

AGM !
12th APRIL

P5

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

This issue of "P5" contains the official notice of our AGM. These are seldom the most dynamic of events organised by any organisation, but it is hoped that members will make a special effort to attend this time. This is because we will be saying goodbye to a couple of long serving and extremely hard working members of our committee.

Goodbye to Viv !

Viv G1IXE, our Chairperson for the past 5 years, is leaving the committee for well earned rest. Over this time, Viv has become one of the best known ATV personalities in the country. It is amazing how many people at Rallies or during contest contacts knows "Viv and the boys" from the Severnside Group. This is a measure of the amount of work and success achieved by Viv in publicising and promoting the Group, and ensuring that it is one of the best run and managed Repeater Groups in the UK. Besides the public duties of the Chairperson, Viv has put in a tremendous amount of time behind the scenes to ensure that all of our events run smoothly. Many are the people that have received one of Vivs telephone calls to see if we can help in some way : I expect Ivors telephone bill will go down now ! We will all miss Viv on the committee and hope that she enjoys some more free time now. You will be pleased (and relieved !) to know that husband Ivor is carrying on his duties as GB3ZZ Site Engineer, and that Viv will still help out at Socials etc.

and Goodbye to Steve !

Secondly, Steve G8KUW, our Chief Engineer & Vice-Chairman is also leaving the committee. As many of you know, Steve & Becky now have a fast growing young son, Matthew, and Steve wants to spend a little less time in the shack and more time with Matthew. Steve has been Chief Engineer for 4 years and during that time GB3ZZ has been transformed beyond all recognition. The computer control hardware, aerial switcher, DTMF tone decoder, video recorder, new receiver, rack mounting hardware and many other items are all projects masterminded by Steve. The reliability of the repeater must now be up to professional standards, with very few interruptions to service although Steve has always turned out promptly when a problem occurs. On the commercial side, Steve devised our test card generator and RGB/PAL colour encoder products, which were very successful. As with Viv, we will miss Steve with his calm professional advice, although we hope that he will still be about in case we get bogged down with that Computer hardware !

This presents the Group with an opportunity to install two new personalities at the top. In the same way that Viv and Steve have done, here is a chance for a couple of people to make their mark on the Group and shape its future development for the next few years. It is essential that these posts are filled at the AGM, and all members are asked to consider this most carefully.

Subscriptions now due !

This issue also contains your subscription renewal form. Your renewal is due after the AGM and it is very much hoped that you will all continue to support the Group during 1994. You will see that we have a new Membership Secretary, Paul G8YMM. Please send all renewals to him, not Viv, and please make cheques payable to SEVERNSIDE TELEVISION GROUP and not to Paul ! Viv tells me that every year, she used to receive a number of cheques made payable to her personally.

You will notice that for the first time since the Group was formed in 1986, we have increased the subscription by £1.00 to £6.00. Technically, this is the committees recommendation and is subject to ratification at the AGM. If we had kept pace with inflation, the rate would now be somewhere near £8.00 rather than £6.00. The committee felt that it was now time for the rate to rise, principally due to increases in the cost of producing "P5". In the past, this was done at very little cost to the Group through the good offices of several members. Now we have to meet many of these costs directly from the subs, and hence we feel a small increase is at last reasonable.

ANNUAL GENERAL MEETING

NOTICE

Formal notice is hereby given of the Annual General Meeting of the Severnside Television Group. This will take place on Tuesday 12th April 1994 at 7.30 pm, at Elm Park Parish Pavilion, Elm Park, Filton, Bristol.

All members are asked to attend the meeting. Guests and non-members are welcome to attend, but only fully paid up members will be able to participate by speaking or voting.

NOMINATIONS

Nominations are now invited for the following posts ; Chairman, Chief Engineer & Vice Chairman, Honorary Secretary, Honorary Treasurer and up to five committee members. All nominations must be deposited in writing with the Secretary (who is currently S.P.O'Sullivan G8VPG, 15,Witney Close, Saltford, Bristol BS18 3DX) no later than Tuesday 29th March 1994. Nominations must be proposed and seconded by two fully paid up members of the Group, and the nominee who must also be a fully paid up member of the Group, must indicate his agreement to serve in the capacity indicated if elected. You may nominate someone for more than one post, the elections will take place in the order given above and the nominee must accept the first two posts to which he is elected. A member cannot hold more than two posts.

