# CQ-TV

Issue 232 December 2010



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## Caption Contest

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

And now ladies and gentlemen the results of the ATV contest... Albert, ON4AAH

I can quite categorically refute that any UFOs have ever been seen at this location... Mike G6HMG

Brian Summers sings Frank Sinatra "I Did It My Way"... Duncan G7VVF

Is it really true that you are transmitting this picture? Derek. GW3FDZ

Take me to your leader...
Jason Haywood G7KPM

Ladies and gentleman for your enjoyment...BATC video Streaming. Richard Carden VK4XRL

Well folks, should he open the money or take the box? Brian Kelly

Treasurer doing a rendition of Abba's' money, money, money'
Ian Pawson

...and the winner is Albert, ON4AAH Congratulations, a caption generator will be on its way shortly.

This months photo is below, comments please to: editor@batc.org.uk

CQ-TV 232

# Contents





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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 CQ-TV232 and on behalf of the committee, please accept our best wishes for a happy Christmas and a peaceful and prosperous New Year.

Some of you may have been wondering if this issue was going to arrive at all, it being the November issue and (at the time of writing) it being a week and a half before Christmas day! Well, you would not be the only one wondering that, I have been struggling to put the magazine together since the beginning of November. It's the same old story; not enough copy from you, the membership, to fill the pages.

I must extend my thanks to the usual suspects for pulling copy out of the hat at the last minute, enabling me to get the magazine to print this side of the New Year! In particular Brian Kelly and Trevor Brown. Also my thanks to Graham Hankins for offering to help collate information for CQ-TV and for putting together the repeater audit.

This issue has been the hardest yet to fill and we start the next issue with the inbox empty and less time than usual to put it together. So I would really appreciate hearing from you, however small your contribution, they are all welcome. Whether it's just a "letter to the editor" giving details of your latest ATV contact, or a full blown construction article (that we can pay you for), please send it in.

Hopefully you have all noticed the new front cover design? If not, then take a look now! Thanks go to Steve Harris for this, Steve has kindly volunteered to produce the cover artwork for future editions of CQ-TV. Please let me know what you think of the new look.

If anyone has any ideas on how to develop the magazine further, please get in touch. I keep saying this, but it really is your magazine, so please let us know what you want to see in it, so it appeals to the widest audience possible. Even better - send something in!

The same goes for the websites:

www.batc.org.uk and www.batc.tv

If you have an idea on how we can improve the services we offer you, then let us know. Feel free to drop me an email, I will make sure it gets to the right person.

So with the February issue already looming, please let me have your letters, articles, photos, etc asap. Perhaps we can get the next issue out on time for a change!

Enjoy CQ-TV232
Chris - G1FEF


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

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. Note that these videos have been made with the H.264 codec and so you will need suitable software to view them.

http://www.batc.org.uk/club_stuff/pubs.html

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

# Chairmans Column

Welcome to CQ-TV 232 and its new look front cover designed by Steve Harris, Steve has taken on the task of designing all future front covers, but in order to continue needs a supply of good quality photographs, so if you have any suitable photographs pertaining to ATV then Steve would like to see them, you can reach Steve at info@vintageradio.co.uk

In the last issue we took the unusual step of funding constructional articles, as of yet we have not paid for any such work or know of any in the pipe line. This was an unusual step, but once you start construction, using modern components that can be replicated by others, as opposed to some thing that was designed around the contents of your junk box it is amazing how the costs soon mount up. My last constructional project was the camera cues and talkback for the TV streaming kit, that enabled the camera operators to have on air cues and hear camera directions, £100 soon disappeared at the local component store, nobody is going to get rich at £50 per page but it might just go somewhere to covering the component costs and bringing a constructional design to CQ-TV that you would not otherwise see.

Membership of BATC at the time of going to press is 804 with a significant number of members preferring the cyber option, for delivery (365). This number keeps on rising, but we still have a core of members that prefer the traditional paper copy. I don't think we have kept records of overall membership and how this has changed over the years we did dip down to just over 600 and I do remember that at one time we were approaching almost 2000 but I don't think we ever did reach 2000.

Where do we go from here? The club streaming kit has seen little use and is currently parked at the south of the country, waiting for a suitable event, It is not a difficult bit of kit to operate and usually comes along with a volunteer camera crew to help, depending on where the event you want to stream is located. A lot of effort went into providing the kit and it's a shame not to see it in use more frequently just for lack of a suitable event. So if you know of something that could be streamed and would be of interest to our members why not contact me and lets see if we can make it happen. It's hard to believe that RSGB AGM's, AMSAT Colloquiums and Microwave Meetings are all that is happening.

We also used to have something called members services that we would like to re-launch as a Members Shop. It used to sell PCB's and special components to support constructional articles, while these might not be in demand at the moment, it also used to sell club badges, equipment stickers, and even club ties and key fobs. There is not a great tie wearing culture at the moment, and car keys seem to be equipped with large electronic dongles, leaving little room for an old fashioned key fob, but change is inevitable, so if you have any thoughts on how to re-launch this service and what sort of products to stock or would like to get involved in running it, why not get in touch.

Remember this is your club, it is capable of great things, but only if people are prepared to step up to the plate, make things happen and provide the effort required for its survival and continual growth.

Trevor Brown
BATC Chairman

## 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* 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 106

*by John Lawrence GW3JGA*

Video Amplitude Test Box

Introduction

To measure the amplitude of a video signal, it is usual to feed the signal (appearing at the end of a coax cable which has been terminated by a 75ohm load resistor) into the vertical 'Y' input of an oscilloscope.

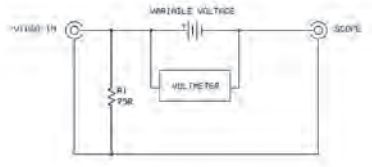

The 'Y' input sensitivity would be set to '0.2V/division' and the time-base to '10us/division'. With the time-base triggered correctly the display will show a conveniently sized image of one line (64us) and a bit of the next line. A signal of 1V amplitude would occupy 5 vertical divisions of 0.2V on the screen.

Using the vertical 'Y' shift control, the bottom of the sync pulse (or alternatively black level) would be set to a line on the oscilloscope graticule and the amplitude of the desired part of the waveform read off against the graticule divisions. This may mean estimating the position of part of the waveform where this does not fall on an exact line.

