



# P5

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

## FROM OUR CHAIRPERSON ...

As we approach our AGM for 1990, the time has flown by since I became Chairperson. We have achieved such a lot in the past year. The new logic was installed by Steve G8KUX and Brian GW6BW on the evening of the last AGM. We had to wait a short while for the remaining software to be debugged and installed. We then had the teletext pages and mini receive beams, all selected by your DTMF tone pads.

Ken G4BVK has made significant improvements to the transmitter, and more are planned in the near future for the receiver. Ivor G1IXF has laid on a new mains power supply to the repeater shack, so hopefully the repeater will not trip out, which used to happen when the ring main circuit became over loaded. The mast and aerial system has been overhauled and survived the worst gales in the South West that I can remember, even the BBC and HTV were off the air whilst GB3ZZ continued to function !. There was great relief all round when the gales eventually died down.

Our "P5" newsletter edited and published by Shaun G8VPG continues to be in great demand, going to members in all parts of the UK and USA. So, all in all, I think that we have done very well. On this note, I must thank the Officers and Committee for all their time and hard work. I must say that they do all I ask of them and more. Further facilities such as the frame store are also in the pipeline, but please remember that this is Amateur Television and we must not expect all the committee members to spend every single hour of their spare time working on behalf of the Group.

Last years contests went very well for us, entering three and coming first on 24 cm on each occasion. We have not yet reached that position on 70 cm, but will be trying to improve - who knows we might have a go on 10 GHz !. I am quite pleased that the BATC do not give cups, as we would have to appoint a member to polish them !.

How about us having a go at the Bristol RSGB Group "Bristol Award" on TV, perhaps we could gain this award from the contest site one day whilst awaiting the start of the contest. It would be nice to achieve this award in one afternoon, any queries on the award please contact Ted G3JMY.

It seems at present that I may be the Chairperson for 1990/91 ( no other volunteers at present ). I would like to thank all the members for your support in the coming year.

My final note before our AGM on April 10th at the Filton Parish Pavillion ; if any member has any constructive suggestions on improving facilities, please get in touch with me so that the committee can consider them.

*73's Viv G1IXE Chairperson*

### BATC MARCH 1990 CONTEST

At the time of going to press, the dates of the contest have not been confirmed, but they are believed to be 10/11th March. Provided that the weather is not too bad, we will once more be entering as G7ATV/P from the Mendip Hills. Please listen out for us, and remember to give us some points.

**EQUIPMENT REVIEW**  
**G4BVK 1.3 GHz FM TV TRANSMITTER.**

Ken Stevens G4BVK, who is Chief Engineer to the Group, has just launched his second new product. This is a state of the art 1.3 GHz FM TV transmitter. The prototype was on display at the BATC stand at the Leicester Show last October, and a great many ATVers showed interest in it. Since then, a number of the first batch have gone out to customers, and the initial reaction all seems to be very favourable.

The transmitter is contained within a die-cast aluminium box of approx. size 188 x 120 x 57 mm, with four rubber feet underneath. The box is neatly spray painted, and features a printed fascia panel. It is powered by 13.5 V dc, which is applied via a locking 2 pin plug and socket on the rear panel. A short dc lead is provided, and when power is applied, an LED on the front panel glows. A transmit on/off switch on the front panel switches the unit into transmit mode, and a further LED glows. A third switch selects one of the two channels which the transmitter works upon, and a pair of LEDs indicate which one is in use. Finally on the front panel, a pair of matching blue knobs adjust the sound and video input levels. The control range of these knobs has been very carefully selected, so that smooth and progressive adjustment of the levels is provided, with very little lost action.

On the rear panel, there is the dc input socket already mentioned, an N type RF output socket, a BNC video input socket and a pair of audio input sockets. One of these is a 1/4 inch jack for a standard microphone, and the other is a phono socket for line level inputs. The two inputs are internally mixed, the intention being that the mic socket is for talkback, whilst the phono is suitable for a GB3ZZ DTMF tone generator. An easy adjustment is available on the pcb to alter the mixing levels.