In the event of more than one nomination being received for any Officers post, or more than five nominations being received for committee members posts, a secret ballot will be held at the AGM.

A suitable nomination form is included in this issue of "P5", but the use of this is not obligatory.

Nominations will be sought at the AGM for the non-committee post of Honorary Auditor.

RESOLUTIONS

Members wishing to propose Resolutions at the AGM must submit them in writing to the Secretary no later than Tuesday 29th March 1994. Each resolution must be proposed and seconded by two fully paid up members of the Group, who should be prepared to address the AGM when the resolution is discussed.

Members should note that whilst there will be an opportunity to discuss minor matters under "Any Other Business" at the AGM, constitutional or major matters must be submitted in advance as a formal resolution.

SUBSCRIPTIONS

Members are reminded that all annual subscriptions become due after the AGM. A suitable renewal form is included with this issue of "P5", and all members are asked to renew promptly. The rate will be set by the AGM.

CURRENT COMMITTEE

For your information, the current committee is listed below ;
Chairperson, Mrs.Viv Green, G1IXE.
Chief Engineer & Vice Chairman, Steve Walsh G8KUW.
Honorary Secretary, Shaun O'Sullivan G8VPG.
Honorary Treasurer, Mrs.Jean Fletcher G0AWX.
Committee Members, Ivor Green G1IXF, Paul Stevenson G8YMM, John Hudson G3RFL, Ken Stevens G4BVK and Brian Kelly GW6BWX.
Honorary Auditor, Bryan Collins G4YQR.

SEVERNSIDE TELEVISION GROUP

NOMINATION FORM FOR OFFICERS & COMMITTEE 1994/95.

We wish to nominate (name) (call)

for the post of : Chairman
Chief Engineer & Vice Chairman
Honorary Secretary
Honorary Treasurer
Committee Member. (delete as applicable)

Proposer (signed) (call)

Seconder (signed) (call)

I agree to serve in the capacity indicated if elected,

..... (nominees signature)/..../1994.

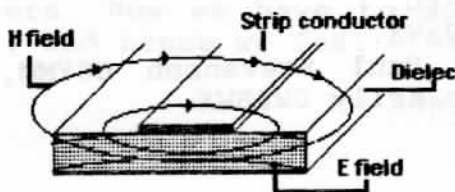
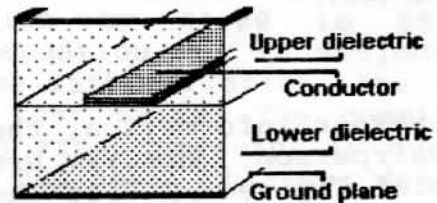
This form must be returned to the Secretary no later than 29th March 1994.

10 GHz Fundamentals

Part 2: Stripline & Microstrip

Stripline

Stripline construction is not normally employed by the amateur constructor for microwave circuits because it is very difficult to predict the impedance characteristics within the stripline. There are many variables to consider when designing a stripline to have a particular impedance. These include the dielectric constant and permittivity of the PCB and the width and thickness of the conductor. However the main advantage of designing in stripline is that the mode of propagation is TEM, similar to mechanical waveguide. The result is an efficient propagation of RF along the length of stripline.



Microstrip

The amateur constructor will normally build a microwave circuit on Microstrip. This technique enables direct connection from the conductor to a device in the circuit. Microstrip is essentially stripline with only one groundplane. It is a non-TEM type of transmission line but because it is easier to fabricate a microstrip circuit from double sided PCB, it is widely used as a method of construction.

