

P5

NEWSLETTER OF THE SEVERNSIDE TELEVISION GROUP
 Edited by Shaun O'Sullivan GBVPG

THE CHAIRPERSONS CHRISTMAS MESSAGE

As Christmas draws near, may I take this opportunity to wish you and your family a Merry Christmas and a Happy New Year.

This years Christmas Social Evening will take place at the Elm Park Parish Pavilion, Elm Park, Filton on Sunday 9th December at 7.30 pm. You are most welcome to bring your family along to enjoy the festivities. Raffle tickets will be on sale for £1.00 each and the draw will take place at 9.30 pm. Any prizes won by members not present will be sent by post during the following week. The proceeds of the raffle will be used to further improve the facilities on the repeater. GB3ZZ is regarded in Amateur circles as one of the worlds most advanced ATV repeaters. It will be on display, complete with its recently installed new transmitter and updated logic software. Committee members will be on hand to answer any queries about its operation.

In the New Year, on Sunday 6th January 1991 at 7.30 pm, our now famous "Fancy Dress on the Air" will take place. All video will be via GB3ZZ, with talkback on 144.750 MHz FM.

Once again, a BIG THANK YOU to all of you who have helped and supported the Severnside Television Group during the past year, especially the various Amateur Radio Clubs around the UK. We look forward to seeing as many of you as possible at the Social Evening, or early in the New Year.

All the best from Viv G1IXE.

GB3ZZ : A STATE OF THE ART ATV REPEATER by Brian Kelly GW6BWX.

GB3ZZ has been mentioned and even praised many times in these pages but users outside the Severnside Television Group who have accessed it have shown little knowledge of its capabilities. This is an attempt to right that situation and describe exactly what the repeater can do.

Like most repeaters GB3ZZ started out life simply being able to pass received sound and pictures through a transmitter and show a test card in the absence of incoming signals. The Severnside group has a wide range of skills available within its membership and a decision was made to put those skills to use in improving the repeater.

Rather than modifying the existing hardware which inevitably results in a "birds nest" of wires and extra boxes bolted on everywhere we wanted to isolate each section of the system and replace it with modules so that easy replacement for repair or upgrading became possible. This has been achieved to a great extent although there is still room for some improvement.

The needs of the users were analysed before any of this work commenced and it became clear that a great deal could be done to improve GB3ZZ and eliminate some of the problems of the original unit. The most significant problems were:

A) Some users had difficulty passing good quality pictures through the repeater although their transmission was fine direct to another station

B) Few users had any idea of the picture quality being re-radiated because desensitising problems in their own location prevented them receiving GB3ZZ while transmitting.

C) The TTL logic control was unreliable, particularly the sync pulse detector which occasionally triggered on interference. GB3ZZ is sited next to a major road junction and a mile from an airfield so the background radar and ignition noise is very high.

The first problem clearly stems from the relative locations of the user and repeater. Unfortunately the repeater is surrounded by tall buildings, including several aircraft hangers which make excellent reflectors and therefore cause ghosting. Tests with directional antennas at the repeater site confirmed that the reflections were causing most of the problems which varied in severity from visible ghosting to sound or chroma subcarrier cancellation.

Problem B could only be resolved by somehow holding the picture after the user had dropped transmission so they could see the signal they had just sent. A frame store was the obvious solution.

