



# CQ-TV

## 224

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## Caption Contest

Here are the entries for last issues picture (shown below):

"If this were ATV (fast scan) rather than SSTV (slow scan) you could see my shirt change to the other seven colors too." - Don Hill (KE6BXT)

"I paid all that money for the camera and all I can get are coloured lines!" - Eric (GW8LJJ)

"I'm scheming and dreaming of multiple streaming" - John Lawrence (GW3JGA)



"Never mind the colour - when does the bar open?" - Eddie (G0EHV)

"If only I had a real job" - Richard VK4XRL

"The good news is every thing works OK, the bad news it's in the wrong room" - Graham Preece (G3RSX)

and the winner is Eddie, for probably the worst joke I've heard in years: "colour" - "bar" - get it??? Congratulations Eddie. Please send in your suggestions for the image below, by email to [editor@batc.org.uk](mailto:editor@batc.org.uk) or by post.



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## 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

Welcome to the November issue of CQ-TV and the fifth issue by yours truly, I hope I have managed to keep up the high standard set by previous editors and that the content has been diverse and interesting for as many members as possible. (If not then please let me know!)

This year was our BGM and for those of you who attended, I'm sure you will agree, it was a successful day with several interesting lectures, exhibits and a chance to socialise - I certainly made a few re-acquaintances with members I hadn't seen for years!

Naturally, this magazine is mainly dedicated to the BGM, with lots of photo's and a few articles based around it, we also have more streaming information and an article covering a recent live event we streamed at a school.

I realise that not every member is interested in "The Internet" and our streaming media efforts, but it IS the way things are going and as has been said

before: the club must embrace the new or dwindle away. I think we are managing to do just that, with membership actually on the increase for a change. I just hope that the new members will help in keeping CQ-TV the magazine it is by contributing articles and sharing information.

Remember, it's not just articles we need: if you have something for sale or are looking for something, I am happy to place an advert in the magazine at no cost to members. I am also interested in what you are up to, if it's even remotely connected with ATV then drop me an email so I can publish it in CQ-TV.

Your committee have decided to streamline the clubs online presence and to this effect the CQ-TV website has now been incorporated into the clubs main website, so if you have [www.cq-tv.com](http://www.cq-tv.com) as a bookmark, please replace it with [www.batc.org.uk](http://www.batc.org.uk) the old CQ-TV website will redirect you to the main site if you forget! We're also doing away with any email addresses for @cq-tv.com so please note the new addresses.

Your committee has also decided to offer you even more value to your already priceless membership: If anyone would like a club email address, they are now available to members, personalised to you, with a choice of formats, for example I can choose from:

[g1fef@mem.batc.org.uk](mailto:g1fef@mem.batc.org.uk)  
or  
[chris.smith@mem.batc.org.uk](mailto:chris.smith@mem.batc.org.uk)

Drop me an email or go online to find out more: [www.batc.org.uk/email](http://www.batc.org.uk/email)

Last, but certainly not least, I would like to thank everyone who made the decision to award me the Grant Dixon award. I am honoured and I'm sure I don't deserve it, so thank you very much. It has pride of place in my lounge display cabinet!

Enjoy the magazine.

*73 de G1FEF*  
*Chris*



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' as well as the Lighting eBook.

The archive contains all past issues of CQ-TV and 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 DVD is available to members for just £5 inc. postage to the UK and EEC.

[http://www.batc.org.uk/club\\_stuff/pubs.html](http://www.batc.org.uk/club_stuff/pubs.html)

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

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## Chairman's Column

A lot seems to have happened since the last issue, we have had the BGM and what an event, we were live on the net with lectures from the venue and we had a live contribution from Don Hill KE6BXT in California, it took a lot of effort to get all this linked into a place with no internet, thanks to Peter Blakeborough, Dave Mann, and Ian Waters for all their work with the links.

We also spent some of our hard earned cash on kit and bought the Data Video SE500 mixer and monitors, see the write up elsewhere in this issue. The kit was used for our third live streamer transmission, again see elsewhere in this issue for details. The hope is it will make life easy for televising these events so that more people can get involved and more events can be screened.

The Streamer is still moving with more of you signing up for members streams it is now at the point where we need to be able to identify the active streams without an exhaustive menu search (hint Chris). *(yeah, yeah, I know! Ed)*

Where to now, well next year the BATC will be celebrating its 60th birthday. A lot has happened from those early days of a 6 page black and white A5 CQ-TV being produced on Mike Barlow's duplicator and going out to 30 people. Paul Marshall thought we ought to have a special event to celebrate and nominated his wife Jill Marshall, to organise the event, (what a manager! need I fear for my job?).

Jill has started the ball rolling and is looking for a suitable date and venue, keep watching the website, as soon as something is set in stone we will put the date up and you can ring fence it in your diary.

Unfortunately its not all good news and we have another 23 cms ATV repeater in trouble GB3HV located in High Wycombe, has been successfully growing for the last 18 years, its transmissions cover much of the UK Home Counties: London, Surrey, Buckinghamshire, Berkshire and Herts. The mast has been purchased by a new group who have little appreciation of ATV.

They have increased the rent to a point that it is impossible for the repeater to continue to use this site. HV was closed down on 15th October 2008, and the search is on for a new site. The HV video streaming on [www.batc.tv](http://www.batc.tv) is continuing as a slide and video show, in order to report any progress, also see the web site, [www.gb3hv.com](http://www.gb3hv.com).

The RSGB news from Roy, G8CKN, at 9.30 local time on Sunday mornings will now be sent via GB3IV for the time being. My biggest worry was pointed out by John Banks of the CAA, at the BGM, the old site does not meet the current screening process for sites. Although no problems have been detected, I suspect the new site will have to meet these rules and may require GB3HV to be located some distance from it present

location, I will keep my fingers crossed on this one.

Another concern is the low number of entries for the CQ-TV caption contest, I have often heard it said that engineers have no sense of humour but I have never believed it.

The Electronic caption generator prize is really worth having, I dug mine out of the cupboard for the Budbrooke school stream and rushed out and bought a PS2 keyboard (getting a little thin on the ground these days) they really are excellent units, they can be switched between being a free running video source or caption superimposition unit, at the stroke of a key. Variable font size, captions are remembered when the power is removed, and so much more from such a small unit, they are an excellent purchase and worth every penny, let alone the chance to win one just for thinking up a snappy punch line.

The rumour also is that Ian Pawson's collection of photo's which seems to be devoted to snaps of me with my guard down has been exhausted and the editor is on the lookout for new material, to use in this competition, but its just a rumour, and you heard it here first.

*(It's true - I had to pick on someone else this issue - sorry Brian! Ed)*

Trevor Brown  
BATC Chairman

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## ATV Newsletter

The ATV Newsletter is a weekly publication covering World ATV News that I find interesting as well as events, projects and activities sent to me by my readers. You also get the latest Local ATV News from the repeater networks here in Southern California. And it's free. Plus information on Digital-ATV/ATV GUIDE, for weekly scheduled ATV events via Streaming Video/ATV Website Links/and more. To subscribe send me an email with your first name and call to [atv-newsletter@hotmail.com](mailto:atv-newsletter@hotmail.com) and I will add you to the mailing list. You can also include any info about your ATV activities in your email, if you wish. I just might put it in the newsletter!

Bryon Foster - N6IFU  
Editor & Publisher of the ATV Newsletter

# Circuit Notebook 99

By John Lawrence GW3JGA

## DATV Progress on 1280 MHz

DATV developments have now moved on from the topics described in Circuit Notebook 96, CQ-TV 221. The large NDS Encoder-Modulator E5910 has been given a new home by David GW8PBX and I have taken delivery of a purpose built AGAF up-converter with output on 1280MHz. The two AGAF PC boards which generate the DATV signal have been mounted in a case fitted with the usual connectors for Video in, Audio in L & R, 12V supply in and RF out, shown in Fig.1. (Ignore the 'Telephone Line' marking on the panel; the case contained a 'telephone balance' unit in a previous life)

The up-converter is mounted externally and takes the DATV output signal on 435.25MHz from the AGAF boards and converts this to 1280MHz. The up-converter has an internal crystal oscillator, multiplier, mixer and filter stages to provide a clean output at a level of about 2mW (+3dBm). The up-converter requires a +7.5V supply and a 12V to 7.5V regulator unit has been built to provide this. The general arrangement is shown in Fig.2.

For quick testing, the 1280MHz output from the up-converter can be connected directly to a small aerial and live tests made across the shack to the little Comag Satellite Receiver SL65/12 (Maplin A94FJ), which has been mentioned previously.



Figure 2  
1280MHz up-Converter and PSU

Figure 1  
AGAF DATV Generator





## Unfinished Strip-line

It was my intention to build a strip-line amplifier using MMICs to provide an output of about 50mW (+17dBm) suitable for driving one of the new Mitsubishi MOSET amplifier blocks which is reputed to have very good linearity and output power. (This is available as a kit from GH Engineering). I had an interesting time machining a strip-line using a 3mm end-mill, see Fig.3 and went on to build a successful two stage amplifier using MAR-7 MMICs. However, due to a shortage of time, the final power stage was not completed and an alternative solution was sought.

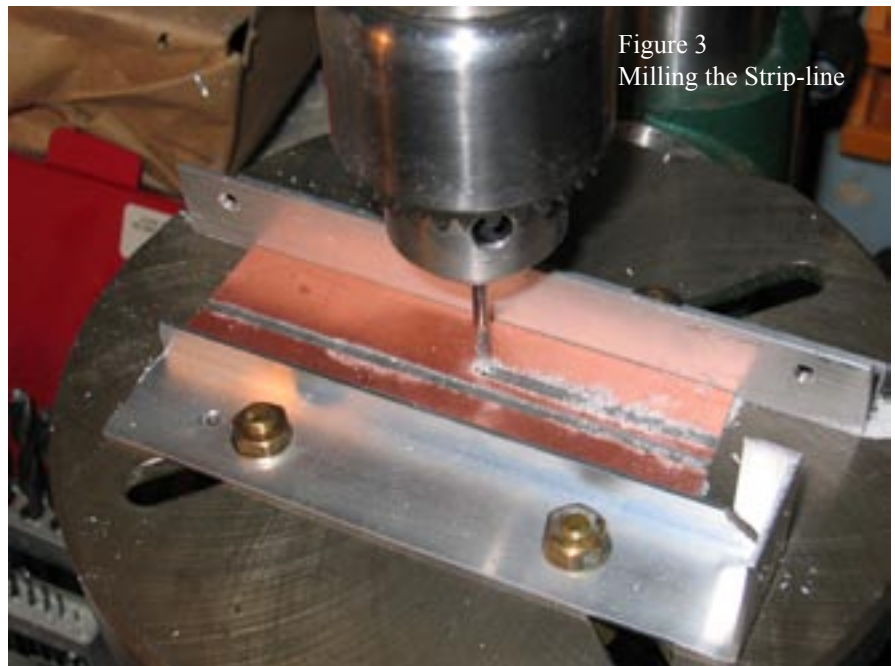


Figure 3  
Milling the Strip-line

## Conversion of my Portable FM ATV TX to DATV

I was anxious to get a signal on the air as soon as possible so I decided to modify my existing portable FM ATV TX and drive just the amplifier and output stages directly from the AGAF up-converter. Not only would this get me operational more quickly but it meant that I could operate portable DATV and easily switch back to FM if I needed to.

A block diagram of the new arrangement is shown in Fig.4 (video and audio inputs have been omitted for clarity). Many of us will be familiar with the Mitsubishi

M57762 block amplifier which is widely used with the popular Worthing kit. But, the smaller Mitsubishi M67753 block amplifier, which may be less well known, is specifically recommended by Mitsubishi as the driver for its bigger brother.

## Bench Testing

I connected the output from the up-converter to the input of the M67753 and coupled the output of the M57762 to my Bird 43 Power Meter with plug-in 100E (100W, 400-1000MHz) and a 50R dummy load. I connected a suitable +13V power supply to everything and

switched on. I was pleased to see an indicated output of 18W.

I then tried inserting various 50R attenuators between the AGAF Board's output and the input to the up-converter until the indicated output fell to 10W. I found a 6dB attenuator ideal. I then changed the Bird plug-in to a 10J (10W, 0.95-1.26GHz) for more accurate indications. I had referred to the Mitsubishi data sheets previously to confirm that at this power level the transfer linearity would be very good.

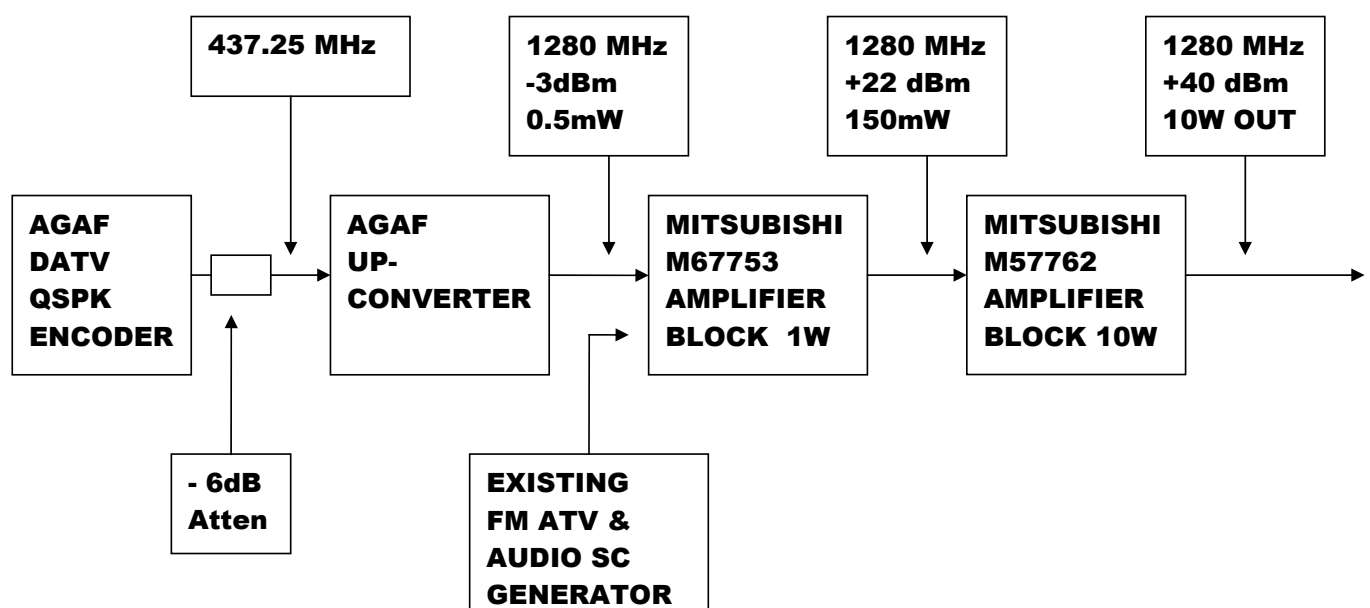


Fig.4. Block Diagram of GW3JGA 1280 MHz DATV QSPK Transmitter



I ran the whole system for about an hour or so without any problems except that the M57762 heatsink was too hot to touch. The heatsink is located inside the transmitter case next to a cooling fan. I fitted a metal cowl over the heatsink to concentrate the air flow as shown in Fig.5, but this made only a marginal improvement.

I then ran some tests using a simple 'indoor/outdoor' digital thermometer, by sticking the remote sensor on the P.A. heatsink. After 30 minutes from switch-on, the heatsink temperature leveled off at about 41degC. I then opened the case and the temperature fell rapidly to about 35degC, indicating that the outgoing airflow was too restricted. The results are shown in Fig.6. I had previously cut 16 x 1cm round holes in the side of the case for ventilation, but obviously this was not enough. I replaced the plain aluminium top of the case with a sheet of perforated aluminium and solved the problem. Continuous operation (e.g. Beacon or Repeater use) should not now present any difficulties. However, a thermal cut-out switch on the heatsink would be a good idea, in case the fan fails!