Removing the lid reveals a very tidily laid out interior, with the unit dividing into two main parts. All the RF circuitry is contained within a further die-cast aluminium box, onto which the N type RF output socket is fixed. The transmitter is based around an oscillator which runs at the output frequency. This is phase lock looped by the well known SP5060 chip, using a crystal oscillator reference running at 1/256 of the output frequency. Provision is made for 2 switchable crystals, 1249 and 1255 MHz are standard, but others are available to special order. The oscillator feeds a buffer stage, before being applied to a Mitsubishi SC1043 power amplifier module. This useful little device delivers a minimum output power of 3 W, which rises to about 3.5 W when it is cold. Ken sets them up some way below their maximum rating of 5 W, to ensure long trouble free life.

All the RF circuitry is contained on one pcb, and all the components in the RF module are leadless surface mounting types. The layout and construction is of a very high order, and the unit is unconditionally stable and vice free. The pcb is fixed to a solid block of aluminium, which provides good grounding and acts as a heat sink for the PA module. The case of the unit becomes comfortably warm after about 20 minutes operation, but the temperature rise is not excessive.

The other half of the unit is PCB mounted within the main case. This is termed the support board, and contains mostly video and audio circuits. The 6 MHz inter-carrier sound generator is on this board, together with the video amplifier and pre-emphasis circuits. The unit incorporates a video clamp, and the modulating video/audio voltage to the PLL is dc coupled, thus eliminating the ramping distortion which some other designs suffer from. The construction is of a very good standard, and the unit can be handled in operation with no adverse effects visible.

On air, the unit has performed very well. Maximum current drawn is about 1.5 A. The PLL locks up smartly on switch on, and remains stable after, which is very useful for repeater operation. The pictures and sound produced by the transmitter are very clean and watchable, and in particular, colour is relayed very strongly. My signal into GB3ZZ was down on normal, but this is a reflection of the difference in power, since my own TX runs 20 W. Considering that the G4BVK unit was running just 3W, it put in a very watchable picture. I understand that Ken is working on an add-on PA module using the SC1040 module, which will boost the power up to 20 W or so.

In conclusion, there is not much I can criticise this transmitter for. It works well and is very soundly constructed, and should give long and reliable service. The cost is £220, plus £2.50 postage & packing. Bearing in mind that this is a fully made unit, needing only an aerial, camera and mic before you are on air with it, this is a reasonable price. The only competition is the Worthing kit and the Camtech module. When you add in the various items not supplied with these alternatives, but necessary to complete them, and take into account the difference in power output levels, you may not be saving as much as you first thought. This of course assumes that you are able and willing to tackle some construction work at 1.3 GHz, which is not to everyones taste.

The G4BVK device is the Rolls-Royce of the FM TV transmitter market, and I can thoroughly recomend it. G8VPG.

---

#### AUDIO CABLE SELECTION

As radio amateurs used to dealing with RF up to microwave frequencies, most of us are familiar with some fairly fancy cables and connectors. Us microwave and ATV types tend to sniff at the HF boys, with their domestic TV co-ax and Belling-Lee connectors, and other assorted horrors. When it comes to conveying audio frequency signals then, surely any old cable will do ?.

I am sure that many of you, even with quite respectable hifi equipment, use bell wire type cable to feed the speakers. I know that I did, and was quite scornful of the advice in the hifi magazines about special speaker cable, some of which costs over £3.00 per m. Surely this was just a "come on" by crafty hifi dealers, preying on gullible and uninformed punters.

However, I recently bought a new pair of speakers, and after running them on my old bell wire for a week, decided to lash out on some better cable. I ended up buying some QED 79 strand cable, which looks to have a similar cross sectional area to 4 sq.mm electrical cable. In other words it is quite beefy, but still flexible, and costs about the same as H100, ie £1.00 per m.

I am pleased to report that the difference was audible, with a deeper, firmer bass and brighter, clearer treble. I am sure that I could pick out the better cable in a blind test. When you think about it, there is some logic behind all this. I am looking at the brochure of a middle of the range NAD amplifier, rated at a nominal 20 W per channel, and it tells me that on peaks, it can push 15 A down the speaker cables. Cable losses must start to mount up, and dull the sound at these sort of levels.

