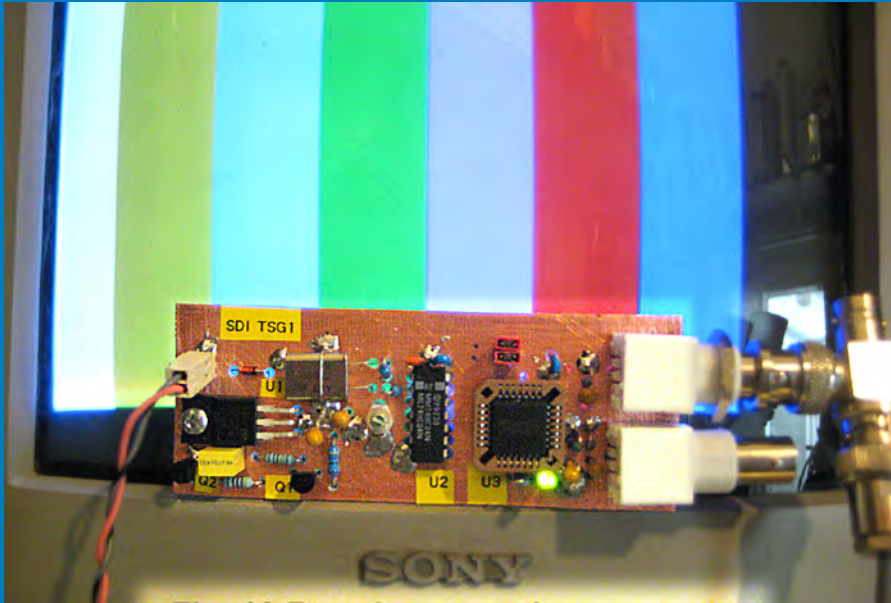




# CQ-TV

# 221



SDI Test  
Generator  
Page 26

Antenna  
Switching  
Unit  
Page 21



# PIC On Screen Display Project Board



**Ideal ATV  
callsign  
generator**



- 4 text pages
- Real time clock
- Counter input
- PS/2 connection
- UK or US key layout
- Colour / mono video
- PAL and NTSC
- Board only option

The BlackBoxCamera™ Company Ltd. sponsors the CQ-TV caption competition. The winner will receive a keyboard text overlay unit.

## GPS video overlay units

Display GPS data on any composite video signal

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07:52:52+01 03/06/07  
PIC-OSD 12.6M  
15.8 mph 23.20°

**PAL - NTSC  
compatible**



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## Caption Contest

Here are a selection of the best entries for last issues picture:

### Peter Stonard

“I see our cable guy has let that field strength meter go to his head”

### Trevor Brown - G8CJS

“It’s fun to film at the YMCA”

### Eric Edwards - GW8LJJ

“Take me to your repeater”

“Well, off the top of my head I think it’s one watt.”

“ATV has gone to my head!”

The winner of last issues caption contest is: Peter Stonard - a caption generator will be on its way shortly Peter.

Please send in your suggestions for the image below, by email to [editor@cq-tv.com](mailto:editor@cq-tv.com) or by post (see committee contacts for address)





# Committee Contacts

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Handbooks, Back copies CQ-TV, and anything related to the supply of BATC publications. Fern House, Church Road, Harby, Nottinghamshire NG23 7ED  
E-mail: publications@batc.org.uk

## Advertising Rates

Size	Mono	Colour
Quarter page	£45	£75
Half page	£90	£125
Full page	£150	£200

**Discounts available for multiple issues.**  
If you would like to advertise in CQ-TV, then please contact our advertising manager: Trevor Brown, 14 Stairfoot Close, Adel, Leeds, LS16 8JR, England. Telephone: +44 (0) 1132 670115.  
Email: adman@cq-tv.com

## Deadlines

CQ-TV is published quarterly in February, May, August and November each year. The deadlines for each issue are as follows: -

February	-	please submit by	December	31st
May	-	please submit by	March	31st
August	-	please submit by	June	30th
November	-	please submit by	September	30th

Please send your contributions in as soon as you can prior to this date. Don't wait for the deadline if you have something to publish as the longer we have your article, the easier it is for us to prepare the page layouts. If you have pictures that you want including in your article, please send them, in the highest possible quality, as separate files. Pictures already embedded in a page are difficult to extract at high quality but if you want to demonstrate your preferred layout, a sample of your finished work with pictures in place is welcomed. Please note the implications of submitting an article which are detailed on the contents page.

# Editors Preamble

A Happy New Year to all our readers, I hope you are all suitably recovered from the festive season!

It seems the new year has swept in some changes: your committee have been busy ~~arguing~~ sorry, discussing how best to move forward and boost membership - have a read of our chairman's column for all the details.

It seems my request for "letters to the Editor" did not fall on deaf ears, so thanks to all who wrote in, please continue to do so, it is always interesting to hear from you and get some feedback, not only concerning the magazine, but about the club and ATV in general.

I was particularly interested in Peter Stonard's comments about an online forum, where we can all "meet up" and have a chat - perhaps we could have some opinions on this? If enough folk are interested then I'm sure your committee could be persuaded to facilitate this.

Next, an apology: it seems that I got things a little confused in the handover and on page 22 of CQ-TV 220 I included photo's from the AGAF stand at HAM RADIO 2007, whilst the text was from an older issue of TV-AMATEUR (145), so apologies to all who were confused.

On another subject, your committee are currently discussing a "Club Project", the last one we had was I2C, way back. The current thinking is that we need to run a series of constructional articles aimed at getting the newcomer to ATV up and running. So such things as: Homemade aerials; 24cms Receiver; 24cms Transmitter and test pattern generators are all being considered - please feel free to contribute, not only ideas for articles, but if anyone has the time to participate in the new club project, please get in touch, we need expertise in the following areas:

RF Design; PCB Layout; RF and Video test and setup; Article write up.

If anyone is interested, please do get in touch, many hands make light work as the saying goes!

New for this issue, is an "Online Information" section, if you have any interesting websites you know of, please share them with us, I am hoping to build up a useful reference list for everyone to make use of.

Talking of online resources, if you have something to submit for CQ-TV and it's too big to email, please visit my website: <http://www.g1fef.co.uk/cq-tv> where you will find a handy upload facility as well as details of how to submit an article.

Finally, I hope you enjoy this issue, it contains a good mix of material, but feedback is always welcome!

*73 and P5 reception to you all  
Chris Smith - G1FEF*



We have produced a DVD containing electronic versions of CQ-TV and the CQ-TV articles index. Also included are electronic versions of our three most recent handbooks, 'Slow Scan Television Explained', 'Amateur Television Handbook' and 'An Introduction to Amateur Television'.

The archive is constantly being updated as more of the old paper issues are converted to electronic format. Currently issues 1 to 134 and 161 to 216 are included along with a few odd ones. This DVD is updated 4 times a year, to include the current issue of CQ-TV.

The DVD is playable in a standard (domestic) DVD player (and on a PC with a DVD player) and the data files will 'auto-run' when the DVD is put into a PC.

The video section was prepared by Brian Kelly and contains videos from Bletchley Park 1999, one from Shuttleworth 2002 and one from 2004. The cost for this DVD is £5.00 for current members and £10.00 for non-members.

Note: This DVD is supplied on +R media only.

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# Chairman's Column

*By Trevor Brown - G8CJS*

Three years ago the Committee introduced cyber membership for overseas members, the scheme was designed to overcome the long postal delays that these members often experienced in receiving their magazine. The scheme acknowledged the fact that these members would not be receiving a printed magazine which is by far the largest outgoing cost of membership and the savings were passed on in the form of a reduced membership subscription. It was initially hoped that the cost of cyber membership would be lower than the £10 it was set at. This is important for overseas members some of whom live in countries where £10 is a significant cost.

The Committee was reluctant to reduce the cost below £10 because of fears that many of those currently subscribing to a paper copy of the magazine would switch to cyber membership and cause an escalation in the printing cost of CQ-TV, due to reduced print run. This is often the case where fixed costs are involved; the Committee however did agree to review the situation at a later date.

Technology has marched on, and a number of the fixed costs for printing the magazine have disappeared, the Committee have reviewed the situation and reduced the cost of cyber membership to £4 for 2008 and the foreseeable future. With this new charge in place it is hoped that the £4 reflects the true cost of cyber membership and that cyber members are not subsidising the printing of a magazine that they will not receive.

The cost of membership for those that still require a printed magazine will remain the same at £15.

We realise that some of you have paid in advance for 2008 at the old rate and indeed some for 2009 as well, you are easily identifiable from the Club database and we will extend you renewal date to reflect the subscription you have

already paid. If you are unhappy with this arrangement then please contact myself or the membership secretary and we will arrange to refund any addition charges.

Initially, cyber membership was restricted to non UK members, although we did agree that if anyone in the UK subscribed we would allow the membership to go ahead, so some of you UK residents may already be cyber members. This restriction has now been removed and cyber membership is open to everyone. If you are currently a printed magazine subscriber and wish to switch to cyber membership then you can do so when your subscription becomes due.

For those of you not familiar with cyber membership, the magazine is compiled by the editor and a PDF file is made for the printers, this is at full resolution, but does not have full colour content for cost reasons.

A reduced resolution copy is then made, but with a full colour content and is used to update the DVD archive. The resolution is reduced a little further to make the cyber copy, but again the full colour content is retained, and every cyber member is then sent an individual email with a link so that he or she can download their cyber copy which has a file size of around 8 to 10MB.

Finally the resolution is reduced further and a copy with a file size of around 4 to 5Mb is made and stored on the club website. With the exception of the last four issues these files can be downloaded by the general public to sample our club or for new members to review past articles. The club website now has an electronic copy of every CQ-TV magazine printed going back to CQ-TV No 1, this archive has just been completed with the addition of CQ-TV 185. I am sure we would all like to express our thanks to Ian Pawson and David Andrews for the work they have done in scanning and converting to PDF, magazines that previously only existed as paper copies.

The Committee further hopes that the new lower cost of cyber membership may encourage new members, and expand the Club, which has suffered a small decline in membership over the past few years. You can all play your part by pointing the new subscription rate out to anyone that you think might be interested in joining our ranks and sharing, through CQ-TV, their ideas.

For our part, the Membership Secretary has written to everyone who's subscription lapsed in either 2006 or 2007 and invited them back into the fold, the letter also explains the cyber subscription, should they feel this is more appropriate for any reason, such as full colour or the easy use of electronic links to the world wide web, or just simply on a cost basis.

We have now introduced PayPal for subscription payments via the web. Plastic money is a fact of life and we need to be on top of processing it in the friendliest way for our members. PayPal does not require that we rent a terminal, or get involved in credit card numbers. This is all handled by PayPal in return for a fixed payment and small percentage on all transactions. You do not need a PayPal account to use this service, but remember the fixed charge. If you purchase multiple years subscriptions you are helping to minimise these charges as they are charged per transaction. Ian Pawson has revised the web and directed payments to PayPal. The new menu behind the subscription link presents a simple and comprehensive button choice for all of our services.

I cannot close without thanking Chris Smith for sliding into the Editor's chair and producing CQ-TV 220, Brian Kelly had to reluctantly leave the position after CQ-TV 219 and now joins the ranks of those that have experienced first hand the most difficult and demanding job on the committee.

# Circuit Notebook 96

By John Lawrence. GW3JGA

## A Baptism of Fire into the Digital Age of ATV

The digital switchover of broadcast TV channels has just begun and in a few years all channels will be digital. Recently, not wishing to be left out, I decided that it was time to experiment with digital amateur TV.

The main attraction is that a digital ATV transmission can provide good picture quality and yet need only occupy a bandwidth of about 2MHz. This opens up the possibility of bringing ATV back to the 70cms band, thus giving increased range over difficult terrain.

When moving into a new technology it is often difficult to get started on the learning curve. Once something, no matter how basic, is up and running then you can build on it and progress is much easier.

### Recent History

A few years ago TV amateurs and those who are also professional engineers, in Germany and Holland, produced kits and complete digital encoder-modulators for amateur use. One such kit is that produced by the AGAF e.V. Group at Bergische University of Wuppertal. The BATC obtained several of these units for loan and/or sale to members for experimental use. A description of work

carried out by Ian Waters G3KKD with one of these units is given in CQ-TV No. 208, pages 30-34 and CQ-TV No. 212, pages 6-11.

More recently, a trickle of professional ex-broadcast (NDS) digital encoder-modulator units have made their way into ATV home shacks. A description of the activities of Mike G8LES and Dave G8ADM using this kind of equipment is given in the ATV Column of the September 2007 RSGB RadCom, by Trevor G8CJS.

### NDS Encoder-Modulator E5910 - Experience so far:

After discussions with Dave G8ADM a large, heavy box arrived by carrier containing an NDS MPEG-2 Digital SNG Coder Model E5910. This unit forms the basis of a news gathering satellite ground station which is used for sending pictures and sound from a remote location back to the TV studio by satellite link.

By amateur standards it is big and it is heavy. It is '5U' (8 3/4") high by 19" deep and is suitable for mounting in a standard 19" rack. The front panel, shown in Fig.1, has a digital display screen (4 rows of 20 characters) for monitoring and diagnostic purposes, a numerical keypad and an X-Y keypad for setting the encoding and modulation parameters – no knobs. The back panel, shown in Fig.2, has a range of BNC

connectors for video in and out and a range of XLR connectors for audio in and out and the usual IEC mains input connector.

The unit contains five very large PC boards, each mounted in a 1U tray. These comprise an Audio/Data/Teletext board, a video input board, a video encoder board which encodes to MPEG-2, a multiplexer and modulator which provide forward error correction and QPSK modulation and a signal IF modulator board which provides a modulated RF output in the range 50-90MHz and 100-180MHz. The final board is an RF receiver which can work with an external LNB to receive off-air signals or can loop back to check the output of the complete system.

Switching on was impressive. Six cooling fans burst into life, warning lights came up and beepers sounded. I was fortunate in that I had been sent a CD of the operators manual by Noel G8GTZ. Over the next few days I worked my way through the 69 pages of the setting up procedure. However, all was not well, I kept getting a message 'FAIL - Receiver (IRD) Card'.

The news of my difficulty got around and in typical amateur radio fashion help came from all quarters. Paul G6MNJ, who has one of the NDS Encoders which is in working condition stepped through each of the settings on his machine and logged these as a file.



Figure 1



Figure 2

He then sent me a copy of the file containing the 28 settings so that I could set my machine to exactly the same parameters. Paul has offered his list of settings for the benefit of anyone else who may inherit an NDS EN5910 machine. The list is given below.

I installed the settings according to the list but again the FAIL message 'Receiver (IRD) Card' appeared. I

have now come to the conclusion that this is most likely to be a hardware fault, connector, component etc. which is feeding the IRD card. (IRD means Integrated Receiver Decoder by the way).

I went into the shack today (20th December) and switched on the beast. Lights came on, beepers sounded as usual but fans failed to start. Is it fan

failure? fuse gone? software setting? No! The shack temperature was only +1 deg C – so no cooling required! Why does one always expect the worst?

As time moves on I anticipate that a few more NDS units will filter on to the amateur market and I hope to confirm my hardware fault by substituting boards and if possible replace the offending item.

*By e-mail from Paul G6MNJ:*

### E5910 DSNG IRD Setup

I have listed below the current settings of my NDS Modulator/Receiver for the purpose of a paper backup for myself and for others to use in order to know that with these parameters and a valid video input their unit should work. The amateur 'standard' for digital TV is still emerging but it seems that the favourite FEC Rate has become 1/2, unfortunately as yet I have not been able to persuade my unit to accept this and the lowest level achieved has been 3/4. If as I suspect this is a limitation of the professional kit we may have to rethink our standards. Setup of the NDS DSNG IRD, once powered up and booted you will be presented with a menu on the screen. Press the Setup button to the right of this and then the System, Modulator, Mux etc along the bottom of the screen for access to each of the sections documented below.

#### System

Service Name	G6MNJ_Digital
Set UTC Offset Hrs	0 or 1 depending on Summer/Winter
Set Date & Time	key in the date and time!

#### Modulator

IF O/P	ON *
IF Power	ON *
Modulation	ON *
Tx Bandwidth	2.560 Mhz (2.000 Msym/s) +
Symbol Rate	2.000 Msym/s +
FEC Rate	3 / 4
IF	60.50 Mhz **
Spectrum Inversion	OFF
IF Preset Power	0.0 dBm (about 3mW)
Satellite Frequency	Don't care!
Satellite Position	Don't care!
Satellite Direction	Don't care!
Satellite Polarisation	Don't care!

\* you may need to return to this menu last to get the I/F and modulation set to ON as the unit will refuse to produce RF unless all parameters are correct.

+ These items affect each other so no need to set both, I set the Symbol rate and it calculated the bandwidth itself.

\*\* the frequency is dependant on what you need to multiply up to your final TX frequency. I will have a modified Microwave Modules 28Mhz to 430Mhz converter, this had a 101Mhz oscillator with multiplied up by 4 to 404Mhz and the 28Mhz was mixed in with that making 432Mhz. It has now a 94Mhz xtal in its oscillator so making the 4 times 376Mhz so to get on 436.50 Mhz the IF frequency will be set to 60.5Mhz on the modulator.

#### Mux

Output Format	IF
Scramble	OFF
Scramble Code	0000000

#### Video

Video Source	PAL
Pixel Resolution	AUTO (1 / 2)
Video Bit Rate	2.000 Mbit/s
Coding Mode	IBP
Low Delay Mode	OFF
O/P on Video Loss	Freeze Frame

#### Audio

Channel A	ON
Coding Mode	MONO
Type	20K ohms
Bit Rate	96Kbit/s
Language	ENGLISH
View Levels – useful display of incoming audio	

#### Data

Nothing to set here

#### Receiver

Receiver Mode	TRACKING
Input Interface	INTERNAL

All other settings will follow modulator with the TRACKING option set.

I hope this is of use to all who read it, and I welcome comments and feedback from others using this kit for DATV.

Paul - G6MNJ  
paul@andrews.eu.com



When progress with the NDS unit halted I moved to the AGAF Encoder PC Boards

### AGAF PC Boards experience so far:

I obtained on loan from the BATC a set of (two) AGAF PC boards. These had previously been out on loan and were fitted in an open chassis which gave easy access to the links on the PC boards and to the input (phono) and output (SMA) connectors through holes in the side. Shown in Fig.3.

#### Inputs are (phono)

Video PAL/NTSC, Y/C

Audio left & right.

#### Outputs are (SMA)

LO 478MHz -24dBm

IF 44MHz -24 dBm

RF 434MHz (QSPK) 0dBm.