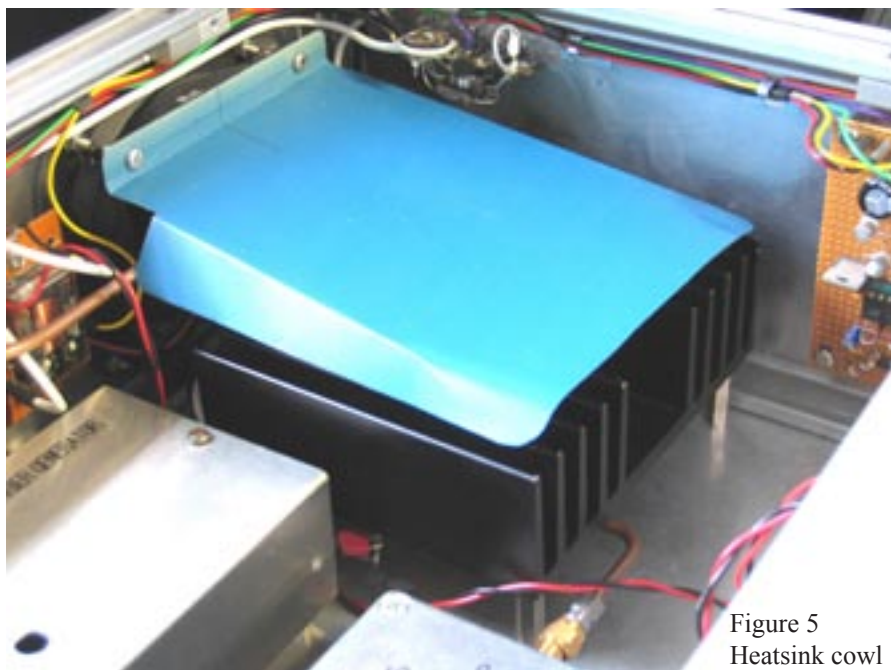


Figure 5  
Heatsink cowl

### On-air Tests

The transmitter was set up and connected an 18 element Yagi aerial mounted on a small tower, using Westflex 103 coax. The aerial height was about 180ft a.m.s.l. beamed westward, out to sea.

Portable receiving equipment consisted of a 23cms Alford slot, a GASFET pre-amp (just in case) and the indispensable little Comag SL65/12 satellite receiver feeding a SAKA 7inch receiver/monitor. A small 18 element 'Sevenside' Yagi was also included for directional tests.

Quick receiving tests were made at our local beach, about 2miles away and at Rhyl, about 4miles. Signals at both locations were P5, as expected. A proper test was then made to the site of our local ATV Repeater GB3TM, on the Isle of Anglesey, a path distance of 38miles (60km).

At this distance, weather and tide conditions can have a noticeable effect. If ducting is present the signal may be enhanced, but it is quite possible for the transmission path to be above the duct and then signal attenuation can be severe. There are also problems with the phasing of the direct signal with that reflected from the surface of the sea. So, the results of a one-off test must be viewed with some suspicion.

However, on the day of the test, the weather was showery with gusting winds; the barometric pressure was about 1008 millibars, so any signal enhancement was unlikely. A P5 signal was received (without a pre-amp) using either the Slot or the Yagi. To check how much signal was in-hand, various attenuators were fitted in the aerial coax lead until the signal dropped out. It was

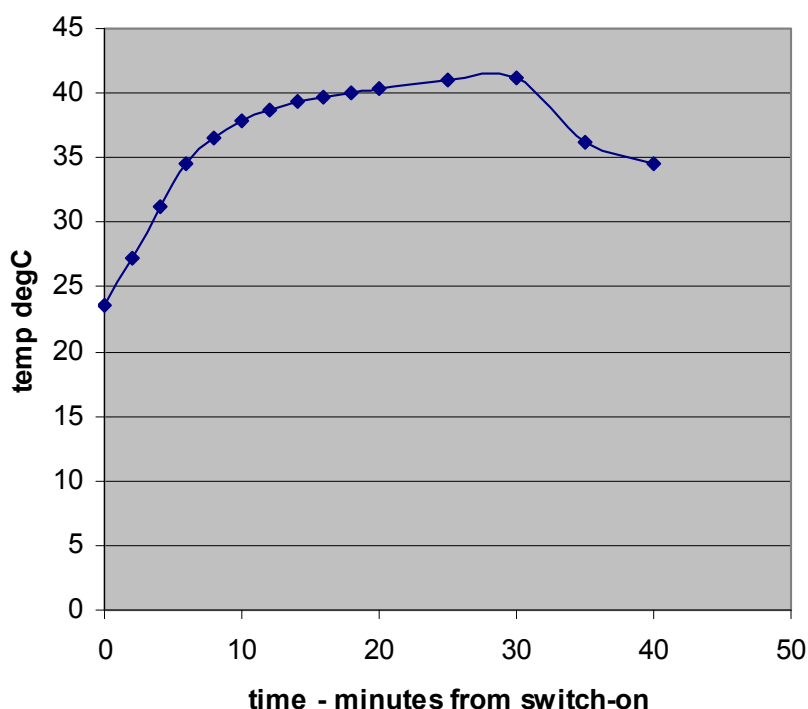


Figure 6  
Heatsink temperature

possible to add 13dB of attenuation to the Slot and 23dB to the Yagi and still receive a P5 picture. See Fig.7.

For the future, it will be interesting to make comparative tests of FM and Digital ATV using the same transmitter power and aerial arrangements.

Note. The Misubishi M67753 and the M57762 are now obsolete and are increasingly difficult to obtain. Alternatives are the GH Engineering PA1.3-0.5 and PA1.3-25.  
<http://www.ghengineering.co.uk>

Figure 7  
Received pictures at 60km



Figure 8  
DATV Units on top of existing FM ATV Transmitter

We have now merged the old [www.cq-tv.com](http://www.cq-tv.com) website with the clubs primary website: [www.batc.org.uk](http://www.batc.org.uk)

# A New Sync Separator

By Mike Cox

At the recent Rally at Stow-Cum-Quy, Kevin Hempson made himself known to me and very kindly presented me with some samples of a new Maxim sync separator IC MAX9568, together with 2 Evaluation Kits for the Club's use. [Fig. 1, Eval kit in action]

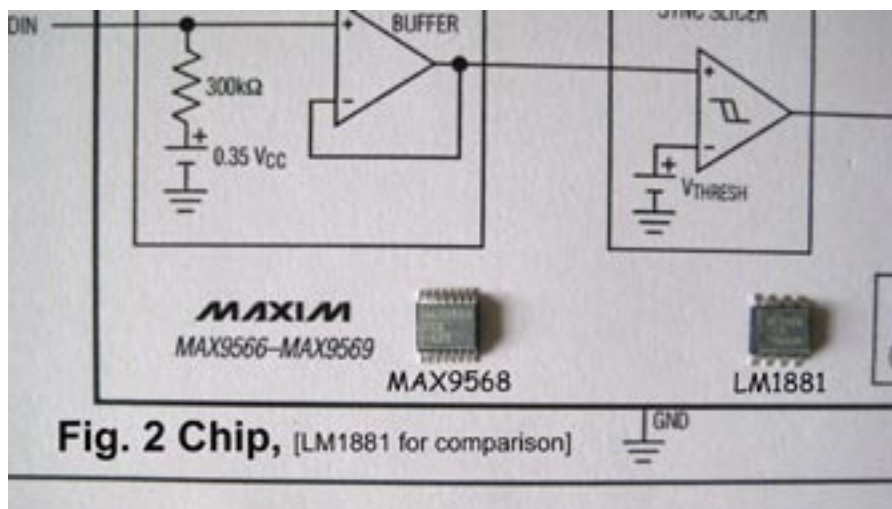


Kevin is ex BBC, then ex Ampex and now works for Maxim in California as Senior Scientist, Applications, in their Multimedia Business Unit. He was over in the UK to visit family and to attend the Rally.

Most members are familiar with the National LM1881, and possibly its Elantec equivalent [EL4581]. These work well in the SD [standard definition] domain, but are not very suitable for HD use.

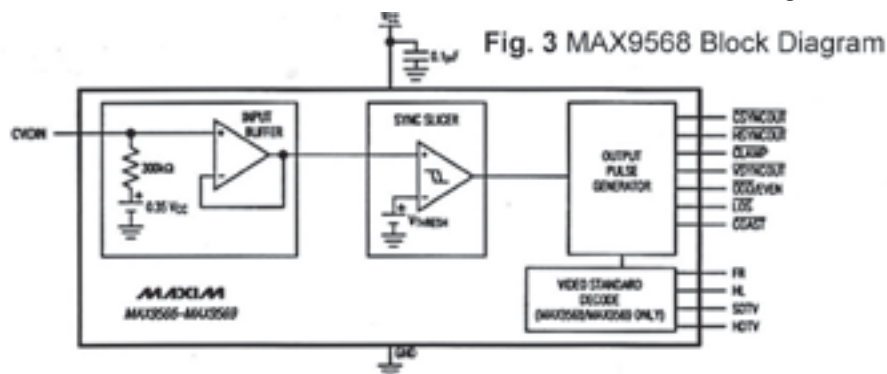
The Maxim IC is configured as an all systems separator, with the advantage of output flags to indicate the standard. It requires a minimum of external components to operate, and runs on a 2.7 to 5 volt supply rail. With a 5 volts rail, it draws typically 8.5 mA.

The only drawback to the MAX 9568 as far as the home constructor is concerned is the package. The device is housed in a 16-pin QSOP package [Fig. 2], with pin spacing of 0.635 mm – quite fine! It can be done with wire wrap wire, but a very fine soldering iron bit is needed, together with a steady hand, and perhaps a powerful magnifying lamp and lens.



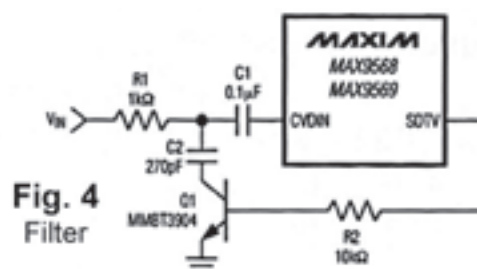
The design has been refined somewhat compared with the LM1881. The latter had a dc restorer at the input to set sync tip level before the slicer. It assumed that video is fed to it from a low impedance source such as an emitter follower. Some designers suggest an RC filter at the input to remove PAL/NTSC colour burst.

In earlier issues of CQTV, I have shown an emitter follower driving the LM1881 input, with the RC filter in the base of the follower. Much higher R-values can be used with low values of C. We should be aiming for 10-dB loss at subcarrier frequency. This rather defeats the object of using a dedicated IC. However the MAX 9568 has a buffer stage before



This is very necessary but the series R should not be higher than a few hundred ohms or the dc restoration will be poor, and sync separation with signals of varying APL [ie most video!] will not be good. Further, return loss of the input termination will suffer if the LM1881 is fed directly from the input via a filter.

the dc restorer [Fig. 3], so that a simple CR filter can be used with a high R [and low C], with negligible effect on return loss. Fig. 4 shows Maxim's take on this, when the C element of the filter is switched in when an SDTV signal is detected. This removes any filtering for HDTV signals.





On test, the Eval. Board worked as expected using a 5-volt supply. Fig. 5 shows some of the outputs when fed with 720P tri-sync. This result gave me peculiar comfort, as it is an independent confirmation that the 720PSTSG[CQTV 222/223] tri-sync is recognisable.

The Standard flag output is interesting. The National Semiconductor “equivalent” device LMH1981 has a complicated serial output, which has to be decoded before the standard, can be determined. The 4-bit output from the MAX 9568 is simple to use, for example LEDs could be driven from the ports and give a ready visual indication.

Fig. 6 gives the basic circuit of the device in action. LEDs are shown on the standard indicating ports. The notes below indicate the signals coming from the various pins.

CSYNC [pin 1] is a sliced version of the input. In the case of inputs with tri-sync, the positive going parts of the waveform are suppressed.

VSYN [pin 3] Vertical pulse output, negative going, starting at second serration of the vertical block.

CLAMP [pin 12] Negative pulse occurring during back porch of horizontal interval. Can be used as Burst Gate.

HSYN [pin 15] Negative pulse occurring slightly after Csync leading edge, and continuing throughout vertical interval.

ODD/EVEN [pin 14] Frame rate signal, appearing when input signal is interlaced, such that field 1 is low, and field two is high.

LOS [pin 13] Gives a low output when a video signal is present.

COAST [pin 4] Negative going signal spanning the vertical blanking interval.

This is altogether a more comprehensive selection of outputs than other similar devices offer, and should prove very useful for many video-processing projects.

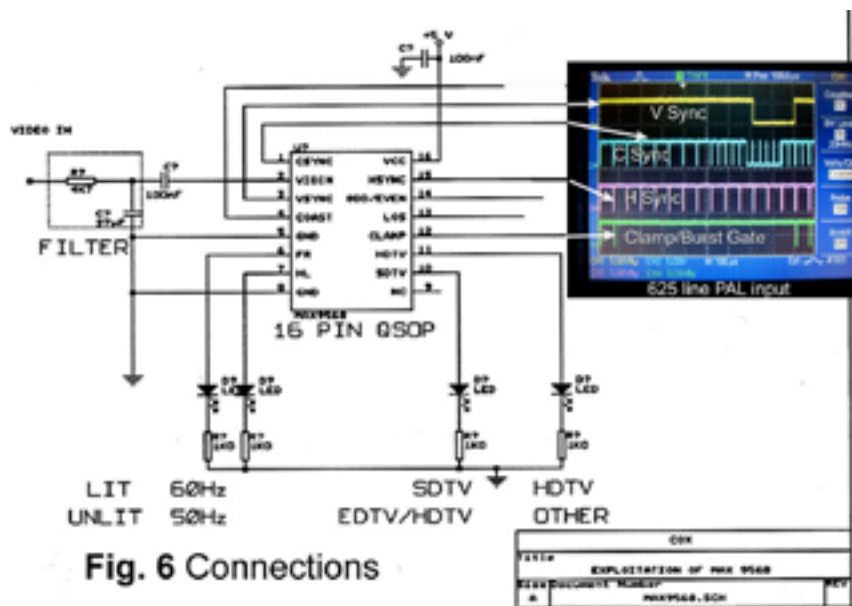
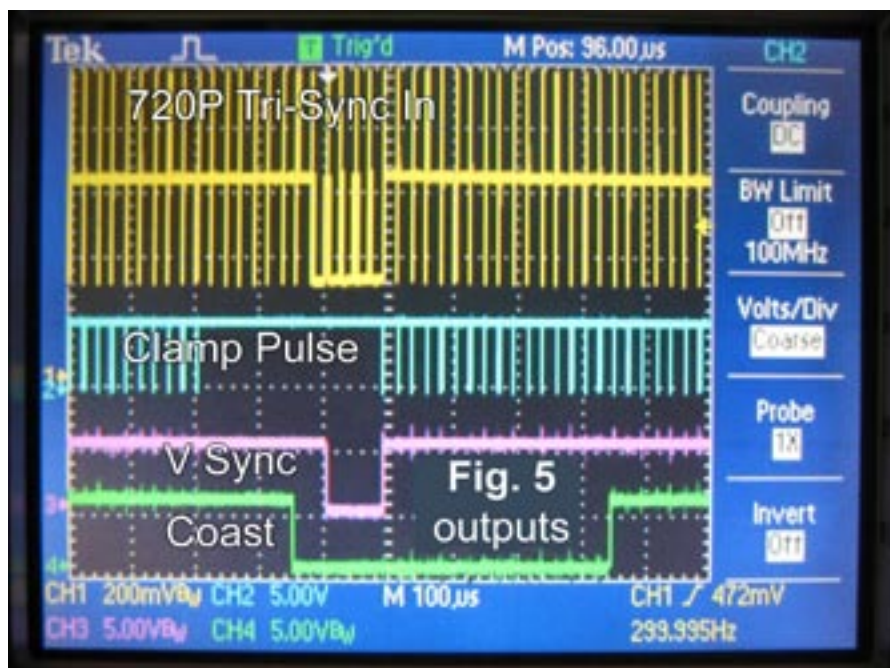


Fig. 6 Connections

Fig. 6 shows the connections to the device, together with some output waveforms with 625-line PAL input.