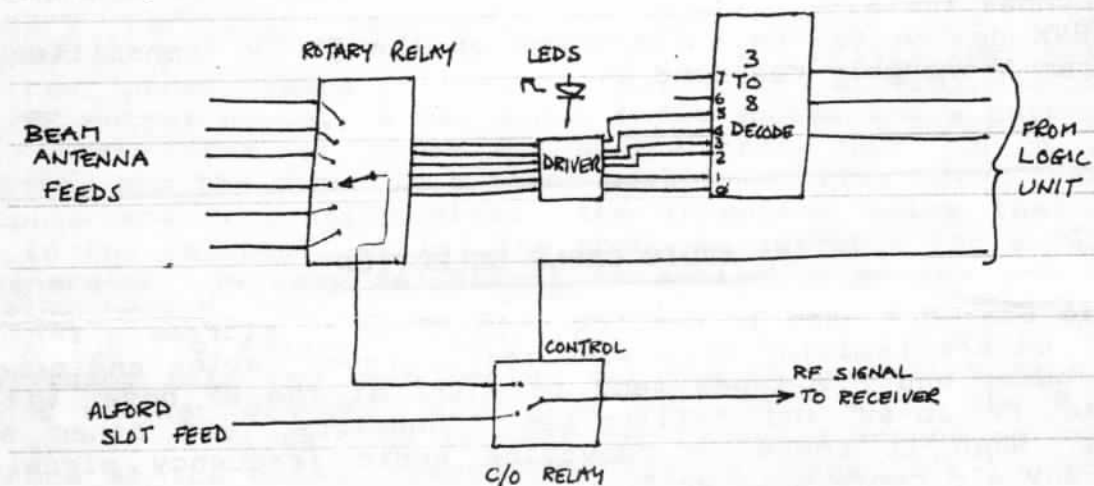
Therefore, if you are running reasonable speakers on thin bell wire, why not try some better cable. For £10 or so, you can produce a noticeable improvement, which is a lot cheaper than buying new speakers or amplifiers. QED and other cables ( more expensive ) are available at any good hifi store, such as Radfords. I wouldn't expect Comet and the rest to have heard of it though !.

by Brian Kelly GW6BWX.

This article describes the new GB3ZZ computer controlled logic system, which has been operational since April 1989. A software update in September 1989 enabled virtually all of its features to be available to users. A suitable DTMF tone generator for accessing the user selectable functions was described in the September 1989 issue of "P5".

1) ANTENNA SELECTOR :

Receive antenna selection is made via two co-axial relays. One relay selects (a) the receive antenna signal from the Alford Slot or (b) the output of the second relay. The second relay is to select one of six beam antennas. A direct signal from the logic unit switches the first relay, the second relay is driven via a binary decoder which changes the three bit select information to individual control lines to each rotary selector input. When the Alford Slot is selected, the rotary relay is set to non-existent position 7. This ensures that the front panel LEDs on the selector unit do not show that the slot and beams are enabled simultaneously.



2) CAPTION GENERATOR & SUPERIMPOSE SWITCH :

These functions are performed on one circuit board. The characters are formed by rapidly switching the RX video off and substituting a preset voltage in its place. That voltage determines the brightness of the caption. (See fig.1). In order that the caption stays stationary on the screen (genlocked) it has to be timed from information derived from horizontal and vertical sync pulses on the receivers video output. Genlocking is achieved by using a standard TV teletext system. The SAA5020 and SAA5030 ICs in a normal TV set are used to generate a 6 MHz clock signal which is then used to retrieve the teletext data. In the repeater, the 6 MHz is generated in the same way but is then used to drive the character generator unit. The actual character shapes are stored in a 2764 EPROM and individual messages can be selected by pre-setting the high order address lines. These are connected to the logic unit so that messages can be selected as required. (see fig.2).