DC Supply +12Volts

I down-loaded technical information from the AGAF website: [http://www.datv-agaf.de/DATV\\_Boards\\_V1.pdf](http://www.datv-agaf.de/DATV_Boards_V1.pdf)

This gave information on setting various links on the PCBs to define the required modulation parameters. I set the links to the recommended positions to provide:

Input: PAL

Input: CVBS

(Composite Video Blanking & Sync)

Data rate elementary stream: 6.0 Mb/s

Data rate transport stream: 6.75 Mb/s

Forward error correction: 7/8

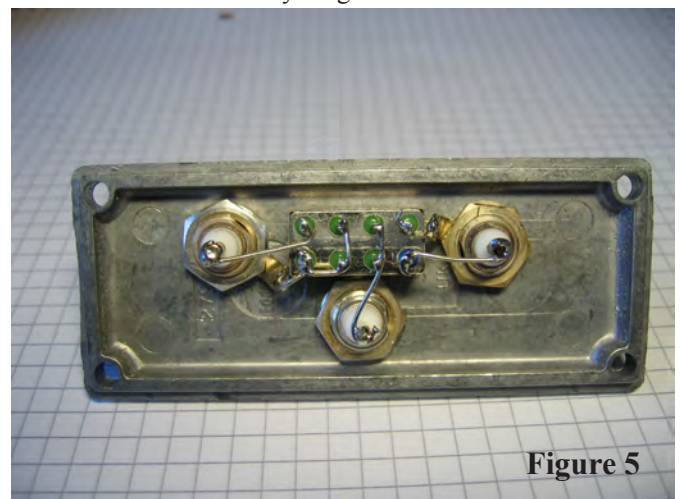
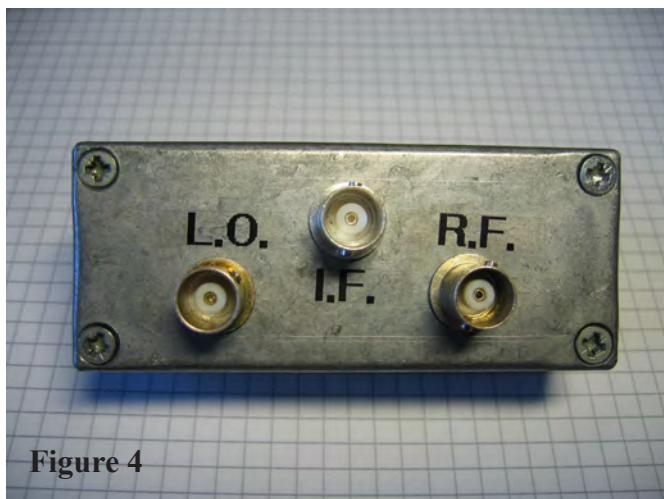
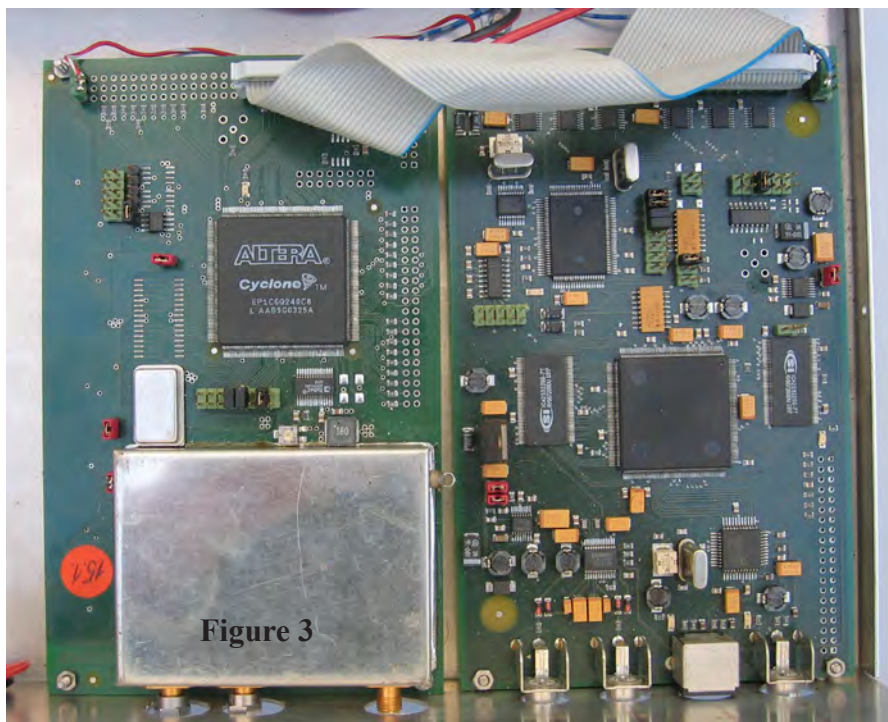
The AGAF information states that these settings result in a QSPK symbol rate of 4.167 MSymbols/sec. The 434MHz output has a occupied bandwidth of 4 MHz and so is more suitable for up-conversion to other microwave bands than for direct use on 70cms.

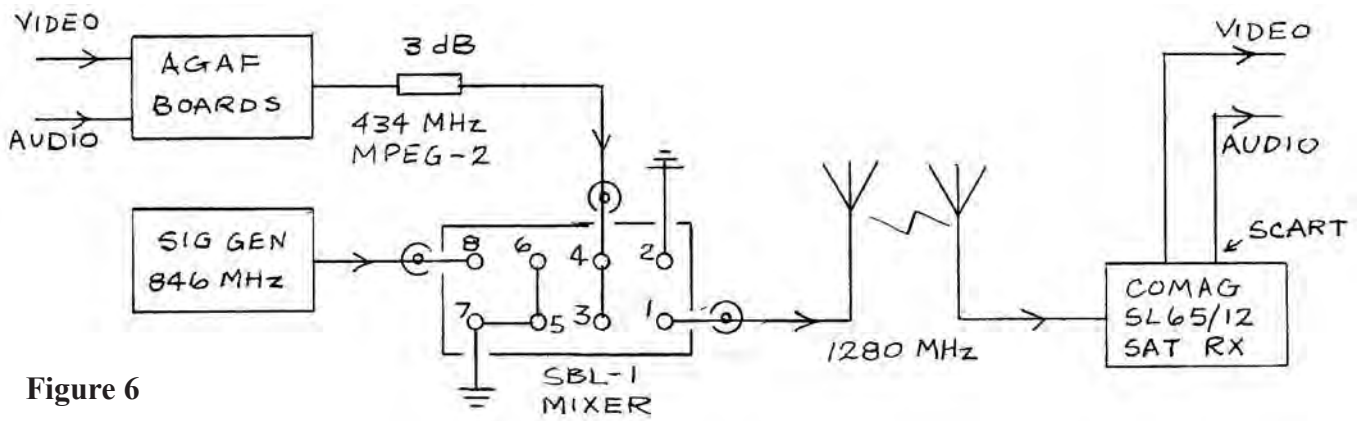
I connected a 12V supply, making sure the polarity was correct and switched on. It states that it is protected against reverse polarity but I didn't wish to try it. A red LED flashed ten times as stated in the instructions and then a green LED came on indicating all was well.

My present requirement is to transmit DATV on 23cms. To make initial tests I put together a double balanced mixer, Figs 4 & 5, using a Mini-Circuits SBL-1 to up-convert to 23cms. Ideally the SBL-1X should be used as it has a higher frequency rating, but the SBL-1 was to hand. This method is described by F4DAY in CQ-TV 219 page 20. I connected the output of a signal generator, which had been set to 846MHz, to the LO input of the mixer and the 434MHz output from the AGAF board to the IF input. One of the output signals is 1280 MHz (846+434 MHz). The circuit is shown in Fig.6. The intention is to replace the signal generator with a crystal based oscillator and frequency multiplier stages up to the desired frequency.

To receive signals, I required a satellite receive which would tune to 1280MHz. I purchased an excellent little 12V receiver, the Comag SL65/12 from Maplin (A94FJ) for £49.99, shown in Fig.7. It will be ideal for both shack and portable use. It comes complete with a plug-top power supply and remote control. It has signal search facilities and automatically sets its decoding to suit the incoming signal. Brilliant!

The normal LNB supply (via the aerial connector) is switchable from the remote control, so I set this to OFF and checked that it was in fact off before connecting anything.





**Figure 6**

I connected a string of coax attenuators (around 30db) between the output of the mixer and the receiver input so as to avoid overloading the receiver. I set the receiver to 'Search' and waited. After about 30 seconds the receiver detected the signal and locked on. Video and sound signals applied to the AGAF board appeared at the receiver output SCART connector. The coding delay was immediately noticeable. Waving my hand in front of the camera was visible on the receiver monitor many milliseconds later. Keying 'INFO' on the remote control brings up a screen giving details of the received transmission, shown in Fig.8.

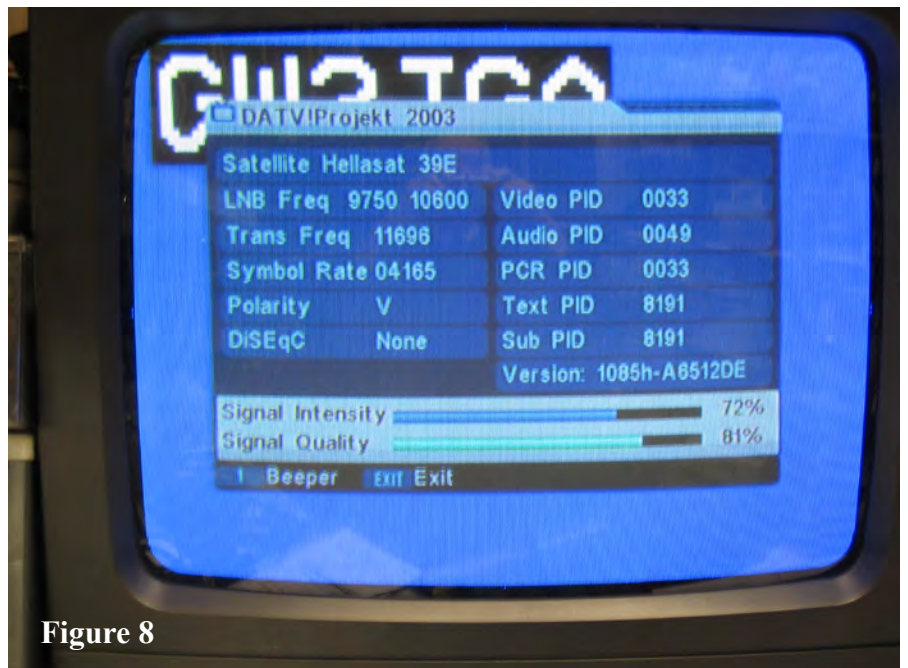


**Figure 7**

I decided to test the quality of transmission by transmitting my station digital test card through the system. The results were excellent. I have a video burst generator which transmits frequency bursts at 1, 2, 3, 4, 5 & 6 MHz. I tried transmitting this, but to my surprise the results were very poor. Only the 1 & 2 MHz bursts were received at full amplitude. I then transmitted a 'pulse & bar' signal from a professional generator and this was fine. I concluded that the problem with the burst generator test may be due to the frequency bursts being from a free-running oscillator and not synchronized to line frequency or to each other. A cautionary tale, which requires further investigation.

My sincere thanks, for most helpful discussions and first hand DATV information, go to Dave G8ADM, Noel G8GTZ, Roy G8CKN, Mike G8LES, Mike G8ASI, Paul G6MNJ, Ian G3KKD, Peter G3PYB & Brian G8GQS.

I removed the attenuators and fixed a little ¼ wave aerial (5.9cms of wire) to the output of the mixer and a similar aerial to the input of the receiver and 'over the air' communication was established immediately. This may not be a great step for mankind but it is a point to which I can always return as I continue developing other parts of my DATV system.



**Figure 8**

# Chronicles of decline

By Klaus - DL4KCK

Many amateur radio repeaters in Germany are located on telecom towers or buildings, because of the outstanding antenna altitude, essential for long range links and beacons. As the former owner, the post and telecom ministry, was interested in good technicians which had often come from amateur radio sources, the financial conditions for the sublease were excellent. After denationalization and splitting of post and telecom authorities a revision of location conditions at 48 very good repeater sites ended with hard restrictions: maximum 100 W power supply, 4 antennas with up to 1 M2 wind-weight. As these sites are often used for several amateur radio modes, these restrictions are creating different consequences - many packet radio nodes have gone qrt, and some high demanding DATV repeaters with several DATV links had to remove some antennas or even terminate their services. Negotiations with the company DFMG (now owner of telecom towers) were delayed endlessly by the special telecom amateur radio group VFDB who stated their monopoly on that matter, and so below are listed some consequences for ATV repeaters:

## **DB0HOB/DB0TR qrt**

Unfortunately we are hit by the utilization changes on our location "Hochries" (Black Forest) in full swing at PR, FM-, APRS- and ATV repeaters. Following the DFMG deadline (double meaning!) we have to shut down and pull out everything within the next few weeks. It is not clear whether there will be any amateur radio activity on that mountain again. We shall try to find a new spot at the Hochries cable railway building. Because of difficult preparations beforehand (contract with owner, insurance, statical calculations, electromagnetic environment certificate) and extensive construction measures we are not able to provide a schedule. Our DARC chapter cannot carry that financial and personal workload unaided, donations are welcome! For amateur radio in Germany this DFMG decision means a complex

breakdown of several radio networks and a reorganization of the extensive link structure. It will take some time to find new locations and fill the gaps, and I ask all amateur radio friends to be patient and give a helping hand in the meantime.

Klaus, DL8MEW  
Head of DARC chapter C14

DB0TVI/DB0INS are shut down, DB0THB runs only in a meager way.

## **DB0SCS Nuremberg**

According to a VFDB publication the DFMG tower locations have to reduce the scale of their operations, this has curtailed our linking projects to Schneeberg, Ansbach, Hesselberg and Parsberg. Inputs and outputs at DB0SCS will stay operational, but all links besides the one to Ingolstadt will have to cease. The ATV repeater alone is using more power than provided by the order, so we will need contributions from our users to extend operating.

<http://db0fhn.efi.fh-nuernberg.de/db0scs/>

## **DB0DTV silent key**

On march 24 in 2007 DB0DTV (Hamburg) will be dismantled completely. I want to thank DG1HT and DF4HR for developments and administration, DB9XC and DC8UE for supporting activities; DL6XB, VFDB and DFMG for the END of DB0DTV (irony), all users and linked repeaters and the internet portal users for a happy time and for having helped to give my amateur radio activities a new life.

DG3HT at [www.db0dtv.de](http://www.db0dtv.de)

## **DB0KO qrt (Cologne)**

The complete installation with antennas and electronics has been removed, as DFMG sent a termination message for Bornheim-Merten dating to end of June 2007! Sys-op Helmut DG3KHS will transmit the weekly ATV bulletin from his home QTH nearby, but some users will have to redirect their antenna. We are searching for a new location...

<http://www.db0ko.de/>

## **VFDB info (May 2007)**

We are proud that our sys-ops have completed the reduction of 90 percent of locations over such a short period, and we have reported this execution to the DFMG. Some positions were given up for different reasons, and the database is settled in conjunction with DFMG. Unfortunately from 11 locations we did not receive any feedback in spite of several letters to them, so the DFMG was asked to remove them from the VFDB contract.

(DL4KCK remark: a timely fulfilment report from the DB0KO sys-op did not arrive at the deciding party...)

## **Optimism on command**

To manage with 100 W (max. electric power consumption) and four antennas on an amateur radio repeater seems impossible to many people. But Paul Weinberger - DL9PX, sys-op at DB0ITV west of Pfaffenhofen, told how he managed with only half what he used before. This was possible by calculating the electric power in kWh per day assuming the allowed consumption. His ATV repeater, with all links, consumed 280 W of electricity, another consumer was the 70 cm voice repeater DB0CP. Under the new DFMG/VFDB preconditions the consumption was to be shared equally, so for ATV only one antenna and another one for the link to Munic (DB0QI) was left. As a consequence the link to Nuremberg and the 10 GHz in/output were given up. These tiny sticks had been defined as separate antennas in the building plan. Luckily it was possible to use another ATV antenna from the voice repeater which in fact uses only one. Now only four hours of ATV repeater activity are left daily, controlled by a timer switching on between 19 and 23 h. Paul asked everyone to request a higher power budget from VFDB calculated like he told. Exceeding electricity charges would be taken over by concerned amateurs.

Translated by Klaus - DL4KCK from TV-AMATEUR 145 & 147 with permission.

# BATC BGM 2008

By *Graham Hankins G8EMX*

In an Email sent around the BATC committee on 23rd December, Trevor Brown reminded us that: "Next year 2008 is a BGM year. We need a venue, date, and a list of who is on committee and who needs to stand down and of those who want to seek re-election".

The 2006 BGM was eventually held in the Village Hall at Stow-Cum-Que near Cambridge, but only after significant time had passed while we looked for an organiser and – even more vitally – somewhere suitable to hold the event. So, this time, to avoid at least one of those searches, I (for my sins) have volunteered to organise (yes, I know, take more water with it hi!)

Now, although that email was sent amid the intense run up to Christmas, mails to and fro leapt into action throughout the festive season and continue to date. You will read elsewhere in this edition that the committee made decisions regarding some changes to the club operation, but we also received a response from a member who actually read the magazine (!), suggesting a BGM venue; that and other possibilities are being considered.

Although nothing is 'cast in stone' the 'perfect' BGM venue Wish-List (thanks to Brian Summers for most of this) would include:

- Good transport links (road and rail)
- Availability of food at a reasonable rate.
- Flat access to the hall.
- Zero cost access to the visitor.
- Access available on the Saturday afternoon to set up a Sunday exhibition and BGM.
- "Stiff" power supply (does not droop under load) for possible OB attendance.
- Good RF location for repeater demos and support of the local repeater group.
- Central location if possible (but this is NOT mandatory)

The BGM proper is the formal meeting at the end of the event, but I use the term to describe the day in its entirety. My wish-list for the exhibition would include:

- Attendance by as many Repeater Groups as possible.
- All presentations in the Lecture Stream to be recorded for later distribution to all Repeater Groups.
- Demonstration of Digital ATV.

As CQ-TV is only published quarterly, please watch the 'What's New' section on the BATC's web site where progress updates will appear.

If you haven't been to <http://www.batc.org.uk/> lately, it's worth a look!

## Repeater News

*GB3WV a life history.*

The repeater was originally built by John G4NTS (sk) and was transferred to the west country on his move from Dorset to Ogwell near Newton Abbott. A group was formed and a site was found at North Hessary Tor Dartmoor. Due to the escalating costs on the change over of mast management the repeater was taken off air. It was looked after by Ralph G3KHU in his garage in Plymouth.

Don G0RQL collected it from Ralph in the hope of a site in N.Devon but due to location and CAA regs (Too close to

a radar installation) he was not able to site it where he had wanted. In the mean time he stripped it down and rebuilt the PA and transmitter with the help of Tony G1BHM.

Don started looking at other sites and Tony M0AVP came to the rescue with an offer of a site at Caradon Hill, Tony acted as keeper because of the distance from Don's home location. Tony then emigrated to a sunnier part of the globe. So I took over as repeater keeper (G1NSV) since I am about 5km from the site. The repeater is maintained by us with one or two donations of equipment by users. At the beginning of 2007 we

heard that our site was being sold and wondered how we would manage, however everything turned out alright as thanks to the generosity of our new landlord Phil Hardacre we are able to continue under our original agreement. The antenna is an Alford slot and we have good take off all round the area as the antenna is at approx 380 m ASL. We welcome users and comments and as we are ideally suited in a holiday area, any amateurs on holiday might be able to convince their wives or partners it might be worth taking a mobile system on holiday!!

Dave - G1NSV

## A plea for information:

The RSGB Yearbook 2008 lists 28, 24cm ATV repeaters, with keeper callsigns. Looking at the callsign pages, most of these calls have a name and address listed; however, four keepers are 'Particulars Withheld'. These are keepers for GB3UD, GB3VX, GB3TT and GB3GV. I cannot see listed the keeper for GB3TX.

For the 13cm repeaters, the Yearbook lists 12, three keepers details are withheld, for: GB3ZE, GB3DH and GB3RT.

For 10GHz, ten repeaters are listed, with only the keeper for GB3XV not listing their details.

As I wish to correspond with all Repeater Groups, could these keepers please let me have some contact details (not for publication) or if someone else from the Groups concerned could get in touch, it would be appreciated.

Thanks  
G8EMX

## Severnside TV Group News Flash

Just a short note to inform all our members that the video & audio output of GB3ZZ can now be seen via the internet, (this may be changed over to GB3XG when the dish is reinstalled back at ZZ site).

Visit [www.stvg.co.uk](http://www.stvg.co.uk) web site & click on the moving banner at the bottom of the page or visit:  
<http://gb3zz.camstreams.com>

The third way is to visit the camsecure site then go to the amateur section, There are more exciting things to come in the very near future with this site with the facilities to hear talkback on 144.750 plus remotely controlled shack and out door cameras plus slide show.

The camsecure site is run by Les, who you may often see at various radio rallies selling surveillance cameras and web cams.

When this site is fully operational I will give all members of the Severnside Television group the password to operate all the additional facilities

Info on how to use this site

Visit [www.camsecure.co.uk](http://www.camsecure.co.uk) you need to click onto the amateur section which is near the top left hand side of the home page, once you are on the amateur page the picture will appear after a 20 seconds delay (aprox)

Hope you enjoy using these sites your committee have worked very hard in the last few months to get this up and running.