If you have one of the latest wiz-bang oscilloscopes, it will probably have two movable cursor lines to set on the parts of the waveform you want to measure, and the result would be shown directly in volts on a digital display.

Operating Principle

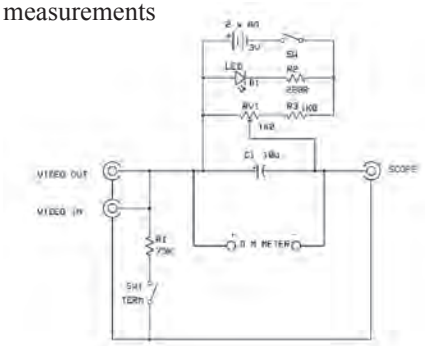
The operating principle of the Amplitude Test Box, is that of a calibrated voltage off-set control. The incoming video signal is terminated in 75ohms and the signal passes through a variable DC voltage supply to the 'Y' input on an




oscilloscope. The variable supply is monitored by a voltmeter, in practise a Digital Multi Meter (DMM) is used.

Circuit

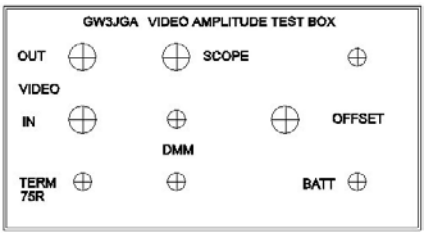
In the practical circuit, shown below, the video input has a switched 75R terminating resistor, for use when required. The video input is also 'linked through' to the video output for in-line measurements



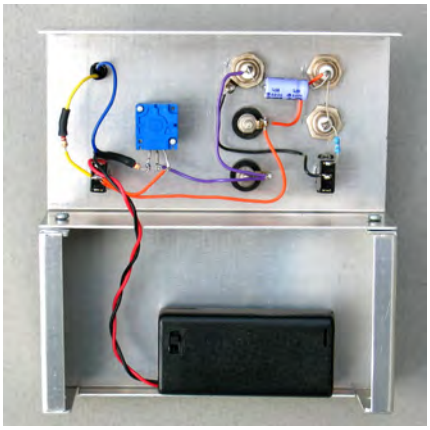

The variable voltage (in series with the video signal) is supplied by a battery and a potentiometer, the output of which is monitored by the DMM. This voltage is decoupled by C1 to maintain the HF response into the oscilloscope. As all the components and the DMM are floating live, they form about 60pF of stray capacitance to ground. This is in addition to the oscilloscope input capacitance and that of the short connecting cable, the total being less than 100pF.

Construction

The circuits of the Test Box are built into a simple two part aluminium enclosure, although any similar sized enclosure could be used. The position of the front panel items is shown below. The drilling positions and sizes are not stated, as switches, terminals and connectors may vary, especially if they are rescued from scrap equipment. The labelling of the front panel is done on a PC using a drafting programme. It is then printed and laminated. The



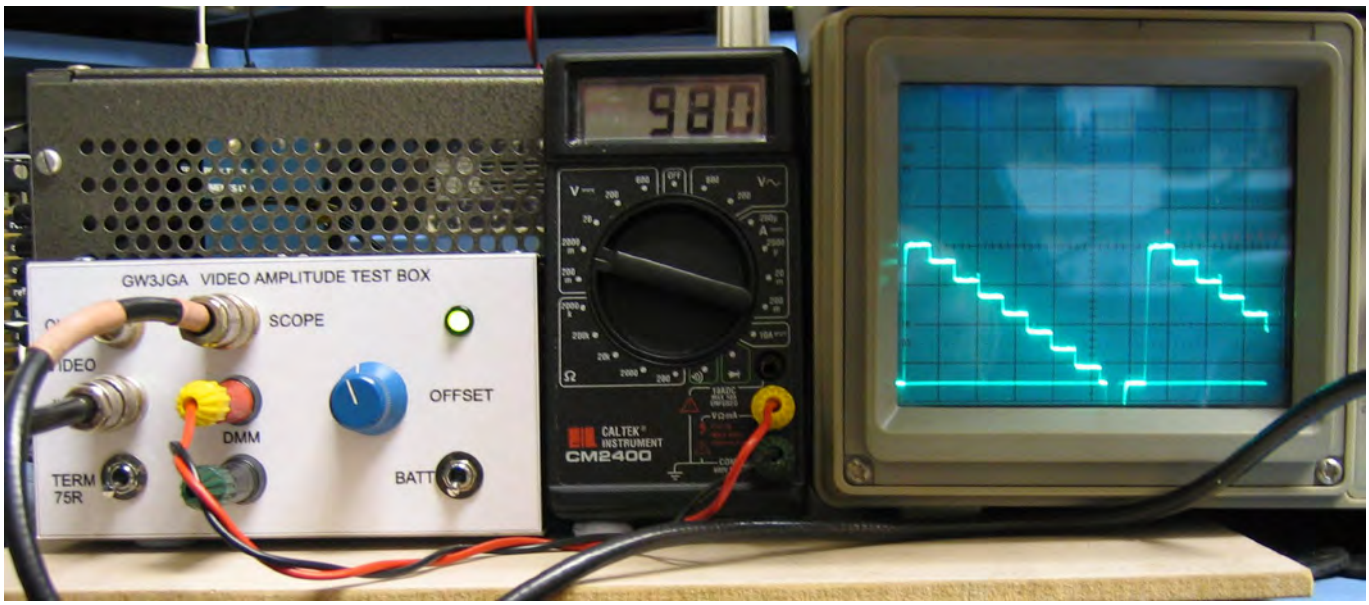

front panel area is cut out and fixed to the enclosure using thin double-sided adhesive tape and the holes punched through. The internal wiring is point-to-point, as shown below, and is positioned to minimise stray capacitance to the metal enclosure.



Using the Test Box

A typical set-up is shown below. The incoming video signal is connected to the input and is terminated by the switched 75R load. The 'scope' output is connected to the oscilloscope 'Y' input by a short coax cable. The oscilloscope input is switched to DC and the 'Y' shift control adjusted to align the bottom of (say) the sync pulse to the centre horizontal line on the graticule.