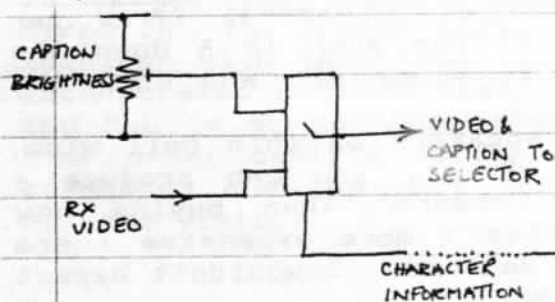


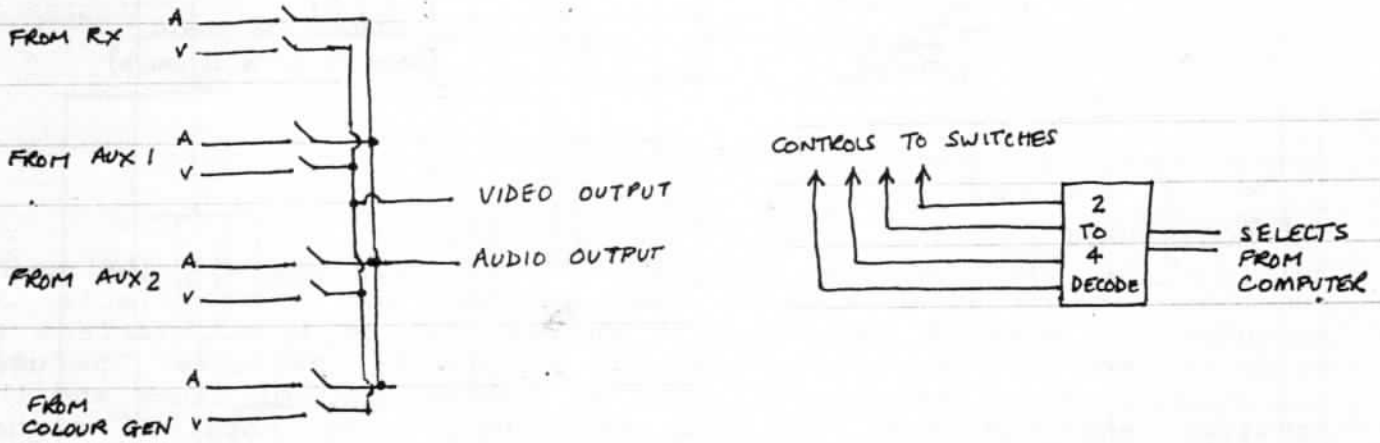
FIG 1

FIG 2

SYNC DETECT TO LOGIC

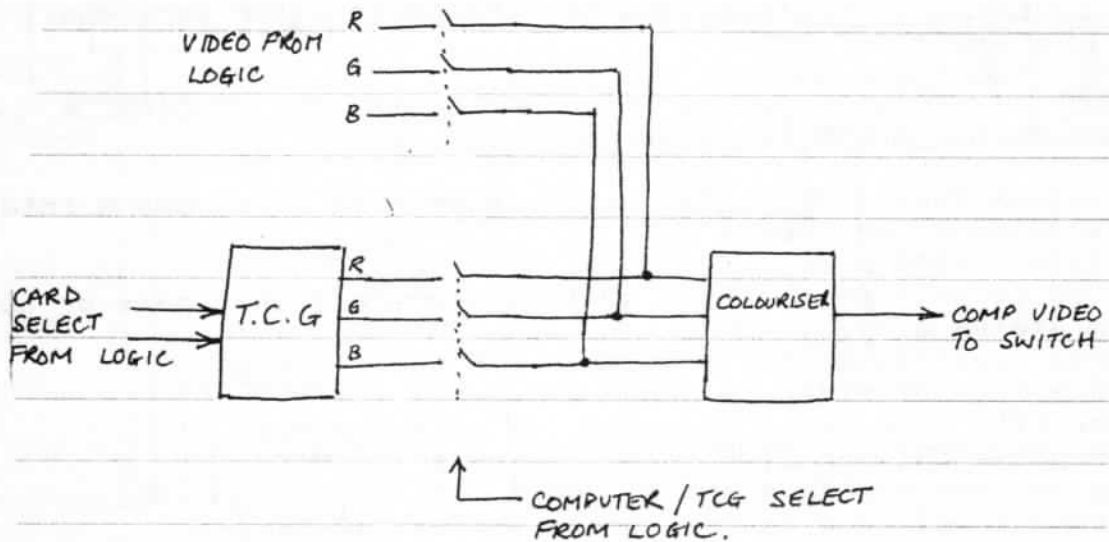
**VIDEO/AUDIO SELECTOR SWITCH :**

The output of the repeater depends on the selected signal path through the switch. The video and audio paths for each input are routed to the outputs. Which is connected depends on the control signal from the logic unit. When accessed the receiver signals are routed to the transmitter. When not accessed, the colour generator is used as the input unless the front panel switch is in "external" position, when the front panel inputs are used instead. The logic unit can override normal inputs so that text pages can be fed through even if access is lost.



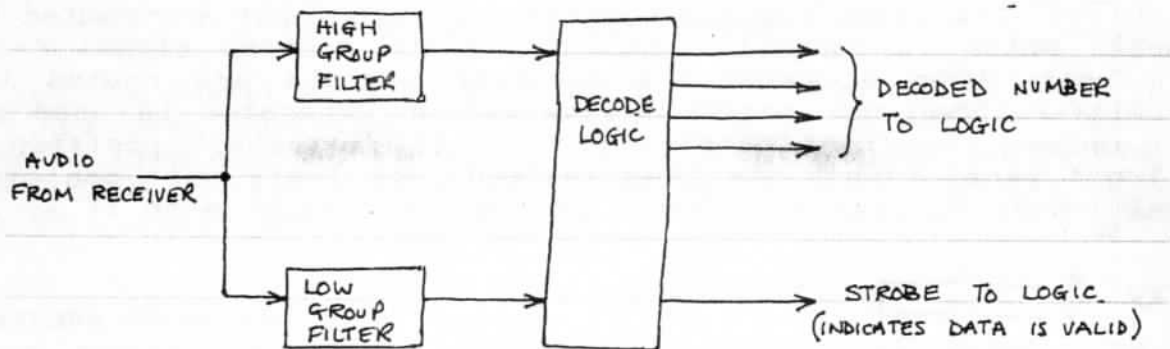
**4) TEST CARD GENERATOR & SWITCHES :**

A standard Cropredy test card generator is used to generate four of the test cards. The "info" page comes from the logic unit. Exactly where the video comes from depends on the setting of the Computer/TCG switch, which either feeds computer RGB signals to the colouriser or the TCG signals. The logic unit selects one of four test cards by driving the TCG EPROM address lines or switches the "info" page video from its own RGB output. Normal sequence of cards is 4-3-2-1-Info-4-3-2-....