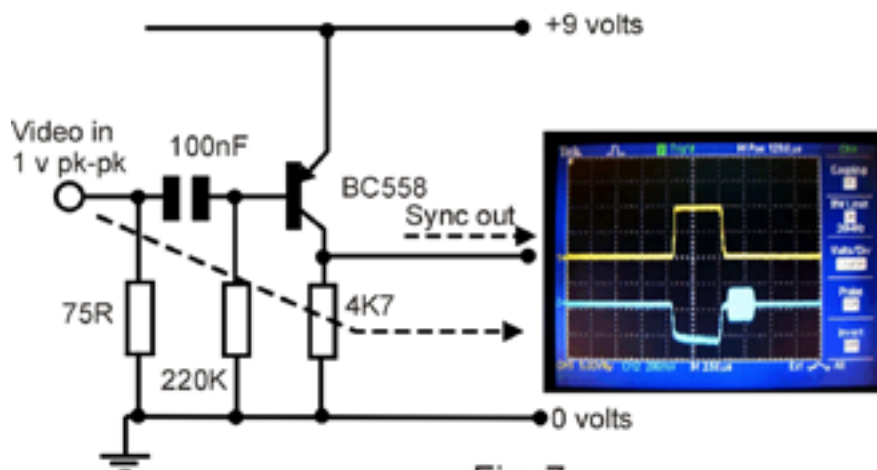


Fig. 7 Simple sync separator

## Tutorial Appendix

Any Sync Separator has two main parts; one to set the dc level of sync tip, the other to slice the sync portion of the composite video signal at roughly half the sync amplitude.

This should yield a sync pulse of correct width as laid down in the signal specification.

The object is to recover only the sync portion of the waveform, with as little jitter as possible.

The separator has to accept changes of Average Picture Level [APL] from 0% to 100% without any significant timing shift in the recovered sync.

A single transistor can work, if one is not too fussy. [Fig. 7]

The base-emitter diode of the transistor provides the dc restoring function, while the transistor [BC558] provides the clipping action. The circuit shown works OK with a 1-volt pk-pk video signal, but gets soggy at -6 dB input, and it distorts the input sync tip slightly. To avoid this distortion, it would be

worth putting an emitter follower between the input and the dc restorer. This cheap-as-chips circuit could be used for say, triggering a scope, or driving a line selector for said scope.

Any member wanting to investigate the MAX9568 device should contact the Editor for use of the Eval kit, and a sample chip or two. Full data can be found at:

[http://www.maxim-ic.com/quick\\_view2.cfm/qv\\_pk/5871/tal](http://www.maxim-ic.com/quick_view2.cfm/qv_pk/5871/tal)

Data on the National devices LM1881 and LMH1981 can be found at:

<http://www.national.com/ds/lm/lm1881.pdf>

<http://www.national.com/pf/lm/lmh1981.html>

Good Luck!



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# Not another VDA!

by Richard L. Carden VK4XRL

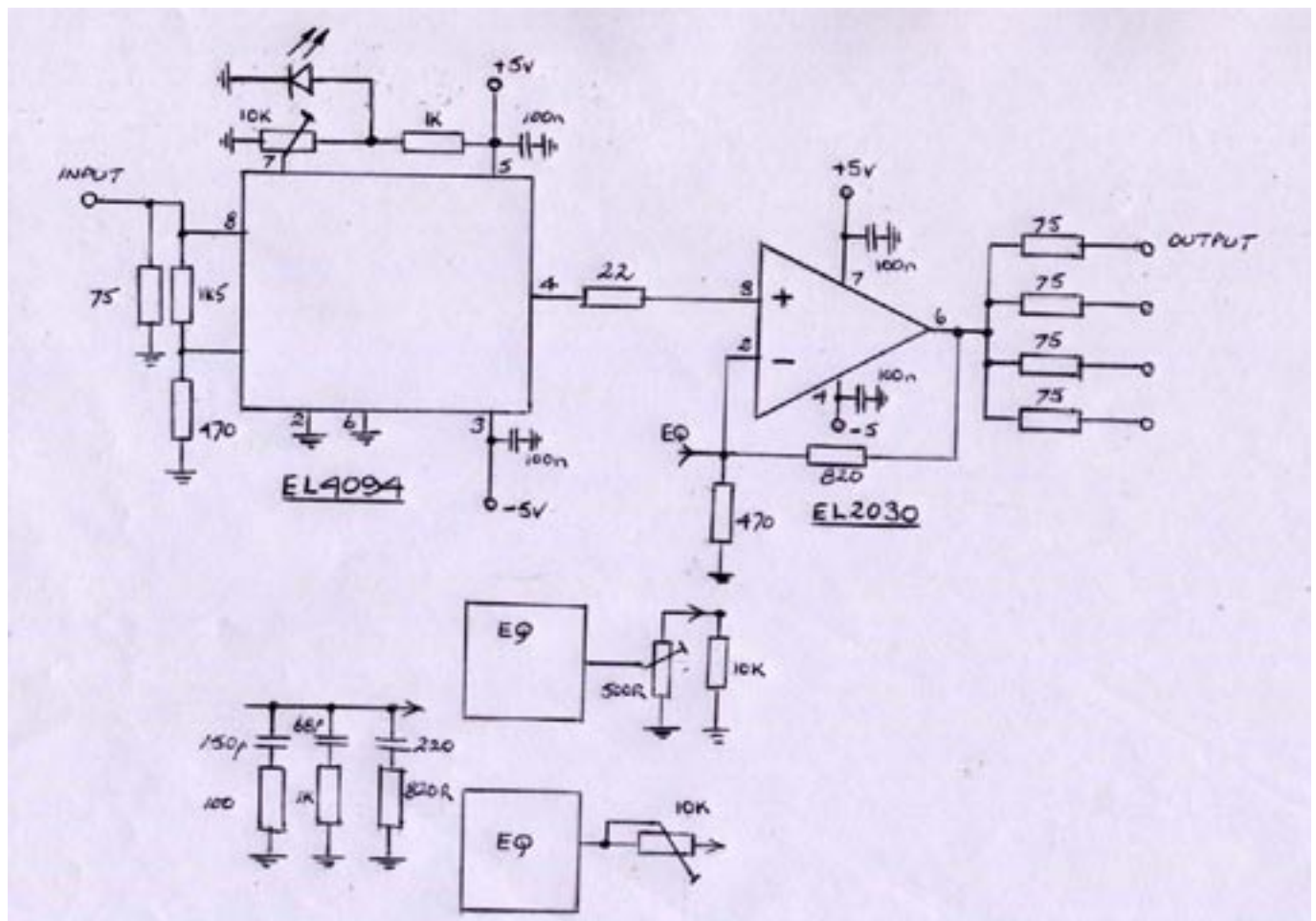
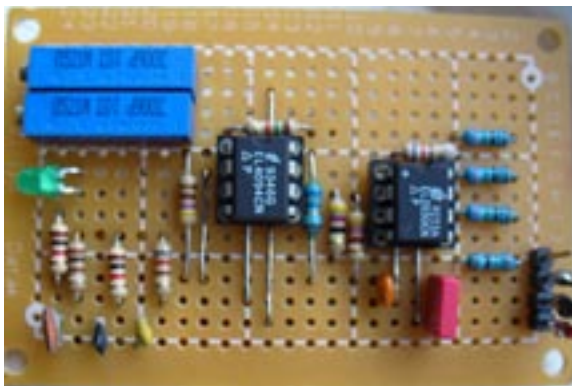
Well some of us will be using analog for quite some time even after analog is switched off. This VDA was the result of the old faithful falling over and the desire not to fix them. Also I had a fist full of EL4094 IC's, these are a video gain control/fader unit so it was decided to use these if we could and utilize them as the video gain control. (Do a Google search for the Data-sheets.)

Each input has a unity gain buffer as does the output. The gain control pin 7 is connected via a 10k video level control to +2.4v, this being set by a LED. It also acts as a power on indicator. The gain control allows for +/- 6db of video level. The output buffer is an EL2030 the gain set by the 470 ohm resistor with the video level set to mid travel. Extra outputs can be added if required by providing extra EL2030 video amplifiers.

At this stage an equalizing circuit has been added to compensate for long lengths of interconnecting video cable. A number of suggested circuits have been included either will work.

One drawback of the circuit as shown is that no clamping of the video input was provided. This can readily be achieved by using an EL2090 with an LM1881 (or equivalent device) sync separating IC providing the clamp pulses. See CQ-TV 208 ITS Generator for circuits using these devices. A simple emitter follow on the input followed by a discrete clamp circuit could also be used.

The unit was built up on prototype board and performed very well.





# Online Information

*By Chris Smith G1FEF*

There have been several enquiries about the new BATC streaming media website: [www.batc.tv](http://www.batc.tv) mainly because I assume that everyone knows as much about PC's and the Internet as I do!

We are developing the website, so things are subject to change (improvements hopefully), but the following should help get you going...

To visit the new website you just type <http://www.batc.tv> into your favourite web browser and you should be at the homepage. From there you can click on the icons on the left side to access various "channels":



Film Archives - this is where all the archived material is stored. Once you click on this icon you should see the BATC Flash player in the centre of your screen.

If you don't see this, or if you see a box with a red cross, the chances are you haven't got the Flash player installed on your PC. Most of the time your browser will alert you to this fact and ask if you wish to download it, but if it doesn't, then you can download and install it manually by going to:

<http://get.adobe.com/flashplayer/>

Follow the instructions on the Adobe website, the process is quite straight forward.

The process for Macs or Linux systems may vary, but if you get stuck Google is always a good source of information, or drop me an email, I am always glad to help if I can.

Once you have the BATC player visible, you are ready to watch any of the streams available. Starting with the "Film Archive" section, you can select any of the available videos from the drop down menu, then click on the "Select" button below the list, this sets the video up ready to play. In order to actually play it, you must click on the "Play" icon on the player itself (see the copy of the player to the left, I have added descriptions to the icons so you can see where the "Play", "Stop", "Volume", etc controls are).

Once the video is playing, you can adjust the volume by sliding the control left/right. You can also click on the "Fullscreen" control to expand the video to fill your monitor, although only the really high definition videos provide good enough quality to watch fullscreen.

Sometime when you are watching a video, it may start and stop or go a bit jerky, with intermittent loss of sound. This is a sign that your Internet bandwidth is insufficient to cope with the stream. You should close down any other applications that use Internet bandwidth and try again, most of the content was recorded at a fairly low bitrate, so this is only likely to happen if you are on a dialup connection, have a very poor broadband connection, or you are unfortunate enough to be using one of the "cheap" broadband providers and their network is congested, which often happens in the evenings when everyone is online.

If that happens - change to a better provider, you get what you pay for in the broadband world I'm afraid, although there are a couple of decent companies out there, who don't charge the earth and provide a quality broadband service...

Now you can view the archived content, you will be able to watch any of the live channels as well. Simply go back to the homepage by clicking on the logo in the top left, then select one of the other icons, "ATV Repeaters" is always a good one as most of these streams

are maintained 24/7 so there's always something to watch.

To view a live stream, it's the same process as an archived stream, except that the stream will start to play as soon as you select it, rather than waiting for you to press "Play". If you press "Stop" when watching a live stream, the stream will stop but when you press "Play" again it will not have "buffered" the stream, it simply rejoins the stream at the current live point, unlike when watching archived content where the "Stop" control acts more like a pause control.

If you decide you would like to join the growing number of members with their own personal stream, then simply fill in the request form online:

<http://www.batc.tv/register.php>

The encoder software is available free of charge from Adobe's website:

<http://www.adobe.com/products/flashmediaserver/flashmediaencoder/>

Once installed and you've entered the stream details you were provided when you signed up, you can start to have some real fun!

If you want to stream live AV the USB capture dongles available on ebay for around £10 - £15 do a good job (just type "usb video capture" into eBay's search box) most of them come from Hong Kong, but don't let that put you off, I've bought a couple and they arrive within a week usually.

Finally, for those that don't already know, I am technical director for an ISP and my company is more than happy to provide commercial grade web and email hosting free of charge to any person, club or group that has a website relating to amateur radio or television, please get in touch for details:

[editor@batc.org.uk](mailto:editor@batc.org.uk)

# Affordable CAD systems

By Brian Kelly GW6BW

In days of old, schematics were drawn with pen and ink and PCBs were made with sticky black paper strips. I know, I used them, and I don't regret moving on to better methods. While the quality of hand drawn schematic diagrams could be excellent and very readable, most people lack the artistic skills and steady hand needed to produce them neatly. Likewise, circuit boards could be wonderful things to behold when designed by an expert but a most horrible mess in the hands of a novice. Besides, the copper traces on modern boards tend to be too thin to lay down with tape or ink without either leaving breaks or inadvertently shorting traces together.

Today, most design work is done on computer and many programs are available to assist with drawing diagrams and producing PCB artworks. Not only does this reduce the time between conception and fruition, it make the whole process much neater, cleaner and because of the added ability to edit the design, future proof as well. Programs vary in complexity and price, some I would put in the 'functionally useless' category, others I would class as prohibitively expensive but there are a number of very capable ones that don't cost the Earth and here I present a summary of the most popular ones around.

I stress that the comments I make on these products is based on my own experiences while trying them and are not to be construed as endorsements or otherwise of any of them. Where problems exist the program authors generally do their best to fix them and new features are always being added so please check for up to date versions and new capabilities if deciding which would be best for your own purposes.

Some programs follow a complete work flow, by this I mean they expect to start at the schematic capture stage and work through the netlist generation and eventually to the PCB layout

stage. Others will only do one of these stages but will cooperate with other programs to achieve the same ending. Consequently, you may find that more than one of these programs is needed. Software developers working on only one part of the CAD flow tend to concentrate on quality more than developers trying to squeeze everything into one package. On the other hand, all-in-one packages offer complete integration and compatibility between the production stages. Most programs have an 'export' option which saves the design information in a format that other programs or even PCB manufacturing companies can 'import' into their own workspace.

Perhaps at this stage it is worthwhile to explain the different stages of CAD design and what they do. Schematic capture is the process of entering the electrical circuit diagram using component symbols and lines to show the connections. At this stage, names are given to each interconnection or node. A node always has at least two things connected to it, even if one is designated 'no connection' but it could have many connections, for example a power line or data bus. The node name will be assigned automatically N0001, N0002 and so on or can be given a more meaningful description if desired such as "video enable" or "data3". When the schematic is complete, it can be printed or published, just as the ones in the magazine are.

The next CAD stage though is to generate a net list. These are lists of all the components and which nodes they connect between. It's a kind of written description of a circuit diagram, telling exactly what connects to what but it doesn't describe the physical placement of component shapes. In some cases a netlist can have an extra entry which also holds the shape designator for the components, if this is the case, it may have been provided at the schematic capture stage or it could be manually entered afterwards. CAD packages generate netlists by scanning the schematic, following the connection

lines and working out which components the lines touch. It's worth noting that netlists will allocate pin numbers to every component and because of this, non-polarised components such as resistors will have a pin 1 and pin 2. This can cause problems later.

Netlists can be used for two purposes, the description of the circuit they provide is ideal for feeding into PCB layout software or to an electrical simulator. The simulator could for example calculate all the voltages and signals you would expect to find if the design was built and may be able to predict the outcome of feeding different signals into the circuit. Only one of the CAD packages I describe later can do this within the program itself but most programs can export netlists and most simulators can import them so compatibility isn't usually a problem.

The PCB layout stage is where the description in the netlist is once more given dimensional properties but this time as real component shapes on a rigid substrate. Typically, the outline of the board is drawn first, the number of track layers to use is set and then the components are read from the netlist and randomly scattered across the available space. This ensures that no parts are left out but there's as much chance of me winning the lottery as an optimum layout being produced. The parts are then moved around within the board outline to pack them in sensibly. A process called "ratsnesting" often helps here, basically all the nodes and connections to them are linked by straight lines. These show where the connections ultimately have to go but ignore that in reality tracks can't cross each other. Nevertheless, the ratsnest lines give an indication of how far away a component is from others it connects to. For example a resistor in the top right corner with lines running to the bottom left corner would suggest it would be better placed in the latter position. Although some packages have automatic component placement facilities, I find these use pure mathematics rather than common sense to find the best locations.

For example, a mains socket mounted in the middle of a keyboard may make electrical sense but it isn't very user friendly to a typist. The copper traces themselves can be placed manually or in some cases automatically. Again, automatic placement may not be best and a degree of user intervention may be needed to help it along. Usually, as tracks are added, the corresponding ratsnest lines will be removed and this gives a good indication of how much progress has been made and how much is still left to connect.