The variable voltage is switched on and then adjusted, causing the image to move downwards, until (say) the top of the waveform (peak white) aligns with the centre line. The voltage displayed by the meter is then equal to the difference between the points being measured i.e. sync bottom to peak white, (980mV in Fig.6). By referring each time to the centre of the screen, any non-linearity in the oscilloscope 'Y' amplifier system is eliminated and any parallax error minimised. The Test Box could also be used for staircase waveform




measurement and other pulse and sine wave peak-to-peak measurements.

Parts List

| | | | |
|---|---|---|---|
| C1 | 10uf | 16V | electro |
| R1 | 75R | 1% | 250mW |
| R2 | 220R | 5% | 250mW |
| R3 | 1k0 | 5% | 250mW |
| RV1 | 1k0 | linear pot | |
| D1 | LED | green | |
| SW1 | switch SPST | 'TERM' | |
| SW2 | switch SPST | 'BATT' | |

2 - 4mm Terminals, 3 - 75R BNC panel sockets
2 – AA Batteries, 1 - Battery holder (2-AA)
1 – 2-part Enclosure Maplin LF08 (Box AB7)

**References**

Television measurements – PAL Systems
Margaret Craig, Tektronix Television Division, Beaverton, Oregon, USA.

Television video transmission measurements
L. E. Weaver, Marconi Instruments Ltd.

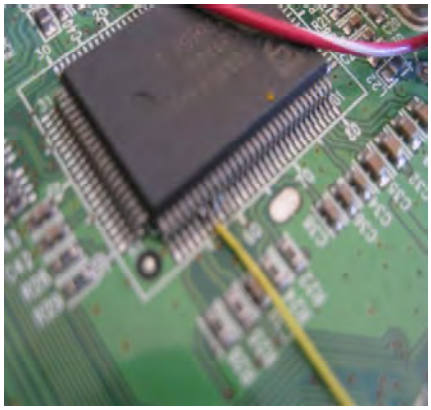


# Modification to DATV receivers...

...for repeater operation.
*by Richard L Carden VK4XRL*

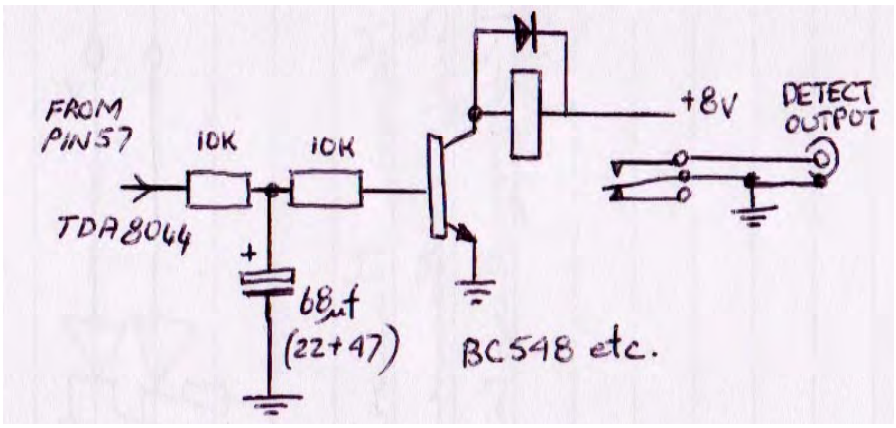
Now that more repeaters are adding DATV or changing over to DATV a receiver is therefore required so that the transmitted picture can be detected by the receiver and then to the switch logic microprocessor to enable it.
Most receivers for digital reception these days have an output available at all times, hence the old analogue system of detecting horizontal sync pulses cannot be used. Some receivers however do have a lock detector arrangement that switches a LED on. This would therefore be easy to modify to provide some form of enable output. I have only seen one receiver like this in Australia but others across the world may have a lot more models to choose from. One receiver I have been able to modify is the Humax Z5400/Z and Z5410. These receivers have been used successfully in VK4RKC in Brisbane and VK3RTV in Melbourne.



This receiver uses a TDA8044 (Satellite demodulator and decoder IC) and does not use any of the lock detector output pins at all. We have three outputs:

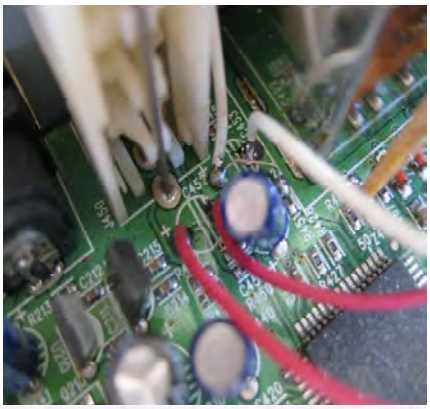
1. Demodulatorlock-pin58
2. Viterbi lock-pin 57
3. Reed-Solomon lock-pin 56

At first I used the demodulator lock but found this a little unreliable. This was later changed to Viterbi lock and the operation as been very reliable. The circuit has shown is very simple in operation and provides a ground on the output via a Relay switching transistor from the lock output. A slight delay