**TONE DECODER :**

The encoding used is called DTMF ( Dual Tone Multi-Frequency ) because each button on the keypad has a pair of tones associated with it. The tones are in two groups, one for each column of keys and one for each row. By recognising the pair of tones, the decoder can decide which row and column the key corresponds to and therefore the keys value. Circuitry inside the decoder chip filters the tone groups and signals to the logic unit that data has been decoded when both tones are present simultaneously and for at least 40 mS. This ensures that other sounds are extremely unlikely to be recognised in error.



#### THE LOGIC UNIT :

This is the heart of the repeater, it co-ordinates all the major functions and produces all the text displays and sound effects. An expanded BBC Model B is used with an external 16 line interface to allow control of the various analogue and digital switches. The user and printer ports are also utilised as digital control lines and the joystick analogue port is used to monitor the received signal strength. Data to update the teletext pages is received via the cassette serial port. The logic is not fitted with a keyboard, but the watchdog timer and reset circuit is connected to the keyboard connector. The beeps for signalling access, drop, error, and the morse ident are generated by the computers sound channel. More details on specific functions can be found in the software listing.

#### 7) LOGIC SPECIFICATION :

Version 2.70 - Specifications may change in later versions.  
Dated 13th September 1989.

© 1989. Copyright passed to the SEVERNSIDE TELEVISION GROUP by software author Brian Kelly GW6BWX.

