in its simplest form it has three components and costs about 10p to build (fig 1). The drawback to such a simple circuit is that if you do set the sensitivity too high it will cause severe distortion because it literally cuts the peaks off the audio waveform.
A compressor is a better solution, it gradually reduces the sensitivity as the input level increases and although this too causes distortion it is far less noticeable. Compressor circuits (fig 2) can be found in many periodicals and should not cost more than a few pounds to build.
A third solution is to use an automatic level control amplifier (fig 3). These are circuits which attempt to maintain a constant output level for a broad range of input levels. They have the advantage of allowing very quiet sounds to pass through with great amplification yet still not letting loud sounds give an excessive output. The difference between ALC amplifiers and compressors is that ALC is based on average signal level taken over a long period of time, typically 0.2 seconds while compressors work over each individual cycle of waveform and are therefore virtually instantaneous in operation. The slow reaction time of ALC systems can give rise to a "breathing" effect where the gaps between sounds are filled with background noise as the amplifier starts to increase its gain and also any rapidly recurring sound can pass through at too high a level because the amplifier cannot reduce its gain quickly enough.

When the new repeater is ready for use it will have a facility to show deviation level on the screen to help with transmitter audio adjustments, until then its probably safest to add a clipping circuit to the transmitter and set the levels with the assistance of another ATVer.

The illustrations show the effect of passing a triangle wave with a small amount of background noise through each type of circuit.



DTMF CODES

Here is a summary of all of the DTMF functions available on GB3ZZ as of January 17th 1991.

*00# Select antenna 0
*01# Select antenna 1
*02# Select antenna 2
*03# Select antenna 3
*04# Select antenna 4
*05# Select antenna 5
*06# through to *09# Select Alford slot antenna

*10# Main text index page
*11# STVG information
*12# GB3ZZ special features
*13# DTMF keypad instructions
*14# List of valid tone sequences
*15# Repeater transmitter information
*16# Repeater receiver information
*17# Repeater logic unit information
*18# Antenna selection details
*19# Plans for the future

*20# VCR functions index
*21# VCR stop control description
*22# VCR play control description
*23# VCR rewind control description
*24# VCR fast forward control description
*25# VCR record control description
*26# VCR pause control description
*27# VCR frame store decription
*28# Functional description of VCR interface
*29# Tips on best VCR usage

*30# Severnside TV Group index
*31# Newsletter details
*32# BATC membership information
*33# Bristol RSGB group information
*34# STVG ATV contest group
*35# Tone keypad kit availability
*36# Latest software release information .updatable.
*37# Latest contest results .updatable.
*38# Can you help ? .updatable.
*39# Repeater location map .updatable.

*40# Contests and events calendar .updatable.
*41# through to *48# Pages indexed from *40# .updatable.
*49# South Bristol ARC calendar .updatable.

*50# through to *59# Reserved for future use

*60# Select alternative signal source
*61# through to *69# Reserved for future use
*70# VCR stop control
*71# VCR play control
*72# VCR rewind control
*73# VCR fast forward control
*74# Unused at present
*75# VCR record control
*76# Unused at present
*77# VCR pause control (toggle action)
*78# Unused at present
*79# VCR frame capture (toggle action)

*80# Signal strength caption
*81# Repeater status report
*82# Repeater audio identification
*83# Repeater video identification
*84# Recall last caption
*85# Received signal diagnostics
*86# through to *89# Reserved for future use

*90# Cancel network link
*91# Network link A
*92# Network link B
*93# Network link C
*95# Network link D
*96# Network link E
*97# Unused at present
*98# Unused at present
*99# Cancel for all DTMF functions

There are also numerous other tone sequences which are used for engineering purposes. They have no effect on the normal operation of the repeater and users are asked to refrain from trying to use them.

Whenever possible a message on the top line of the information page testcard will announce changes to the updatable pages.

To those members unable to join the Severnside TV Group's Fancy Dress evening held on 6th January 1991 here is a word picture of the fun we had.