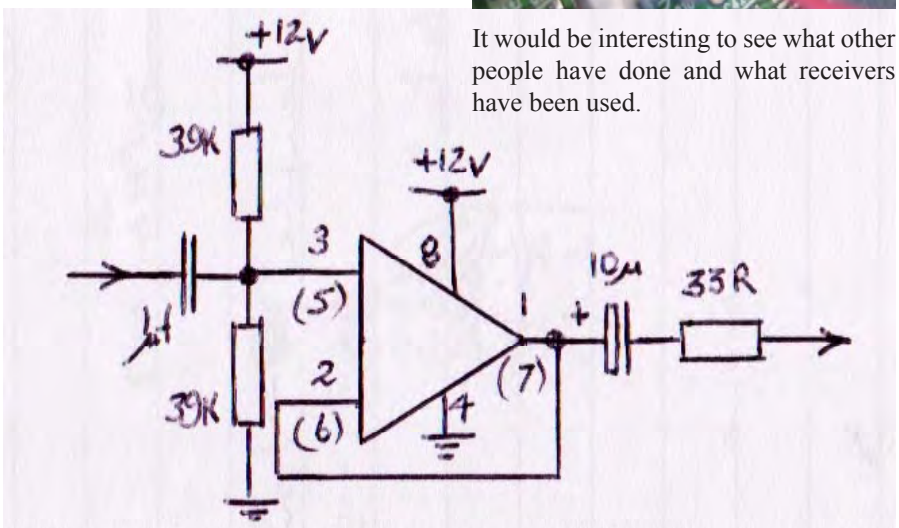


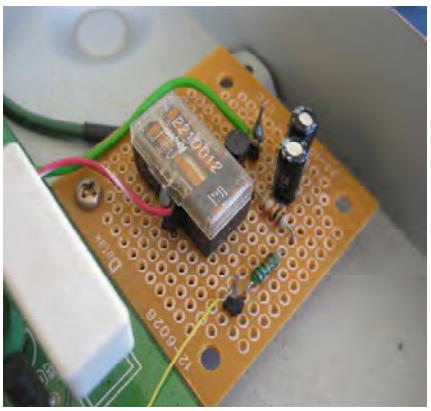

circuit is built in via two 10k resistors and the 68uf capacitor (47uf and 22uf).

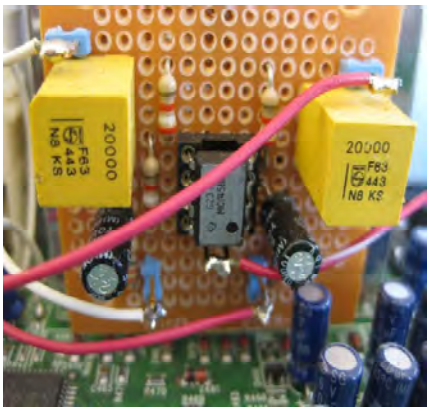
I encountered one other problem during the debugging process and this was that the audio level was reduced when feeding into the audio switchers we were using (600R input impedance). This was overcome by removing the two output capacitors and adding a voltage controlled amplifier with a low output impedance.



It would be interesting to see what other people have done and what receivers have been used.





# A Brief History of ATV...

...with consideration of bandwidth requirements. *by Ian Waters.*

There is evidence that before WW2 some amateurs unofficially transmitted 30 line mechanically scanned TV on the HF bands. The bandwidth occupied would have been about 10 kHz.

When fast scan ATV commenced in the UK in the 1950s it was permitted on 70 cm and higher frequency bands. It used the then broadcast black and white standard of 405 lines interlaced with double sideband positive amplitude modulation. In practice most transmissions were 202 lines sequential scanning. This required a maximum occupied bandwidth of 5 MHz, although in practice little energy was radiated at more than +/- 0.5 MHz from the carrier. As the 70 cm band in those days extended from 420 to 450 MHz and was virtually unused there was plenty of room. It allowed several simultaneous transmissions and permitted pictures to be relayed on from station to station. With a few watts of RF, propagation on 70 gave a typical range of 30-40 miles. Much greater distances were achieved during lifts, which seemed much more frequent in those days. Sound was usually on 2 m. Reception was easily achieved by using a simple frequency down converter feeding a band I TV receiver.

By the 1970s, on the one hand ATV had developed from 405 to 625 lines with the addition of PAL colour, while on the other the band had been effectively reduced to 432 to 440 MHz and became increasingly occupied by other amateur and non amateur users. As a double sideband modulated 625 line PAL colour picture requires an occupied bandwidth of at least 10 MHz and has a high level of energy at the colour sub-carrier frequency of +/- 4.43 MHz from the carrier a single transmission would fill the entire band and spill over into adjacent channels! Some amateurs used such a signal for low power short distance contacts. Others tried vestigial single sideband modulation as used in broadcasting, which although rather complex to achieve, could reduce the required bandwidth to 7 MHz. This signal was still too wide for high power use.

So during the 1970s main ATV activity migrated to 23 cm with some use of higher bands where there was again plenty of room. 70 ceased to be used except for some narrow band black and white transmissions mainly for ATV contests.

As in those days it was very difficult to generate any useful amount of linear power on 23 cm as is required for amplitude modulation, frequency modulation was adopted with transmitters often using varactor multipliers. The FM modulation standard was a half deviation version of that employed for microwave links and which was soon to be employed for the first analog direct to home satellite broadcasts. It required an occupied bandwidth of 16 MHz for a colour picture complete with sound. A disadvantage of FM was that simple down converters feeding TV sets could no longer be used for reception requiring dedicated FM receivers to be constructed.

Another disadvantage was that the range obtained was usually much less than that which had been enjoyed on 70 cm. To overcome this ATV users copied the technology of using favourably located repeaters, that had been developed for communication between mobiles, but usually in this case for communication between fixed stations. These enabled ranges of up to 30 miles to be again achieved in favourable locations. With the 23 cm band extending from 1240 to 1325 MHz there was adequate room for the two 16 MHz wide up and down transmissions without interfering with other band users. With the advent of satellite broadcasting surplus set top boxes became available. Although these were not ideal they made the reception of ATV much easier, feeding video and audio into the AV input of a TV set.

An ATV repeater network using FM was progressively developed covering a large part of the UK until today there are some 48 sites.

During the late 1980s and early 90s significant and rapid developments were taking place in the professional broadcast world, which were soon to lead to the establishment of the digital television services in use today. There were two main developments. Firstly there was source coding or compression, notably the MPEG2 algorithm, which by discarding redundant spacial and temporal information could reduce the 270 Mb/s, generated by digitising a quality 625 line colour picture to as little, depending on the quality required, as 1.5 Mb/s. The second was channel coding, which applied powerful forward error correction (FEC) algorithms and used spectrum efficient modulation systems. Three modulation schemes were standardised:

First DVB-S, which uses quadrature phase shift keying (QPSK) modulation of the carrier and is used for direct to the home satellite broadcasting. It has the advantage that the occupied bandwidth is proportional to the symbol rate. It soon replaced the old analog system;

The second was DVB-T, a rather more complex system, which uses coded orthogonal frequency division multiplex (COFDM) modulation. By adopting multiple carriers with long symbol durations it overcame the multi-path propagation problems encountered in terrestrial broadcasting, but not present when receiving signals directly from space;

A third standard DVB-C was optimised for the comparatively benign conditions found in cable systems.