Happy New Year

Viv - G1IXE



## Doug Pitt - Silent Key

*Doug Pitt, the co-founder and chairman of Narrow Bandwidth TV Association, has died, aged 88. He was a familiar face at BATC events, often demonstrating mechanically-scanned television pictures, and he treasured one onlooker's comment: 'Whatever will they think of next?'*

*Scottish-born, Doug was schooled in Derby, home of the famous Radio Club, and a centre of particular enthusiasm for the Baird-BBC 30-line TV broadcasts of the early 30s. After war service with Royal Electrical & Mechanical Engineers, Doug became a teacher, eventually attaining Head of Science at a Nottingham school. He wrote many articles in the 1960s for magazines such as Practical Wireless and Radio Constructor. It was during a lunchtime chat with fellow Science teacher Stan Kujawinski in 1971 that the idea was hatched to experiment again with mechanical TV. They gradually unearthed information, including a copy of the early book 'Television Today and Tomorrow', and Stan recalls 'the decision to use 32 vertical scanning lines rather than the 30 used by Baird. The decision was for practical reasons to do with accurately marking out the angles for scanning discs using compasses and dividers. However we also thought that choosing a binary number might be useful in the future, although at that time we had no idea as to why.' The first discs were old vinyl LPs drilled with 0.5mm holes, with modulated neon lamps behind.*

*Doug wrote several magazine articles from their researches, and correspondence began with a number of interested readers. One of these was Chris Long of Australia (now VK3AML) who had been experimenting independently for some time and had achieved considerable TV success using photomultiplier tubes. Doug and Stan acquired some ex-Post Office photomultipliers and were soon getting pictures good enough for public demonstration. The idea of a club dawned, and they gave demos at several radio rallies and clubs. Further articles and even a BBC TV 'Pebble Mill at One' spot followed. Correspondence grew such that a newsletter was needed. First via spirit duplicator in vibrant hues, the news sheets became a regular quarterly. A meeting in Clifton, Notts was convened and the 'Low Definition TV Association' formalised. Soon Gil Miles (VK2KI) urged a name change to the more positive Narrow Bandwidth TV Association. 'After all,' Stan points out, 'we were trying to produce the best definition possible within the constraints.'*

*The pursuit caught the interest of many experimenters with its freewheeling mixture of analogue and digital electronics, radio communications, mechanics and optics, and the NBTVA today has about 180 members worldwide. Its work occupied Doug right up to his death. Stan's words end this account. 'The excitement at each stage of progress, the hours of discussion over the telephone, evenings spent experimenting, and making unexpected discoveries. Joyous times. Doug will be missed for his organisation and drive, but most of all for the infectious enthusiasm that he brought to many of those members with whom he shared our interest. He will be missed, but not forgotten. I have always imagined Doug to share many of the qualities of his fellow Scotsman and hero John Logie Baird, and in my mind the two could have been cast from the same mould.'*

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# ATV Newsletter

First I want to thank Chris, G1FEF and Trevor, G8CJS and the British Amateur Television Club and the CQ-TV magazine for the opportunity to tell you all about my newsletter.

## Intro:

My name is Bryon Foster and my ham call is N6IFU. I live in Simi Valley, California which is in Ventura County just west of the San Fernando Valley and the Los Angeles County line. Grid DM04og

I first got involved with ATV back in the early 1980 Elmered by a good friend John, KA6HXX. I changed jobs and moved out of the area and ATV wasn't in my life until about 4 years ago when I moved back to Simi.

The only ATV repeater located in my area is on Oat Mtn. and it is part of the ATN (Amateur Television Network) repeater network. Oat Mtn. is linked to another ATV repeater located on Santiago Peak in Orange County. The ATN club had a Net every Tuesday evening. The newsletter got it's start because of the Net.

## How the ATV Newsletter started:

The ATN Net was held every Tuesday and only lasted about 5 min. each week because of a very small turn out of members. The club members would tell me that they had forgot about the Net and couldn't remember. So I began to collect email addresses and started to send out a "Net Reminder" each week.

Attendance and check-ins to the Net increased and it became natural for me to add additional bits of news to the "Net reminder". The ATN repeater network had lots of repeater problems and equipment failures and many ATVer's would turn on their equipment and find that there wasn't a signal or they couldn't make contact. So the Net Reminder was a source of information for the status of network.

It was the same with people selling equipment, and when repairs would be made to the repeater system and I always spent extra time to note new hams coming to ATV in the newsletter so they would feel welcomed.

Later I added all the ATN members in other States and they passes it along to other hams that were interested in ATV. And it took off from there.

In August of 2007 the 'net reminder' became the "ATV Newsletter".

## The Focus of the ATV Newsletter:

As my newsletter evolved into what it is today, I learned how much involvement there was and how there were so many different ways to participate in ATV.

I was aware of the Amateur Television Quarterly and the CQ-TV Magazine but being published once every quarter left us all without a venue for months.

So I have positioned my newsletter to help fill the gap and give everyone a place to post their news. I have no expectations of doing what CQ-TV and ATQ does because the news I print is perishable and the quarterly publications are timeless. Something that is kept and referred to over time. My newsletter is for imminent consumption.

I welcome articles from anyone that wants to let everyone know about an event or an experiment or an idea that another ATVer might find of interest. I don't expect to publish projects or schematics, in fact I haven't added pictures to my newsletter.

I welcome links to camstreams and websites. In fact I am very interested in camstreams and linking ATV repeaters together via IP. The ATN club has tried using Skype and SlingBox to link repeaters with limited success. There has to be a way we can communicate "RF to Internet and back to RF". I published an article from G7KMP in the Jan. 15th

issue about this very subject which I have great hopes for it's success.

## Open Invitation:

I want you all to know that you have an open invitation to submit anything about ATV for publication in the ATV Newsletter. And because the newsletter is published every week you can get your story or info out to the readers very fast.

Please try to keep your articles short and to the point but if you have something that needs to be explained in a long article, don't hold it back.

The ATV Newsletter is your open opportunity to communicate how we can all improve the hobby and a way interested Hams can get together.

## Subscribing to the ATV Newsletter:

My newsletter is free and I encourage you to pass it along to anyone you think would enjoy it.

To subscribe send an email to: [atv-newsletter@hotmail.com](mailto:atv-newsletter@hotmail.com) and please include your first and last name as well as your call sign.

My mailing list is not shared or sold.

At the time I sent this to CQ-TV Magazine, the circulation of the ATV Newsletter is 832 and growing.

## Special Thanks:

I want to add a special thanks to Ian, G3ZHI. Ian has been extremely helpful in guiding me through the ATV establishment in the UK. Ian hosts a website for me that you can download past issues of the ATV Newsletter: <http://www.qsl.net/g3zhi/atvnews.htm>

Thank you for your time,

N6IFU  
Bryon Foster  
Editor and Publisher of the ATV Newsletter

# One Hundred Years of All-Electronic Television

By Paul Marshall

As one grows older, anniversaries seem to come around ever more frequently. Perhaps in an uncertain and ever faster moving world we crave stability, points of reference and solid ground. 2008 is, as is any year, an anniversary for many things and many people, but to anyone who professes an interest in the history of television it is a significant date.

For the quiz programme generation of the UK the answer to the question, 'Who invented television?' the answer is always the same; John Logie Baird. It is not the purpose of this article to denigrate the huge and important activities of that famous Scotsman, but to remember his less well known countryman who had far reaching effects on the technology of television and indirectly its cultural development.

Alan Archibald Campbell Swinton is not a name that the public associates with the invention of television, or indeed anything else. Engineers and scientists stand a better chance of recognising the name as he is occasionally mentioned in technical books. This is a shame as Campbell Swinton is arguably one of the most influential figures in the history of television, but even in recognised texts devoted to the study of the history of television his contribution is often covered in a only few scant paragraphs. Most of these works acknowledge the importance of his ideas and of his advocacy of them, but it is an unfortunate fact for us that he was a most self effacing man and perhaps as a consequence has left little detail of his life and work. For those that know of his activities the importance is clear, for those that have only just about heard of him the importance is a hazy construct.

1908 was the year that Campbell Swinton published his ideas for television and that makes it the 100th anniversary, but were they that important? I believe that they were, as too did one of the key members of the Marconi-EMI team that developed the British all-electronic television system in the 1930s, Professor

J D McGee who wrote in a 1977 paper celebrating Campbell Swinton; 'It is felt that his crucial role in this important technological development should not go unrecorded'.<sup>1</sup>

## Defining Days

Campbell Swinton, as might perhaps be guessed from the double barrelled surname construction, came from a well connected family that to this day still produces people of note, though now without the 'Campbell' addition.<sup>2</sup> Tilda Swinton, the film and television actress is his great, great niece. The Swintons are one of the oldest families with a recorded lineage in the whole of the UK, tracing their ancestry back to 886, well before the Norman Conquest.<sup>3</sup> Members of the family have had a knack of popping up throughout British history mainly in the field of military service and administration, but apart from Ernest Swinton, one of the progenitors of the tank, the only other Swinton to have made their mark in the field of science and engineering has been A A Campbell Swinton.

Born in 1863 in Edinburgh to able parents who encouraged his interests, Campbell Swinton was brought up in the family country seat at Kimmerghame in the Scottish borders, close to the village bearing the family name of Swinton. As a young boy he exhibited traits that might be familiar to many engineers; an overwhelming curiosity about how things work and a disdain for anything involving sport! Two interests dominated his world, photography and electricity, both being encouraged by his parents and by teachers at his first school at Cargilfield in Edinburgh. This happy period was not to last as he was sent up to public school which he truly hated. Leaving his unhappy association with the minor Edinburgh public school of Fettes without being entered for or having passed any exam, he was apprenticed to the firm of Armstrong, the shipbuilding and military armament manufacturers. His interests and abilities in electrical engineering were duly noted by senior



Figure 1 Alan Archibald Campbell Swinton, photographed around 1910-1911

managers leading to him becoming the electrical specialist at Armstrong's, even before his apprenticeship was completed. Realising his own abilities and seeing the need for such expertise in this new activity in late Victorian Great Britain, Campbell Swinton set up his own electrical consulting company based in London making good money in a rapidly developing field.

Making good money was not enough for him and his curiosity took him deeper into the scientific basis of electricity and the many new electrical phenomena that so fascinated the 'gentlemen scientists' of the period. Experiments with high voltages and discharge tubes took him further into the science of electrical curiosities, especially those involving any of the new 'rays' that were being investigated. X rays (then known as the 'new photography') were discovered by Wilhelm Röntgen in January 1896 and a week later Campbell Swinton had managed to replicate the work with an electrical discharge tube and a photographic plate. This 'new photography' occupied his interest for several years, developing better X ray tubes and investigating the properties of X rays and of electron beams. This was alongside establishing a commercial X ray facility for medical and other purposes creating another business opportunity.



X rays had meshed his fascination with electrical phenomena and photography together. Perhaps this same fusing of ideas also led sometime in 1903 or 1904 to his idea for a practical method of television. So strong was the idea that he began experiments to reduce it to practice. We only have his word for this date as no laboratory notes or records survive.<sup>4</sup> Not surprisingly, even to him, he was not successful in his endeavours but the idea remained, his mind returning to it frequently. For the 'official' date we must move forward four years.

## First Publication

The discovery of the electrical properties of selenium in the presence of light by telegraph engineers Willoughby Smith and Joseph May in 1873 probably stimulated ideas for achieving 'distant vision' as an adjunct to the Victorian reality of 'distant hearing' (the telephone). Numerous proposals and ideas appeared but none were practical, at least with the electrical techniques of the time. For some years the dream lay dormant, but the Edwardian period experienced renewed activity in the quest for the newly named 'television'.<sup>5</sup> New technologies, fresh ideas and new proposals for applications inspired inventors to think again about the concept. Speculation about how television could be done surfaced in the correspondence columns of the famous scientific journal, *Nature*. Intrigued by statements written by the well known experimenter and inventor Shelford Bidwell about how 'photographic telegraphy' might be achieved published in the June 4th 1908 issue, Campbell Swinton was moved to reply with his own opinion and suggestions for 'distant electric vision'. This letter, published in the June 18th 1908 issue of *Nature* has become the reference for the start of CRT based electronic television.<sup>6</sup> It is reproduced in Figure 2. Even though it has been published many times in texts on the history of television it never fails to impress engineers in terms of its ingenuity and prophecy in a few well written lines. He never patented the idea, much to the regret of the current occupant of Kimmerghame, his great nephew Sir John Swinton.

## LETTERS TO THE EDITOR.

*[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]*

### Distant Electric Vision.

REFERRING to Mr. Shelford Bidwell's illuminating communication on this subject published in *NATURE* of June 4, may I point out that though, as stated by Mr. Bidwell, it is wildly impracticable to effect even 160,000 synchronised operations per second by ordinary mechanical means, this part of the problem of obtaining distant electric vision can probably be solved by the employment of two beams of kathode rays (one at the transmitting and one at the receiving station) synchronously deflected by the varying fields of two electromagnets placed at right angles to one another and energised by two alternating electric currents of widely different frequencies, so that the moving extremities of the two beams are caused to sweep synchronously over the whole of the required surfaces within the one-tenth of a second necessary to take advantage of visual persistence.

Indeed, so far as the receiving apparatus is concerned, the moving kathode beam has only to be arranged to impinge on a sufficiently sensitive fluorescent screen, and given suitable variations in its intensity, to obtain the desired result.

The real difficulties lie in devising an efficient transmitter which, under the influence of light and shade, shall sufficiently vary the transmitted electric current so as to produce the necessary alterations in the intensity of the kathode beam of the receiver, and further in making this transmitter sufficiently rapid in its action to respond to the 160,000 variations per second that are necessary as a minimum.

Possibly no photoelectric phenomenon at present known will provide what is required in this respect, but should something suitable be discovered, distant electric vision will, I think, come within the region of possibility.

A. A. CAMPBELL SWINTON.

66 Victoria Street, London, S.W., June 12.

Figure 2 Campbell Swinton's letter in *Nature*, June 12<sup>th</sup> 1908

Campbell Swinton continued to work on his idea and in a lecture to the Röntgen Society he presented a diagram of his proposals that was published in their journal in 1912 and reproduced in Figure 3. Surely we can baulk at the impracticability of it, the slip rings on generators that would have created sine wave deflections instead of sawtooths, the lack of amplification and a host of other practical points. The suggested high voltage of 100 kV would not have seemed strange to someone used to working with X ray tubes and given the 'hard' form of CRTs at this time this would have been the order of the voltage required.<sup>7</sup> However, the main elements of an all electronic television chain are there and Campbell Swinton's own explanations completed the scheme that could still be used today to describe

the concept of television. It must be appreciated that in 1911 the thermionic valve was still a new idea and that wireless was still largely accomplished using spark gaps and coherers. There were no 'electronic' techniques to oscillate, process or amplify. Campbell Swinton realised that this was only an idea and that to make it practical the resources of a large industrial research laboratory would be required. The era of the lone inventor was almost over and something of this complexity could not be accomplished by one man.

There is a competing claim to precedence. In 1911 Boris Rosing in St Petersburg, Russia, had achieved some limited success with a display CRT able to scan four lines connected to a mechanical image scanner. It worked,

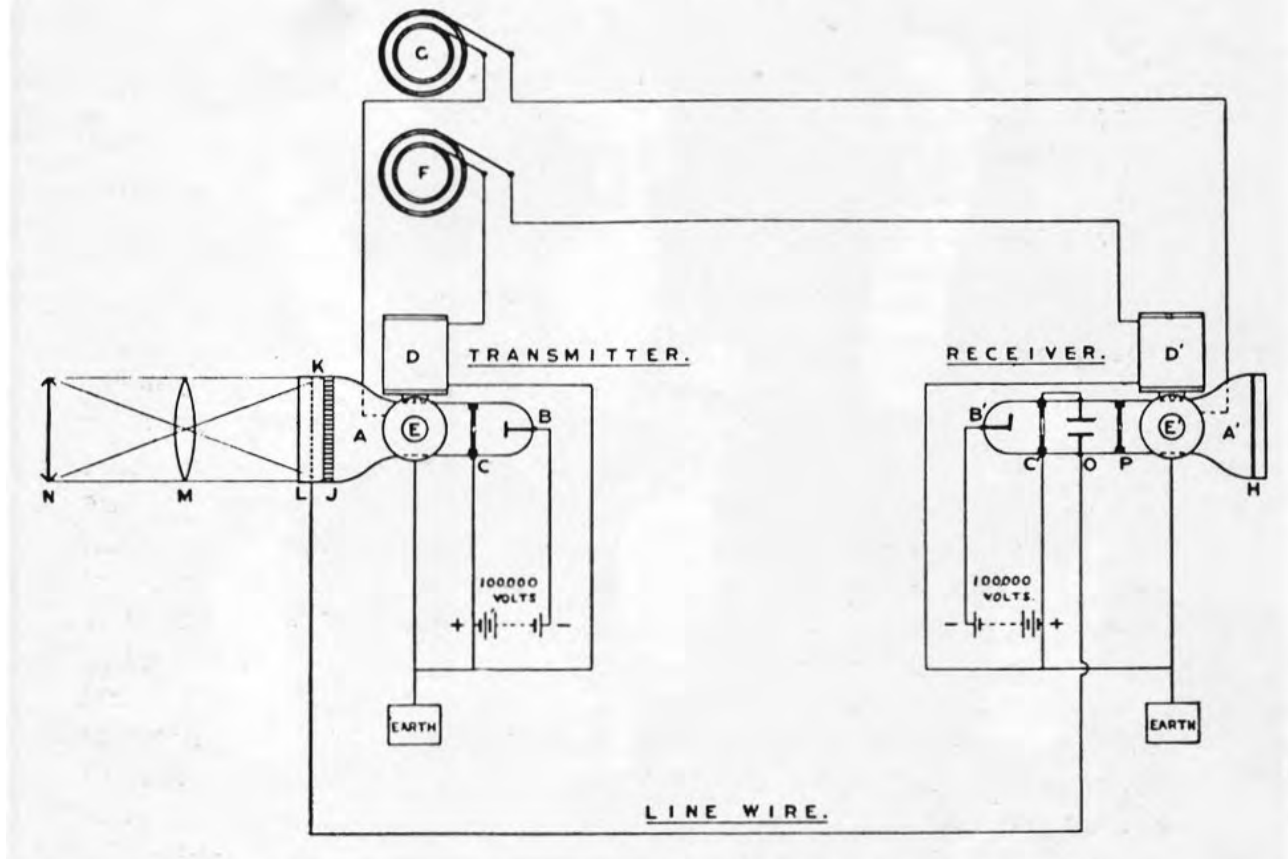


Figure 3 1911 block diagram of Campbell Swinton's CRT Based Television System Proposal, as reported in the January 1912 issue of the *Journal of the Röntgen Society*

up to a point but it was hardly an image, being described at the time as simply 'four luminous bands'. Rosing had patented his device in Great Britain in 1907 but he never made the leap in proposing the use of a CRT as an imaging device. Even in Russian texts on the history of television Campbell Swinton is credited for the idea of using a CRT based device for imaging.<sup>8</sup> Rosing is another forgotten figure, dying after incarceration by Stalin in 1933 because of his intellectual ability, a talent so hated by the communist dictator.

After two decades of publications and practical results in fields ranging from steam turbines to television, Campbell Swinton was recognised by the British scientific fraternity in 1915 by his election as a Fellow of the Royal Society, a high honour and one that he was very proud of. He had 'arrived' in the world of science, despite his classical education at Fettes and his failure to enter or pass any exams.

### The Idea Matures

Campbell Swinton's ideas for television were published around the world, appearing in many magazines and journals including the influential *Electrical Experimenter* in the United States, but little or no practical work was attempted by anyone until after the Great War. The war created a massive stimulus to the development of wireless technology creating a major new industry that sought out fresh applications and ideas. Anything 'new' in the burgeoning field of wireless in its widest sense was always of interest to the infant industry. The idea of television was still on Campbell Swinton's mind and an article was published in 1924 in *Wireless World* that presented an updated view of the concepts (Figure 4). The scheme now sported valve amplification and wireless transmission of the signals.<sup>9</sup> Others had certainly seen the ideas and the embellishments probably leading to a number of patents

appearing adding ever more detail to the proposals, yet there was still no real practical work. The patents of Vladimir Zworykin (1923) and Kálmán Tihanyi (1928) are probably the most important of the period, both bearing a close resemblance to Campbell Swinton's original concept. Only the scanned phototube image dissector idea of Philo Farnsworth (patented 1929), can be described as different, but even this has common ground.