After the PCB is designed it can be printed or plotted and used as artwork to make circuit boards or it can be converted to a format that can be passed to commercial production houses. The most common format is "Gerber" which is a text file of vectors and shapes. It contains a sequence of X and Y coordinates which describe the positions of the starting and ending point of lines and a tool setting which describes the width of the 'pen' that would draw the line and the diameter of circles or arcs to make curves. A drill entry will list the coordinates and diameters of the holes through the board. Using these basic definitions, PCB fabrication machinery can mass produce boards automatically.

The programs here are listed in alphabetic rather than personal preference order. At the end of the article there are short references to more advanced programs but bear in mind that these are likely to be outside the budget of hobbyist users and small businesses.

## Autotrax.

The latest version of Autotrax I have is 9.30 but at the time of writing, version 9.51 had just been released. I have not updated to the current version for reasons I will reveal later. The changes between versions is relatively minor and this summary is still valid for the newest release.

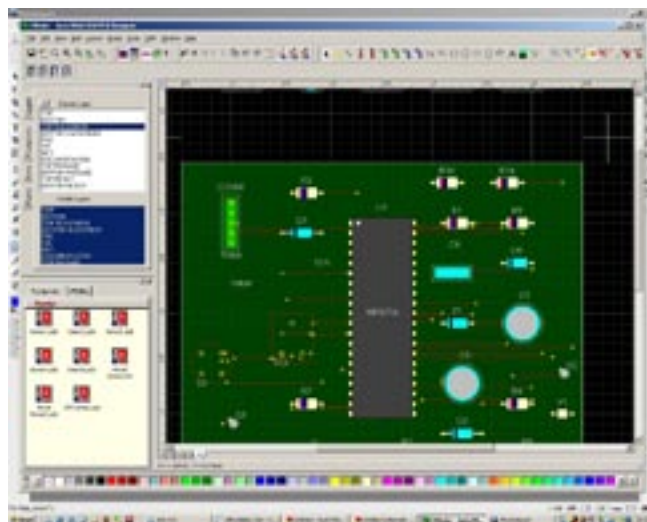
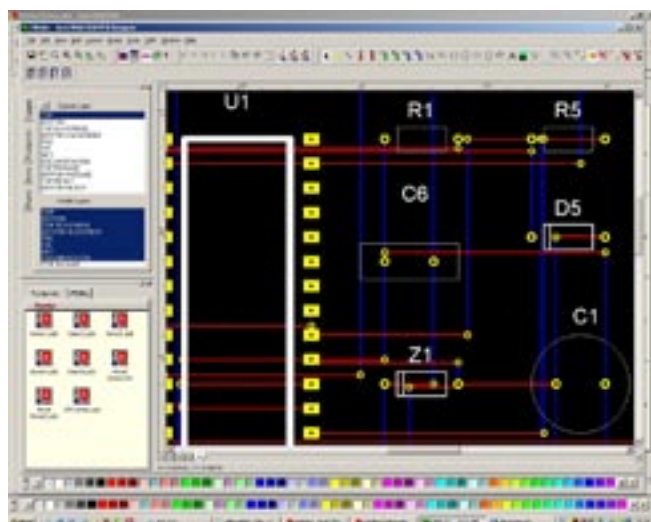
Autotrax is a fully featured program with modules for doing almost everything in electronic design. It has a module for drawing schematics which has provision for designing symbols for parts that are not in the supplied library. One of the common problems with all design packages is that the part you want to design with is rarely one of the thousands provided in the parts library so a method of adding you own parts is essential. This program has a unique feature of being able to interpret symbols directly from PDF data sheets which is a real time saver when you have a deadline to meet. Almost all component data is supplied in PDF form these days so being able to select the schematic symbol in the data sheet and drop it straight into the Autotrax editor is very useful, it even

extracts pin information for use in the new part. Of the low cost packages, Autotrax is the only integrated one that has a built in simulation option. It is possible to add virtual signal generators and oscilloscope probes to parts of the schematic to predict what should be there in real life. It uses the industry standard SPICE simulator which is regarded as very accurate. Another unique feature of Autotrax is it has a project manager built in. This is of little use to the hobbyist but in a commercial environment where design, purchasing and fabrication has to be coordinated, it can help enormously. Also provided with the package is a 3D modelling program which can be used to make lifelike component shapes, ones with height and surface texture rather than just flat shapes. This allows PCBs to be rotated in virtual space to give a better idea of what the final product will look like. Currently, Autotrax costs \$99 which makes it the cheapest all-inclusive package on the market. There is an annual cost to continue receiving program updates of about half the full new cost but without paying it, the last version you have will continue working indefinitely.



Autotrax in schematic capture mode showing a solar panel controller design.

PCB trace and component placing in Autorax.



Autotrax can show components as 'solid' objects to give a better impression of the final board appearance.

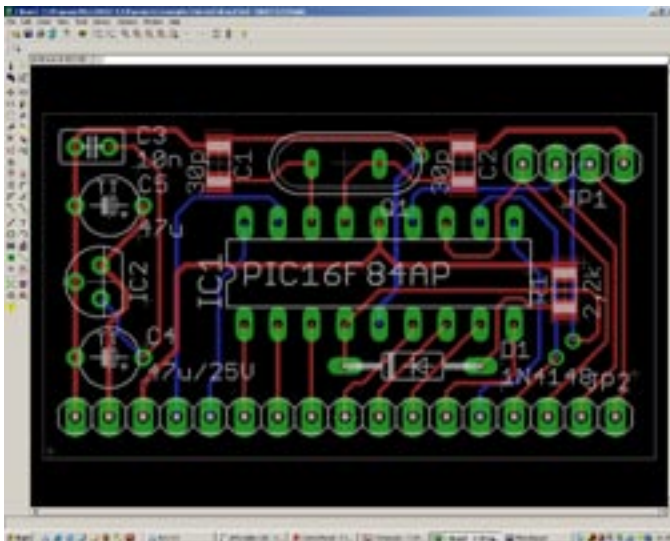


## Eagle.

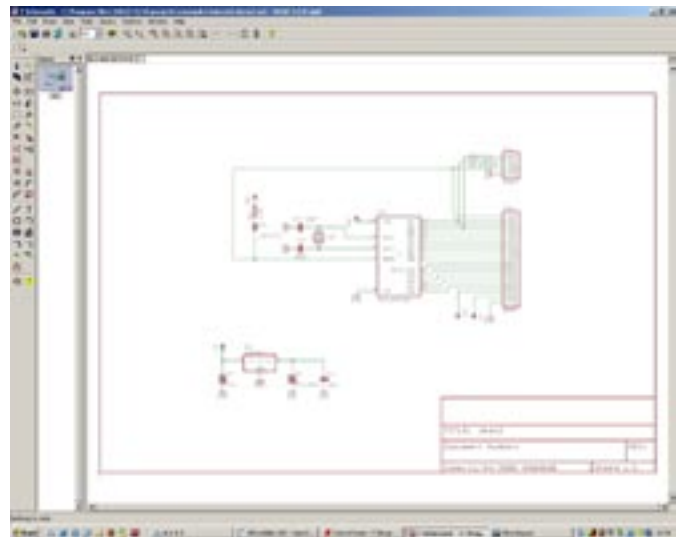
I can't help thinking the wording "Easily Applicable Graphical Layout Editor" was fitted to the name EAGLE as an afterthought! This program comes in freeware and licensed versions, the main difference being the complexity of design that can be achieved. The freeware version 5.20 reviewed here is limited in pin count and board size but up to that limitation is fully functional. To be fair to Cadsoft who wrote the program, the limit is quite generous and more than adequate for small projects. Eagle is

famed for the library of components included with it. These are so popular that several programs have been written to convert the libraries so they work with other CAD systems! The legality of this is debatable but the practice is widespread. Eagle has an unorthodox screen layout which takes some getting used to but it does function quite well. It also has a built in scripting system called ULP or User Language Program that allows operations frequently used to be saved as mini-programs then executed whenever needed. The language is similar to 'C' and very versatile. It goes

further than just keystroke recording and for example, could be used to renumber all the components in a schematic or to create solder stencils from a board layout. A tutorial and 312 page users manual is included although for the majority of users, the interface is so straight forward that they could start work straight away without reading the documentation at all. Placing components in both schematic and PCB is by standard pick-drag-place method and quite easy to handle. The autorouter is one of the better ones on the market and also quite fast at its job.



An example PCB layout from one of the EAGLE demo designs.



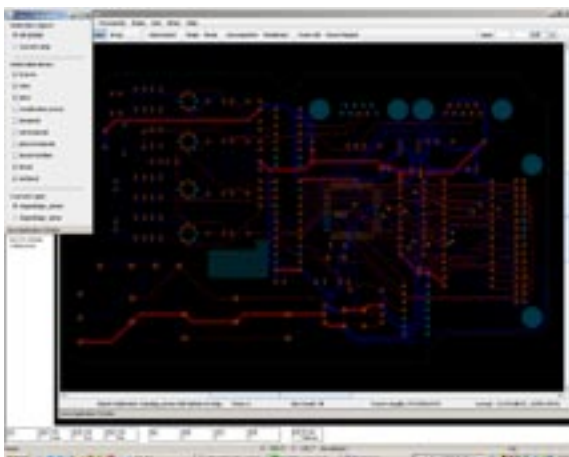
Eagle schematic for the PCB shown in the screen shot.

## FreePCB.

This is a one-man venture, but the man, Allan Wright is enthusiastic and responsive to users needs. As the name suggests it is free but it has limitations. It is purely a manual PCB layout program although it does have a close association with Bruce Parhams on-line freeROUTE program which extends its capability to full autorouting. This is also free but works through a JAVA interface where it interacts directly

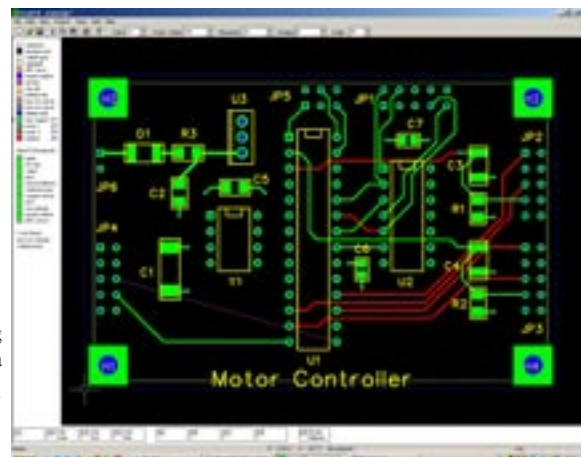
with freeROUTE over the internet. It works really well and the combination of the two programs can produce excellent results but for commercial developers it is easy to see where security could be a concern. Because FreePCB lacks schematic capture capability, it relies upon a netlist being prepared elsewhere, either manually or by another application. TinyCad which will be mentioned later can supply the necessary files. Although at first glance FreePCB lacks the glitz of some of the

other programs, it doesn't take long to realise that the core functions of a PCB program are not only all there but all work exceptionally well. Furthermore, if like me you usually need a tool to prototype a hand drawn schematic, all the fancy features of some other programs actually get in the way and slow you down. If you like the keep it simple approach, but still want professional results, FreePCB may be the right program to use.



This shot shows FreeRoute while routing a board produced by FreePCB.

Manually placing components on a FreePCB design.



## GEDA.

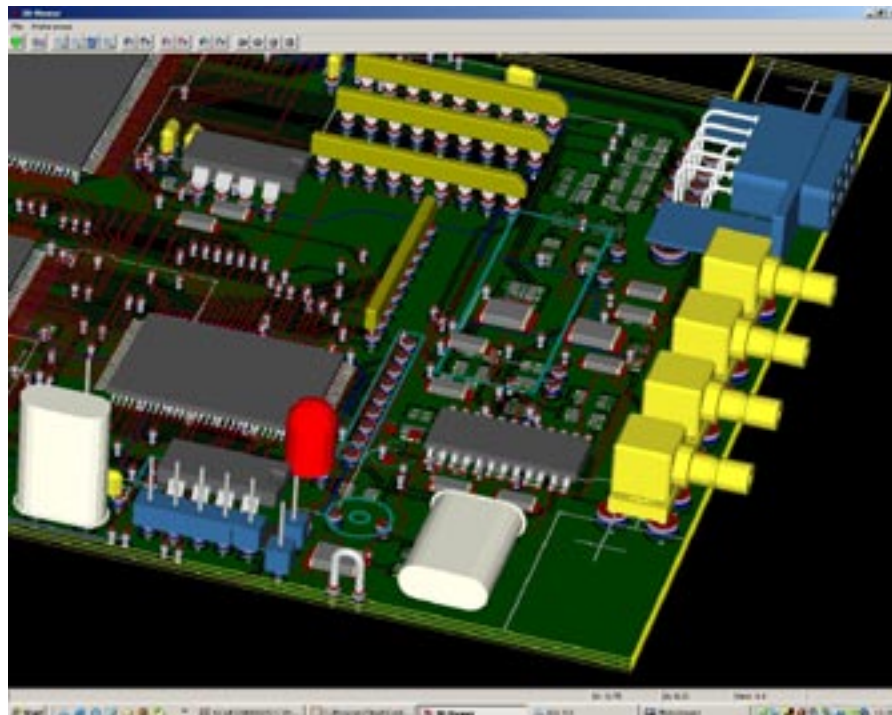
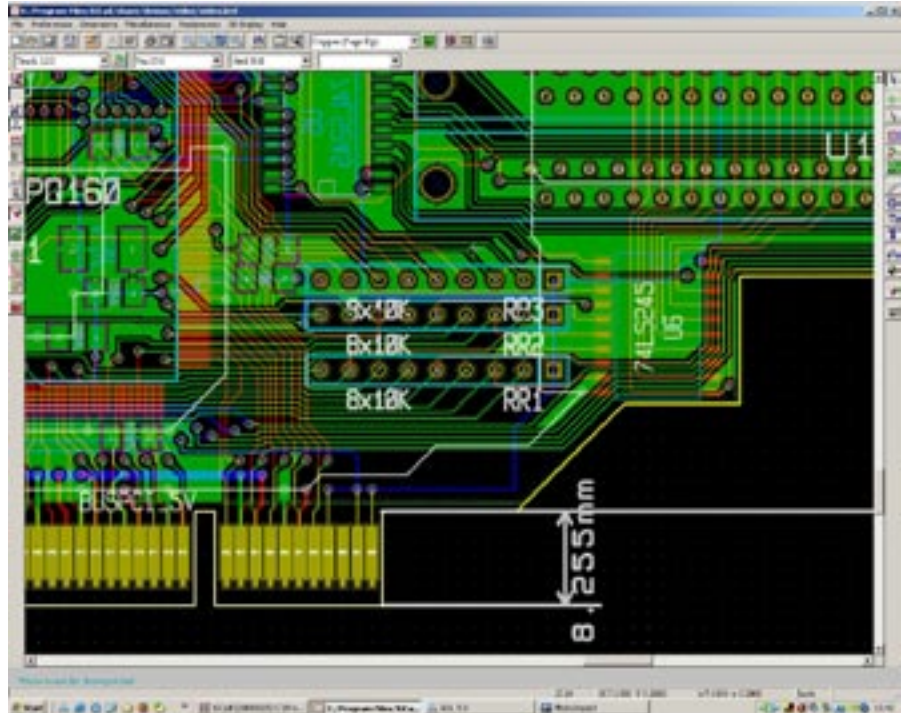
This is a free program available only on the Linux platform. It will not be installed by default on most systems but can be found by browsing the Synaptic Package manager in the “Electronics” category. There are three modules, the schematic capture is more like a conventional mechanical CAD package with cross cursors and X/Y coordinates always being shown. The component libraries are somewhat limited but new entries can be created as desired. The PCB layout section is similar in style and again the number of supplied library footprint models is a weakness. It does have an interesting (and entertaining) trail of what the autorouter does so you can see it trying all the combinations of routes as it connects things together. The third module is an attribute editor which is for creating or editing the library or placed component properties. I see some similarities with KiCad but the latter would appear to be the more versatile program. The gEDA website has lots of links to interesting related projects.

A close up of one of the sample designs provided with KiCad, a PCI connector and traces.