The main driver of these developments was bandwidth conservation enabling more programmes, hence more revenue, to be accommodated in the spectrum available. Other benefits were a reduction in transmitter power for a given coverage and an improvement in picture quality. This latter needs some qualification. An analog transmission

degrades progressively with reducing signal strength until a feint image can just be discerned in the noise. Due to the so called cliff edge effect, a digital picture continues to be of high quality, until accumulating bit errors due to noise and interference, overwhelm the error correction and the picture disappears abruptly.

When amateurs learned of these developments they quickly realised that this technology would sooner or later benefit ATV. However when they saw that the experimental coding equipment at the transmitting end, then built largely using discrete components, occupied several cabinets and the decoder was almost as large, it was clear that some time must pass before these items were to be found in an amateur shack!

Amateurs saw several potential benefits, a reduction in occupied bandwidth, an increase in range for a given transmitter power and a greatly improved picture quality until the decoding limit was reached. The most interesting prospect seemed to be that a colour picture with sound, occupying say 2 MHz, could revive ATV activity in the 70 cm band.

Once the system specifications were agreed IC manufacturers, applying large scale integration, produced ever improving chip sets, particularly memory, which greatly reduced the size of the coding and decoding equipment. At the receiving end improved chipsets together with quantity manufacture reduced the set top box (STB) to its present size and its cost to a few tens of pounds.

ATV reception could now be easily achieved by using a free to air STB, usually with a preamplifier for 23 cm, or a similar box with either a frequency up-converter for 70cm or a down-converter for the higher bands. As an STB normally accepts an IF from the LNB, mounted on the dish, in the frequency range 950 to 2150 MHz it can receive a 23 cm ATV transmission. To do this the STB needs to be programmed by entering a "satellite" frequency equal to the ATV frequency plus the LNB local oscillator frequency of 9750 MHz ie.11066 MHz in the case of a typical repeater output. The symbol rate of typically 04165 and the FEC typically 7/8 also needs to be entered.

ATV transmission was however a very different story. The only coders were professional ones, large, complex and extremely expensive.

A breakthrough came in 2004 when Prof. Kraus DJ8DW in Germany developed source and channel coding equipment specifically designed for amateur use. It comprised two circuit boards each 160x100 mm. The first, the DATV encoder board encoded video and audio to MPEG2 standards. The second, the DATV exciter board added forward error correction and then employed QPSK to modulate a carrier in the 70 cm band to deliver an output of 1mW.

The default settings of these boards gave a signal with 4167 MSymb/s and FEC of 7/8. This could be amplified for transmission in the 70 cm band, or up converted for use in the higher frequency bands. However as the occupied bandwidth was a little over 4 MHz it was really to wide for 70 although some transmissions have been made using it. A 4 MHz wide signal is no problem on the higher bands where it is only one quarter of the width of FM. A batch of these boards was made for the AGAF in Germany and the BATC obtained six with which to kick start DATV in the UK.

About this time a debate took place in ATV circles as to whether it was better to use DVB-S or DVB-T principles. DVB-S was simpler and had the advantage that the occupied bandwidth is proportional to the symbol rate and when carrying a single video/audio channel could be as low as 1.5-2.0 MHz. It has the disadvantage that it can suffer from multi-path propagation. DVB-T was more complex but produced a rugged signal immune to multi-path problems. It has the disadvantage that it is designed to carry a multiplex of 4-6 separate video/audio channels in a fixed bandwidth of 8 MHz, but amateurs normally only need one channel. Set top boxes were available for receiving either option. Tests showed that in amateur use, where highly directive antennas are used, multi-path was not usually a problem. DVB-S became the standard in the UK although DVB-T has been adopted elsewhere.

The equipment from AGAF and somewhat similar units manufactured commercially by SR Systems was rather expensive and was only taken up by a few amateurs for home station use. The cost was however reasonable for use at a repeater. A number of repeaters have been updated to transmit both FM and QPSK. Usually when in beacon mode they transmit the two alternately. When accessed by an FM input they can repeat it either as FM or QPSK as determined by instructions sent by DTMF tones on the incoming sound channel. Where there are home stations equipped to transmit digital, repeaters have also been provided with a digital receiver. In these cases it is possible to repeat an incoming digital signal as a digital output. When this is done the picture quality is such that it is difficult to observe any degradation when comparing the source picture and that returned from the repeater.

Returning to 70 cm two things have happened recently 2008-10. First a small number of professional encoders, released as broadcast facilities have been upgraded, have been made available to amateurs. These are flexible units that can easily provide the lower symbol rates appropriate to 70 cm. Secondly a number of solid state RF amplifiers capable of an output of up to 250 W, with a linearity such that spectral re-growth is acceptable at about –30 dBc, have also become available. These together have stimulated a considerable increase in DATV activity.

In August 2010 the BATC organised "Network Day". Among other transmission activities stations were encouraged to operate 70 cm DATV with as much power and from as high up sites as possible. It appears that the range, under average propagation conditions, of up to 100 miles or more are to be expected. The results are thus rather similar or better than those in the analog days. We wait to see what may happen when a lift occurs.

What of the future? It is possible to speculate on a number of possibilities. In the broadcast world an improved compression algorithm know as MPEG4 or H264, which has a compression efficiency at least 50% better than MPEG2, and an improved modulation

scheme DVBs-2 are in use for high definition TV. If/when equipment for this becomes available it could be used for coding standard definition pictures to allow an even smaller occupied bandwidth on 70 cm.

At the BATC convention in 2010 an excellent closed circuit colour stereo TV system was demonstrated. Could it be that the left and right video signals used could be transmitted over a DATV link?

Some amateur enthusiasts, who have professional software skills, are known to be developing programs to run on modern high speed computers, often found these days in a shack, to generate DATV signals. When this work is successful it should enable DATV transmissions to be originated at a much lower cost than by using commercial equipment Who knows what may happen?