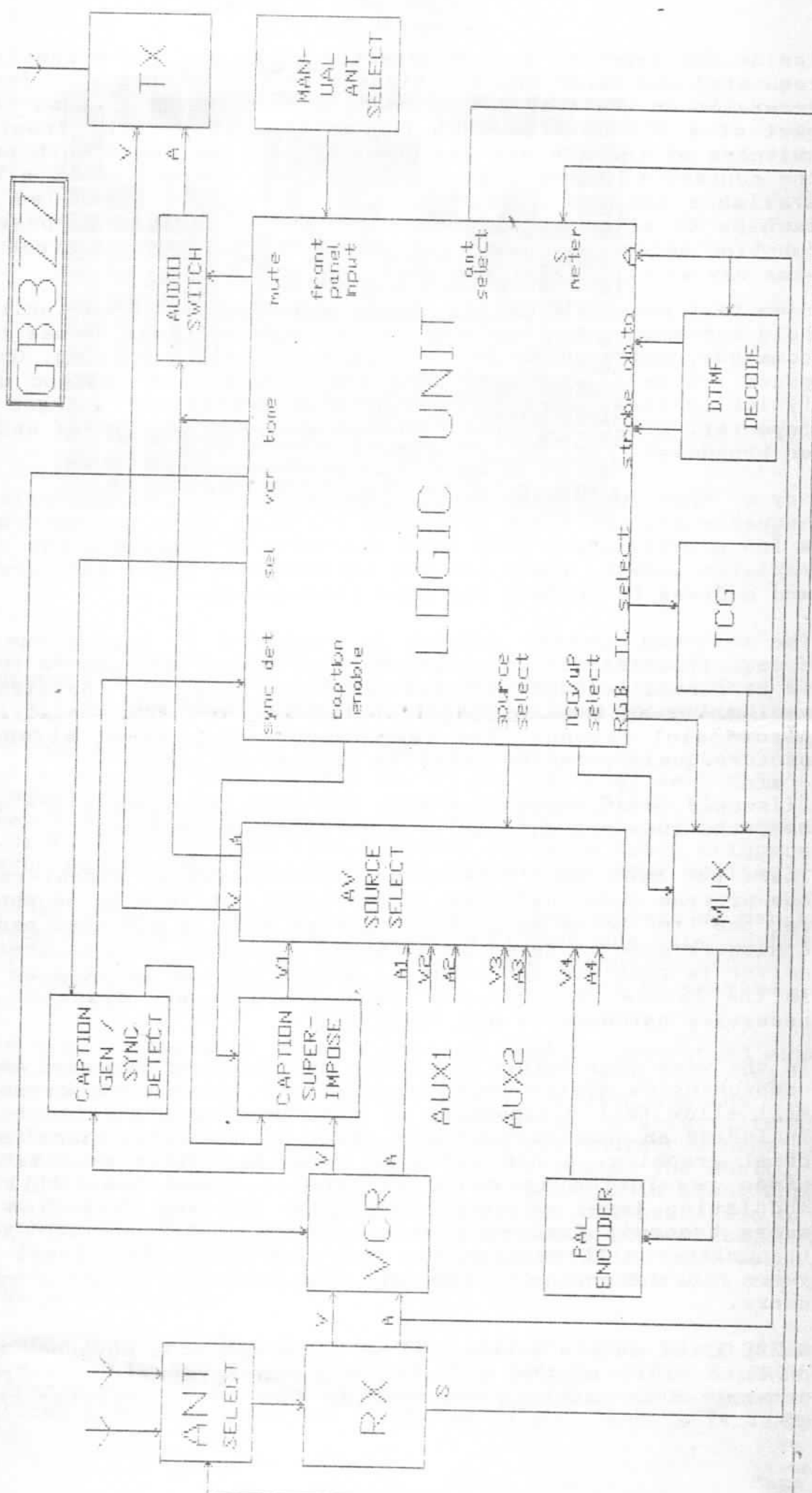
Sync detection was carried out by looking for any line frequency component in the video from the receiver using the 'standard' PLL detector circuitry. This proved unreliable because of the high ambient noise level and its dependence on the strength of the incoming signal. The solution was to use a design by G8KUW which senses the equalising pulses in the sync pulse train. This proved extremely reliable and also generates a phase locked 6MHz clock which is used elsewhere in the repeater.

The need to select directional antennas for reception and to control the frame store made the inclusion of a microprocessor based logic unit mandatory. Based on available systems for developing the control software, the use of the 6502 chip was chosen for the job.

When designing a microprocessor based repeater it makes good sense to see what other features can be incorporated into the system to make use of all the available computing power. Text of some sort to introduce the repeater to new users was the first choice and the 64K of memory made available could store 40 full screens of information while still keeping memory clear for the program itself and its workspace. Rather than reinventing the wheel the now standard teletext format was chosen. It gives clear easily readable pages and has limited graphics and colours available. Above all, the dedicated ICs to produce the text are inexpensive and easy to use.