By the mid 1920s the infant world of television development had been gripped by the 'new' idea of mechanical television as defined and developed by Baird in Great Britain and Charles F Jenkins in the United States all based on an 1884 idea by Paul Nipkow. Campbell Swinton was horrified to see money being wasted on what he knew was likely to be a blind alley. He wrote strident criticisms to *The Times*, to professional journals and especially to the BBC which was being pressured by

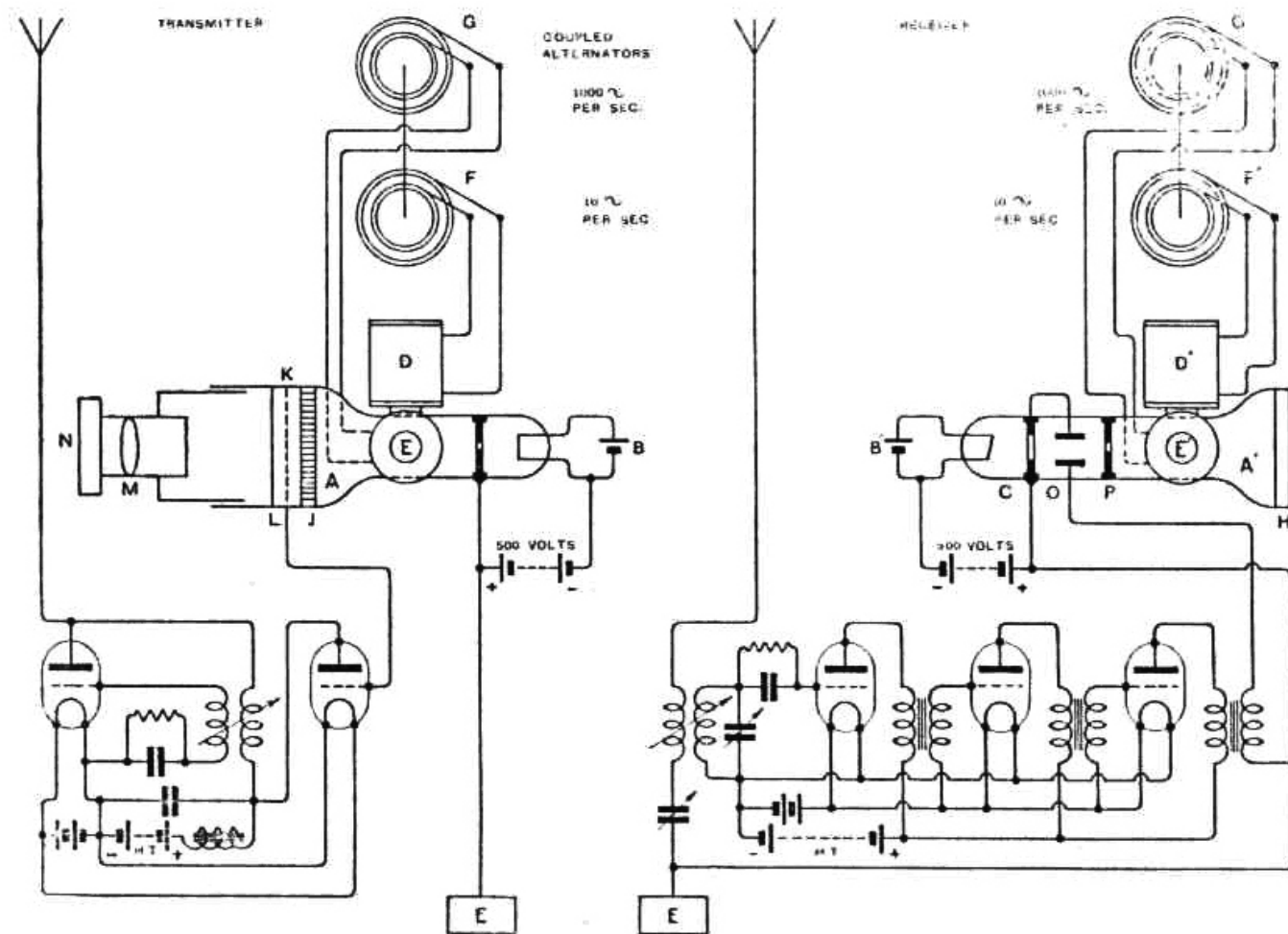


Figure 4 Campbell Swinton's revised diagram of 1924 that appeared in the April 16<sup>th</sup> issue of *Wireless World and Radio Review*.

Baird for transmission facilities for his mechanical television.<sup>10</sup>

Despite the concentration on mechanical television in the late 1920s some of the wireless companies such as RCA realised that Campbell Swinton was almost certainly right, that mechanical television could never offer a worthwhile picture quality for any really useful purpose. According to Campbell Swinton, only the '... extreme tenuity and weightlessness of cathode rays'<sup>11</sup> could offer fast enough operation to produce a useful television image. In the United States, RCA, the Philco Storage Battery Company and Farnsworth's Television Company were all working on all-electronic television by 1930. In the USSR crude results had already been achieved in the early 1930s by a team led by Boris Grabovsky in Tashkent but this was not known of in the west at the time.<sup>12</sup> Great Britain had some catching up to do.

There is controversy over whether Campbell Swinton had anticipated the need for storage, the integration effect of a camera tube that multiplies its effective sensitivity by as much as four orders of magnitude. Farnsworth's image dissector had no such storage and was consequently very insensitive, despite his invention of the electron multiplier in an attempt to offset the problem.<sup>13</sup> Patent wars raged throughout the 1930s over whether Zworykin of RCA had anticipated this in his 1923 patent. Some historians imply that Campbell Swinton had indeed appreciated it, others not. The arguments largely hinge around whether his suggested operating principle was photo-emissive or photo-conductive. The origin of the storage principle was a key issue for over a decade but the legal wrangling did not impede development work.

All electronic television technology was not seriously taken up in Great Britain until the early 1930s. For Campbell

Swinton that was too late for he died of pneumonia at the age of 66 in 1930. The only television that he ever saw was mechanical, the work of Baird.

There is a real lack of detailed information about Campbell Swinton, the only work of any consequence so far published has been a short monograph published by the Royal Television Society in the early 1980s.<sup>14</sup> Excellent as this work is in drawing together everything that could be found on Campbell Swinton at the time it is still relatively little. No laboratory notebooks have survived, no significant amounts of equipment remain and little or no correspondence has come to light. Despite him being an important member of a dozen or so institutions ranging from the Royal Society to the IEE none has little more than brief records.<sup>15</sup> In his will it appears that the books and notes from his work passed to the son of a close friend and ex-assistant. So far, the whereabouts of these documents

has not been found. They should have passed to one Alan Robert Houston, but despite my many enquiries, no trace can be found of anyone of this name, or indeed of his father.

In this short article it has only been possible to run through as concisely as possible the most important work and contributions to science and engineering of Campbell Swinton with special reference to television. There is much more to tell and perhaps even more yet to be found. He never married, saying that he 'didn't have time', but his legacy lives on.

#### References:

1. McGee J D 'The Contribution of A A Campbell Swinton, F.R.S., to Television', Notes and Records of the Royal Society of London, Vol. 32, No. 1 July 1977 pp 91-105. p. 104
2. The Campbell Swinton branch of the Swinton family is an offshoot from the main lineage, the full story and explanation can be found at <http://www.swintonfamilyociety.org> (accessed 25th Jan 2008)
3. Bridgewater, T. H. (1982) A A Campbell Swinton, London, Royal Television Society. p. 3
4. Swinton, A. A. C. (1926) 'Electric Television', Nature v118 p. 590
5. Television, or 'distant vision' was coined by a Russian scientist Constantin Perskyi and first used at a conference in Paris in 1900. For this reason it is sometimes wrongly supposed to be French in origin.
6. Swinton, A. A. C. (1908) 'Distant Electric Vision.' Nature v78 p. 151
7. 'Hard' in this instance does not refer to the vacuum but to the fact that there is no heated cathode – electrons had to be dragged from the cathode by the sheer force of the anode voltage.
8. Uralov, V. A. (1990) Ocherki Istorii Televideniia Essays on the History of Television, Moscow, Nauka. p. 69
9. Swinton, A. A. C. (1924) 'The Possibilities of Television with Wire and Wireless.' The Wireless World and Radio Review. April 16th p. 83
10. Swinton, A. A. C. (1929) Television: Past, Present and Future. Unpublished article written for the BBC. Swinton private archives.
11. Swinton, A. A. C. (1930) Autobiographical and Other Writings, London, Longmans. p. 137
12. Uralov, V. A. (1990) Ocherki Istorii Televideniia Essays on the History of Television, Moscow, Nauka. pp 98 - 105
13. Burns R W (1998) Television: an International History of the Formative Years London, IEE pp 618-620 examines the controversy in detail.
14. Bridgewater, T. H. (1982) A A Campbell Swinton, London, Royal Television Society.
15. Campbell Swinton (amateur callsign 2HK) was elected the first President of the Radio Society of Great Britain (then the London Wireless Society) in 1913, remaining in office until 1920.

#### Further reading:

For those interested I can recommend the late Tony Bridgewater's (ex Chief Engineer) BBC Television, (1982) A A Campbell Swinton, London, Royal Television Society. This is the fullest account to date of Campbell Swinton and his work, but it only fills 33 pages of A5. Bridgewater's conclusion is the same as mine; a lot more needs to be researched.

The most definitive written portrait is his own, Swinton, A. A. C. (1930) Autobiographical and Other Writings, London, Longmans. This is only available on inter-library loan as it is very rare.

There are a number of other papers, readings and articles that he published. I would be happy to furnish details to anybody who might be interested, but just where are his laboratory notes and books?



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Contact us for details**

# Antenna Switcher Unit for the Advanced ATV Repeater

by Brian Kelly. - GW6BWX

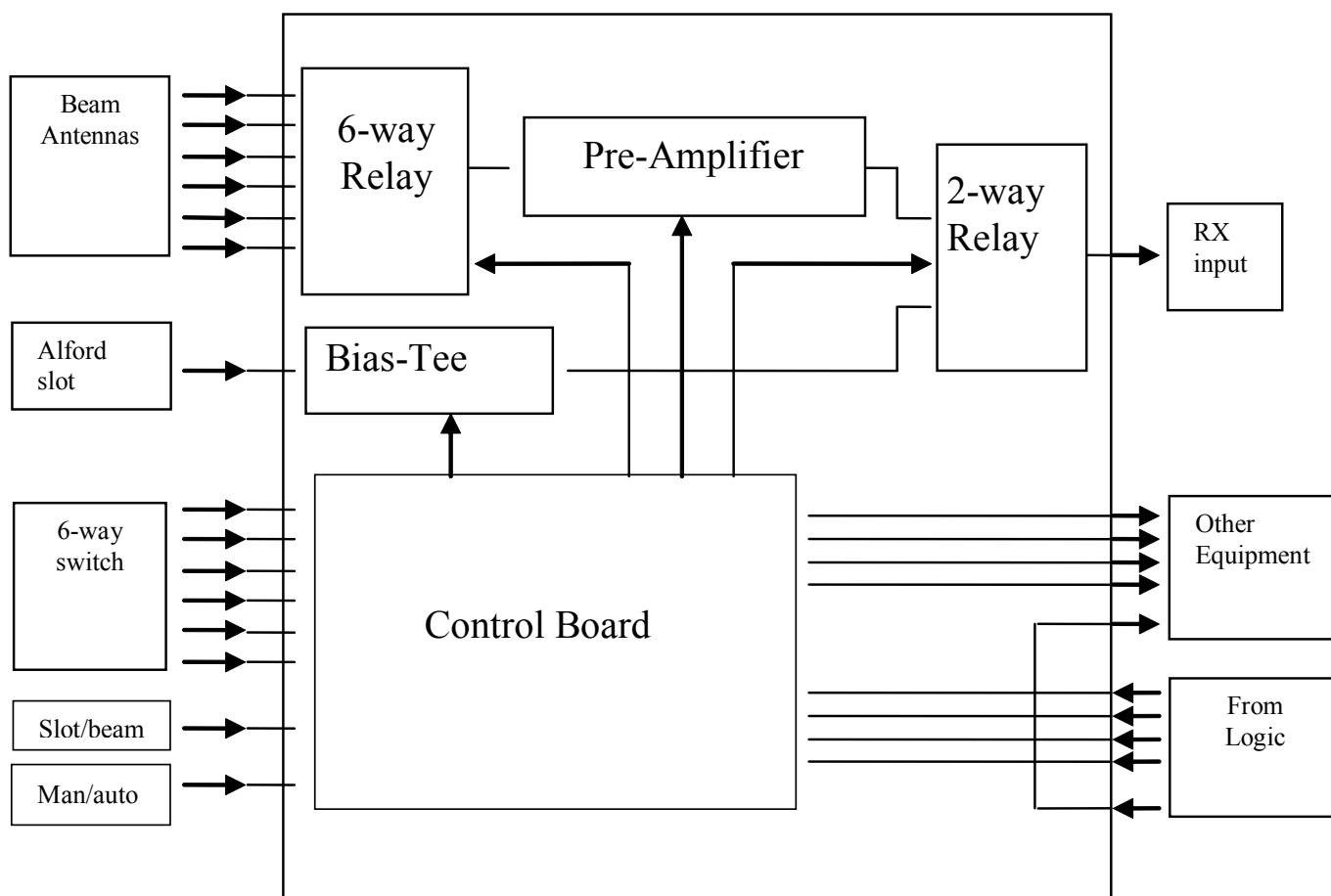
Originally designed for use with the Repeater unit described in recent CQ-TV magazines, it allows on-site selection or remote control by DTMF tones of one-of-six directional Yagis or an omnidirectional Alford Slot antenna. The antenna switcher unit is a mains powered box containing a pre-amplifier, bias tee, antenna selection relays and a

the 9-way 'D' connector on the rear panel. Actual selection of antenna is achieved using either a rotary relay or a bank of single RF relays.

The antenna control socket on the repeater logic unit also carries signals to the weather satellite receiver and in order that they can still be used, they are passed untouched to a second 'D' socket, also on the rear panel.

significant bit, bit 3, is therefore always held low in this mode.

Provision is made on the controller board to either keep the bias-tee (used to power the Alford Slot pre-amp via its feeder cable) and the internal pre-amplifier powered all the time or to selectively power it up only when in use. For example, it is possible to power down the beam pre-amplifier while the



control board. On the front panel is a rotary control for selecting one of six directional beams, a toggle switch to control routing of the selected beam or the Alford slot antenna to the receiver and a switch to select manual or automatic control. When manual operation is chosen, control from the main logic unit is disabled and the other front panel controls decide which antennas signal reaches the output socket for connection to the receiver. Under automatic control, the manual switches are disabled and all selections are made by binary number applied to

This socket also carries the antenna section signal so that other equipment downstream of this unit can be controlled if desired. When in automatic mode, the antenna output signals are identical to the ones received from the logic unit, when in manual mode they reflect the state of the current antenna selection. Note that as the logic unit is capable of selecting any one of 16 antennas, when in automatic mode, all four control lines are passed through. In manual mode it is only possible to select one of seven antennas (6 plus the Alford slot) which needs three control lines, the most

slot antenna is in use and vice-versa. Links are also provided on the PCB to reverse the polarity of the drive signal to both the 2-way change-over and 6-way relays. This is to allow the relays to be either 'high side' or 'low side' driven depending on the type being used. Drives are made available to operate LED indicators to show which antenna has been selected, these LEDs work in manual and automatic modes. The PLD on the control board is statically operated, it has no clock signals and therefore should not be a source of electrical noise.

The internal schematic of the PLD is shown in figure 2a and 2b. Basically, all it does is select one of two sets of input lines and routes them to the output pins. However, because one set comes from the mechanical switch where none or only one of the inputs is active at any time and the other input is from the repeater logic which has the antenna number in binary, some converting has to be done. The output is in binary and one of the inputs is binary so it made sense to convert the odd one out to binary as well. Looking at fig2a, the device on the left is a 'one of eight' to binary converter, the middle device is a four-pole two-way switch with its outputs made directly available for other equipment at the back socket. The device on the right does the opposite of the one on the left, it converts the binary lines back to one of eight although only seven outputs are actually used. These are the signals which will ultimately control the relays and LEDs. Note that this selection is either the same as

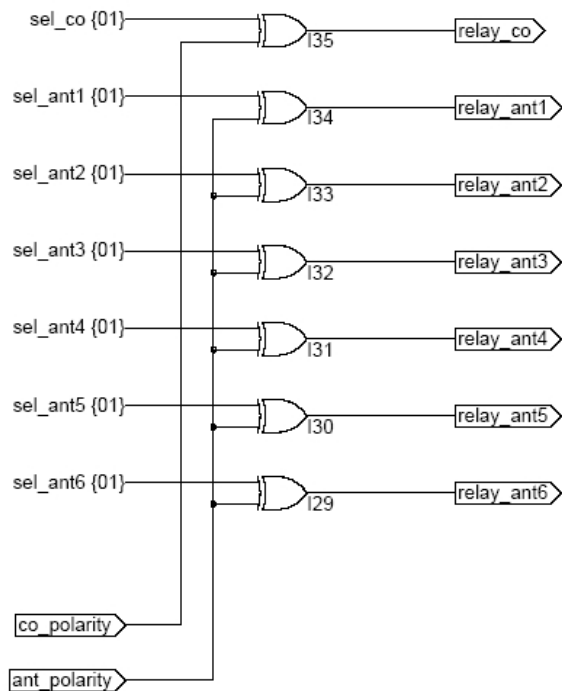


Fig. 2b - Inside the PLD, polarity selectors.

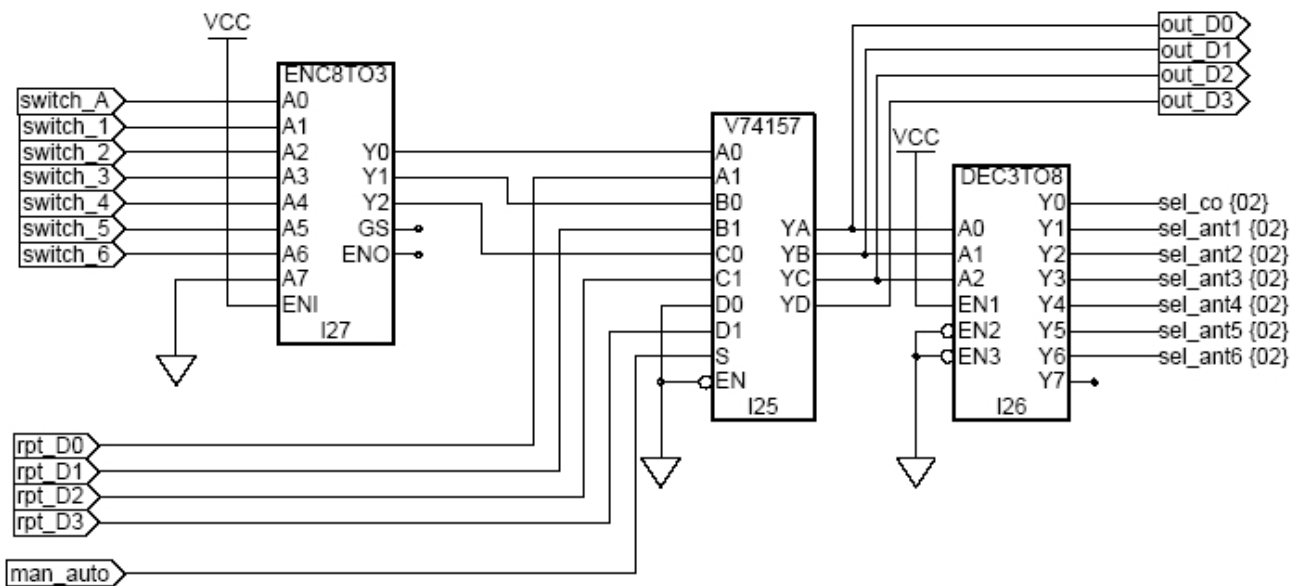


Fig. 2a - Inside the PLD, encoding, switching and decoding.