# DATV - What's up with my picture?

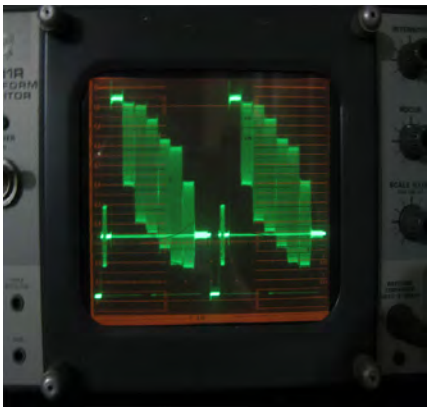
*by Richard L Carden VK4XRL*

Since having gone digital (DVB-T) with VK4RKC here in Brisbane I have noticed a few signals that looked rather poor. Looking on the scope from the digital STB the video level was about half amplitude. I couldn't understand this as my own signal both on 23cm FM and DATV were coming back without a problem.

A situation happened when our repeater dropped out of operation to allow if I could uncover what was happening.

Now Don VK4TVD has had a problem in getting into the repeater but with a lot of work he has succeeded, but depending on the conditions it can be noisy. With our repeater down Don was able to transmit to my QTH and I was then able to feed his signal into my own digital transmitter. Having done this Don's signal was only half amplitude? Checking Don's direct picture on the waveform monitor it was found it to be the correct amplitude. The idea now was to try and simulate the condition so I set my 23cm transmitter up using colour bars and low and behold it was perfect. Now Don's vision was a little noisy so to simulate that my 23cm receiver has two outputs one composite and the other BB out which included noise, sub-carries and isn't de-emphasised. This was ideal so it was feed into the DATV transmitter and the output showed low amplitude on the colour bar signal. Switching the sub-carriers off and the signal was restored to correct amplitude.

I knew my levels were correct so on further investigations I found that the



digital encoder (SR-System MPEG-Encoder V4) has an automatic video level setup and this was acting on the noisy signals. The older versions of the encoder didn't have this facility.

If you go into the Mini-Mod menu under encoder you will find Video AGC Enabled/Disabled, switching this to disabled did fix the problem. The gain can then be set from the gain menu the default value being 148. Further information can be found in the Midi-Mux Users Guide-May 2010 from SR-Sytems.

## !!! Your Club Needs You !!!

If you do something, anything, related to ATV please drop your editor an email so it can appear in CQ-TV, if you can write an article about your latest project even better, you may even get paid !!

**editor@batc.org.uk**

# Wireless talkback for camera crews

*by John Bales*

When streaming events it is common for several cameras to be deployed to provide cover and with appropriate shots selected by an operator using the club's vision mixer and directing the camera crew via a talkback link.

Trevor Brown our chairman recently completed an excellent wired system providing a feed of talkback for each camera and along the same piece of twin screened cable, a cue light to let the camera operators know which camera is currently selected by the vision mixer. There can be times however where the cameras may be located outside a building or when rigging time is limited making the cabled approach for talkback and cue is difficult to implement.

This prospect led me to investigate a wireless option for the talkback.

There are already on the market several types of wireless headphones from suppliers such as Maplin and CPC of Leeds for home users to wear whilst listening to their HiFi or TV as they walk around the house. These use "863 MHz RF technology" and provide a reception range of 50 – 200 metres depending on terrain. The transmitter provides a choice of three operating frequencies, switch selected, and the receivers auto scan to find the selected transmitter frequency.

Two versions are available, one with a transmitter and docking station with charger for a dedicated pair of headphones containing a receiver with volume control and rechargeable batteries. The second version features a small box containing a transmitter configured to accept a line level signal from an audio system. Pocket sized receivers powered by AA batteries are then used with headphones of the user's choice to hear the material radiated from the transmitter.

These receivers also come with a volume control to set a comfortable listening level and this version seemed ideal for the talkback application. So with half the job done by an off the shelf set of gear, we come to the constructional bit!

As mentioned above, the transmitter requires line level signals so additional gain is needed to boost the signal from the microphone picking up the instructions of the vision mixer to the camera operators

Now Maplin market a nice little low noise stereo mic preamp kit using a NE5532 IC which is fun to build and provides almost enough gain to lift the level from an electret or dynamic mic to a level sufficient to modulate the transmitter fully. Two mic preamp boards are used in cascade in this project as although the maplin amp is in fact a two channel arrangement designed for stereo, cascading two amplifiers on the same pcb to provide sufficient gain, led to instability problems.

It seemed sensible to power the preamplifiers from the same nominal 12 volt wall plug PSU which powers the transmitter, but as will be seen from the schematic, additional capacitive decoupling of the supply rail is needed in the form of a 1000uF capacitor for the supply to the preamps. This capacitor was chosen to be able to cope with up to 27 volts which was only just above the off load output of the supplied PSU.

Two input options to the preamp are provided, both via 3 pole 3.5 mm jacks. The first carries the mono mic audio and a polarizing voltage for use with an electret mic. I used a cheap ex computer mic on a gooseneck for this job. The second 3.5 mm socket is wired as for stereo to accept a mono dynamic mic fitted with a 3 pole plug but with the mic connected to tip and ring. Alternatively, a dynamic mic could be connected to one channel and programme sound to the other if required since the whole system in fact two channel capable.

There is a limiter amplifier circuit within the transmitter to avoid over deviation and which also reduces the risk of excessive sound levels reaching the earphones of the camera crew. Adding more listeners to the system is of course as simple as issuing them with additional receivers and headphones. Battery consumption of the receivers is quite low, such that in two full days of use at the recent AMSAT convention, no battery changes were required.

The preamps are assembled in a die cast box (see photo below) with the pcbs suspended from the box lid via

machine screws and spacers. The various connectors are mounted around the sides of the box leaving just enough room at one end for a piece of strip board for mounting the 1000uF smoothing capacitor and associated resistors. The strip board is supported in a length of adhesive backed pcb guide rail.

The kits are supplied with preset type potentiometers to adjust their output level and it was found best to set those on the first board for maximum output and adjust the pots on the second pcb to set the drive level for the transmitter.

The completed system is plug and play and has been used without problems on several streaming events.