On screen displays of signal report and repeater status are generated by the logic unit and these are genlocked to the incoming video by using the 6MHz clock from the sync detector circuit. These displays are shown superimposed on the received picture in the top left corner of the screen.

With all these features available an interesting problem arises, how does a user tell the repeater what to do? The answer is to send DTMF (Touch-tones to US readers) codes over the sound channel. The keypads to do this are available through several retail outlets including Radio Shack/Tandy shops and are inexpensive to buy. Sproggit & Sylvester dafter investors can even use their access beepers held against their microphone to make the tones.



GB37Z

Inside the repeater a tone detector works out which function was requested and sends control signals to the antenna selector, text generator or whatever device needs activating. The frame store is part of a VCR with picture freeze capability. The front panel switches of the VCR are disconnected and the logic unit provides the contact closures instead. The normal operations of a VCR are available too and a short length of tape is installed in the machine to allow recordings to be made for test purposes. All function selections on the VCR are reported on the screen in the same way as the signal reports.

Some text pages are stored inside EPROMS in the logic unit, these hold information on the repeater and instructions to use the DTMF commands, pages which do not require frequent updating. Other pages are held in RAM so that the text can be changed quickly, typically these announce forthcoming events and changes to the repeater, similar to the engineering pages from CEEFAX and ORACLE on broadcast TV.

Any of these pages can be selected by keying the appropriate tone sequence but the first ten pages are also shown automatically for a few minutes every half hour starting 30 minutes after the last repeater access. These are the introductory pages and give a name and address to contact for more information.

The sectored receive antenna is activated by keying one of six codes. If access is lost the omnidirectional antenna is reselected to give all round coverage again. Although all the directional yagi antennas have no additional gain over the omnidirectional Alford Slot antenna, the improvement in apparent strength and picture quality can be dramatic to say the least.

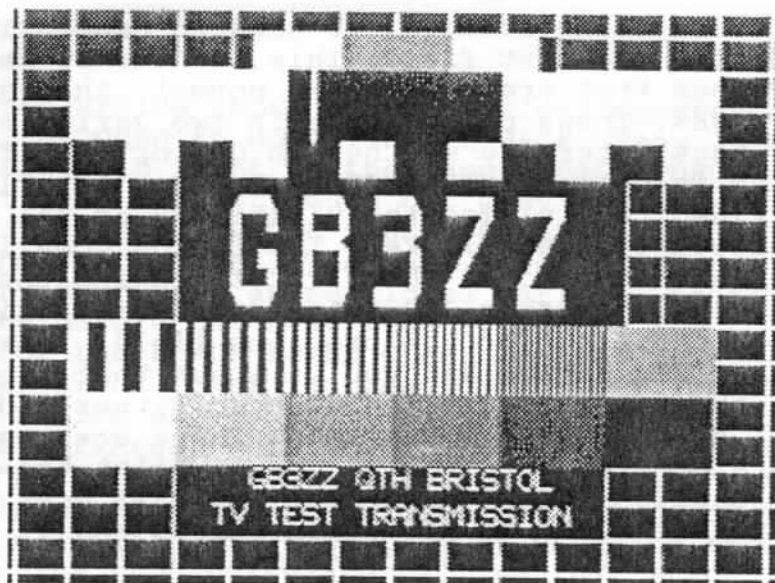
It should be stressed that only the receive antennas are switchable, the transmit antenna is always omnidirectional.

There has been much talk about interlinking TV repeaters, GB3ZZ has program code installed in readiness for this to happen though for the time being an acknowledgement beep is all that happens if a network code is keyed in. Similarly control over another transceiver is possible (on 10GHz ?) should this be allowed by the DTI in the future. For now all these features are disabled and the necessary hardware is not installed.