## KiCad.

Unusually, this is a program written to run under the Linux operating system but uses graphics libraries which allows equivalent Windows versions to be made. It is a complete package but uses four separate programs to complete a design. These are linked by a project control window but can be run independently as well. The first, “EESchema” is the schematic capture part, designating the component shapes to use is done with

“CVPcb” and the PCB trace layout is done with “PCBnew”. The final part if needed is “Gerbview” which as it’s name suggests is a Gerber file viewer to inspect circuit boards before sending them to a production house. KiCad uses a hierarchical page structure, meaning you can link several pages of design through a master sheet. For example, you could have a master sheet showing the sections of a design and their interconnections and then a separate sheet detailing each of those sections.



KiCad can zoom into a PCB and rotate it in space to show what it will look like when assembled.

The component library included in KiCad is very good and users are encouraged to share new library devices with each other through the support web site. One user has developed a web based component designer which allows you to specify the pin names and functions of a new device, its shape and placement of pins, then produces the library model for you to import into your project. Although described as ‘experimental’ for several years, the PCB package has a useful facility for producing microwave striplines and signal delay traces. New stable versions of KiCad come out about every six months but development (use at your own risk) releases are almost daily so if you want to try them and report back problems you can do so. KiCad is open source and completely free.

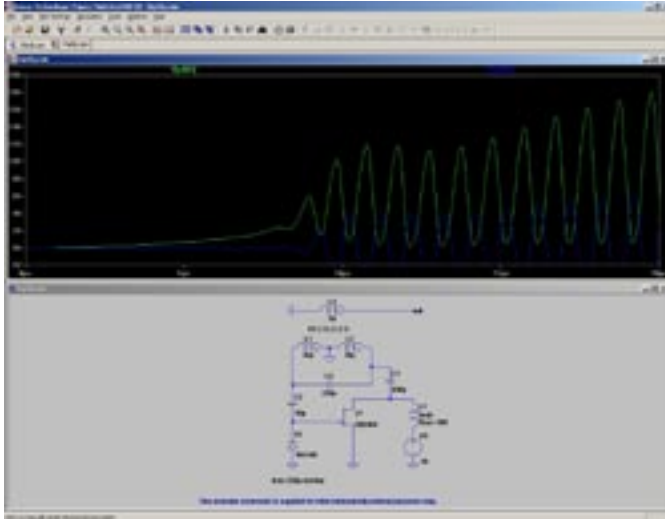


## SwitcherCAD III

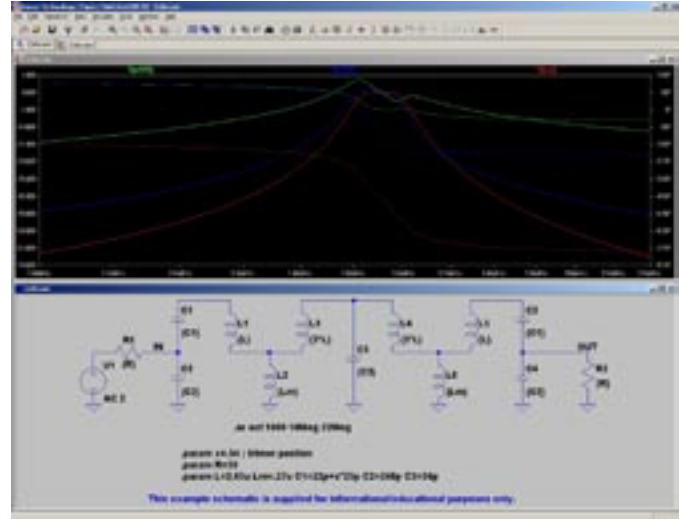
The name of this package comes from the manufacturer Linear Technology who specialise in switch mode power applications. The program is not limited to that field though and is one of the better schematic capture and simulation packages. It has no PCB design functions whatsoever but schematic

data can be exported as a netlist in 21 different formats so it should be compatible with every PCB program imaginable. SwitcherCAD has an excellent library which is expandable and far from limited to Linear's products but it's greatest strength is its simulation capability. All you have to do is draw the diagram and then point one or more 'virtual' oscilloscope probes at it to see the expected voltages

and waveforms. It is also capable of performing frequency and time domain analysis. In plain language, it can plot the frequency response of filters and even allow component values to be tweaked to see how the response is influenced. The program is free from the Linear Technology web site and is updated frequently as they add new devices to their range.



Showing a simulation trace of a Hartley oscillator as it starts up in SwitcherCAD



SwitcherCAD showing the frequency response at different taps along a filter circuit

## TinyCad.

This program hasn't been updated for about two years so its future is somewhat doubtful. It is a schematic capture program which can export its designs to other programs but has no PCB design capabilities. Many people use TinyCad in conjunction with FreePCB which it compliments rather nicely. I have used TinyCad to produce circuit diagrams for publication because it is quick and produces very neat looking schematics. It does have a minor irritating feature which is that it stores its symbols in a Microsoft JET database rather than an open source one. This means that you either have to install one of the Microsoft Office programs or download special support files from Microsoft before it will work. The rest of the program is open source and free of charge. I think the reliance on JET is probably due to it being on the developers computer already and was used without consideration to other computer configurations. Of course being free you shouldn't complain and you certainly can't ask for your money back!

Also of note – but somewhat more expensive:

## Altium Designer.

This program package does everything. It works from schematic capture to PCB and simulation and can even be used to design custom ICs. Its costs so much that the company don't advertise the price, you have to ask them for it. My guess is about the same as a small car for starters and considerably more if you add extra modules.

## Orcad.

Now handled by a company called Cadence. There can be few engineers who haven't come across it at some time because Orcad is used almost universally as an educational aid in colleges and universities. This is clever marketing by Cadence who try to build brand loyalty at the earliest opportunity. To be fair, Orcad is probably the best all-round product for electronic design work but at a price which puts it out of reach of non-commercial operators. It is also one of the longest established programs. I remember using it over 20 years ago when it ran under DOS.

## Circad (also known as Omniglyph).

One of the wierder packages in that it claims to be written in assembly language and by electrical engineers rather than 'utility programmers'. Its interface is certainly unusual and somewhat reminiscent of DOS rather than Windows or Linux but maybe for strictly technical operations that isn't a bad thing. It is the only program that claims to be able to reverse engineer a PCB by looking at a scanned photograph of it. At \$995 I'll accept their word for it, I don't think the Treasurer would let me buy a copy to find out for myself. There is a demo version which confirms it works but intentionally isn't much use as a production tool. What I can say is that it is blisteringly fast, no doubt due to the assembly language programming.

## PADS

This package comes from Mentor Graphics, a highly respected company with a long history in the electronics design and manufacturing arena. PADS is the PCB development section of a much larger package which covers virtually all aspects of design and production. Its expensive of course and probably



a bit too advanced for most readers of this article. Looking at their web site today I see a headline “3.125 Gbps with your Hair on Fire - Simulation-Based Signal-Integrity Analysis of Digital Interconnects at Multi-Gigabit Speeds” which shot straight over my head and clearly places it somewhat out of the hobbyists realm.

## Easy-PC

From Number One Systems comes a mid-price ranged product which does the most useful functions in product development but doesn't carry the excess baggage of some of the other applications. The starting price is £247 for a full package with PCB autorouter but it is limited to 1,000 component pins. For the home user or small business this is probably adequate but there are more

expensive versions with a 2,000 pin limit or an unlimited version if needed. There is also an optional improved autorouter at a cost.

## WinQcad

I include this because I have heard of the program but I have never used it or know anyone who does. It claims to be compatible with Orcad but presumably at a competitive price. The producer is Microcad and their web site indicates it can handle all the design stages and has a PCB autorouter compatible with Spectra which is one of the best on the market. A free demo version is available with a restricted pin count and limited Gerber file size. The full program costs between \$240 for a limit of 500 pins and \$960 for version with no pin limit.

## Conclusions:

Without doubt, if you want a comprehensive do-everything design solution you have to dig deep into your pocket but for those of us on a limited budget, there are still some very competent programs out there if you search for them. I have used all the programs in the low cost section and some of the more expensive ones. For a time I used Autotrax as my main program but I have recently switched to KiCad. It's a personal preference of course but I find KiCad does everything I need to develop circuit boards and in functionality it is almost the same as Autotrax. It has two big advantages from my point of view, it's free and it works in both Windows and Linux. As Windows gets bigger and slower I find Linux becoming even more attractive so the ability to copy work files between systems is especially appealing.

## Web addresses:

Autotrax – [www.kov.com](http://www.kov.com)

EAGLE – [www.cadsoft.de](http://www.cadsoft.de)

FreePCB – [www.freepcb.com](http://www.freepcb.com)

gEDA – [geda.seul.org](http://geda.seul.org)

KiCad – [www.lis.inpg.fr/realise\\_au\\_lis/kicad/](http://www.lis.inpg.fr/realise_au_lis/kicad/)

SwCadII - [www.linear.com/designtools/software/switchercad.jsp](http://www.linear.com/designtools/software/switchercad.jsp)

TinyCad – [tinycad.sourceforge.net](http://tinycad.sourceforge.net)

Altium – [www.altium.com](http://www.altium.com)

CirCad – [www.holophase.com](http://www.holophase.com)

Cadence - [www.cadence.com/products/pcb/Pages/default.aspx](http://www.cadence.com/products/pcb/Pages/default.aspx)

WinQcad – [www.winqcad.com](http://www.winqcad.com)

MentorGraphics - [www.mentor.com/products/pcb/index.cfm](http://www.mentor.com/products/pcb/index.cfm)

Easy-PC - [www.numberone.com/easypc.asp](http://www.numberone.com/easypc.asp)

Vutrax - [www.vutrax.co.uk](http://www.vutrax.co.uk)

Program	Windows	Linux	Schematic	Netlist	PCB	Gerber	Autoroute	Simulator	Price
Autotrax	Yes	*1	Yes	Yes	Yes	Yes	Yes	Yes	\$99 US
EAGLE	Yes	*2	Yes	Yes	Yes	Yes	Yes	No	\$49 to \$1494 US, restricted demo is free
FreePCB	Yes	No	No	No	Yes	Yes	*3	No	Free
GEDA *4	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Free
KiCad	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Free
SwitcherCad	Yes	No	Yes	Yes	No	No	No	Yes	Free
TinyCAD	Yes	No	Yes	Yes	No	No	No	No	Free
Altium	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	According to which modules are installed
Cadence	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	According to which modules are installed
Circad	Yes	No	Yes	Yes	Yes	Yes	Yes	No	According to maximum pin count
Mentor Graphics PADS	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	According to which modules are installed
Easy-PC	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	£247 up to about £1500 for all options
WinQcad	Yes	No	Yes	Yes	Yes	Yes	Yes	No	\$240 to \$960 US according to max pin count

Comparison of the CAD packages.

## Notes:

\*1 a Linux version called Leonardo has been promised and apparently released but no information could be found on it.

\*2 the free restricted version is available for Linux, this might be upgradable to the full version.

\*3 works in conjunction with FreeRoute but this is not part of the program itself.

\*4 a version compiled for Mac OS-X is available in the links page of the web site.

Please note that some of the Windows programs may run under WINE emulation on Linux systems but this has not been tested. Linux/UNIX versions of the commercial programs are almost certainly available but not listed on the producers web sites.

# 23 cm Propagation

By Ian Waters G3WKD

This report describes some measurements made on the strength of the signal received at the writer's station from the Cambridgeshire Repeater Group's 23cm ATV repeater GB3PV.

## Setup

GB3PV, located at Madingly (TL 392 594) some 7 km west of Cambridge city, radiates 25W erp from an omni directional aerial at 77 m above MSL. At G3KKD, located in Quy (TL 519 603) some 7.5 km east of Cambridge, two aerials were in use at the time of these measurements. There was a main aerial at a height of 16 m above MSL and a look thru aerial at 14 m. Both had an effective gain of 19 dBd. The look thru aerial was on a separate mast 4.5 m from the main mast and at 90 deg. from the line of the signal. The path PV\_KKD is thus quite short and is unobstructed except for trees and some small buildings.

The look thru feeder included a filter with an insertion loss of 2 dB and the receiver was equipped with an s meter, not calibrated in absolute signal level values, but in relative dBs.

## Measurements

Graph 1 shows the relative received signal via the main aerial from 07:00 to

20:00 hrs on a rather hot summer day in June. It will be seen that there was a 4 dB reduction in signal as the temperature increased. Graph 2 shows the received signal level, via the look thru aerial, over a period in late October.

It will be seen that the signal level was lower, as might be expected from the lower height and the presence of the filter, but showed a change of 5.5 dB, Graph 3 shows the averaged daily signal levels versus averaged daily temperatures over a five month period from summer into autumn.

It will be seen that both aerials performed similarly with a variation of over 4 dB for the main and 5 dB for the look thru.

## Conclusions

Over this quite short and fairly unobstructed path signal strength varies quite strongly with temperature on a daily cycle superimposed on a yearly cycle. Although not shown on the period covered by the graphs, a measurement made in the following January when the temperature was -5 deg C showed a signal level 2 dB higher than the highest recorded.

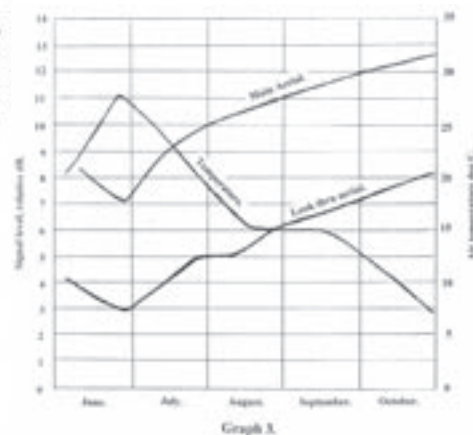
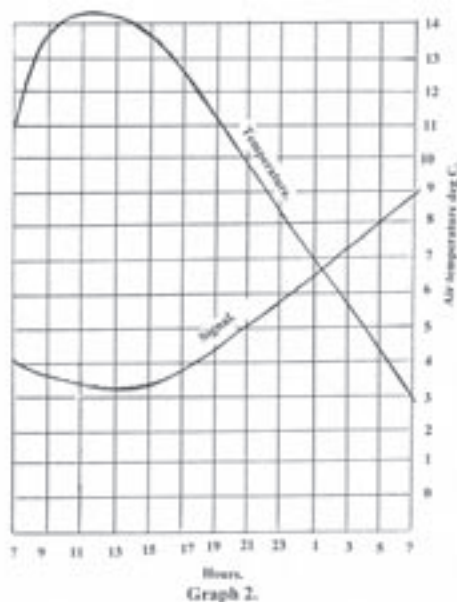
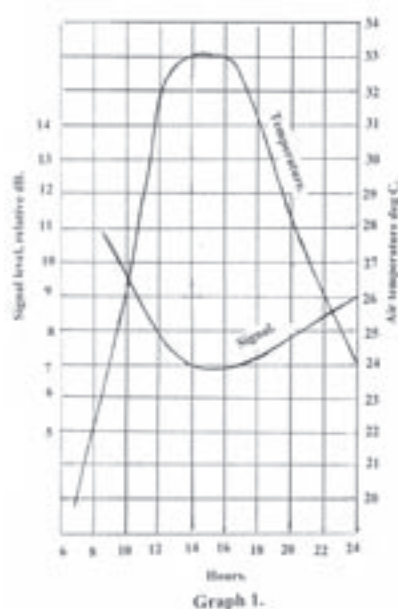
It may thus be concluded that there is a change of some 8.5 dB between a warm summer afternoon and a cold winter night. It is as well that it is this way round as it on winter evenings that we

are most likely to be working ATV.

I was unable to find any correlation between signal level and atmospheric pressure or humidity, but there could be a change caused when the leaves come on the trees in spring and fall in autumn. There are very short term variations of several dB caused by trees and probably aerials blowing in the wind.

While I am no propagation expert, reading the text books shows that, neglecting air pressure and humidity which only cause secondary effects, the refractive index of the air varies inversely with temperature. It seems that the results can be explained by there being greater refraction at lower temperatures causing part of the signal that would otherwise pass over my aerials to be refracted down and received.

Since these measurements were made, while the signal via my main aerial has remained constant, that via my look thru aerial became very distorted and virtually disappeared. I suspect that this is due to some obstruction in the path having been built or having grown larger causing a reflected signal out of phase with the main giving almost total cancellation. I have had to move the look thru to another part of the garden. Whereas with FM on a marginal path a change of this sort will result in little more than one p rating point, with DATV it could be the difference between no picture and P5.