**Components/Stockists**

CPC:
One transmitter and receiver set
Cat no AV15935
Additional receivers: Cat no AV15936

Whilst you're ordering you might also need 3.5mm panel mount jack sockets and coaxial power connectors if none in your junk box

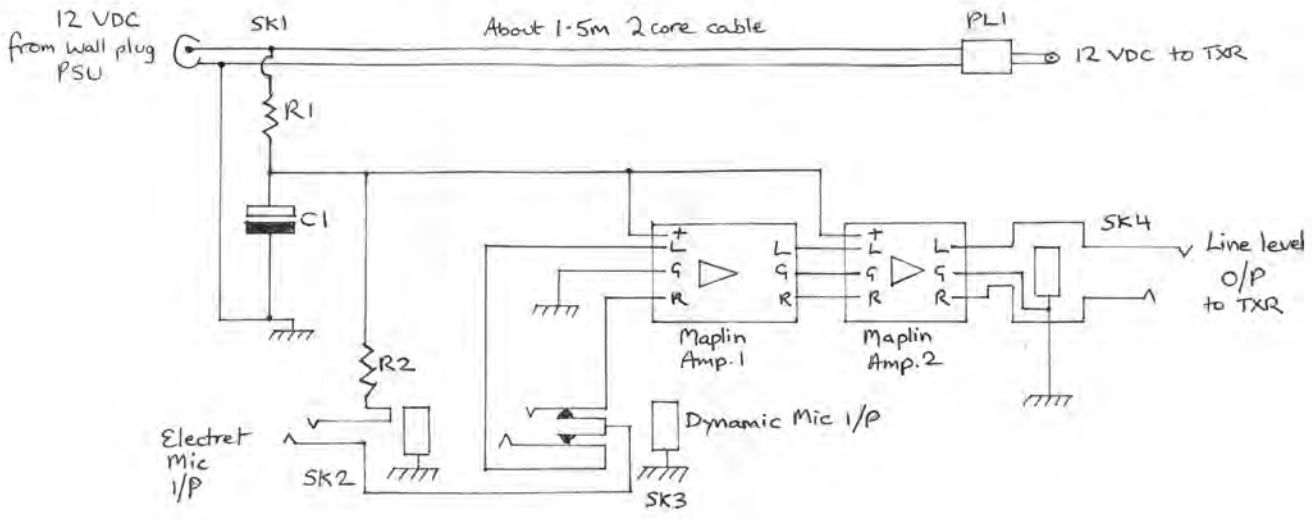
Diecast box: Your choice.
Mine was 114mm x 63mm x 30mm

Maplin:
Low noise stereo mic preamp kit
Cat no N47FL (two needed)

RS components:
Adhesive backed plastic pcb guide
RS Stock No. 580-023

Websites:
http://www.cpc.co.uk
http://www.maplin.co.uk
http://rswww.com

## Details of wiring of Interface Box




Circuit diagram drawing thanks to Wendy Bales.

### Parts List

| | | |
|---|---|---|
| R1 | 510R | ¼ Watt |
| R2 | 10k | ¼ Watt |
| C1 | 1000µF | 27VDC |
| SK1 | 2.1mm | Panel Socket |
| SK2 | 3 Pole 3.5mm | Panel Socket |
| SK3 | 3 Pole 3.5mm | Panel Socket Switching Contacts |
| SK4 | 3 Pole 3.5mm | Panel Socket |

# Choosing a new 3D TV

*by Mike Sanders*

As of September 2010, all the big name Consumer Electronics giants like Sony, Panasonic, Samsung, Philips, Toshiba, etc. have announced Plasma and LCD 3D TVs that will be released over the course of 2010. These manufacturers are aggressively marketing 3D televisions and making a strong case for their introduction into the consumer's homes. But in the end when we are ready to buy we initially just want;-

(a) The best value for our money
(b) A good quality displayed picture

Then we might consider how the item will look in our living room.

However additionally for us film makers we ask can we connect our existing AV kit to it i.e. do the panels have the desired connections, but we can't look at any of these things in isolation without additionally having to choose between the various technologies of the screen as well as its size.

Our first task is to look at the room size and see what size screen we need, however there are a couple of things we need to consider first. If you decide to splash out on a 3D TV, which are currently running at roughly double the price of non 3D screens as of the date of this article, the current smallest consumer 3D TV is 40 inch wide (measured diagonally), but also if you want to really enjoy the picture detail available in FULL HD 1920 by 1080 TV you need to be surprisingly close as the eye's 20/20 vision doesn't naturally perceive detail at a distance. Just for instance compare the detail you perceive on someone's facial skin at talking distance of about 3 feet in comparison to someone sitting in an arm chair the other side of the room.

From the chart below, a 42 incher its ideal viewing distance is only 5 feet 6 inches away for best detail, and a 55 incher is 7 feet 4 inches. Even the 101 incher only just gets to the other side of a small room at only 8 feet 5 inches. As a guide the viewing distance is suggested as 4 times the vertical height of the picture area. Not nearly as far as you thought is it? In the end there is usually a compromise on costs, working round any probable domestic customs veto, and what you can get away with, without imminent domestic strife and divorce.

Now we have looked at our screen size we now need to turn our attention to panel technology, LED, LCD, Plasma or OLED. Firstly LED and LCD are the same technology it uses a liquid crystal to turn off the light from a back lit source we are simply discussing the type of backlighting. LCD are simply made with liquid crystal light switches which work by applying an electrical charge to allow or prevent the light source from behind being seen by the viewer in front. Breaking this down to basics for LCD screens, it's nothing more than having a fluorescent tube at the back, which will age, change colour over time, and wear out just as does our domestic lighting. Sadly it has to be noted that it is not economical to change the tube after production, so you have to throw it away when its worn out, a sort of built in obsolescence. Early adopters of LCD screens will now be finding this happening and indeed some screens are now appearing on the local council recycling centres.

On the LED ones they are either edge lit or back lit by a bank of Light Emitting Diodes which is the preferred backlighting alternative to fluorescent tubes as they will last for in excess of 10 times as long or many years. The edge lit ones are less evenly lit than "Full LED" ones as they suffer from getting good light into the centre of the screen from the edge of the glass.

However LCD itself, regardless of the backlighting source suffers from a number of disadvantages. When making your evaluation, you first of all need to get past the impressiveness of the display brightness in the relatively high lighting level of the retail sales floor. The viewing angle is much poorer on the LCD screens than on the Plasma, so if you regularly have guests or family members sitting close to the left or right hand sides of the screen they will get a changed brightness and colour perception of the picture as they move further round towards the screen edges. A room corner position with the screen diagonally across the corner is kindest for LCD, giving most viewers the best unaltered picture.