In the very near future the logic unit will be replaced by a more comprehensive system based around a 16 bit microprocessor which will allow full diagnostics of the incoming signal to be given, including an oscilloscope-like trace of the video signal shown in pixel graphics. A new receiver offering better sensitivity and video resolution is under construction and this will report modulation level of sound and video and any deviation of the users transmit frequency back to them on the screen. An Aztex transmitter will replace the existing one which is now several years old and not up to the very high standard demanded by today's users.

GB3ZZ is already acknowledged as being the most advanced repeater on both sides of the Atlantic and the Severnside TV Group are determined to maintain the leading edge in TV repeater technology.

COMPOSITE SYNC PULSES
by Steve Walsh G8KUW.



Many people who own a 'scope, often don't understand the trace they see on the instrument when viewing composite video signals. This item may help them to identify the individual parts of the bright green line.

Most modern 'scopes have a "TV" trigger setting, this is very useful to us TV amateurs but it was put there to aid the TV service engineer. This facility will usually have two sections marked LINE and FIELD, it will enable us to set the Horizontal Timebase setting on the 'scope to somewhere near the Line or Field repetition rate and view a stable trace triggered by the incoming sync pulses, the very same sync pulses that your monitor uses.

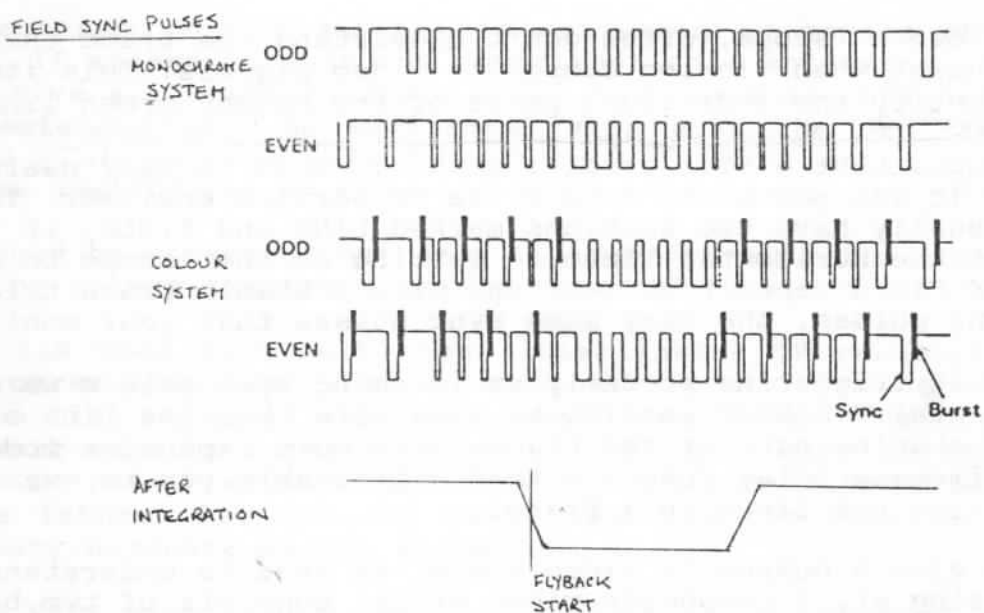
Once the 'scope is triggering properly on incoming sync pulses we can then alter the Horizontal Timebase setting to view more than one line or field or more closely examine part of the trace. Some more expensive models incorporate a Timebase Delay function that will enable you to examine just one line out of the 625 lines in a Frame.

Now that we can view a composite video signal we need to understand exactly what we are looking at. A composite video signal consists of two basic parts, hence the name composite. The two parts are the SYNC and the VIDEO, on a DC coupled signal, the VIDEO is anything above zero volts and the SYNC is anything below zero volts. Sync pulses are therefore negative going pulses of 0.3 volts at the end of each line or field. The monitor looks for these pulses to cause an event called FLYBACK. This event happens when the spot on the CRT must FLY BACK to the start of the next line or field to be scanned. The VIDEO portion is anything above zero volts, with what we see as BLACK corresponding to 0.0 volts and WHITE is +0.7 volts. This article will not be concerned with the Video content but will try and explain the SYNC pulse section.