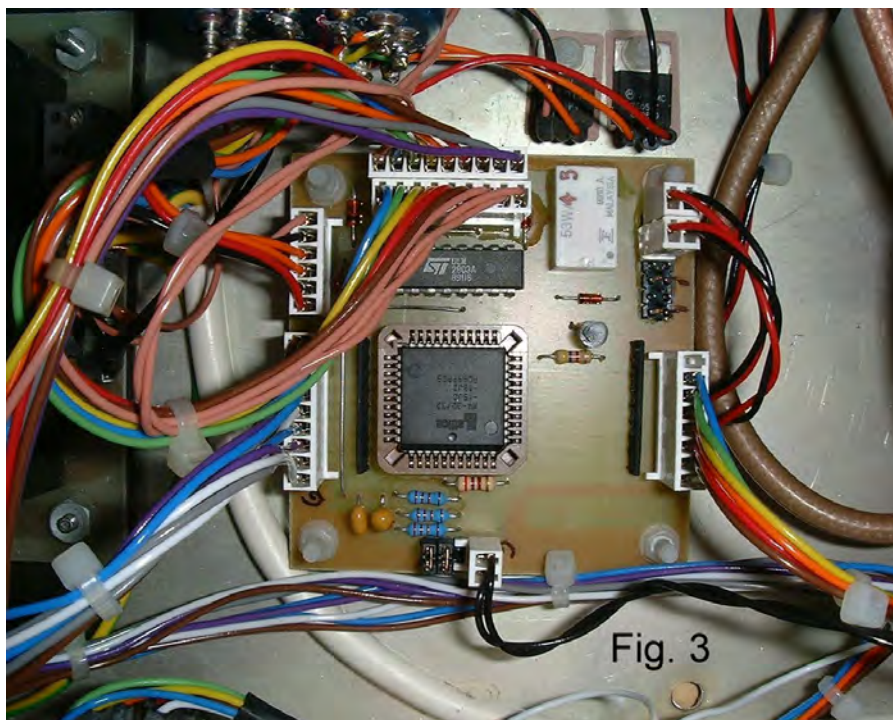
selected by the mechanical switch or the same as selected by the repeater logic, depending on the state of the auto/manual switch. The section of PLD in fig2b serves to reverse the polarity of the relay drive signals to suit different external driver circuits and relay types. Less than half of the PLD is used but in terms of cost and complexity, it is a better solution than discrete devices, especially when you consider that the

pins on the chip can be assigned to make the PCB layout easier.

Will the person who complained that these PLDs cost £75, look in the catalogues, they cost under £5!

Figures 3 and 4 show the assembled PCB in-situ in the box and figure 5 shows the completed unit from above. The large PSU was used because it was available,

it doesn't have to be anywhere near as big as the one used in the prototype. The PCB draws less than 50mA but the total drawn by the whole unit will be more, depending on the relays being used and the current consumption from the bias tee and pre-amplifier. There is no voltage regulation on the PCB but with such little consumption it shouldn't be hard to supply it with a steady 5V. The unit in the photographs used 12V and



5V linear regulators to feed the PCB and these were derived from the 24V used to operate the rotary selector relay.

Note a 'bridge' of tin-plate (as cut from a can of beans!) MUST be fitted between the central copper land under the PLD and the copper border area. Without it the unit will not function and damage may occur to the PLD. To have incorporated it in the PCB layout would have forced a two-layer board which would have made it far more difficult to fabricate at home.

**Notes:**

Zener diode D3 is used to drop the incoming 24V down to 12V to keep the front panel LEDs happy. The LEDs used were in a decorative bezel and designed to mount through a panel. They had integral resistors to allow them to run directly off a 12V feed. Ordinary LEDs should have a suitable series resistor connected to either pin to keep their operating current below 10mA. D3 can be changed to drop any voltage up to about 25V or could be replaced by a link if the relay supply is below 12V.

SK2 and SK3 are designed to be left open circuit or have a jumper fitted across them. They reverse the polarity (on/off or vice versa) of the antenna selector relays on the change-over relay respectively.

SK5 goes to a front panel toggle switch. This decides whether the repeater logic or the manual controls are in charge.

One other toggle switch is connected, it is not shown on the schematic diagram. It connects between the common pin of the manual selector switch and pin 8 of SK4. Normally, one of pins 2 to 7 of SK4 will be pulled high by the selector switch, opening the toggle switch lets them all go low, this deselects all the antennas, operates the change-over relay and enables the power feed to the bias tee so the Alford slot pre-amp operates.

**Connections:**

**SK1:**

- 1 – ground
- 2 – logic input D0
- 3 – logic input D1
- 4 – logic input D2
- 5 – logic input D3
- 6 – logic output D0
- 7 – logic output D1
- 8 – logic output D2
- 9 – logic output D3

**SK2:**

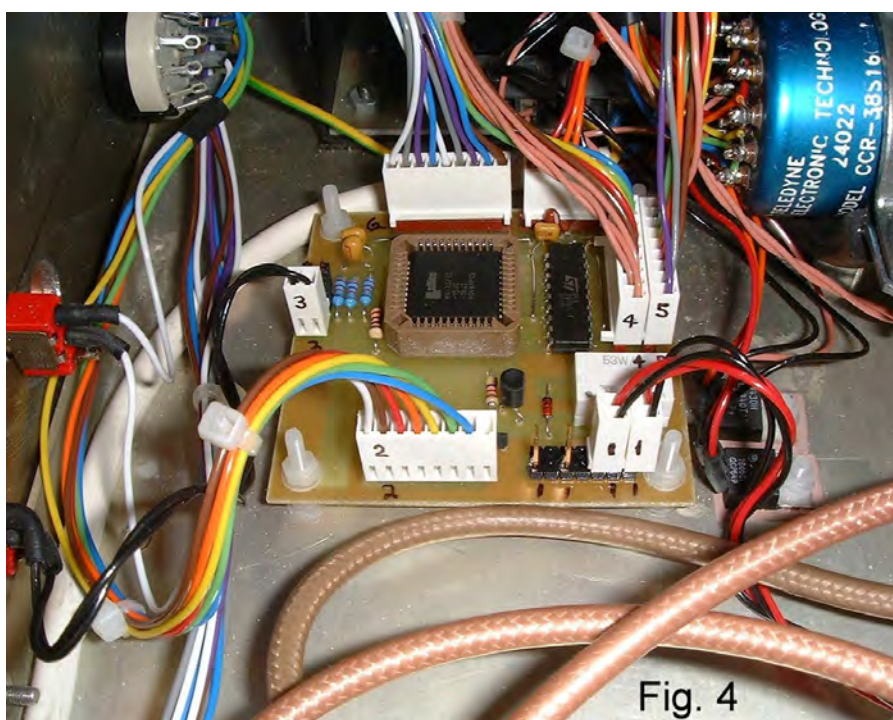
Link to reverse the state of all antenna selector relays

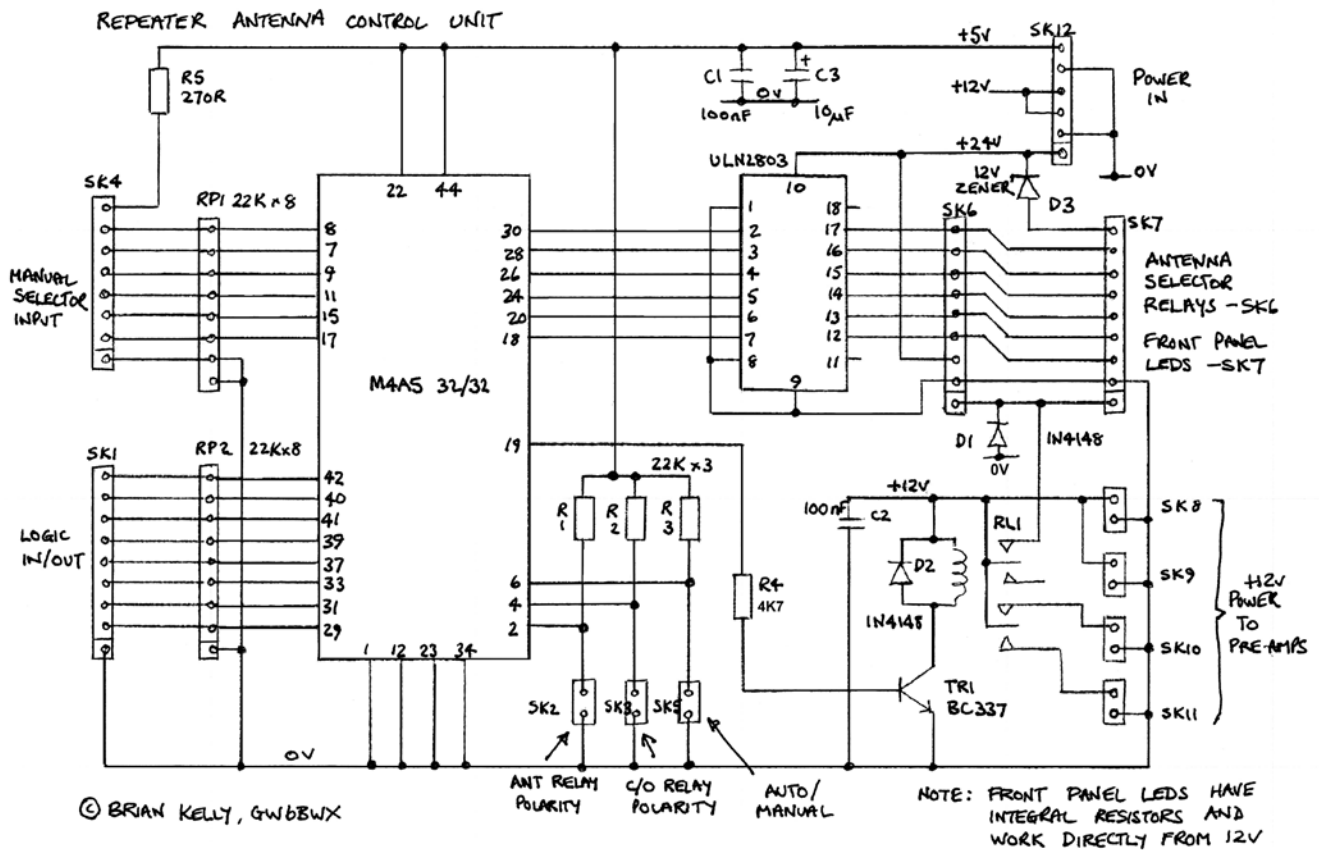
**SK3:**

Link to reverse the state of the change-over relay and pre-amp power outputs

**SK4:**

- 1 – ground
- 2 – high to manually select antenna 6
- 3 – high to manually select antenna 5
- 4 – high to manually select antenna 4
- 5 – high to manually select antenna 3
- 6 – high to manually select antenna 2
- 7 – high to manually select antenna 1
- 8 – high feed to common pole of selector switch (see notes)





SK5:

To front panel manual/automatic switch

SK6:

1 – switched 12V to change-over relay coil  
 2 – ground  
 3 – unswitched 12V to selector relay common connection  
 4 to 9 – switched ground to low side of selector relay

SK7:

1 – switched 12V to anode (+) of front panel LED (Alford slot in use)

2 – ground

3 to 8 – cathode end of LEDs to indicate antennas 1 – 6 are in use.

9 – common (+) supply to LEDs on pins 3-8

SK8 & SK9:

These are switched power feeds to pre-amps if required

SK10 & SK11:

These are unswitched (always on) feeds to pre-amps if required

SK12:

1 – power input to selector relays (12 to max 30V)  
 2 – ground  
 3 & 4 - +12 for on-board relay and pre-amp power outputs  
 5 – ground  
 6 - +5V for PLD.

The JEDEC source file for programming the PLD is available on my web site:

<http://www.atv-projects.com>

under the ATV repeater sub-heading.

## Online Information

Each issue, I will try to bring you some interesting links for you to explore online.

This issue, try some of these UK repeater sites, that are streaming their video out to the www.

Ed

<http://gb3zz.camstreams.com>

<http://gb3gg.camstreams.com>

<http://gb3hv.camstreams.com>

<http://g7vfv.camstream.com>

<http://m0dts.camstream.com>

<http://mysite.wanadoo-members.co.uk/gb3km>

<http://g7vfv.camstreams.com/>

<http://gb3bh.camstreams.com/>

<http://data0002.camstreams.com/>

<http://g7jtt.camstreams.com/>

<http://gb3lo.camstreams.com/>

GB3ZZ

GB3GG

GB3HV

GB3EN

GB3KM

GB3KM

GB3EN

GB3BH

GB3IV

GB3IV

GB3LO



# Contest News

By Dave Crump - G8GKQ

## Repeater Contests

The results for the December ATV Repeater Contest are below.

Congratulations again to John, GW3JGA and to all those involved with GB3TM. I was especially pleased to see a Receive only entry from MW0AQZ.

The next Repeater Contest will be held on 22/23 March, from 1800 on Saturday until 1200 on Sunday. The rules are similar to a normal contest, but you should score the total distance from you to the repeater and then on to the other station. The full rules and a simple scoresheet are posted on the BATC website.

There must be more active repeater groups out there: How about an entry from the users of GB3HV and GB3BH?

## BATC Repeater Contest 8/9 December 2007 Results

### Section 1 – Transmit and Receive

Place	Call Sign	Points	Locator	QSO	Rptr	Rptr Dist
1	GW3JGA	1300	IO83HI	5	GB3TM	61
2	GW4KAZ	856	IO73VE	4	GB3TM	24
3=	GW8FEY	796	IO73XH	5	GB3TM	19
3=	GW0ABL	796	IO73VF	4	GB3TM	19
3=	GW8PBX	796	IO73VF	4	GB3TM	19

### Section 2 –Receive Only

Place	Call Sign	Points	Locator	QSO	Rptr	Rptr Dist
1	MW0AQZ	524	IO73QH	5	GB3TM	24

## Repeaters

Place	Call Sign	Points	Locator
1	GB3TM	5068	IO73UJ

## Summer Fun Contest

The Summer Fun Contest is planned for 7/8 June 2008. By popular request, this contest will run from 1200 UTC to 1200 UTC to give portable stations more opportunity to operate in daylight. Please treat this as a practice event for the September International contest.

## CONTEST CALENDAR 2008

1800 UTC 22 March - 1200 UTC 23 March - BATC Repeater Contest

1200 UTC 7 June - 1200 UTC 8 June - BATC Summer Fun Contest

1800 UTC 13 September - 1200 UTC 14 September - International ATV Contest

1800 UTC 6 December - 1200 UTC 7 December - BATC Repeater Contest

## International Contest 13/14 Sept.

This year it is the BATC's turn to host the IARU Region 1 Contest. I'll be doing all the hard work of checking the logs and compiling the European Results – I just need some UK entries! So please, let's make a special effort to try to operate during the September Contest.

## Contest Photos

I have been trying to publicise ATV Contests, but find that I have very few photographs for publication in other magazines. If you have some photos of portable stations, numbers in the noise, or anything else of interest, please could you e-mail me with details.

## Conclusion

I'm still struggling to find local ATV activity near my new home in Virginia Beach, USA. However, as usual, I can be contacted through e-mail (contests@batc.org.uk), or through my BFPO address: Wg Cdr D G Crump, Mailbox Number ACT, BFPO 63, London.

# SDI Test Generator

By Mike Cox

## Introduction

This article describes the design and construction of a simple Test Generator to produce digital signals serialised to the Serial Digital Interface [SDI] standard [SMPTE 259M]. This has become the interface standard for equipment connection for standard definition television [525/625 lines].

Having started investigation into digital television some years ago, and described in previous editions of CQ-TV, a prototype of this generator was built in a small Eddystone [or similar] die-cast box, and has now been in use for around 6 years.

One of the problems when playing around with digital kit is that when you begin, you have very little of it. If you have problems, it is tricky to see whether the problem is at the sending end or the receiver. The simplicity of such a generator makes it a very useful and economical back up source. It should be relatively easy to assemble and set up.