Although not ATV, a somewhat similar effect has been observed at my location with Freeview. I receive TV from Sandy Heath at a distance of 38 km. While most programmes are carried on channels in the 40s and are radiated from an aerial at the top of the mast,

BBC4 and interactive are on channel 67 and radiated from half way up the mast. The result is that while all but 67 are solid throughout the year, 67 disappears in the spring and returns in the autumn. At times of transition no pictures are available in the day, they become blocky as the evening progresses and

then satisfactory later on. I suspect this results from about a 6 dB change in signal the combined effect of leaves and temperature . I have been too lazy to upgrade my aerial and take BBC4 via FTA satellite instead.

# A DATV signal detector

*By Ian Waters G3KKD*

The Cambridge ATV repeater GB3PV is being equipped for digital operation, this raised an interesting requirement.

**Requirement:** To detect an incoming DATV transmission and send a signal to the control logic.

**Constraint:** To do this without modifying the free to air set top box used as the receiver, so enabling it to be replaced easily.

**Problem:** An STB outputs sync, blanking and an on screen display (OSD) saying no/weak signal when none is being received. This prevents a conventional sync detector from being used.

**Solution:** This rests on the fact that the OSD only occupies a small part of the picture area, typically 2.5%, whereas a normal picture occupies virtually all of it.

**Circuit:**

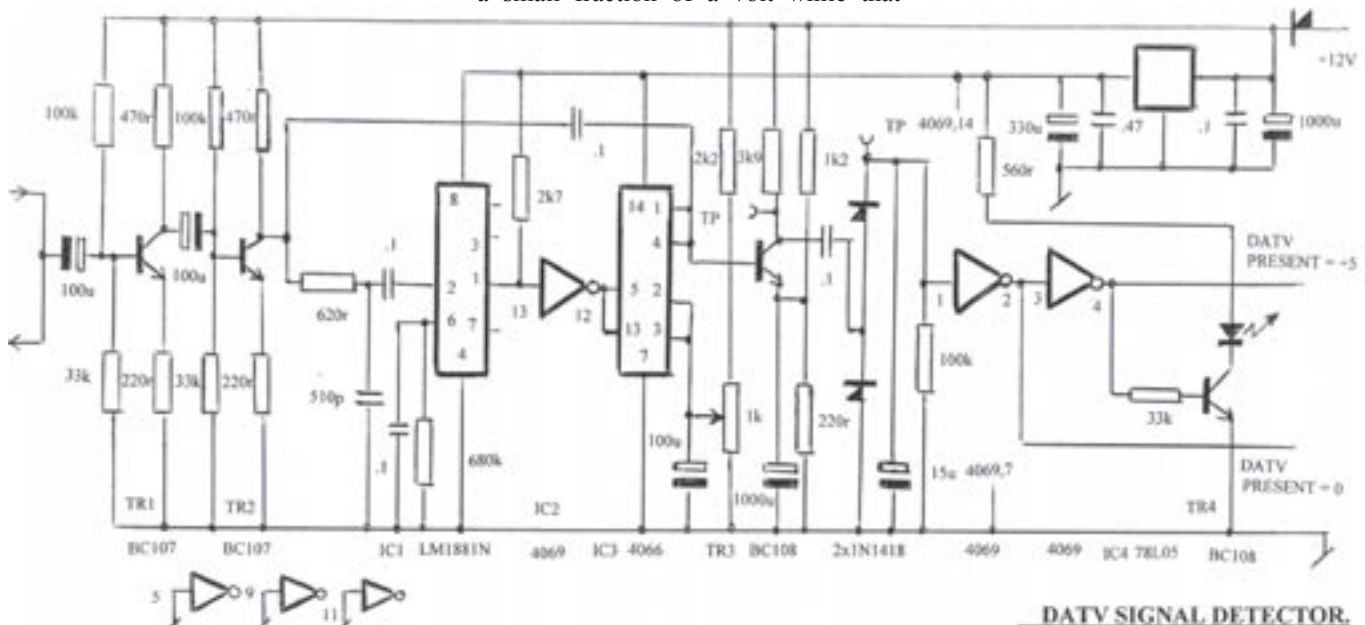
The unit is bridged across the video line from the receiver. TR1 and 2 form a buffer preventing the unit from influencing the received signal and providing a voltage gain of 3 without a phase reversal. The signal from the collector of TR2 passes two ways. IC1 is a sync separator from which only the burst gate from pin 1 is used. As this is a negative going pulse it is passed through one section of the inverter IC 2 to provide a positive going clamp pulse. IC 3 clamps the video signal at the base of TR2 to a voltage determined by the potentiometer.

The emitter is held at a small positive voltage and the potentiometer is adjusted so that only the video component appears amplified across the collector load. This may be observed at TP1. This video is passed to a voltage doubling rectifier which charges the 15 uF capacitor. The voltage produced by the OSD is only a small fraction of a volt while that

produced by a typical picture is 5-6 V. It can be measured at TP2. This voltage is passed through two more stages of the inverter IC2 . This gives the choice of two logic outputs one of which is high and the other low when a valid DATV signal is being received. The LED lights when this is so.

**Comments:**

It is possible that the unit could be deceived if the DATV picture is faded to black for more than a second or so. However I have fed a broadcast programme through it and watched for a considerable time and have not seen this happen. If this were to be a problem the 15uF capacitor could be increased in value . When the DATV signal drops the OSD will be seen for a second or so before the repeater switches to its beacon mode or whatever. This unit was constructed using components in stock, It could of course be constructed using more modern equivalent devices.





# Internet linking by radio

By Peter Blakeborough G3PYB  
and Ian Waters G3KKD

Prior to the club's convention and biannual general meeting, held at Quy near Cambridge on 5<sup>th</sup> October 2008 the BATC had televised two other events and streamed vision and sound worldwide via its [www.batc.tv](http://www.batc.tv) web site. Both these venues had the advantage of a broadband internet connection being available.

When planning the convention in Quy the club wished to stream its own event, but unfortunately the hall used did not have an internet connection and the provision of one would have been prohibitive.

It was therefore decided to make use of the line available at G3KKD's house, about a third of a mile away, and to connect to the hall by two way radio links using amateur radio/television equipment.

## The uplink

Presentations in the hall were televised by two professional quality cameras backed up by computer graphics working in conjunction with a vision mixer while sound was picked up by several microphones with a sound mixer.

Video and audio were fed outside the building to G3PYB's car parked close by where they were fed into an AGAF MPEG 2 coder and modulator assembly. This produced a QPSK modulated signal with a symbol rate of 4165 ks/s and 7/8 forward error correction on a frequency of 437.25 MHz.

This was then up-converted and amplified to deliver a signal in the 3.4 GHz band to a flat plate 22 dBd aerial on a short mast attached to the car.

At G3KKD's house an aerial with an integral down-converter to L band had been installed on a temporary mast in the front garden, from which the signal was routed into the shack. The temporary

mast arrangement was to keep the signal path clear of a neighbouring building.

In the shack the L band IF was fed into a domestic free to air satellite set top box which demodulated and decoded it to deliver conventional PAL video and audio.

These signals were processed by an external A/D unit, which converted them to USB2 computer standards, to be coded into a flash file by a laptop computer logged on to the BATC web server. The computer connected by an existing Ethernet CAT 6 cable from the shack to the BT voyager router in the house and thence to the ADSL line.

## The down link

In the reverse direction signals from the ADSL line came via the router and the ethernet cable into the shack and thence into the laptop.

The SVGA output from this was converted to PAL CVBS and audio to be fed to a link coder producing an MPEG 2 coded QPSK signal with a symbol rate 2000 ks/s and an FEC of 1/2 on 70 MHz to feed a 70 to 436 MHz up-converter and amplifier. This signal with a power of about 3W was fed directly into G3KKD's main 70 cm aerial array beamed toward the hall.

While a symbol rate of 4165 ks/s producing a transmission bandwidth of about 4.2 MHz was satisfactory for

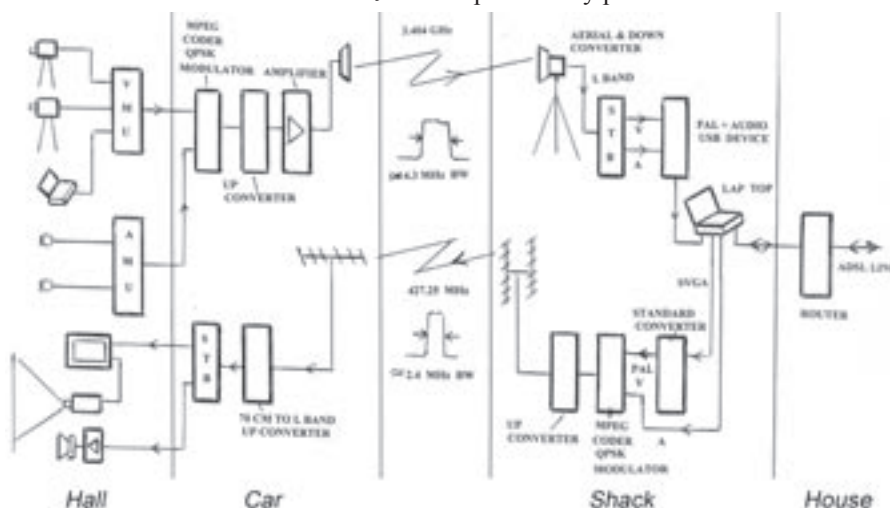
use on 3.4 GHz, a lower symbol rate giving a transmission 2 MHz wide was considered more appropriate for use on 70 cm. In addition the link coder used steeper roll off on the QPSK skirt.

The 70 cm signal was received by a yagi aerial attached to PYB's car where it was up-converted to L band and fed to another set top box, as no dedicated 70 cm DATV receivers are currently available up-conversion enables the complex functions of demodulation and decoding of a 70 cm signal to be performed by an inexpensive domestic item.

Video and audio was finally fed into the hall to be displayed on monitors and by a large screen projector on which a contribution from California was shown.

## Setting up and testing

Although the 3.4 GHz path was short it was quite heavily obstructed by trees. In view of this it was thought desirable to test it before proceeding with the project. Tests carried out several weeks in advance of the event showed that the path would work, but that some rapid variations in the received bit error rate were present, it also showed the desirability of avoiding the neighbouring property so leading to the erection of the temporary mast in the front garden for the receiver. The 70 cm path was also tested although this was not expected to present any problems.



Also in view of the complexity of the whole set up and the fact that it would be assembled using equipment from several sources, arrangements were made to have the hall available on the day before the event for setting up and testing. There are few things

more embarrassing than trying to make equipment work when visitors are arriving!

In the event this proved to be a wise move as it took a team of three most of the day before everything was

ready. While there was nothing wrong with the concept, the main problems were the usual ones of defective plugs and sockets etc. Once these had been cured the system worked for the whole period of the event without the need for adjustment or any other attention.



3.4GHz 22 dBd aerial



DATV TX Equipment



## TV FUN.

Dicky Howett writes, "What a wheeze chums, colour tv on a 1953 Kolster Brandes console tv receiver. Simple really. Just insert 15" inch JVC monitor (circa 1995) plus a bit of Mini-DV footage from my recent trip to NYC and lo, retrovision in 2008."

*(With apologies for those watching in back & white! - Ed)*



# The 2008 BATC Rally and Biennial General Meeting

By Chris Smith G1FEF

Your clubs 2008 rally and BGM was held at Stow-Cum-Quy on Sunday 5<sup>th</sup> October.

A big thank you to everyone who helped organise and setup, especially those who came the day before and had long journeys!

An even bigger thank you to all of you who turned up on the day and made it the success that it undoubtedly was.

My weekend started on the Saturday morning as I piled just about everything I could think of into the back of our estate, "just in case" it was needed. A two hour journey directed by satnav brought me to the village hall where Peter G3PYB and Dave G8ADM had already setup and were busy testing the RF link back to Ian G3KKDs house, who had kindly agreed to provide the internet link on the day.

I started unloading my VT4 (Video Toaster, as described in Trevors article last issue) which was used as live production mixer and recorder on the day. Shortly after Trevor arrived to help run cables and get everything setup and tested.



From the comments I heard over 2m I gather Peter, Dave and Ian had some fun and games getting the RF video link setup - they provided a two-way DATV link, the uplink on 13cm to send AV to Ians house and then onto the internet, and a return DATV feed on 70cm so we could see what was happening as well as provide the link from Don Hill KE6BXT ATN-CA President later in the day.

Everything was eventually setup and deemed working, we then disappeared back to our hotels with a suggested meet at Peters hotel for dinner later in

the evening. Everyone managed to turn up for dinner on time except Trevor and Pauline, we had to talk them in over the mobile *and* they had satnav - perhaps he's not as multi talented as I first thought (see front cover) !!

Bright and early the next morning I set off back to the hall to complete the final checks and help with the Sunday arrivals, it all went fairly smoothly apart from one of Paul Marshalls cameras that refused to provide any colour! Even Peters 30m video and audio cable runs comprising of joined up patch leads seemed to work ok!

The members started to arrive all too soon, a quick change to the advertised program, due to an incorrect time on the website and Brian G8GQS kicked off with an informative lecture on camera history.

The next lecture attracted the biggest audience: John Banks from the CAA gave a very interesting and insightful lecture on spectrum management and how the CAAs input can affect NOV applications, especially with regard to ATV repeaters.

A break for lunch was announced although the only food appeared to be a full blown sunday roast at the local pub and I'd forgotten to bring sandwiches!







enthusiastic member of the BATC - I will continue to supply copy and pics to CQ-TV and have booked a BATC table at Donington Rally (no racing noise this year, we are assured). Am now in contact with a member who has offered a good site and mast for an ATV repeater.....

### Contest Report

Dave Crump could not be with us, but Trevor Brown read his report:

“Since my appointment 2 years ago, I have added 2 repeater contests to the Contest Calendar each year in addition to the Summer Fun and IARU contests..



The repeater contests have seen an increasing number of entrants, including some using Repeater Linking, digital modes and internet linking. . Unfortunately the conventional format contests have had very few entrants. For example only 2 in the latest IARU Contest.

The BATC is hosting this year's IARU Contest and I shall be compiling the Region 1 results in a few weeks time..

Although I am fulfilling the role of Contest Manager whilst living in the USA, and have been unable to compete, I am enjoying it and was particularly pleased to receive an entry for the last repeater contest from Gary VK2CRJ, who had used the internet link into GB3HV to compete. Such is the diverse future of our hobby, and I hope to continue to encourage this innovation whilst I am Contest Manager.

### Membership

Pat Hellen was unable to attend this year, but reported 772 members 152 of which are now cyber. Membership is on the increase.

After the break and with my blood suger boosted by half a packet of biscuits the next lecture kicked off with Peter Blakeborough G3PYB, Dave Mann G8ADM and Ian Waters G3KKD taking it in turns to provide details of their DATV efforts along with a short video on GB3BH

The final lecture of the day was given by Mike Cox and was called Upstream, followed by a live link from Don Hill KE6BXT ATN President from California. There were a few technical glitches due to bandwidth limiting at Ians house (we *were* streaming in both directions at the same time!) but we managed to stabilise it and Don was able to address the membership for a few words.

At 3pm the BGM started, there now follows the official minutes:

### Chairman's report

Trevor Brown reported on the declining position of the club in 2006 No CQ-TV editor and a declining membership. Brian Kelly took over as temporary editor and produced three Magazines. Chris Smith then took over as Editor and has since produced four more magazines.



The committee reduced the cost of Cyber membership and allowed UK members to join the scheme We have place reciprocal ads into other magazines ie. VHF Communications. Set up a Paypal subscription account for processing membership fees.

Introduced a discussion forum and the club video streamer [www.batc.tv](http://www.batc.tv) which has so far being funded out of sponsorship.

Yet to come a new online member's database.



The result is we have reversed the decline in membership and 2008 is on target to be the year we finish with more members than we started.

Trevor thanked Brian Kelly and Chris Smith for their hard work.

### Secretary's report

Enjoyed organising the BGM wrote to the CAA 'on spec' to see if anyone was willing to speak. I am certain that lecture alone drew some attendance in. I am now off the committee I remain an



### **Treasurer**

The treasurer reported that the last two years produced a surplus in the accounts and that the BATC was in a strong financial position.