Starting at the top with our Chairman, Viv G1IXE made a lovely "Parrot", we tried not to ruffle her feathers as her beak looked nasty, but the "Pink Panther" Ivor G1IXF appeared to keep her in order, while talking through his 'nose'. Next a subtle G4NXI John entitled "Fly Fishin'"(it was catching flies, not what you thought). Alan G7DRU has us all guessing in his disguise as the "Turk". Bryan G4YQR and Phil G1HIA kept each others "spirits" up with the "Witch" and "Indian Scout" respectively, in order to join in the fun. "Colonel Gadafi" emerged as G0FDD Cliff looking every bit the part. Our Chief Engineer, Steve G8KUW was deperate for snow as he became "The Skier" for the evening. Real ingenuity was evident from Terry G4YTH in "The Arts", a video he made of himself as the senile old painter busy at his easel. Last came myself G0AWX Jean, as "The Mad Labeller", with labels in the form of call-signs bearing no resemblance to any of the friends they represented, but they all recognised their own label during my stint!

It was great fun for the couple of hours we shared and also showed the lengths members of Severnside TV Group will go to in order to in order to bring something 'new' to ATV. Do join us next year, I can promise you lots of laughs.

Jean G0AWX.

SEVERNSIDE TELEVISION COACH TRIP TO THE LONDON AMATEUR RADIO SHOW AND CENTRAL LONDON SHOPS

STG is pleased to announce details of our first coach outing. This will take place on Saturday 9th March 1991, and will be to the London Amateur Radio Show, which is being held at the Picketts Lock Centre, Edmonton. This is the second year which the show has been held, but already it is well established as a major show, on a par with Leicester. Those of you who know how bad London traffic congestion can be, and how much train fares are, will appreciate that the best way to get there is to sit back in our coach, and let the driver take the strain. Furthermore, after dropping us off at the show, the coach will go on to central London, so that the XYL can get 3 or 4 hours shopping in. Hence it is a trip for ALL the family.
The fare is only £7.00 (Show admission is £1.50 on the door) and the coach will leave the North Bristol ARC premises (quarter of a mile from GB3ZZ) in Braemar Crescent, Northville at 8.00 am, returning by about 8.00 pm. All bookings to Shaun G8VPG on 0225 873 098.

NB : As you may gather, since this date clashes with the March ATV Contest, we will not be entering this contest this year. The weather in previous years has been very bad, especially 1000 feet up on the Mendips. However, G7ATV/P will be back with a vengeance in June !!.

SEVERNSIDE DIARY 1991

SATURDAY **9th MARCH** Coach trip to London Amateur Radio Show.
TUESDAY **9th APRIL** STG Annual General Meeting.
SUNDAY **5th MAY** STG stand at BATC Rally, Harlaxton Manor.
FRIDAY **10th MAY** Print deadline for June issue of "P5".
SUNDAY **12th MAY** STG Social Evening
SUNDAY **2nd JUNE** "P5" June issue published.
SATURDAY **8th JUNE**)
SUNDAY **9th JUNE**) ATV Contest
SUNDAY **30th JUNE** STG stand at Longleat Rally.
FRIDAY **9th AUGUST** Print deadline for September issue of "P5".
SUNDAY **1st SEPTEMBER** "P5" September issue published.
SATURDAY **7th SEPTEMBER**)
SUNDAY **8th SEPTEMBER**) International ATV Contest.
SUNDAY **15th SEPTEMBER** STG stand at Bristol Rally.
SUNDAY **6th OCTOBER** STG Social Evening.
SATURDAY **26th OCTOBER** STG at Leicester Amateur Radio Show.
FRIDAY **8th NOVEMBER** Print deadline for December issue of "P5".
SUNDAY **1st DECEMBER** "P5" December issue published.
SUNDAY **8th DECEMBER** STG Christmas Party.

Please advise the Secretary G8VPG of any changes, additions etc.