Master Clock Tick ( MCT ) 0.1 Sec. - generated by hardware interrupt.  
Test card sequencer 400 x MCT.  
Ident timer 6000 x MCT.  
Access response time approx 1 mS from test card/info page or approx 50 mS from status display.  
Time from video detected to access 0.5 Sec  $\pm$  1 x MCT.  
Time from loss of video to drop 0.5 Sec  $\pm$  1 x MCT.  
Time for DTMF tone to be accepted 40 mS  $\pm$  1 x MCT.  
Minimum pause between DTMF tones 40 mS  $\pm$  1 x MCT.  
Timeout between keying \* and # 500 x MCT  
Delay before watchdog causes reset approx. 40 Sec.  
Update tone format Logic 0 = 1200 Hz, Logic 1 = 2400 Hz, Data rate 1200 baud.  
Text format 40 characters x 24 rows, 7 colours + flash + double height, Block graphics definition 80 x 72.  
Caption period 3 Sec.  $\pm$  1 x MCT.  
No drop period after antenna change 2 Sec.  $\pm$  1 x MCT.

#### 8) VALID TONE SEQUENCES :

All sequences must conform to the following rules ;  
They must start with a \*, followed by two digits.  
They must end with a #, allowed time for full sequence 5 Sec.  
Illegal combinations will cause an error beep.  
Sequences incomplete within 5 Sec. will cause an error beep.



Valid sequences are ;

\*01# to \*05# Select beams 0 to 5.  
\*06# to \*09# Select Alford slot.  
\*10# to \*19# Text pages from program ROM.  
\*20# to \*29# Text pages from secondary ROM.  
\*30# to \*35# Text pages from secondary ROM.  
\*36# to \*39# Text pages from RAM ( updatable ).  
\*40# Signal strength caption.  
\*90# Status page.  
\*98# Slow morse ident with "Bristol" caption.  
\*99# Soft reset to reselect RX video.

NB : There are other valid tone sequences which are used for engineering purposes only. Users are requested to use only the valid sequences listed above, since unauthorised use of engineering codes could cause considerable inconvenience to our engineering team and other repeater users.

### 1990 RALLY CALENDER

STG hopes to attend several more rallies in 1990 than it did last year. The calender is now fairly well booked up, and our programme is as follows ;

#### **EASTER SUNDAY, 15th APRIL, CENTRE OF ENGLAND AMATEUR RADIO RALLY.**

This is a new rally, which is being held at a very attractive venue, the National Motorcycle Museum. This is located right by the NEC junction on the M42, where the A45 crosses the motorway. This is only about 80 miles from Bristol, and so it should attract a large number of visitors from the South West, aswell as the Midlands.

#### **SUNDAY 6th MAY, BATC CONVENTION.**

Once again, there is a new venue for this event, one which will inconvenience a great many visitors from the South West. The venue is Harlaxton Manor, near Grantham, which is about 170 miles from Bristol. It looks to be a beautiful old house, but I don't expect that many of you will be able to travel that far.

#### **SUNDAY 24th JUNE, LONGLEAT AMATEUR RADIO RALLY.**

Once again, STG will be represented at Longleat, one of the major events in the Amateur Radio calender each year. The 1990 Longleat Rally looks set to once again break the records set in 1989, with about 10% more traders space available to meet the demand which keeps on rising each year.

#### **SUNDAY 16th SEPTEMBER, BRISTOL RADIO RALLY.**

After a years enforced absence, it is nice to see the Bristol Radio rally back in business in 1990. The venue is still the Brunel Train Shed at Temple Meads, Bristol, and the organisers have promised us the same location as in 1988. This means that we will be able to rig external aerials, and provide a live demonstration of GB3ZZ.

#### **LEICESTER AMATEUR RADIO SHOW .**

The date of this event has not yet been released, but it is usually the last weekend in October. We hope that through the kind offices of the BATC, we will once again be represented there.

When you consider the three contests which we enter each year, it is obvious that we are going to be busy on 8 weekends during 1990, besides the times when work is done on GB3ZZ. If you are available on any of these weekends, please let Viv know, since your help may be required. If you don't mind an early start, it may be possible to arrange a car sharing arrangement to get you there.