Calculating the characteristic impedance

Because not all of the electromagnetic field is contained in the dielectric, the dielectric constant is not as high as stripline. The effective constant is determined by the ratio of substrate dielectric and air. The width of the conductor ratioed to the substrate thickness determines the line impedance. Roughly, a ratio of 2 to 1 equates to 50 ohms. The ratio also affects the velocity factor and hence wavelength. The conductor is also dispersive and therefore it is important to obtain accurate information about the PCB material before committing to a particular design. It is not a good idea to use general purpose epoxy GRPB at these frequencies because of relatively low permittivity and high losses. It is more common to use FR4 PTFE / glass fibre PCB but this type is much more expensive.

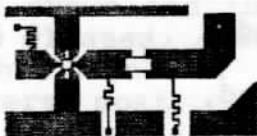


$$Z_0 = \frac{60}{\sqrt{(0.475 + 0.67/e)}} \times \ln\left(\frac{h}{(0.134w + 0.168t)}\right)$$

where w is the conductor width h is the dielectric height e is the dielectric constant and t is the conductor thickness

Construction techniques

The FR4 PCB is printed and etched in the usual manner, take care not to etch any groundplane away. Provide plenty of ground vias to minimise ground inductance near virtual ground decouplers. Do not use Isothermal vias, they will have an inductance. The usual method of through hole grounding is to use Veropins™ soldered each side. These will also help to sink heat away from a power device.



When assembling a project on microstrip, be aware that any excess solder on a SMT joint will alter the effective thickness of the conductor strip. It is good practice to mop up excess solder after flowing using solder wick. This is especially important near active devices where continuous impedances are required. Due to their physical size, SMT components are particularly susceptible to overheating when soldering.

High Power Microwave amplifiers

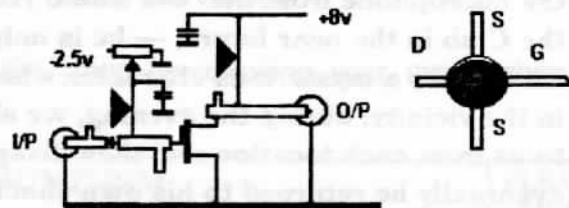
Steve Walsh G8KUW

For the amateur constructor, 10GHz is probably the easiest of microwave bands on which to get active, at low powers. The wide availability of Gunn diode oscillator modules has made 3cm the most popular of the bands above 24cm. Unfortunately, if you need powers above a few milliwatts, things start to get a bit more complicated. This P5 article covers some of the options for the generation of higher powers. It is not intended that any of these areas will be a complete guide to building a 3cm amplifier, but a more detailed project article will be generated for P5 sometime in the future.

Solid state amplifiers

Modern semiconductor devices that have useful power at 3cm are gradually becoming more accessible, that is more available and less costly, to the amateur constructor. GaAs FET devices that operate at this frequency are physically very small, and lend themselves to microstrip designs that can even be built into a mechanical waveguide. See previous articles on GaAs FETs. Monolithic Microwave Integrated Circuits (MMICs) provide useful gain at the lower power stages but GaAs FET devices capable of 300-500mW output are becoming increasingly common. The circuit shown here is typical of a FET amplifier designed in microstrip, the 50 ohm input is matched to the input impedance of the FET. The calculation of Z_{in} and Z_{out} of the FET device and microstrip dimensions is best left to a "SPICE" type circuit modelling program, but many PCB designs are published that can easily be adapted by the constructor. As you can see the power supply requirements are simple and providing that good decoupling is applied to all virtual ground points a very stable amplifier can be built. This design is easily cascaded to progressively more powerful stages. The SMT devices in common use today are ideal for microstrip construction since they have no lead inductance and are physically small. The higher power devices require attention be paid to dissipating the heat generated by the FET, especially if the layout is prone to self oscillation. Standard epoxy glass fibre PCB is not usually suitable for this type of circuit, being too lossy. The more expensive FR4 PTFE / glass fibre PCB has a very high dielectric constant, perfect for microstrip design.