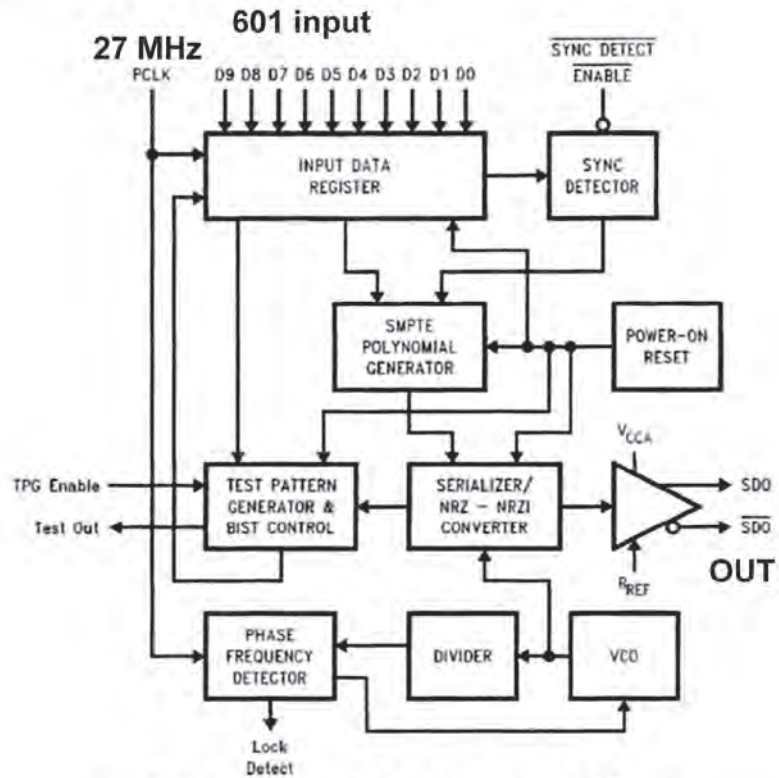


Fig. 1 CLC020 BLOCK DIAGRAM

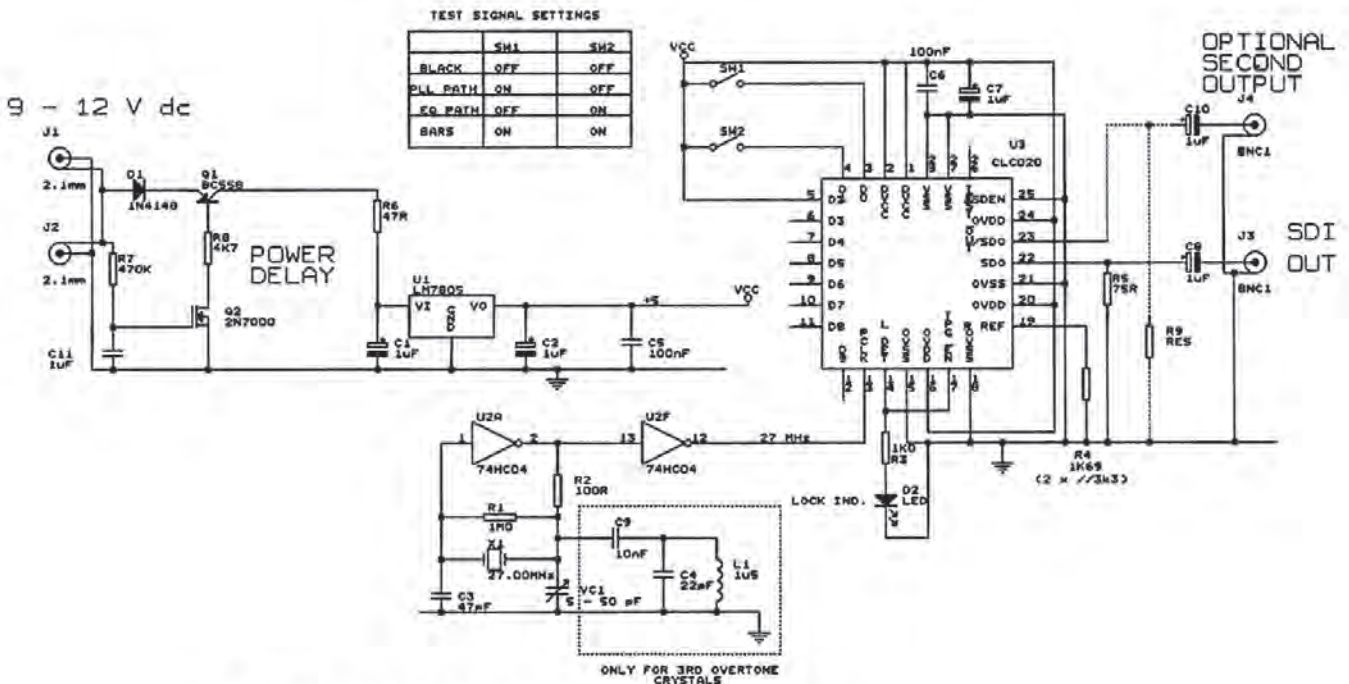
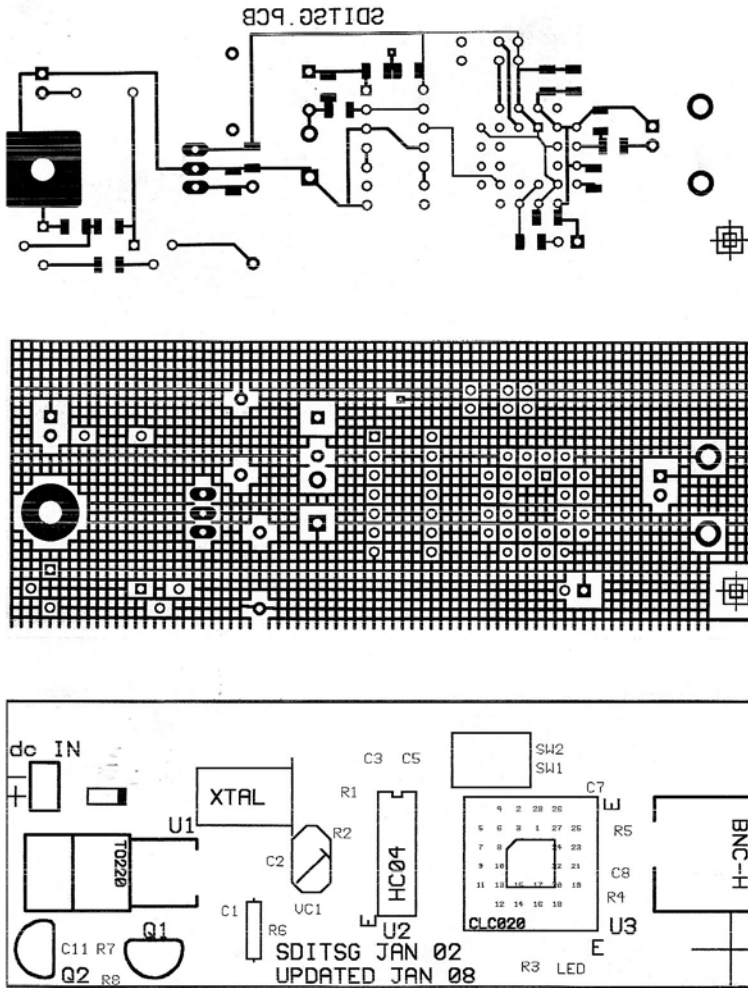


Fig. 2 TSG CIRCUIT DIAGRAM

a single pin [17]. All it requires is a feed of 27 MHz clock.



**Fig. 3 Artwork for SM version**

Fig.2 shows the circuit of the complete generator. Power is fairly conventional. Both the crystal oscillator [U2] and the serialiser [U3] require a 5 volt rail; this is regulated by a 7805. Before the 7805 is the power delay circuit. Some crystals do tend to do strange things if the power comes up slowly. The object of Q1 and Q2 is to provide a little delay and then turn the power on sharply.

The crystal oscillator is a conventional oscillator using a 74HC04. Some 27MHz crystals I had were obviously 3rd overtone rather than fundamental, and showed a tendency to oscillate at 9 MHz. Rapid Electronics [qv] do fundamental ones. If you do have 3rd overtone ones, then the LC network [C4, C9, L1] keeps it running at the right frequency.

The CLC020 has a pin [14, L Det.], which goes high when the internal VCO has locked. This pin is taken to the TPG Enable pin [17] to put the chip into Test Generator mode, and is used to illuminate an LED to show LOCK [of the internal VCO].

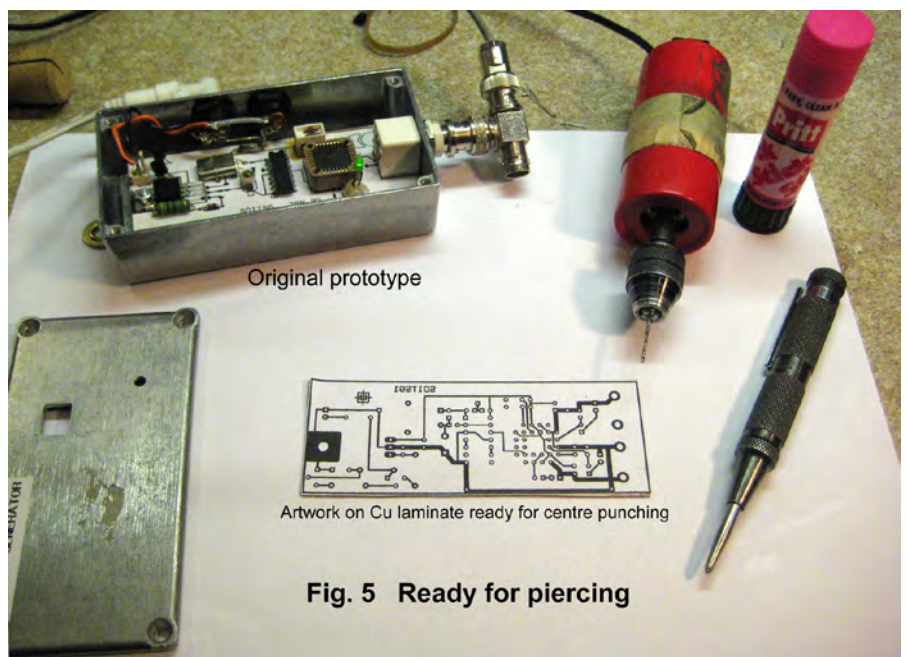
The first 4 data pins [3, 4, 5, 6] are used to select the type of Test Signal generated.

A parts list, PC layout and suggested part sources are given at the end of the article. To make sure that the following instructions work, I have built a second generator using the template given in Fig. 4 to prove that it works, and all the pictures are from the latest unit.

**Design**

In an SDI system, the components Y [luminance] and Pb/Pr [colour difference] are appropriately band limited, then digitised to 8 or 10 bits. The three parallel digital components Y, Cb, Cr are fed first to a multiplexer to produce a 601 stream, then to a serialiser chip which takes the components and serialises them with a bit rate of 270 Mbp/s. [Fig. 1 Block Diagram]

Such a serialiser is the National Semiconductor CLC020. One of the useful features of this chip is that it has a built-in test facility. This is enabled by



**Fig. 5 Ready for piercing**

I suspect most will want colour bars, but there are so called “pathological” test signals designed to show weakness in decoding circuits.

It is suggested that before starting this project, you have at least a 100 MHz oscilloscope, and a frequency counter to set the crystal oscillator to 27.0000MHz.

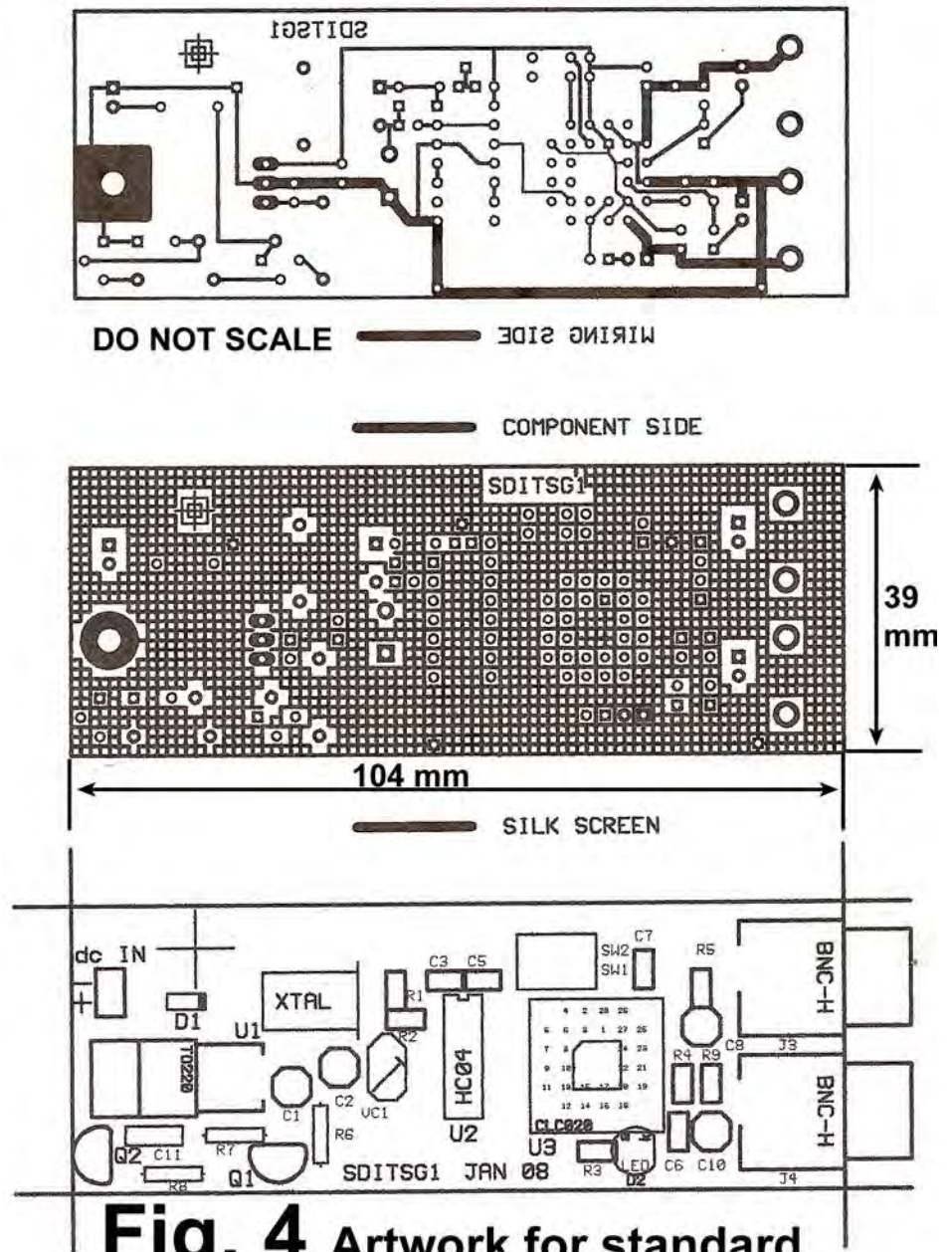
The most expensive component is the serialiser chip, CLC020, currently around £26. The rest of the components are relatively inexpensive, and the total outlay should be around £40 +VAT. I have not given stock numbers for resistors as I expect many of you will have these, as well as some of the other parts.

Set out [Fig. 3, 4,] are the Silk Screen, Component side and Wiring side of two versions of the generator.

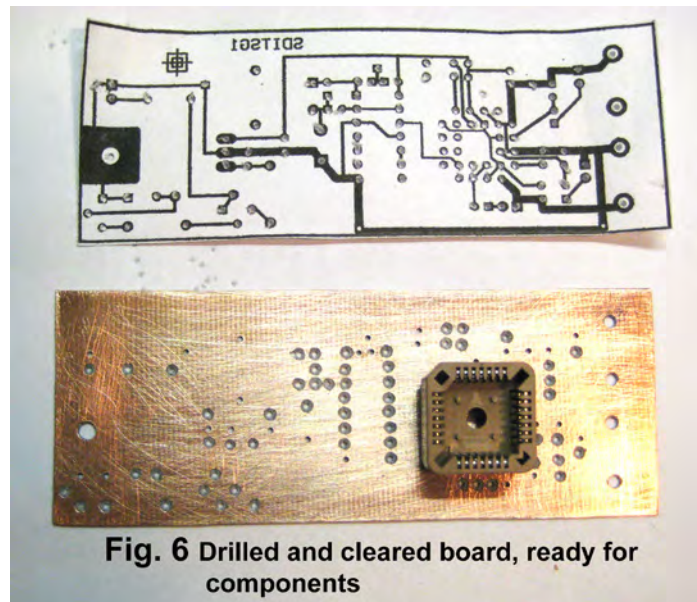
One uses surface mount components on the Wiring side, while the second uses conventional components, and has two outputs.

It is hoped that Gerber files for these can be placed on the Club website for those who wish to get boards made. The SDITSG1.PCB version is suitable for using as a drilling template on a suitable piece of Cu laminate. Ground pins can be soldered directly to the top side, and component wires used for wiring underneath, rather as the CAT5 TX/RX units described in CQTV 220.

If you decide to follow this route, photocopy the wiring side from Fig. 4, ensuring that it is correctly scaled. Then paste [Pritt works well] onto the copper side of a piece of single-sided copper clad laminate 104 mm by 39 mm. [Fig. 5 shows work about to start] With a centre punch, indent the centres of all pads, and very carefully drill out with a 1mm drill. Ensure that you have the template the right way up – the words “wiring side” will appear mirrored, and should be on the copper side of the laminate. Holes should be cleared on the copper side with a 2.5 mm drill bit, or a suitable spot face cutter. The centre hole for the 7805 needs to be opened out to 3 mm, and the two fixing holes for the BNCs to 2 mm. The holes for the trimmer capacitor may need opening up to 1.2mm, and the “hot” end clearance



**Fig. 4 Artwork for standard component version**



**Fig. 6 Drilled and cleared board, ready for components**

needs to be 3 mm as tabs are rather wide, and could short to ground plane.

Be careful not to clear too far in general, particularly if you are using 0.8 mm laminate, as I have done. Any connection to ground should left as is, ie uncleared. Remove the template, and clean the copper side with some fine emery paper. Fig. 6 shows cleared board ready for components.

Components can now be inserted and ground points soldered directly to the copper. When inserting the PLCC socket, ensure that it is fitted with its cut off corner at top left. It will have to have its ground connections wired with tinned copper wire and taken to ground immediately outside the socket boundary. An extra 1 mm hole here will be useful.

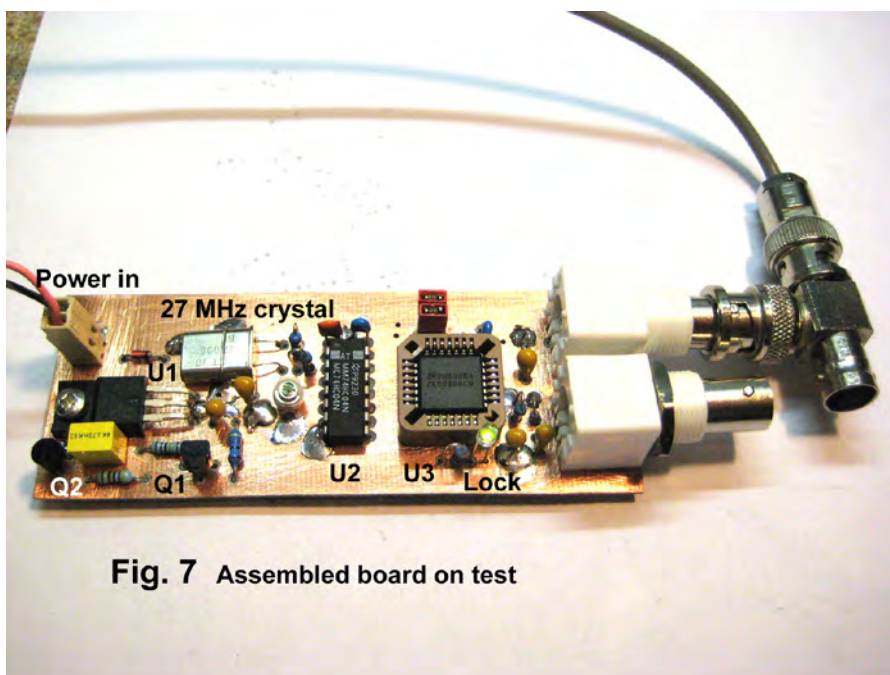
Fig. 8 shows the wiring side, while Fig. 7 shows the completed board.

### TESTING

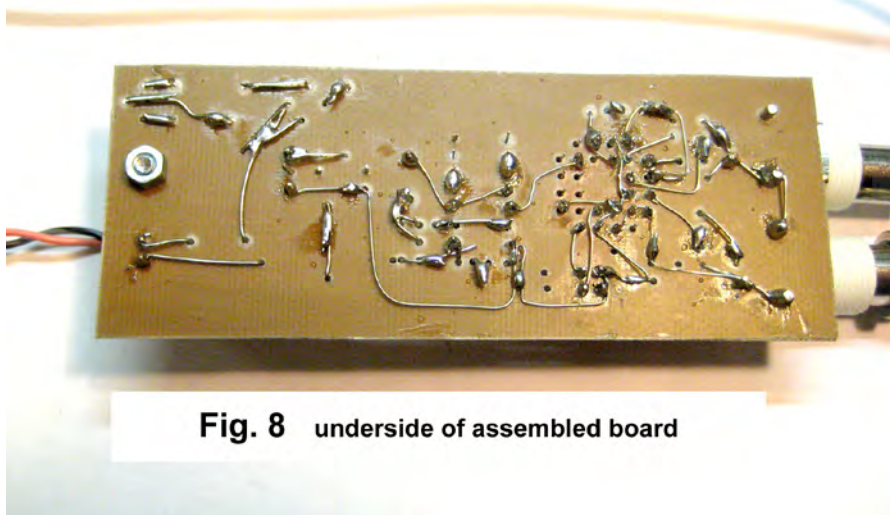
A 100 MHz oscilloscope, a frequency counter and an SDI decoder/display will be necessary. Power supply can be a 9 – 12 volt plug-top type, or even a PP3 battery as the current draw is only 70 mA.

Before applying power, check rails for any shorts. Do not insert CLC020 yet. Connect power to two-pin connector, and measure + volt rail at U2, pin 14. With an oscilloscope, look at U2 pin 12 to check the crystal oscillator, and that it is running at 27.000 MHz. If you have a frequency counter, measure the exact frequency, and adjust if necessary using VC1. Fig. 9 shows the points to note during test.

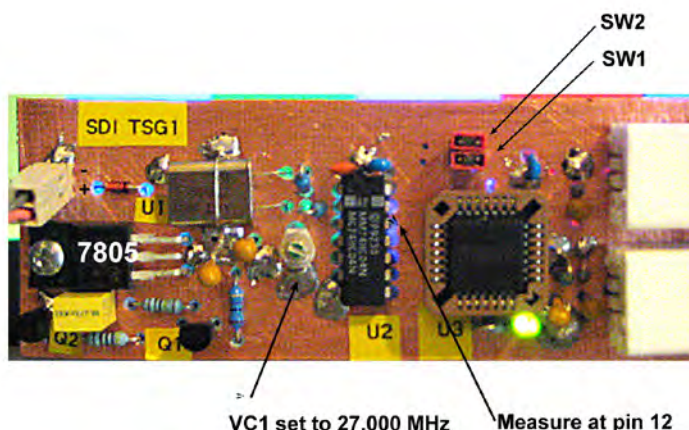
When all is well, power down, and then insert CLC020. Connect output to an SDI decoder, and power up. If all is well, the Lock LED should light, and bars be seen on the decoder out. The front cover photo shows monitor display with the working board in front of it. Fig. 11 shows the SDI output waveform at 10 nS/cm, while Fig. 12 shows the luminance waveform at the SDI decoder output.