He then outlined the changes in the way that subscriptions are processed and the adoption of the Paypal payment and credit card systems. It was stated that the existing Barclaycard system will be surrendered when we are satisfied with the Paypal operation. The BATC is still very happy to accept Cheques as payment.

An explanation of the workings of the Cyber membership system was then given.

It was explained that members services had a large amount of unsold stock and that the book value of this has been reduced to a realistic level and that disposal would be attempted for unsaleable items.

A report of the sales of members DVDs from publications was good with a good surplus being made on this item. The treasurer stated that paper CQ-TVs were still available from publications.

### **Editor**

Chris Smith explained he had now produced four issues of CQ-TV and that the major problem was still the lack of copy submitted by members.

### **Election of Committee**

Dave Lawton and Graham Hankins stood down from the committee.

Paul Marshall, Brian Summers and Giles Read stood down and we re elected, Chris Smith previously seconded to the committee was also elected.

Proposed by Bob Robson  
Seconded by Tom Mitchell  
Carried unanimously.

Paul Marshall, Brian Summers, Giles Read, Chris Smith, Pat Helen, Ian Pawson, Graham Shirville, Mike Cox, Dave Crump and Trevor Brown are the committee for 2008 to 2010

### **Awards**

John Lawrence  
Bob Robson  
Peter Delaney  
Dave Lawton  
Brian Kelly  
Trevor Brown

Were all appointed honorary members of the club.

The prestigious Grant Dixon Award was presented by the club president to Chris Smith for his work on CQ-TV, the BATC forum, the batc.tv streamer, and the new online database.

The Meeting closed at 15:42





# ATV on the International Space Station

By Graham Shirville G3VZV

A meeting of the ARCOL (Amateur Radio on Columbus) team was held last month in Belgium to further develop the plans and specifications for the amateur radio equipment to be installed in the Columbus module of the ISS.

The Columbus module was delivered to the ISS early this year and has two dual band L/S antennas already installed on the outside. In addition there are plans for the installation of two additional VHF/UHF dual band antennas during a spacewalk in mid to late 2009.

These new antennas would provide even greater flexibility for ARCOL operations but the main focus of the planning team remains to incorporate a digital video downlink and possibly some form of video uplink capability as well.

There are tremendous constraints on what can be done, the mass has to be very small, the power consumption and thermal dissipation also will have to be very small. However the intent is to

provide a system which astronauts could use whilst making their schools contacts (these are currently voice only affairs!) and which could be used by individual radio amateurs at other times.

With the mass and power limitations comes the challenge of the link budget... how big an antenna would be needed on the ground? It looks likely that the video will have to be restricted to 200-400kB data rate but that is still conjecture.

What is REALLY needed at this moment is an injection of fresh ideas and equipment designs from additional ATV experts in this field.

There are further meetings planned with ESA for early next year but if you are interested in becoming part of the ARCOL team and contributing towards the future of ATV in space please contact me in the first instance!

[g3vzv@amsat.org](mailto:g3vzv@amsat.org)



Photo:  
ESA

## The BATC 60th anniversary

*BATC turns a youthful 60 in 2009 with signs of the club entering a new era thanks to the streamer project.*

In order to celebrate this milestone birthday the committee of the BATC is pleased to announce that there will be a special event in the summer of next year. The format of this event is still being worked on but the general idea is that of a technical conference with an

exhibition of past and present hardware followed by a dinner.

It is hoped to gather together as many of the original members as possible - we're on the look-out for them!. A good turnout of our membership (and guests) would make this a memorable event and it is hoped that it will receive attention from the media. It will be an opportunity to celebrate, to socialise and to plan our

future direction.

Any ideas, offers of assistance, requests or comments please forward to [publications@batc.org.uk](mailto:publications@batc.org.uk), or telephone Paul or Jill Marshall on 01522 703348 or write to us at:

Fern House, Church Road, Harby, NEWARK, Notts. NG23 7ED

Cyber-membership: CQ-TV beamed directly to your PC  
four times a year for only £4  
Visit: <http://www.batc.org.uk> for details



# Streaming a live event

By Trevor Brown G8CJS

In the last issue I explained some of the problems of engineering a small TV production unit, and came down heavily in favour of a small mixer with inbuilt synchronisers. The club has now purchased a Data Video SE 500 mixer for streaming live events and I have had a chance to play with it, evaluate it, and use it on a live event.

The first limitation is it only has two synchronisers, but having said that it manages them incredibly well. There is no preset and take logic that I feared might be imposed by only having two synchronisers, it is possible to select any one of the four sources directly on the cut bank without any disturbances, I can only assume that the cut bank buttons select the input source of the synchroniser that is not in use and then change the synchronisers over after a small delay to allow settling, if this is the case the delay is small and the logic is transparent to the operator.

It's a four input mixer, the fifth source is a selectable colour background, which is rather clever, you press the background colour button, to change the background colour and not only does the colour

of the background change the actual button changes colour too in sympathy to indicate the selected colour from one of eight, if you include black and there is a surprising good colour match between the colour of the button and the on screen colour

There is also a sub source bank of buttons so you can select another source and mix or wipe to it with a conventional fader. Other features are PIP (Picture in Picture) and the sub source is faded up as a reduced size picture in one of four preset screen positions, It can be given a coloured border that matches the coloured background. The output of the mixer can be frozen, useful for simple presentations so a power point screen viewed by a single camera can be retained, while the camera is repositioned and then mixed to.

There is also a split so two pictures can be squeezed sideways into the same frame, the sort of thing Channel four does to the credits to promote the next programme, drives you mad, or is just me?

There is a quad split output as I mentioned in the last issue which displays the four input sources on a single monitor

along with on screen tallies to indicate the on air source, and this works in conjunction with a preview button for mixes and wipes, press this button and the quad split is replaced with a preview of the selected mix or wipe, it only takes a second and then the quad split is returned, but its very useful. This enables a single monitor to view four sources and preview effects, the mixer is light and easily transportable, you would not want spoil this by carrying around a monitor stack would you.

On the technical front the inputs are CVBS or Y/C and there are two CVBS outputs and one Y/C output and even a component output that uses one CVBS and one Y/C output, although I must admit I have not tried this yet. I have tried hard to find sources it will not lock to from off air to CCTV camera's DVD players a pic-osd.com character generator and a VGA to video converter, I failed - it mixes all of these together without batting an eyelid

Combined with this piece of video wizardry is a small but effective sound mixer one stereo mic input or two mono mics inputs along with a stereo aux input, with separate faders and a master fader, a bar graph level meter, well you

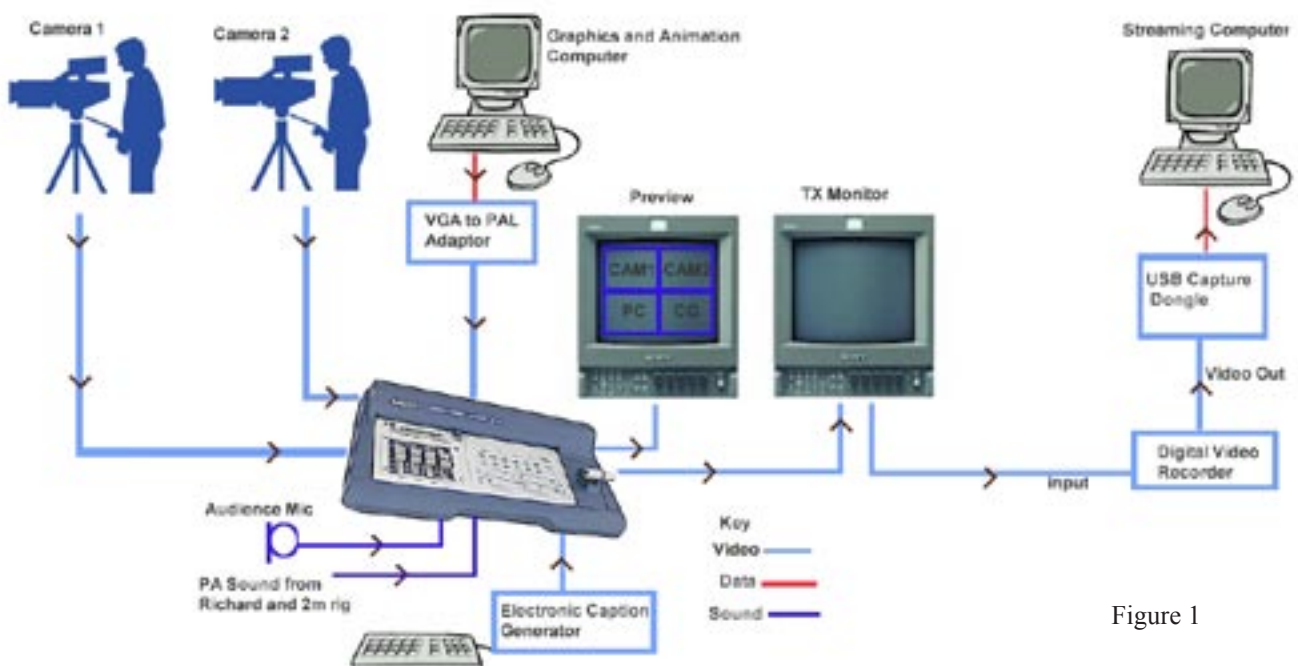


Figure 1

weren't expecting a PPM were you, and a headphone socket so you can monitor the sound, it's a plug top power supply so it could work on 12 volts if you were planning a really ambitious outside broadcast away from domestic mains or generators.

I think this is a well planned very useful piece of kit. I have a few small dislikes, one being no key input so strap lines have to be wiped up from the bottom. The headphone amp does not quite deliver enough umph for my DT100 head phones, it's designed for low impedance cans. The tally out connector is a VGA plug and needs me to construct a break out box so the camera operators will know when they are on air. I hate soldering leads to one of these, fortunately I only need to hook up 5 wires to let the camera operators know when they are on air. If only it had been a female connector wired to match those AV leads that are 5 BNC's to a VGA male connector, but a crossover box should still be within my constructional capabilities. Last but not least a plug top power supply, the sort that jams up a multi plug, I much prefer the inline kind especially with an IEC input. These are all very small grumbles, for such a well engineered unit.

Where do we go from here? well the intention is to form an events team to use the mixer to televise live events on the streamer, The first live was Friday the 17th of October and a chance to find out how the mixer would perform streaming a real event.

The event was at Budbrooke school and was an amateur radio contact with Richard Garriott W5KWQ on the international space station

The mixer arrived late Wednesday and so Thursday was a make leads day and come up with a plan. The equipment configuration I had pre planned as per Figure 1.

Those of you that watched this event live on October the 17 it lasted just 11 minutes, for me it was a three hour drive so I passed on the rig day and opted for an early start on the day. The contact was for 1200 and I had hoped to arrive for 9am and get the TV side of things rigged in and operational in a couple of hours, but it was 10am when I finally got to the school. The plan relied heavily on the mixer which seemed to be the answer to all the non sync problems, but with the late arrival of the mixer on Wednesday and early start on Friday, most of Thursday spent making leads and not much familiarisation time with the kit and getting to the site an hour later than intended did not help

Peter Blakeborough loaned his Sony BVP 7 camera and assured me everything needed to get a picture was in the flight case, I never tried the camera and this was to become the backbone of the shoot providing pictures of the children talking to Richard. The second camera was a loaned CCTV camera and was locked off on a wide shot of the school children watching the event. The computer was going to provide the

graphics to cover the absence of pictures from the actual space craft. I also copied these onto SD card and took along one of the small Scandisk card readers.

On the day the PC was used to show the orbit of the ARISS craft on a large flat panel screen, so the backup became the main plan and it was plugged in to the mixer in place of the caption generator on which I had hoped to add name straps of the children as they spoke to Richard this was thought to be too ambitious on the day.

Did it all work? I think so, the equipment held together, the mixer picture delay, causes lip synch errors, but nobody commented on the streamer text, and it can be fixed on the library copy, perhaps an audio delay could be added at some future date. The CRT monitors in the diagram were replaced by two LCD monitors which were part of a special offer when we bought the mixer, and make life just so much easier, but did empty the sponsorship coffers.

For me the best part was seeing the expression on the childrens faces. The whole event was recorded on the Digital Video Recorder and is now in the streamer library, so judge for yourself. My thanks to Graham Shirville G3VZV for his help with the cameras and running the streaming desk. The communications team: Carlos Eavis G0AKI, Howard Long G6LVB and Ciaran Morgan M0XTD not forgetting Richard Garriott W5KWQ

See the rear cover for more photos of the event and point your web browser at:

<http://www.batc.tv>

to watch the recording of the event - Click on the "Film Archive" icon, select "Richard Garriott" from the drop down list and click on the Select button. You can then play the video by clicking on the Play button (white triangle directly below video).



# Contest News

By Dave Crump G8GKQ

## IARU International Contest

The International Contest in September did not see as much UK activity as I had hoped. Ian G3KKD was active in Cambridge, but had no replies to his CQ calls. I only received 2 entries:

### IARU International 2008 UK Contest Results

#### 23 CM

Place	Call Sign	Points	Locator	QSO	DX	DX Loc	Km
1	G0ATW/P	3870	IO93WH	5	G7AVU	IO93OJ	265
2	M0DTS/P	944	IO94LI	3	G0ATW/P	IO93WH	130

#### 13 CM

Place	Call Sign	Points	Locator	QSO	DX	DX Loc	Km
1	M0DTS/P	1080	IO94LI	1	G7AVU	IO93OJ	108

#### Overall UK Results

Place	Call Sign	70 CM	23 CM	13 CM	3 CM	Total Points
1	G0ATW/P	0	3870	0	0	3870
2	M0DTS/P	0	944	1080	0	2024

There were at least 11 UK stations active in the contest. It would be great to have had logs from the 8 that I did not hear from. Please contact me (by post) if you need paper entry sheets. Please note that I aim to acknowledge all entries I receive by e-mail within one week; so if you don't hear from me after submitting your entry, please assume that I haven't got it and try again. I would rather receive multiple copies that miss someone out.

## International Results

I have just compiled the provisional International Results for the IARU Contest which I will publish here as CQ-TV is just closing for press. The final results will be published on the BATC Website. Here are the top 3 and the UK Contestants. There were a total of 38 Entries.

Pos	Call	70	23	13	3	Total
1	PA1DYK	1270	3810	8990	1280	15350
2	F6ANO	4202	7700	1735	1250	14887
3	F6GNJ/P	3953	7728	1640	650	13971
19	G0ATW/P		3870			3870
27	M0DTS/P		944	1080		2024

The band winners were:

Band	Call	Locator	QSOs	Points	Best DX	QTH	QRB
70	F9ZG/P	IN98JW	17	7021	F1AHH	IN95QQ	364
23	F6GNJ/P	JN08WV	15	7728	F5AGO	JN06DP	277
13	PA1DYK			8990	ON4DPPP/P	JO20mw	131
3	PA2RIK			1955	PA1DYK	JO22va	57

Full results in the next issue.

The IARU Contest clashed with the IBC Exhibition in Amsterdam this year. Next year's contest would normally take place on 12/13 September 2009. Can anyone suggest a better date that I could propose to the IARU?



## December Repeater Contest

The next repeater contest is due to take place on 6/7 December. Remember internet and repeater linking are within the rules, so there is lots of scope for innovation.

## Contest Ideas

Now that some stations are equipping themselves for high-power digital TV, the opportunities for long distance Contest QSOs next June or September will be increased. Remember that you

only need 2MHz or so of bandwidth to transmit an amplitude modulated monochrome analogue contest signal. Such a signal can really go a long way, especially with aircraft scatter!

## Conclusion

I can be contacted through e-mail ([contests@batc.org.uk](mailto:contests@batc.org.uk)), or through my BFPO address: Wg Cdr D G Crump, Mailbox Number ACT, BFPO 63, London.