Firstly the general areas, LINE pulses trigger LINE FLYBACK, FIELD pulses are just a lot of line pulses close together that trigger FIELD FLYBACK, a FRAME is two interlaced FIELDS, more of that later... In colour systems a BURST pulse follows the LINE pulse for 10 cycles of SUB CARRIER (4.43MHz).

FIELD PULSES.

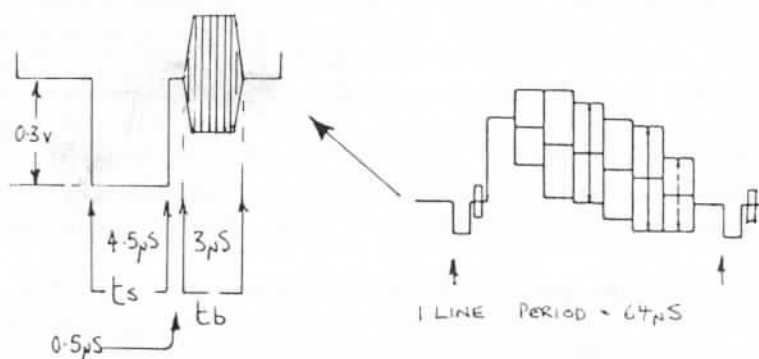
At the end of the field being scanned, we need to cause flyback to the top of the screen ready for the next field. This is done by sending a special sequence of Line Pulses that are wider than normal, that after integration are called FIELD PULSES. These pulses come in two varieties, depending on the system in use, that determine whether an ODD or EVEN field is being scanned. This system is called INTERLACED scanning. Interlace is used in 625 line standard video to minimise the visibility of the line structure and to reduce the effect of scan flicker. The fields come in pairs called frames, 312.5 lines are scanned in the first field and the scan restarted. The next field contains the other 312.5 lines and are positioned to "fill in the gaps" between the lines of the previous field. Look carefully at the diagram showing the field pulses and you will see that there is half a line difference between the odd and even field sets. Either side of the field sync chain you will see EQUALISATION pulses. These are required to prevent the line sync separator from getting too upset whilst the field pulse chain is being sent. The caption insert generator in GB3ZZ uses industry standard chips that expect to see these equalisation pulses and it gets "lost" when searching for them should the transmitting station not be sending them. This has the effect of the insert caption drifting down the screen as the phase lock loop looks for something to phase lock to. Most amateur video sources supply correct CCIR standard pulses, and we should strive to ensure that we all do so whenever possible.



CHRISTMAS FESTIVITIES 1
 CHRISTMAS SOCIAL EVENING
 SUNDAY 9th DECEMBER at 7.30 pm
 ELM PARK PARISH PAVILION
 ELM PARK FILTON
 ALL MEMBERS FAMILIES AND GUESTS WELCOME

LINE PULSES.

The Line Sync pulses arrive about every 64 micro seconds. Their function is to signal the monitor when to do a line FLYBACK. They last 4.5 microseconds and have a FRONT PORCH in front of them and a BACK PORCH after them. The Front porch is not used for very much but provides a quiet period just before the sync pulse to allow the sync separator to distinguish between video overshoot and sync pulses. The Back Porch is there for three main functions, to carry the Burst as mentioned earlier, to allow time for flyback to complete before the next line of video, and to provide a known level of "black" for the BLACK LEVEL CLAMP or RESTORATION to check at the start of each line. Black level restoration is very important to prevent a dark image from rising above black and background detail in bright images from being lost in darkness. This unfortunate effect is due to most video amplifier chains "AC coupling" the video signal between stages thus causing the mean voltage level to ride up and down with the picture content. Black level restoration alleviates this problem by checking the back porch voltage just after the sync pulse and calling that BLACK. Restoration cancels another effect called FIELD TILT, this is when the mean voltage varies down the field scan, but it cannot cancel a similar problem called LINE TILT. This is of no consequence in amateur TV systems.