## 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 10th April 1990 at 7.30 pm, at Elm Park Parish Pavillion, 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 to the Secretary ( who is currently S.P.O'Sullivan G8VPG, 15,Witney Close, Saltford, Bristol BS18 3DX ) no later than Tuesday 27th March 1990. 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 27th March 1990. 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, Ken Stevens G4BVK.

Honorary Secretary, Shaun O'Sullivan G8VPG.

Honorary Treasurer, Mrs.Jean Fletcher G0AWX.

Committee Members, Ivor Green G1IXF, Alan Tink G7DRU, Phil Smith G1HIA, Steve Walsh G8KUW, Brian Kelly GW6BWX. Ted Halliday G3JMY has served as a co-opted committee member during the past year.

Honorary Auditor, Dr.Chris Newton, G0FGZ.

**PLEASE DON'T FORGET  
TO RENEW YOUR ANNUAL MEMBERSHIP PROMPTLY  
AND CONTINUE TO BENEFIT FROM**

- \* GB3ZZ, THE MOST ADVANCED REPEATER IN THE UK
- \* "P5", OUR QUARTERLY NEWSLETTER PACKED WITH NEWS AND TECHNICAL TOPICS
- \* G7ATV/P, OUR VERY SUCCESSFUL CONTEST TEAM
- \* REGULAR SOCIAL EVENINGS DURING THE YEAR

## FOR SALE - MEMBERS ADVERTISEMENTS.

**SONY CAMCORDER** : Sony Betamovie Model BMC 500, the last version of this excellent machine produced, with CCD picture tube infra-red automatic focussing and 6:1 motorised zoom lens. Date and time insert. Complete with 3 rechargeable battery packs and charger. £300 or very near offer. Roger Worth G4ZQF, Tel. Bristol 693 240.

**AUDIO EQUIPMENT** : I have a selection of audio equipment looking for another home. Offers are invited for the following ;

\* Ferguson Stereo Unit, comprising 17+17 W amplifier, FM Stereo Tuner with 6 presets, BSR record deck with Goldring cartridge. This was an export model not normally sold in the UK, and hence is better than the usual Ferguson equipment. In good working condition, complete with full service information.

\* Solavox PR25 pair of speakers. These are infact Wharfedale Dentons under a Comet own brand label. 8" woofer, 2" tweeter in a nice wooden box. Working well.

\* JVC KD720 stereo cassette deck. Features Dolby noise reduction, suitable for standard, chrome di-oxide or ferrichrome tapes. The autostop mechanism is faulty and disconnected, but otherwise in good order and working well.

\* Indesit 12" monochrome TV set, with 4 presets. With full service information, working well.

\* Fidelity UA4 stereo record player with 2 small speakers.

\* Fidelity RD200 belt drive turntable, still under manufacturers warranty with original packing.

All items come with the original instruction books. Shaun O'Sullivan G8VPG, Tel. Saltford ( 0225 ) 873 098.

Any members with items for sale are welcome to send details to the editor for inclusion in the next issue of "P5".

## LETTERS TO THE EDITOR.

Dear Shaun,

Another couple of points on the Worthing TX ;

a) Mine was oscillating too high but was brought down to a reasonable area by slightly lengthening the earthy end of the varicap.

b) Otherwise, the thing tended to "take off" and was proving impossible to set up properly until G4WTV suggested to me that L6 was notorious for being responsible for this. Throwing L6 away and substituting a 180R resistor worked a miracle and the TX is now putting out a stable 1.5 W.

I ought to mention that this is my second Worthing board, to which I intend to fit the PLL system. Wherever practical I used chip capacitors. I also used the orange spot Mullard trimcaps and a small Farnell ceramic trimmer ( 2 leg ) in lieu of C24. An LF351 replaces the 741 op-amp. Infact I used few of the Worthing supplied parts apart from the semi-conductors !.

Cheers,

Pat Janes GW1SXU.

*Once again, thanks for the useful tips Pat. Like a number of other popular designs, this board seems set to become a classic, with a list of mods as long as your arm !. Perhaps later in the year, we'll publish an omnibus edition of all the known mods. Ed.*