## Contest Calendar

1800 UTC 6 December 2008  
1200 UTC 7 December 2008  
- BATC Repeater Contest

1800 UTC 21 March 2009  
1200 UTC 22 March 2009  
- BATC Repeater Contest

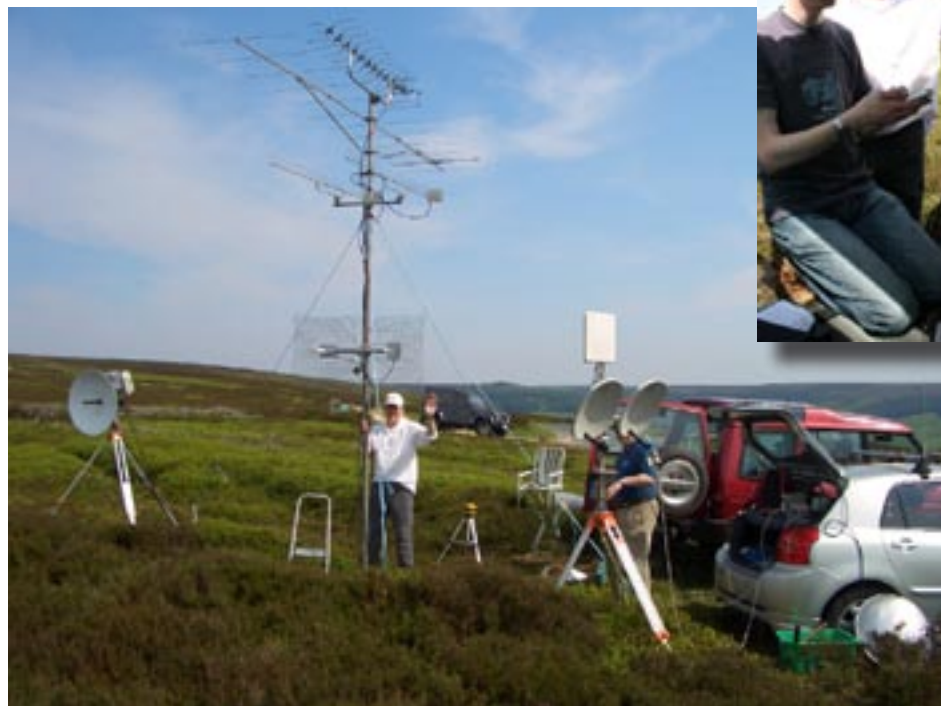
1200 UTC 6 June 2009  
1200 UTC 7 June 2009  
- BATC Summer Fun Contest

1800 UTC 12 September 2009  
1200 UTC 13 September 2009  
- International ATV Contest

G0EHV 2m talkback, 3cm  
atv setup on parcel shelf

**Rob M0DTS of the North East ATV Group kindly gave permission to print these photos taken during the 8th June SummerFun Contest on Bilsdale West Moor**

M0DTS and G0EHV looking  
for DATV from G3PYB



M0DTS  
and G0EHV  
looking for  
DATV from  
G3PYB



# BATC Publications and Members Services

Publications	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, 210,211,212,213,214,215,216,217,218,219	£1.50	.....	.....
<b>Special Offer: Any four of the above issues</b> 220,221,222,223	£5.00	.....	.....
<b>The BATC DVD</b>	£3.75	.....	.....
	£5.00	.....	.....

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Or by sending a cheque made out to 'BATC'**

*All items appearing in Members Services from previous editions, can still be ordered (subject to availability). Please see page four for contact details. Several items are still on sale, so please check for the latest pricing before sending a cheque.*



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- Bespoke SMS services
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Contact us for details

# Letters to the Editor

Dear Sir,

I am an old man and too often the bearer of bad news, this is just such an occasion. If you have not already been informed, I am writing to say that Mr Edward Hardy G3GMZ died on Friday September 26th.

He was a leading light in the narrowband TV association. He, along with G4JNU and G0SDQ were responsible for the transatlantic 32 line TV broadcast between the chalkpits museum and the USA three years ago.

I hope someone from the Narrow Band TV association will write an obituary.

Mr D. Buddery  
G3OEP

Dear Chris,

I am writing to you in a hope that readers of "CQ-TV" may be willing to help in a project that I am attempting to start.

Over 20 years ago while I was living in Russia I got interested in Slow Scan Television. This mode was illegal for Soviet hams to use and information was nearly impossible to obtain. Nevertheless I managed to find some bits and pieces here and there and build my first P7 monitor. When I saw a picture slowly rolling down the fading screen I was hooked.

Anyway, to make a long story short, I want to make a documentary film about early SSTV history around the world. I started collecting stories from "old timers" and any other materials (books, magazines, article reprints etc.) I can find.

My wife does professional video editing and agreed to help with the project. I am also trying to locate old SSTV gear for filming live (if in working condition). So far I collected all pieces made by Robot in the USA with the exception

of Robot 300 scan converter. I posted several adds on different ham swap web sites with some success.

Unfortunately I was not able to find any commercial or homemade equipment of non US origin. I know from BATC "SSTV Explained" that at least one model of SSTV converter was produced in UK and a few models in Germany (Volker Wraase). If someone still have any of those units boxed in their garages or sheds and willing to donate, let me borrow for filming or even sell at reasonable cost I'll be grateful. This is a hobby project and on a very limited budget, so price must be very reasonable :-)

Does not have to be working equipment, I will attempt to fix it. Also if there are old kits, PCBs I would like to build them if parts are still possible to find. One comes to mind is G3WCY converter and G4ENA transmit module for it. Some may be willing to share their memoirs, stories may be even audio or video recordings of SSTV contacts.

All and any help will be greatly appreciated. Thank you and 73,

Sergei KD6CJI (former RA4LBZ)  
Sacramento CA - USA

Dear Sir,

Although at this point in time the following question will appear purely academic due to the advent of digital TV, I am still pursuing the topic of the "old fashioned" analog TV mode for research and experimentation purposes.

In the amateur brotherhood, there used to be a rather popular use of the IC type 4060 as combined crystal oscillator and multistage binary counter to eventually generate the analog TV horizontal scanning frequency at 15625Hz (PAL standard).

Now, with a little application of easy mathematics, crystals whole multiple of 15625Hz (eg 1MHz, 2MHz, etc)

can be coaxed without trouble into the task of primary sources of the scanning frequency combined with PLL circuits.

For reasons not quite clear to me a few experimenters favoured the use of 10MHz crystals that definitely precluded classic binary counter chains, and called for either the use of mixed types of counters or some form of hard gating together of appropriate output stages in the dividing chain and then using the output of such gating to reset the whole dividing chain to eventually force out the wanted final frequency.

Now, presumably out of your published magazine, it would appear than an interested reader published the results of his efforts in such line, and apparently he used a 74HC4060A as primary oscillator cum binary counter: crystal used was 10Mhz one.

To force such primary combination to output 15625Hz he proposed to AND together two non-consecutive output stages in the dividing binary chain of the 74HC4060A and then connect the output to the reset pin.

I cannot recall what type of AND gate he used, nor can I now recall what out pins of the counter chain he ANDed together to achieve the wanted results. Anyway, it would appear that the whole contraption worked!

I am now coming to the end of this rather prolix and verbose disquisition: all what I am now asking to your courteous patience and archivist expertise is to retrieve on my behalf that little piece of information, both as text and as drawn circuitry.

Thank you so much!! 73  
Sincerely yours,  
Eugenio Muratore  
Australia

*If anyone can help with these two enquiries, please contact me and I will forward the information on:*  
*editor@batc.org.uk*



# 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 38 - "Winter 1958"

## Amateurs save big BBC show

**BACK** after a 10-week break, the BBC's "Panorama" last night took viewers to Jamaica (to hear reactions to race riots), to Venezuela (to follow up their recent revolution) and into the sky (for the Comet

IV versus Boeing 707 battle). It was all very solid and competent, writes Andrew Smith. But it lacked light relief which should be part of any panoramic view of life.

The nearest approach to entertainment was the introduction of what Richard Dimbleby

called, "A Third Channel." This was G8PYT, a complete outside broadcast unit built into an old taxi by a group of Cambridge amateurs.

Part of the "Panorama" programme was put over by the unit and the picture was reasonably clear.

"Perhaps these headlines are rather optimistic", said CQ-TV on the 'What the Other Chap is Doing' page, "but it is true that the Cambridge Group appeared on B.B.C. Television as part of the first in a new series of "Panorama" programmes. This followed a visit to the Convention by the Panorama film unit and further details have been given in the report on the Convention. Some of the Chelmsford Group have made a film recording of the B.A.T.C. part of the programme and this is available to members. A tape soundtrack goes with it and the film is 16 mm with sprocket holes on one side only. The tape is recorded at 7½"/sec. The film should be run at about 25 frames/second but the main objection to running at slower speeds is the difficulty of keeping the tape recorder in step!"

The report on the Fourth Amateur Television Convention itself, held on September 6th said that, although the night before saw the worst storm in southern England for many years, attendance was well up. The programme for the day consisted of a general show of equipment in the morning with the Annual General meeting in the early afternoon. This was followed with more demonstrations of equipment and a film sent over from Canada.

Equipment on show came from all over the country; Colour from Ross-on-Wye, an image orthicon camera channel from Chelmsford, staticon cameras from High Wycombe, Cambridge, Stotfold, Manchester and Chelmsford. There were also several flying spot scanners and a 5527 camera. Items of U.H.F. and microwave gear were also shown.

The Cambridge Group showed the camera that usually sits on top of Matilda. Due to lack of time, Matilda was not running as Roving Eye, but the camera was running and caused much interest due to its fine pictures and smart appearance. The only other working camera was Mike Cox's 5527, and although the pictures were reasonably good, it was unfair to judge the results as power supply problems restricted the available light. Mike Cox also had a monoscope running. Peter Burrage showed a wide range of 3cm microwave equipment, including his complete microwave link. Also a 430 MHz R.F. amplifier using a pencil triode caused considerable interest. Bob Flood-Thain and Brian Partridge both showed 70 cms convertors for vision. Possibly the smallest item to arouse considerable interest was Brian's new pulse generator. This used transistors and home made printed circuits, and was running for the whole day giving a 405 line interlaced output. The whole unit was only about 5" x 5" x 5". The Convention went off very successfully and was enjoyed by all, special thanks are due to Mrs Wheele, Mrs Ball and Miss Sylvia McKay for their help with the refreshments, and to Miss Pauline Gamy who looked after reception. A new club General Secretary - Don Reid - had been elected at the AGM.



Arthur Critchley tightens the lens turret on the Cambridge group camera



Mr & Mrs Mike Cox and gear

Another topic which has featured recently in CQ-TV is amateur television activity in north Wales, and issue 38 reported on the first GW/T contact.

Following a number of 40 metre QSOs on Sunday mornings between Derek Whitehead, GW3FDZ, Llandudno and John Lawrence, GW3JGA Prestatyn during 1957, arrangements were made for 430 MHz tests between the two stations but, due to a large mountain in the way, a direct 430 MHz signal path was impossible.

On 7th of April, 1958, a test card was radiated from GW3JGA/T to Llandudno and this was received by an amazed GW3FDZ/T, sitting in his car on the top of the Great Orme at Llandudno, armed with a 6 over 6 slot and a G3KOK convertor into an Ekco 12V portable TV- a distance of 18 miles. The next weekend, 15 April, GW3FDZ/T transported his complete i/T shack, by car, to the Hotel on the Great Orme known as 'Randy Turpin's Place'. After reconnecting all the gear everything worked first time and very soon a test card was being radiated to GW3JGA/T, who after prolonged fiddling with the oscillator injection on the convertor, received an excellent picture. Transmissions of various captions and slides were made for 50 minutes each way, making the first GW/T two way contact. Some improvements resulted from adjustments of the vision Tx at both ends. The sound link was on Top Band.



GW3JGA/T received on portable Ekco with G3KOK/T convertor in GW3FDZ/T's car

On Monday, May 5th at the Railway Hotel, Prestatyn, GW3FDZ/T and GW3JGA/T gave a demonstration of closed circuit and 'on the air' amateur TV, to a meeting of Flintshire Radio Society members. Unfortunately, Derek Whitehead left Llandudno to go to Canada almost immediately after the completion of the tests, and so left GW3JGA as the sole /T station in GW.

#### STATION DETAILS

GW3JGA/T

405 lines interlaced.

Flying spot scanner MW36-44 - 93la.

Vision Tx. 432 MHz

18 Watts in to 832A. Power tripler.

Aerial. 6 over 6 slot. 50 ft high.

Receiver

G3KOK convertor - Ekco T207

GW3JGA/T

405 lines interlaced.

Flying spot scanner. 7FP7 - 93la

Vision Tx. 432.6 MHz

16 Watts in to 852A. Power tripler.

Aerial. Corner reflector. 30 ft high.

Receiver

G5KOK convertor. Ekco T161.

The technical articles included one by G3KOK/T describing a 'new vision - blanking - sync mixer', based around an N78 and two ECC81 valves, whilst Mike Barlow contributed an article about 'Viewfinders'. "Most of us being human", he wrote, "leave the viewfinder for our camera until last - something we feel can be built in a jiffy with no trouble, so we'll do it at the same time

as the painting and finding of matching knobs....." He added that certain well-known BATC cameras had been run 'for years' without viewfinders, the operator relying on a nearby floor monitor to see what shot he was taking. Mike then gave guidelines for the design points to be considered in making a monitor specifically for use as a viewfinder.

Other news from members included Arthur Critchley, of St Albans and Cambridge, who had been giving thought to colour standards, and had also drawn a sketch of Matilda. John Cronk was busy trying to sort out the bugs in his vidicon camera.

Not all the activity was in the UK. In Cyprus, M W Heffernan had been receiving from England on 405 lines, from the Persian Gulf on 525 lines, and from Italy, Russia, Czechoslovakia and Hungary, all on 625 lines. (all on Band 1, VHF). Norman Kay in Los Angeles had built a transistorised 1846 iconoscope camera. Back in Essex, there had been a 'Roving Eye' - g3MFT/T's van with G3KOK/T's camera - on display at the Enfield Town Show.

Most of the equipment provided for the show was in suitcase like boxes mounted in shock absorbing frames. The weather caused some problems, but the group also discovered that several of their convertors were then found to work after being totally submerged in water !!!



# Big Bertha boogies again

*A report from the deep South.*

*By Dicky Howett*

Celebrating 50 years of 'ITV in The South', BATCs Paul Marshall and stalwart chums Dave Hill and Sam Booth (plus Dicky Howett who brought along his authentic 1960s Southern Television 'Auricon' 16mm camera) took part, at Southampton's sumptuous Rose Bowl stadium, in a gathering of television memories.

It was at 5.30pm on the 30th August 1958, from a converted (Plaza) cinema in the Northam area of Southampton, that Southern Television began transmitting. Thus it was on the 20th September 2008, in the 'Hampshire Suite' that over 280 people, (mostly, ex-Southern TV old-timers, with a smattering of TVS and Meridian staff ) gathered for an impressive buffet, a chat, a rummage through memorabilia and amazed collective gasps at 'Big Bertha', the fully-restored original-condition late 1960s Southern Television scanner.

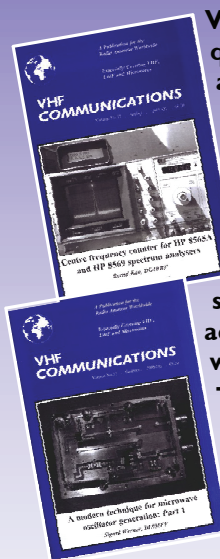
On show also were two live Marconi Mk VII four-tube colour cameras, (themselves over 30 years old) one outside covering arrivals and the other in the marquee, shooting the elegantly tanned Fred Dinenage and guests.

Media coverage included the attendance of crews from Meridian ITV and also The Royal Television Society who are making a commemorative DVD. Colour footage from the two Marconi cameras will be included as an 'authentic' touch.

Don't "lurk" - Use the new Forum - Post a msg today!  
<http://www.batc.org.uk/forum>

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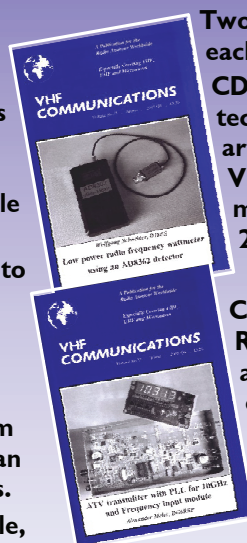


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The site of the Northam studios, now derelict, awaiting demolition



Dicky Howett focusses a Marconi Mk VII



Memorabilia on display, not forgetting the HOW! annual



Big Bertha and Marconi Mk VII camera



An original Southern Tv Auricon 16mm news camera