A simple microstrip 3cm amplifier



Klystrons

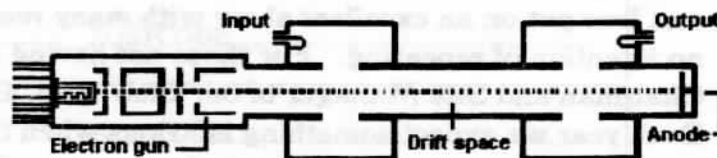
Due to the power supply requirements, the incorporation of these devices into an amateur project is probably only for the dedicated few. A Klystron is a thermionic valve tube device that can operate as either an oscillator or an amplifier. Sometimes as both, if you are not careful! The power requirements are similar to standard valves (tubes), being -200v, +300v, and heaters, but good regulation of these high voltages is critical to avoid unwanted oscillation.

Dual cavity Klystron amplifiers

Primarily used as an amplifier, the dual cavity Klystron design is the easiest to understand.

The input cavity is sometimes called the *buncher* because it uses the incoming RF to velocity modulate an electron beam fired through the centre of the cavities. As the electron beam travels along the *drift space* towards the anode it passes through a second cavity called the

catcher. This cavity collects the energy from the electron beam. The current density variations in the electron beam produce a voltage wave in the cavity. The catcher will normally be tuned to the desired frequency, usually the same as the exciter frequency, but may be tuned to a harmonic if desired thus obviating the need for a varactor or step recovery diode tripler.



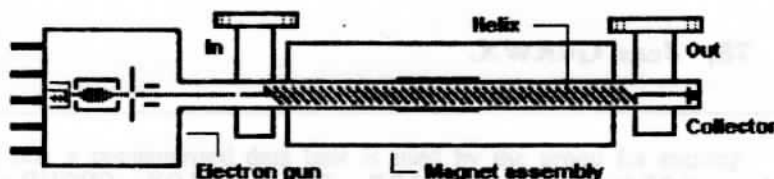
Reflex Klystron sources

Another design of klystron tube is the *reflex* klystron, this type has only a single cavity that acts both as a *buncher and catcher*. This is achieved by bouncing the electron beam back into the cavity by a negatively charged repeller electrode. This single cavity design is usually, but not exclusively, used as a source. A typical device designed for 10GHz is a 2K25. This looks very like an ordinary metal octal based valve but can generate 40-50mW as a 3cm source. As with a dual cavity device, the voltage regulators are critical, but the repeller voltage can be adjusted to tune the exact output frequency.

TWTs

Travelling wave tubes are similar in principle to the dual cavity klystron, except that the electrons are guided through a helix inside what would be the klystron drift space and that the RF input signal is fed along the helix. The electron beam is held centrally within the helix by a strong magnetic field.

The interaction between the magnetic field of the helix and the beam causes the charge density of the electron beam to be modulated. This modulation increases along the length of the helix until it is picked up by the output waveguide coupling. An area around the central part of the helix is usually painted with graphite paint to dampen any self-oscillation.



Dear Mike,

Once again reporting on the tiny part of the "goings on" in the Severnside Television area...The Fancy Dress on the Air Night... for STG, no serious technical matters are discussed on an evening such as this, just sheer fun and laughter.

To commence the evening we couldn't do better than in the person of Mr. Data of the Star Trek team, the make up and costume extremely realistic for an android. Steve, our Chief Engineer was behind the mask of make up, but most endearing was a new member of the "crew", suitably attired and made up, young son Matthew, who was determined to make his presence felt by commanding the microphone from the "old Radio Ham", we shall accept his recruitment with the Club in the near future, — he is only 2 years old.

There was a mysterious character which kept popping into various radio shacks in the vicinity, during the evening, we all recognised him as "Mr Blobby" he waved to us from each location and then disappeared. The speculation was intense but eventually he returned to his own shack which gave the viewers a hint it was "our Phil" who is always having fun with us all on these occasions. His antics for the evening caused real hilarity for all the viewers, as each household heard a bell and wondered who they had to entertain while looking a little odd.

Ian kept us smiling all evening as he caught a moment here and there to show us the Motor cycling friend, the tourist came on screen and various other impersonations, all well thought out in the spirit of the evening.