CHRISTMAS FESTIVITIES 2
FANCY DRESS ON THE AIR
SUNDAY 6th JANUARY at 7.30 pm
SEE ALL THE ACTION ON GB3ZZ
HEAR THE TALKBACK ON 144.750

"TRY A SQUIRT OF THIS !"
by Shaun O'Sullivan G8VPG.

I am convinced that there is a remedy to most of mankinds ills, and what is more I know where they can be found. It will be in a small bottle or aerosol can. I am a sucker for any kind of chemical cure all, as the overloaded shelves of my garage and shack will testify to any visitor. I can never visit a motor factor or chemists shop without coming away with another purchase. I'm not a hypochondriac, but my colleagues at work all know that my briefcase resembles a doctors bag, and many of them have cause to be grateful as I dispense headache pills and sore throat lozenges to those not so well prepared.

Of course you must take many of the claims with a pinch of salt, but over the years I have found some very useful and consistently effective remedies, which may be of interest to readers. For instance, those of you with cars will know how easily the printed tracks of the heated rear window can be severed. Until recently, I thought this was incurable except by replacing the window, but there is a very good cure available. It is a silver rich paint which is quite expensive at £5.99 for 3 g, but you don't need much. 2 coats over the break, and the track is back in full working order. This paint could be equally as effective repairing broken or cracked tracks on a pcb.

If you've ever taken down aerials that have been on the roof for a few years, you will know how corrosion can cause nuts and bolts to seize up solid, requiring a hacksaw rather than a spanner to undo. This can be largely prevented by a liberal coat of Finnegans Waxoyl, which is sold as a car body underseal. Although messy to touch, it stops the worst of the corrosion and the professional aerial rigger that does most of my work is always amazed that nuts and bolts can be undone, rather than having to be cut off.

In the depths of last winter, one of my colleagues was most concerned that when he dipped his headlamps, all the lights on the car went out. As many of you will know, automotive electrical systems do not seem to follow the usual laws of physics, and I think that they exist in a different time/space domain where Ohms law doesn't apply. Anyway, we were all stumped by this problem until a local garage suggested that the steering column stalk switch needed replacing. Since this is a complex multi-function item, it is quite expensive to buy, so I said to Brian "before you do that, try a squirt of this", brandishing my faithful can of Servisol switch cleaner and lubricant. The repair was instant and permanent, and I have lost count of the number of switches, relays and contact breakers that have been brought back to life by it.

On the medical front, the most effective remedy for sore throats that I have found is Vicks Chloraseptic spray, which is almost magical. Believe me, I have a drawer full of 8 or 9 other types of lozenge etc. A pity about the bilious green colour though.

Another super spray is Armor All, which is a plastic restorer. If you have any plastic items such as bumper mouldings on a car which are faded or scratched, this will bring them up like new. It does leave a slight residue, so don't use it on surfaces which you handle a lot such as the steering wheel.

I want to end this piece with a plea for help. Several years ago, I had a car whose locks periodically became stiff to operate. The garage always cured this with a few squirts of a graphite based lubricant, which was most effective. I have never been able to find a source for this, and I would love to add a bottle to my collection. Anyone got any ideas ?. Don't forget that whatever the problem, there is sure to be a squirt of something to cure it !

A Severnside Sonnet.

ATV Fans from far and wide,
Look with awe at Severnside;
Transistors, Diodes, Filter and Choke,
impress very much this ere' Bloke;
Gasfets many, Heatsink Unctions,
Provide us with many functions;
DTMF Tones ever bleeping,
Controls "ZZ" in order keeping;
A Lady Boss too, our own Viv G,
(A kinder face than Maggie T;
Steve, Ken, Ivor, with skills so able,
Makes easy to write this funny fable;
Ted "JMY" with Engineering skills.
Must save the Group so many bills;
Also must remember Brian,
His Computer skills we do rely on;
And Lady Jean looks after Cash,
Counting Coin and Notes with usual dash;
For Shaun, tremendous work behind the scene,
A Founder member he has been;
Pat Janes too, with articles Technical,
Puts us right with things Electrical;
From Mendip on Contest Day,
Swings to and fro the Aerial Array;
Assembling all the Co-Ax Joints,
Then piling up the Contest points;
What will the next development be,
Not much room left in the Box you see;
Perhaps IO Gigs, so small and neat;
Will be the next extraordinary feat,
Must finish somehow this long Tale,
From George Four Yankee Tango Hotel.....