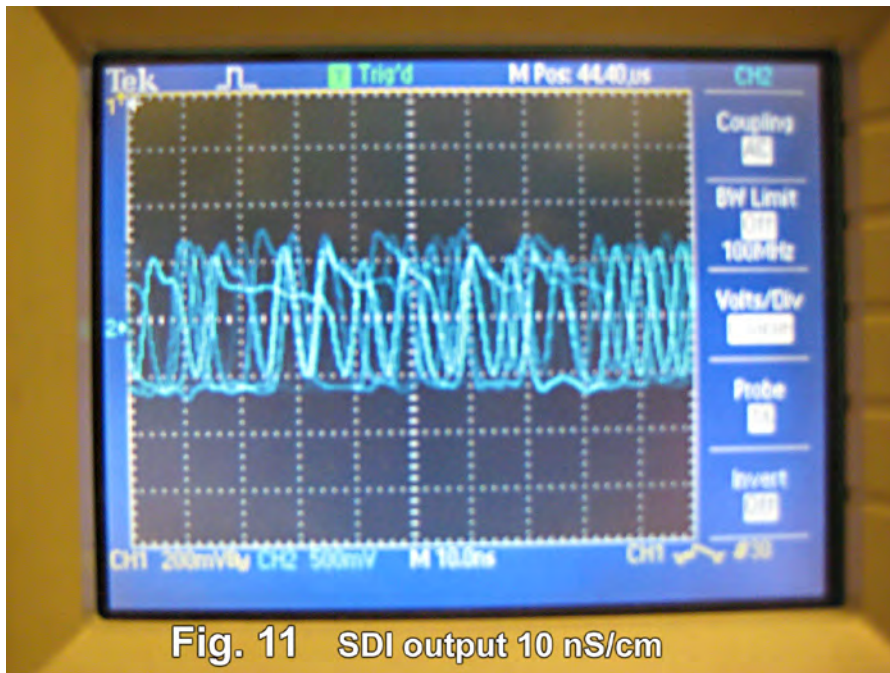
**Fig. 7 Assembled board on test**



**Fig. 8 underside of assembled board**



**Fig. 9 Detail of board**



**Fig. 11** SDI output 10 nS/cm

**Websites:**

Rapid  
<http://www.rapidelectronics.co.uk>

Farnell  
<http://www.farnell.co.uk>

CPC  
<http://www.cpc.co.uk>

Rapid is shown for most of the parts, with Farnell for the CLC020, and the BNC connectors. If either of them has not got parts in stock, it is worth trying CPC. CPC is now owned by Farnell, and there are some similarities.

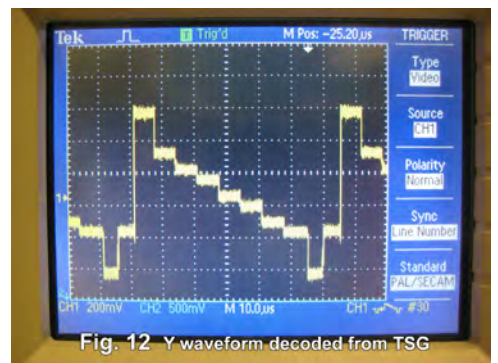
I hope this project is useful, and easy to put together. If you have problems, I am sure the Editor will put you in touch so that I can help sort them out. It took me a few hours to drill the board, assemble the components and solder them and test the board.

Further information on the CLC020 can be found on the National Semiconductor website: <http://www.national.com>

If any would like, I will make available a couple of spare SDI to CVBS, Y/C orYPbPr decoders through the good offices of the Editor. They are of Shootview manufacture, and are working, but do not put SDI with embedded audio into them, or you will get running bars through the picture. They work alright with this test generator, though. I told the story behind this a few CQTVs ago.

**Parts List**

U1	7805 5 volt regulator	Rapid, stock no. 47-3290 or 47-3312
U2	74HC04 DIL or SOIC	Rapid, stock no. 83-0042, SMD 83-0180
U3	CLC020 [National Semiconductor]	Farnell stock no. 822-1855
Q1	BC558	Rapid, stock no. 81-0184
Q2	2N7000/VN10KM	Rapid, stock no. 47-0180
D1	1N4148	Rapid, stock no. 47-3308
D2	Green LED	Rapid, stock no. 72-8970
X1	27.0000 MHz crystal, fundamental	Rapid, stock no. 90-0474
C1, 2, 7, 8, 10	1uF tantalum capacitor	Rapid, stock no. 11-1036
C5, 6	100 nF ceramic	Rapid, stock no. 08-0275
C3	47pF NP0 capacitor	Rapid, stock no. 08-0935
VC1	5 – 50 pF ceramic trimmer capacitor	Rapid, stock no. 12-0188
J3, 4	Rt. angle 75 ohm BNC connector	Farnell, stock no. 102-0963
SK1	28 pin PLCC socket for CLC020	Rapid, stock no. 22-0340
J1, 2	2.1 mm power socket	Rapid, stock no. 20-0980
Case	Die cast Al. Alloy	Rapid, stock no. 30-1532
R1	1M0 resistor standard 1/4 w 1%	
R2	100R resistor	"
R3	1K0 resistor	"
R4	1K6 resistor	"
R5	75R resistor	"
R6	47R resistor	"
R7	470K resistor	"
R8	4K7 resistor	"
R9	75R resistor	"
PCB	To be provided by the constructor	



**Fig. 12** Y waveform decoded from TSG

**STOP PRESS**

The new launch date for the ISS (International Space Station) European Columbus laboratory, on Space Shuttle Atlantis, is set for the 7th February at 20:45 CET.

You can follow the events online at <http://www.esa.int/>

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Two compilation CDs are available for £10 each plus postage.

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## Members Ads

### Marconi Instruments Sweep Generator and Display

This set of units was originally from ACE (1988) Ltd, via Vistek, and hence to my lab.

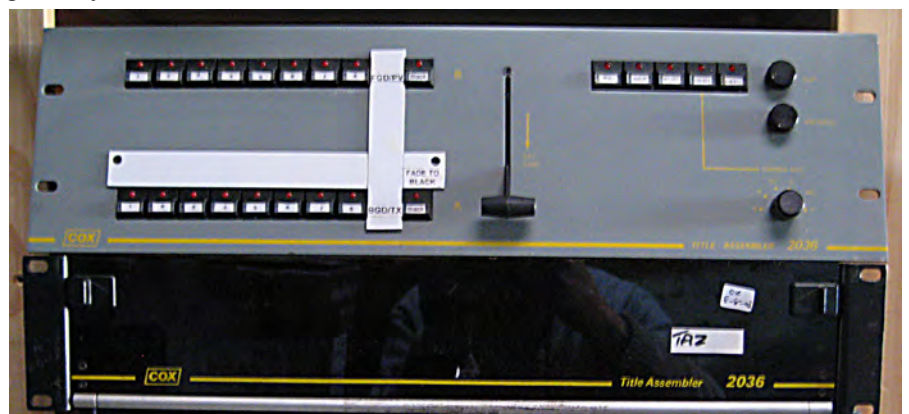
It sweeps up to 30 MHz, and when set up correctly, can measure response in 1 volt video systems to around 0.05 dB or better. The associated display is a 12" CRT, such that your response curve can be seen across the lab, useful if what you are tweaking is not close to the sweep generator. I believe there is a bit of a manual with it.



### 8/10 input Component Mixer

Originally built for London Weekend Television's Graphics department, a number of these were sold for use with Character Generators, or for use in presentations.

This one was last used at IBC in 2003. It consists of a 2U rack unit containing the electronics, and a separate control panel, connected via a 25-way D cable, probably ribbon.



If you are interested in either or both these units, give me a ring: -

Mike Cox  
020 8891 0367

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# BATC Publications

Publication	Each	Qty	Total
<b>An Introduction To Amateur Television (225gm)</b> The latest handbook full of detailed information on how to set up your ATV station, plus lots of new video and RF construction projects. The BATC handbook featuring construction articles on video units, 24cm and 3cm ATV, a Digital Frame Store, and much more.	£2.50	.....	.....
<b>The Best of CQ-TV (150gm)</b> A compilation of the best construction articles from CQ-TV's 133 to 146	£3.50	.....	.....
<b>CQ-TV Back Issues:</b> The following issues are still available. Please circle those required: 185, 186, 187, 188,189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210,211,212,213,214,215	£1.50	.....	.....
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# VK FM ATV GRAND SLAM ATTEMPT

By Dan Joyce, VK2GG

On the week-end when the heads of governments were gathering in Sydney for the APEC Summit, in Early September 2007, two ATV teams were venturing west for an attempt on 5 or even 6 Australian National FM ATV Records. If we had set up microwave dishes in Sydney that week end, we would have been arrested as possible terrorists! Jack VK2TRF and I between us already hold records on three bands: Jack and I for 6 cm and 3cm, and Jack and Nick VK2ZTY for 13 cm; how would 23 cm, 9 cm and 1.2 cm go added to those, along a 240km near LOS path? Going begging was a possible GRAND SLAM attack on 4 existing VK FM ATV records, and the possible setting of 2 more, including 24Ghz!



Let me explain some of the difficulties which beset DX ATV enthusiasts in Australia; namely, there are just not many LOS paths which have mountain peaks devoid of trees enough and which exceed about 150-200 km apart! We know of a couple of paths which are circa 250km, but they are in alpine regions, and have limited road access! Gum trees are very beautiful, but are the enemy of ATV'ers!

Early on Thursday morning, Jack VK2TRF and Garry VK2UNI headed for Mt Ginini in Canberra (altitude 1760m). Dan VK2GG headed for Mt Canobolas near Orange, in the Inner West of NSW. (altitude 1276m)

The trip had been the result of at least 12 months planning. An earlier survey trip to Mt Canobolas had found a near

perfect location with good clear air southward. A back-up location had been catered for, as well as a second back-up location, ear-marked for the relatively un-tried band: 24Ghz. We had, of course to build some more transmitters and feeds, test them across other test paths, and to cope with unforeseen events like one exciter failing a week prior to our departure, and two video invertors not producing acceptably stable video even on the day. Also, we had failed to achieve two-way ATV contact on two bands!

As I did some preliminary testing from Mt Canobolas, some VK1 hams on the Mt Ginini repeater were surprised that I was getting into Canberra from 240km away on a handheld!

Early on Friday morning, we proved

that Mt Ginini was far too populated by trees to be useful on any band other than 2.4G. P2-3 pictures were received on the 241 km path. Jack, Garry and Bob VK2MRP then proceeded to Mt Coree, where conditions were more favourable, and all 5 FM bands from 23 cm to 3 cm were able to be logged with pictures on all bands being at least P4.(Altitude 1420m). Dan had been joined at Mt Canobolas that morning by Dave VK2TDN and his XYL. As well as assisting on ATV, some 23 cm FM voice was being successfully experimented with from several locations. Dave has a varactor diode transverter, which works very well on FM.

Jack and Garry were also joined by Bob VK2MRP, who said he thoroughly enjoyed himself. Bob obviously likes

“Tim-Tams” the obligatory ATV snack!

The following day, Jack VK2TRF, Garry VK2UNI and Bob VK2MRP drove to Boorowa, which is almost exactly in the same line of fire as Mt Coree, but is only 120km from Mt Canobolas. It has a hill of some 620m elevation. 24Ghz ATV was attempted, but no pictures were seen. There were storms in the path, and rain was threatening at Canobolas. We decided to try again on Sunday. Jack had found that their access up to the top of the hill at Boorowa was blocked by a chained and padlocked gate! Fortunately, the chain was one which could be lifted over the post!

What a beautiful day was Sunday 9th September! Wall to wall blue sky – no clouds on both ends of the link. We set up for 24G ATV – nothing for 4 hours! Peter, VK2YGM and new wife Irene had joined me at Canobolas. We had been both watching the same cloud in the centre of the path from each end - that was weird! Jack actually was able to see the TV towers on Mt Canobolas, such were the clear conditions. The humidity was checked via internet, and it was discovered that it was dropping from 70-80% to something like 50%; looking promising! Still nothing until about one o'clock, when Jack announced that he was receiving our carrier full-scale. Wow! Virtually P5 pictures were then received, with conditions apparently worsening for the reception on Canobolas. P2-P3 pictures failed to dampen our elevated spirits!

We had done it, not only on the five bands from Coree to Canobolas, but on 24G, which had proved a very tricky band. Our dishes had a beamwidth of a little over 1 degree! Rain makes reception almost impossible, and humidity also attenuates the signal.

Grand Slam? More like an ATV Marathon! Many thanks to Dave VK2TDN, Garry VK2UNI, Bob VK2MRP and Peter VK2YGM.

Where next? More ATV on 47G?, EME? Narrow band?

---

## EQUIPMENT:

- 23cm Tx: Minikits exciter, 50W PA, 16 el yagi; Minikits 20W PA into slot/plate (splash) fed 1.2m dish.
- 23cm Rx: G1MFG receivers with G6ALU ATV Controller, Minikits (VK5EME) pre-amp.
- 13cm Tx: G1MFG exciters, 20W PA, Gridpack antenna, modified Conifer feed.
- 13cm Rx: G1MFG receivers, home brewed Sig Strength Meters.
- 9cm Tx: Minikits (VK5EME) exciter with VK5EME 3X multiplier into 40W Toshiba PA's, slot/plate (splash) fed parabolic dishes.
- 9cm Rx: C Band extended LNB (Minikits) into G1MFG receivers, G6ALU controller.
- 6cm TX: A/V sender into 8W PA; 1.2m dish fed with penny feed. Other end same exciter/PA with modified gridpack antenna (30db).
- 6cm RX: A/V receiver (Jaycar) from same antennae.
- 10G Tx: G1MFG exciter, DB6NT (Kuhne) X 4 multiplier, penny fed 1.2m dish; other end same with 1W DB6NT PA into 60 cm dish.
- 10G RX: LNB's, G1MFG receiver, G6ALU controllers, penny fed dishes.
- 24G Tx: Microwave Radio Gunn (50mW) into 60 cm dish with penny feed.
- 24G Rx: DB6NT (Khune) LNB with G1MFG receiver, G6ALU Comtech ATV Controller, 60 cm dish with "penny feed".

**Cyber-membership: CQ-TV beamed directly to your PC  
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## Letters to the Editor

### BATC - The Future

As an ex-committee member I have been noting with serious concern the struggle that past Editors Ian Pawson and Brian Kelly have been having in finding suitable technical articles for publication in CQ-TV. All credit is due to them for their efforts.

### CQ-TV

I have been retired for a number of years now and CQ-TV has become my main source of ATV information, as it is for most TV amateurs. If CQ-TV was to end, this source of information would disappear and as far as the TV amateur is concerned, so would the BATC. I feel strongly that CQ-TV should be

maintained at (almost) all costs. We are right at the beginning of Digital ATV and CQ-TV can play a leading part in the educational and practical aspects of this new technology.

Having said that, we are very fortunate indeed to have a new and enthusiastic Editor in Chris Smith G1FEF, but he will need everyone's support to take us forward. There are over 50 ATV repeaters in the UK. Each one will have been built by someone or a group of enthusiasts, so there are plenty of knowledgeable amateurs about, some already into digital ATV. Surely there must be some budding authors amongst them who can write in detail about what they are doing. A strong request from

our President and our Chairman will help, but more chasing and persuasion will be needed.

Perhaps we should re-introduce the late Mike Barlow's 'What the other chap is doing' page in CQ-TV to get the information flowing. I'm sure the Editor would be delighted to hear from you.

Digital ATV will be an expanding area of interest for us as we try to make the best use of our frequency allocations. The BATC and CQ-TV should now be leading the way forward.

I wish all Members a P5 New Year  
John Lawrence GW3JGA

---

Dear Mr. Smith,

Welcome to the CQ-TV editor's chair, here are a few comments from my rather unique point of view; as an ex-pat Brit living overseas.

I don't think the recent role changes within the club and in particular the production of CQ-TV is to blame for the general decline in the quality and activity of the BATC. Rather, I would say that times change and the BATC has to either change with them or continue on its current nostalgic path and possible extinction.

While I look forward to reading the paper version of CQ-TV each quarter, we live in a world that has become much smaller and fast paced thanks to affordable high quality and almost instant worldwide communication over the internet. Traditional newspapers, an important part of public information and in many ways a check and balance system for society, also face extinction now that their role is "Yesterday's news tomorrow". People have turned to other channels for information.

I compare my membership in the BATC with another group that caters to a specialist hobby. They have about 400 members worldwide and publish a quality paper club magazine quarterly. I found them through an on line "email reflector" before discovering their more traditional presence and deciding to join up. Members pay annual dues while the email reflector is free (and hosted by a free internet portal supported by on-screen advertising). The email reflector also serves to promote the club and attract new members.

I suggest that the BATC create a real time on-line discussion forum and encourage all members to join in and participate. While there may be a few members without internet access (or a desire to use a computer, etc.) I think the great majority of us have email; instant messaging; internet access over mobile phones or PDAs; as a familiar part of our daily lives. The quarterly paper CQ-TV should continue in a traditional role (and cover complementary topics instead of trying to compete with a parallel on-line presence).

There are well designed tools to support a comprehensive forum with little or no costs and easy start up (for example <http://www.phpbb.com>) or hosting through an established portal (for example <http://groups.yahoo.com/>).

The simple step of letting all BATC club members meet and greet each other on line with 24/7 access and equal voice provides the catalyst to make the BATC a better club.

Comments Welcome!

Peter J. Stonard  
Campbell, California

---

Hi Chris,

A happy New Year and congratulations for taking on the Editor role of CQ-TV.

I've been a member of BATC for a number of years (though not actively on the air) and, though you suggested that you wanted new copy, there must be a wealth of constructional articles - even from way back in the days of the A5-sized CQ-TV - that could be updated (e.g. cct diagrams re-drawn where necessary) and re-published. Similar to the article in the latest CQ-TV - Crystal Locked Audio Sub-Carrier in fact.

Perhaps if these were 'themed' and announced in advance e.g. Issue 221 Antenna Pre-amplifiers, Issue 222 Antennae, Issue 223 Test tools etc. this might stimulate those who are more technically competent (than me !) to dig out projects that they might not have previously considered suitable for publication.

Anyway, thanks again for taking on what must be a time-consuming role as editor and best wishes for 2008.

73s  
Dave Holden

---

Happy New Year.

A small piece of info that may be of use for CQ-TV. As mentioned, the Cambridge repeater GB3PV is now on the internet: <http://www.cambridgerepeaters.net> and click on GB3PV. I regularly take part in an 80m SSB net with stations

around the UK: GW4UJT, G0RNO etc. By giving my contacts the above address and then transmitting a picture into PV they were able to see into my shack as I was in QSO with them.

Particularly useful if talking about any item that can be put on camera. I have not heard of this being done before. I expect the cynics would say why bother about Ham Radio or ATV at all, just use Skype, but it seems another aspect of ATV that could be useful.

73 Ian G3KKD.

---

Hi Chris,

I don't know if this will be appropriate for you to publish but you may like to know of the following:

I attended that Sutton park Jamboree as a "Scouter" - jargon for scout master. I was with the combined Harrow and Northwood troop. I even have some 8mm footage of the event.

I do remember the marquee housing the "seven amateur transmitters" and what a snooty lot they were. Any concept of a scout looking in to investigate their activities was met with a swift rebuff as I recall. There was not a huge amount of scouting activity to attend to so I spent much time "assisting" the local electricity people with their PA system for the arena. I recall it included a magnetic disk with several read heads arranged around it to provide the necessary delays for the various sets of loudspeakers around the field.

I also remember a broadcast TV team doing an OB of a childrens show from the Jamboree during a fierce rain storm. Despite all this I never came across the ATV station described by Peter Delaney. What a thrilling experience that would have been. I wonder how they kept themselves so well hidden. I always enjoy Peter's looks back at the old days and CQ-TV in general. Keep up the good work.