"The Blue Lamp Patrol" was very interesting...Along came WPC Morse 007 with her handcuffs, truncheon, whistle even her walkie-talkie, and of course with her on patrol was PC Useless, sporting his magnifying glass, concerned with his investigations into the STG Repeater! I feel sure you will already guess that Viv and Ivor put on an excellent show with many remarks from viewers which I have no intention of repeating. For those not having already met Viv and Ivor, they are Chairman and Site Manager of our Club - and, as an aside- Husband & Wife.

Each year we expect something hilarious when these two appear on our screens, they never let us down. Later in the evening a Punk was displayed for us, yes Viv had felt she had more to offer, having dressed herself in black rubbish bags and horrific make up.. the main comment was "Oh! No!"

As a group, the tradition is that we all display our cuddly toys. Out came the oldies, Teddy Bears, Koala Bears, Ducks crawling across the bottom of the screen and the mysterious Rabbit, to this day we have no idea who he belonged to but felt he was much loved!

Have you all discovered that STG is crazy down here in the West Country? None the less we each of us, wish each of you, a belated Happy New Year.

73, Jean G0AWX.

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SEVERNSIDE TELEVISION GROUP

MEMBERSHIP APPLICATION AND RENEWAL 1994/95

Membership renewal is now due. Please note, that the Membership Annual Fee has been increased to **£6.00**, an increase in £1.00 since the group was formed.

Membership benefits include:-

- * Support and use of GB3ZZ. * Support and future use of our 10GHz repeater.
- * Free quarterly newsletter "P5" * Discounts on group products
- * Social evenings, Rallies and Contests * Help and Advise

We hope you will continue supporting the group by renewing your membership promptly and encouraging new membership.

APPLICATION FORM	PLEASE TICK
I hereby apply for membership for the year 1994/5 and enclose £6.00	<input type="checkbox"/>
Please renew my membership for the year 1994/5 and enclose £6.00	<input type="checkbox"/>
NAME..... CALLSIGN.....	
ADDRESS..... POSTCODE.....	
TELEPHONE NUMBER..... STD CODE.....	

Please make cheques payable to "SEVERNSIDE TELEVISION GROUP"

Please send your application form and cheque for £6.00 to:- **MR P STEVENSON (G8YMM), 14 CAMELFORD RD, GREENBANK, BRISTOL, BS5 6HW.**

We endeavour to improve our services constantly therefore, please could you spare some time by filling in the questionnaire provided on the back of this form.

THANK YOU

NOTE:- Members are advised that a computerised data base is used by the group for mailing purposes only. This data is strictly confidential and is bound by the data protection act. If you object to your details being on the data base please confirm in writing.

BEVERNSIDE TELEVISION GROUP

MEMBERSHIP QUESTIONNAIRE

Members are asked to answer the following questions. This will provide the group with statistical information which enables us to monitor, improve, and plan future requirements.

Please circle where applicable.

- 1 What make is your Receiver ?.....
- 2 What make is your Antenna ?.....
- 5 What make is your Transmitter ?.....
- 6 What make and type is your Coax Cable ?.....
- 7 Can you receive GB3ZZ ? YES / NO
- 8 If YES, What picture grade do you get ? P5 / P4 / P3 / P2 / P1
- 9 Which, if possible, of the GB3ZZ selectable Antennas gives you the best results ?
Horizontal (1 / 2 / 3 / 4 / 5 / 6) or Vertical (0)
- 10 Do you use the Text pages ? (Regularly) (Sometimes) (Never)
- 11 Do you use the Weather Satellite ? (Regularly) (Sometimes) (Never)
- 12 Do any of the Test / Text Pages give problems such as Audio Noise or Rolling pictures if Yes, which ?.....
- 13 What additional facilities would you like to see on GB3ZZ ?
- 14 What subjects can you suggest for future articles in "P5"
- 15 The Committee always welcomes offers of support and advice. Listed below are a few areas which we would welcome your support.

* Contests * "P5" articles * Construction

* Rallies * Social events * Technical advise

If you have any further comments or suggestions, please enclose them on a separate sheet of paper or contact a committee member. Thank You.