WEATHER SATELLITE PICTURES ON GB3ZZ : One of the developments that your committee are presently considering is the addition of a weather satellite facility to GB3ZZ. A receiver on 1691 MHz would pick up the downlink from the geostationery Meteosat bird, and via a decoder and digital framestore would provide pictures from about a third of the earths surface 24 hours a day. During the night, infra red images are sent. The satellite divides the image of the earth which it sees into 9 segments and sends all 9 segments twice an hour. Thus a picture including the UK would be seen in accordance with a published timetable twice an hour. The pictures you see have already been processed at a ground station in Germany, and have superimposed national borders, with northern latitudes electronically stretched to provide a more recognisable image.

The picture would be accessed by a DTMF code sequence in the same manner as the other repeater functions. If you are interested in having this facility, please let us know. The snag as always is that it will cost several hundred pounds to install, but I daresay that we can overcome that hurdle if there is sufficient interest. Investigations reveal that since we are an Amateur Group only providing images to other Amateurs on a hobby basis, and for no charge, there are no copyright problems in relaying these pictures.

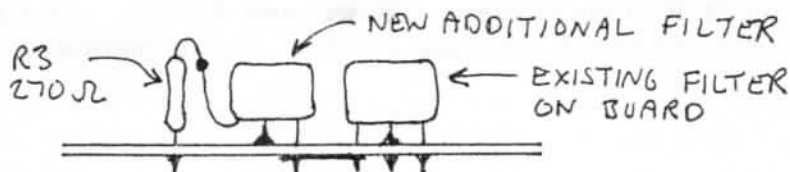
CONTEST NEWS : A little birdie has told us that we have done rather well in the UK section of the last contest we entered - last Septembers International. We have regained the top spot on 23 cm, and achieved second on 70 cm. This is our best ever result if confirmed, and we are now hoping that we have enough points to be first in Europe on 23 cm, for the second year running. Next years target must be a double first !.

VISION SWITCHER BOARDS FOR FREE ! : Pat Janes GW1SXU has dropped me a note to say that he has a pair of matrix boards and a logic/tally board for the BATC Revised ATV Handbook Vision Switcher project going free to a good home. Most components have been fitted, except the IC's. Regular readers in the Bristol area will know how to get hold of Pat - just call on 144.750 MHz.

VIDEO IF BOARDS : Many of you I know use the Wood & Douglas VIDIF board in your 23 cm FM TV receivers. You may care to try this very simple modification to the FIF1 sound IF board that accompanies it. I noticed that certain testcards and pictures caused some video buzz to breakthrough on the sound channel. This can be considerably alleviated by fitting a second 6 MHz ceramic filter in series with the first one on the board. The 270 Ohm resistor R3 is removed, and the filter positioned over its slot. One lead is soldered to where R3 fed the existing filter. The centre lead is soldered to the ground plane. R3 is re-inserted into its other hole vertically, and its free end soldered to the remaining lead of the filter.

Suitable filters are available from Bonex, Cirkit etc for about 60 p. I have found that the extra insertion loss of the second filter is not noticeable, but the reduction in video buzz is worth having. This is an idea I pinched from the Camtech IF board that I have been playing with for a few weeks. My conclusion on that board is that whilst it performs well enough, in overall terms it is no real improvement over the W&D VIDIF unit. In many ways it is worse, the colour shades being very pastel, and the sound noisier. However it does have very good agc and afc outputs, features that will be put to use in the new GB3ZZ receiver that GW6BWX is building to drive some sophisticated on screen diagnostic graphics. These will inform users if they are off frequency, or overdriving their transmitters. Keep watching this space !!.

ADDING A SECOND
6 MHz IF FILTER
TO THE W+D
FIF1 BOARD.



BONEX SFE 6.0MB
PART N° 080130
CIRKIT SFE 6.0MA
PART N° 16-06055.