73  
John G0HAT  
Poole Dorset

# Turning back the pages

A dip into the archives of CQ-TV, looking at the issue of 50 years ago.

By Peter Delaney

CQ-TV 35 - "Winter 1957"

This issue of CQ-TV was somewhat thinner than the previous ones, and was the first one put together by the new London editor, Alwyn Stockley.

The main 'constructional' article was for another 'simple flying spot slide scanner.' It was said to be a 'little unit' that 'gives out a standard one volt composite signal from transparencies without the need for any optical system.

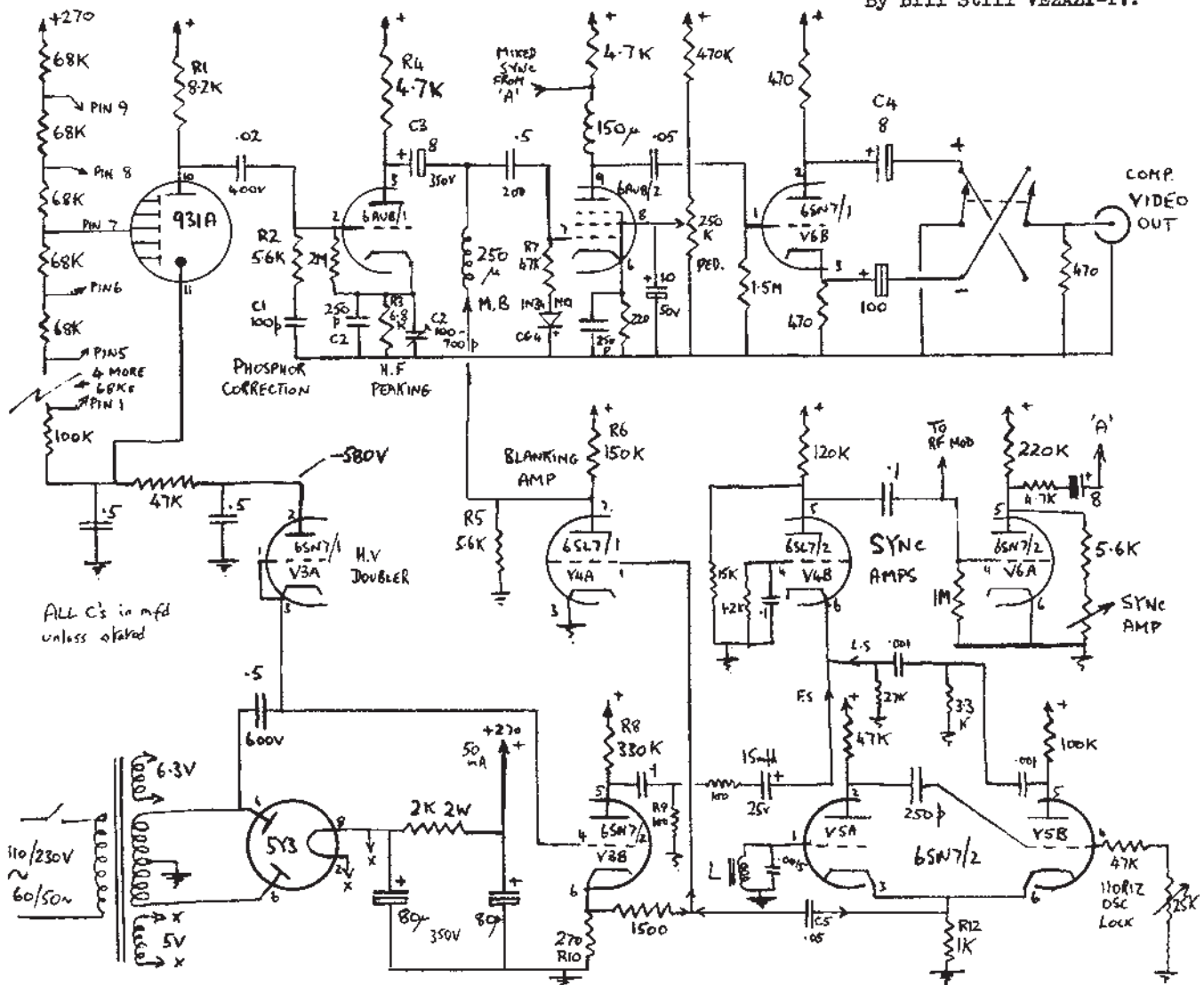
The scanning is interlaced' The values given on the circuit diagram were for 525 line 60 field operation, 'but no significant changes should be needed for 405, 625 or 819 line systems, except to the master frequency control. Two big advantages of this circuit especially for the beginner are that the scanning is done by a completely untouched TV set, and that the power supply is very simple, not even using a choke'. The article went on to describe the operation of the various valve stages, and included a 'typical layout' for the unit on a 6" x 8" x 2" aluminium chassis, as also shown in the photograph. The 931A photomultiplier tube is the one screened

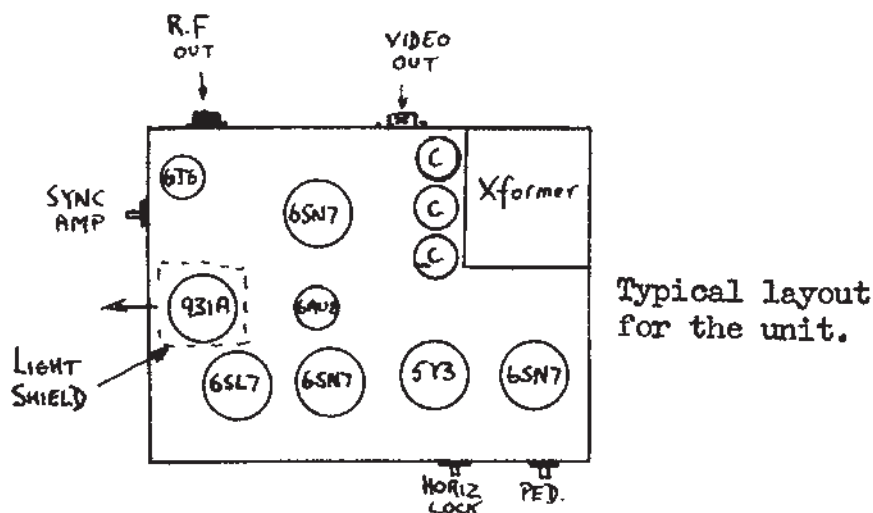
by a metal canon the front left hand corner.

Much of the rest of the magazine was taken up in reporting three events that the Club had attended. The Harlow Mobile Rally had taken place on a deserted airfield 'as windy and cool as such places can be'. The exhibition was in a Nissen hut, with the Chelmsford ATV group at one end. The mains was brought in 'via about 3/4 mile of cable' G3KOK had set up a camera, whilst Jeremy Royle had installed an aerial and converter to receive pictures from G2WJ/T, some 8 miles away, with 'most excellent results'. The report

## A SIMPLE FLYING SPOT SLIDE SCANNER

By Bill Still VE2AZT-TV.





newspapers gave publicity to the BATC display, all of them concentrating on the 'Televisionfone'. Members of the public, however, "seemed slightly scared of dialling TEL, and the general opinion was that the idea would not be an advantage in the home". Thanks were expressed to all those who loaned or operated gear ... "especially the kind gentleman with the un-emptiable-coffee-pot!".

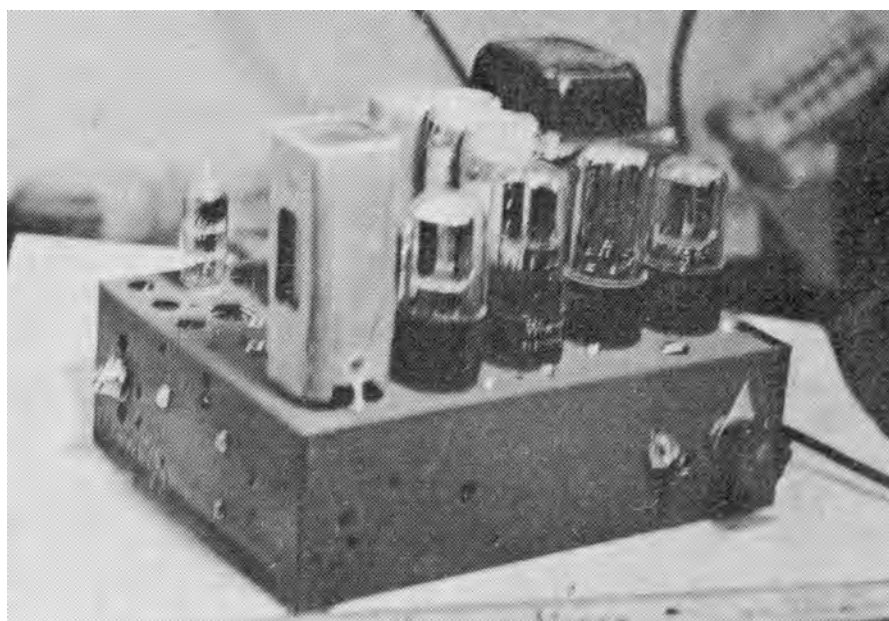
"In view of the fact that over half the members of the BATC live in countries where the broadcast standards are for negative modulation", a shorter 'technical information' article considered the differences between positive and negative modulation. (Britain at that time, of course, was still using 405 line pictures, and positive modulation of that onto the RF carrier). As was pointed out, there is absolutely no difference in the video equipment required which in either case will deliver a one volt 70:30 composite signal, white positive". "However, in the modulator, the video is inverted or not by the system of modulation. In one case, the peak white signal will yield maximum RF output from the transmitter, which is termed positive modulation. In the other case, the same white signal will yield minimum RF output, the so-called negative modulation.". The actual RF envelope levels corresponding to the input levels vary slightly. The article went on to discuss the relative merits and disadvantages of each - including the possible use of intercarrier sound and the effects of noise spikes on the transmitted signal, as shown in the accompanying diagrams.

ended with 'special mention ... Of John Tanner who slept out in the Nissen hut as night-watchman'.

The Enfield Town Show was said to be like a smaller version of the Dagenham Town Show. G3KOK was again there with his camera - and John Tanner as night watch-man. One of the highlights of the ATV demonstrations was a joint set up with the Radio Controlled Models Society - "a radio controlled boat armed with a dirty great needle in the bows attacked an unarmed balloon floating on the water, the controller watching by means of G3KOK/Ts camera. The two dimensional picture gave the controller some anxious moments, but ... The deed was done most successfully, to the delight of a huge crowd. As far as is known, this is the first time anyone anywhere has controlled a boat by radio and TV... (BATC Does It Again)". Apparently "another highlight or two

were the delightful Irish XYLs who took their interviewing of Danny Blanchflower and others so seriously that they wanted to join BATC and do it at all our shows (interviewing that is)".

The largest event was the 1957 Radio Hobbies Exhibition, which ran for 4 days. The Club display was again arranged by the Chelmsford group, with Jeremy Royle's photicon cameras, Brian Partridge's image orthicon camera and Martin Lilley's flying spot scanner as the picture sources. A small 'studio' was arranged, and the 'transmissions' included panel games, technical discussions, talks and general show announcements, with 'commercials' for other exhibitors at the even between these items. The 'press' were attracted to a 'Televisionfone' a one way 'television-telephone', on which John Tanner was interviewed 5 times on just the first day. Five of the national



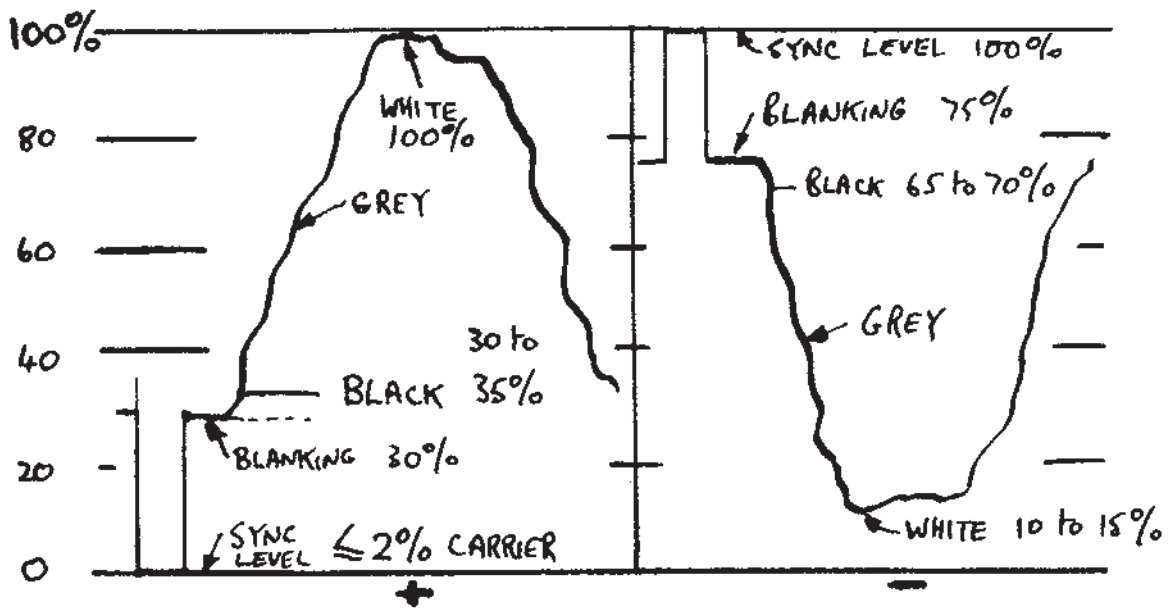


Figure 1: RF envelope levels for Pos. and Neg. Mod.

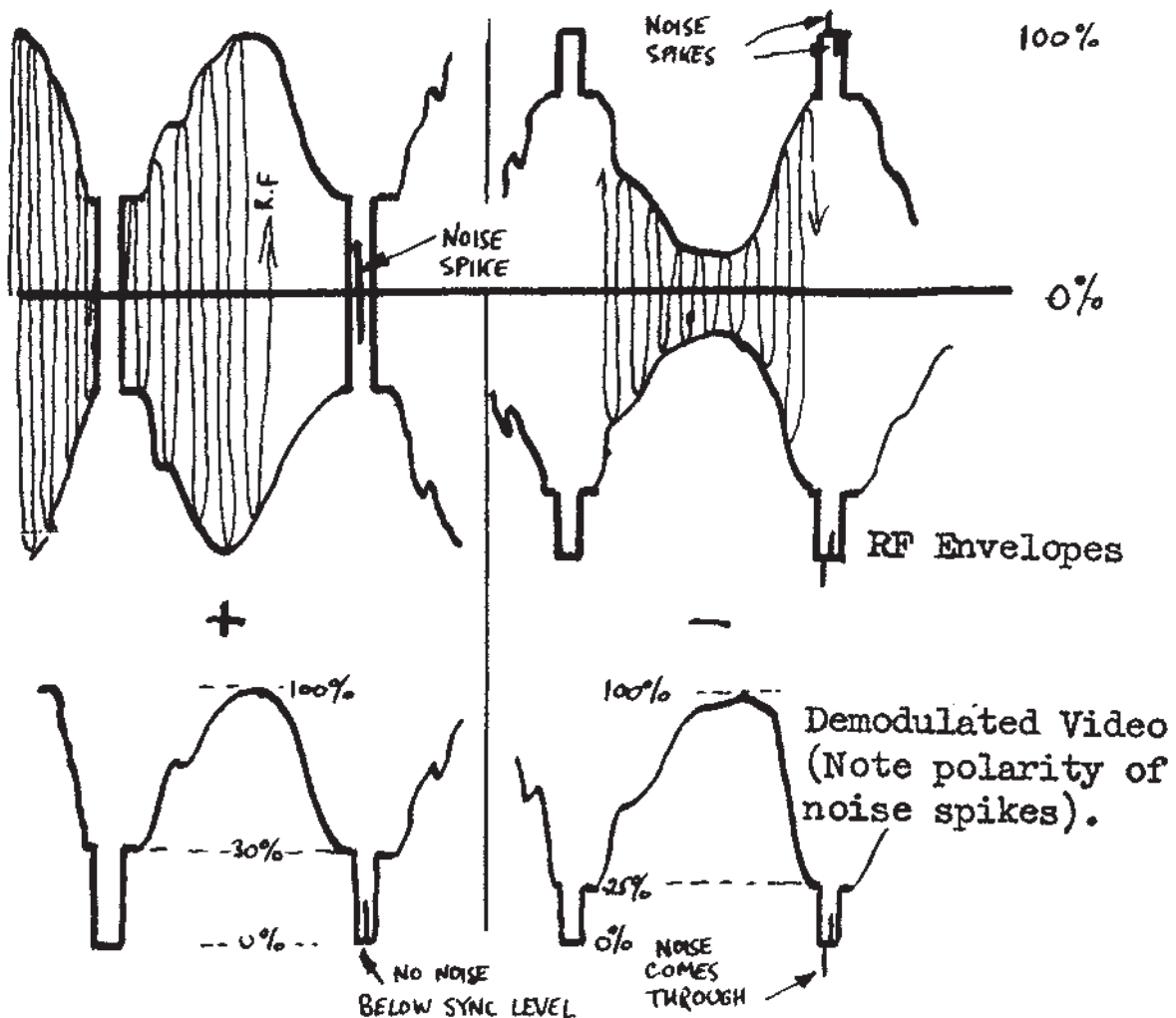
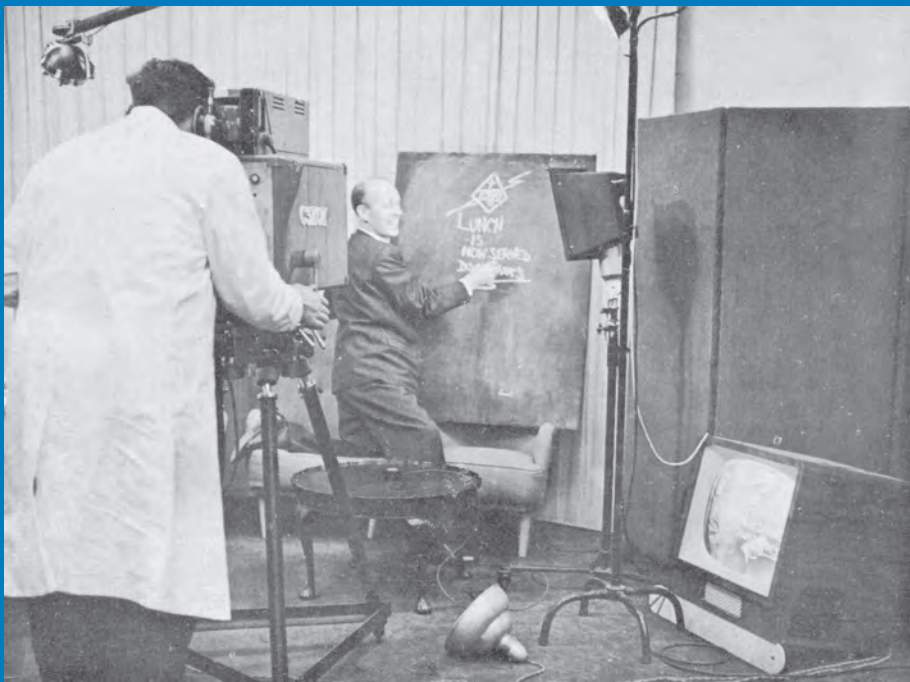


Fig. 2: Effect of Noise on Pos and Neg. Modulation



The Studio at the Radio Hobbies Exhibition, with Phil Thurgood drawing attention to a 'vital notice'. There is a lamp reflector added to the mike boom (top left), to make the response of the microphone more directional.

The Studio, showing the two cameras (photicon on the left, and image orthicon on the right) and mike boom, and what was described as 'comfortable seating'.



The equipment racks, with a 9" monitor, Jeremy Royle at his camera control unit. And further over, the flying spot scanner and monitor. (The 'white laboratory coat' is no longer part of the average ATV'ers uniform !)



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Attempt

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