The viewing angle however on a Plasma screen is 180 degrees, so there is no such problem with those.

The OLED panels are probably going to be the best in 5 years time, which use organic LED panels where the light output is right on the front of the panel and one LED per pixel, but as yet screen sizes are only up 15 inch at around £2000 a piece, but like all new technologies as the production yield and consistency goes up, the risk of volumes of big rejected panels with a failed pixel reduces, and up goes the panel size.

| (3D) TV Size Diagonal inches | Optimal Viewing Distance 1080p resolution inches | Closest possible Viewing Distance 70 Degree Field of View inches |
|---|---|---|
| 42 | 66 | 26 |
| 50 | 78 | 32 |
| 55 | 86 | 35 |
| 60 | 94 | 38 |
| 65 | 101 | 41 |

(The larger the panel the more OLED's are required - it's a numbers game). It's also a very low power technology and probably the nearest modern equivalent to the glowing phosphors on the front of the old style TV tube. But if you are ready to buy now this technology is not a consideration.

If we look at picture quality and trueness of image we always have a difficult assessment job on our hands as we rarely have the original image to compare to. However there are some factors about Plasma screens natural performance that is better. The colour and greyscale linearity of a Plasma screen is much superior to LCD backlit, with whatever technology, but the Plasma is not as impressively bright as LCD. These LCD panels are becoming sleekishly thin and tend to look more sexy than the thicker Plasma screens, but we should buy on performance not look.

Personally I prefer the truer reproduction of the Plasma. Plasma is cheaper to produce which is reflected in the lower price. Plasma has one non green credentials snag however in that a 63 incher will cost 0.357KW hour to run and keep you warm in the winter! (Samsung P63C7000 quoted, costing £2,218 @ Amazon).

Plasma has a major advantage over LCD which is that it's inherently faster at turning off the light than LCD at some 2 milliseconds whereas with LCD it even depends what was the last colour displayed, as to how long it can take to turn the cell off, and that may be up to 10 milliseconds, giving more blurring and "drag" on fast motion shots.

Manufacturers will try and sell you on superb blacks and high contrast ratios. What you really want to look at however is the amount of detail in the black which they don't want you to look at.

So in conclusion I would recommend Plasma technology at present providing you can afford to run it, as it gives the widest viewing angle, and trueness of image, and the fastest response time on action movies. Do check first though how good the TV is at reproducing standard definition and that it handles 4 by 3 sources such as film club footage on the inputs you want to use, as we are going to be stuck with needing to display SD for years to come yet.

So assuming you have bought in to some technology, where are you going to get your HD material from for your new TV? There is of course your own camcorder which I am sure by this stage you will already have verified you can connect to your new screen. So let's look at our externally provided material.

Looking at broadcast TV you have Freeview, FreeSAT and SKY. The line up for the free services is not currently very impressive offering only BBCHD, ITV1HD and Channel 4 HD, as channel spacing is currently an issue with the analogue channels still on air this may well be the restriction until 2012. A number of TV's have now either Freeview or FreeSAT built in, but do make sure its the FreeSAT-HD or Freeview HD versions to avoid disappointment.

Sky of course charge HD customers a £10 per month extra for HD on top of the subscription package charges, but has a most impressive array of HD channels including films, drama, documentary and natural history.

The other source is a BluRay DVD player which can not only upscale standard DVD's to pseudo HD but also provide Full HD and 3D content as well.

Ok so now we have chosen our screen technology and size we now need to look at connections and inputs. Warning! Some TV's lose the S-Video connection completely others embody it in a SCART connector, so if you want one, just make sure its there.

The typical inputs are:

PC 15 pin for your laptop
HDMI up to 4 of those
Component video
Composite video
SCART only one or maybe 2 (one maybe S-Video and RGB)

The newer HDMI connection is a digital connection and allows a conversation between the connected device and the TV to ascertain how each other will talk to each other. It also carries the HDCP - HD Copy Protection code between the DVD player and the TV, the DVD player asking if its a TV display on the end before it will display full resolution content. This was insisted on by Hollywood to help prevent bootlegging of HD DVD's (very good quality source) onto the car boot sale markets.

Now we move onto 3D, which really best is left in the cinema, but it's not to say that an immersive experience can't be had at home. The cinema technology is to use two projectors each fed with individual footage, left and right eye film. This is passed through a polarising filter one eye material being clockwise polarised light the other being anticlockwise light. A special reflective screen is needed to maintain light polarisation such that the viewer uses polarised lens glasses to view the material being shown reflected from the screen. This is probably the most comfortable 3D viewing experience of all technologies currently available.

So now we move on to something more practical in the home environment, as 2 projectors and a special screen are not acceptable in the home. So what we need is our nice new Full-HD screen to be able to play 3D movies. But we have a problem; we have 1 screen and two different eye videos to show, so we need a simple way to do this.

The first sort of 3D was Anaglyph which meant using magenta and cyan filtered glasses, but these gave poor colour rendition and caused user discomfort for long periods. YouTube has video examples of this method being used to display 3D material over standard computer monitors, and that is its main advantage, no special display is required.

The home method promoted at present is to tell the TV to alternately switch the image between left and right eye frames, but at double the normal frame rate to avoid flicker. So if you look at a 3D TV and say the rugby posts are on the screen, there will appear to be 4 verticals instead of two as you are being presented with both eye views at the same time as far as the speed response of the eye is concerned.

So we need to have these images separated for us somehow. This is done with glasses which contain an active LCD shutter, which synchronises to an infra red beam coming out from the TV. By this method one eye is blanked whilst the other is active, thus the presented double image is divided out for us. The glasses have active electronics which need a battery, and the rechargeable ones should be bought. There are both clip on glasses for those that already wear glasses and full glasses with side frames. The main snag with this system in the home is that every viewer needs glasses and it is totally immersive, so you can't look down at your knitting. The glasses are around £60 a pair some TV sets include one two or even no pairs, so check these are thrown in or beat up the sales assistant as 2.4 children and parents gets expensive!

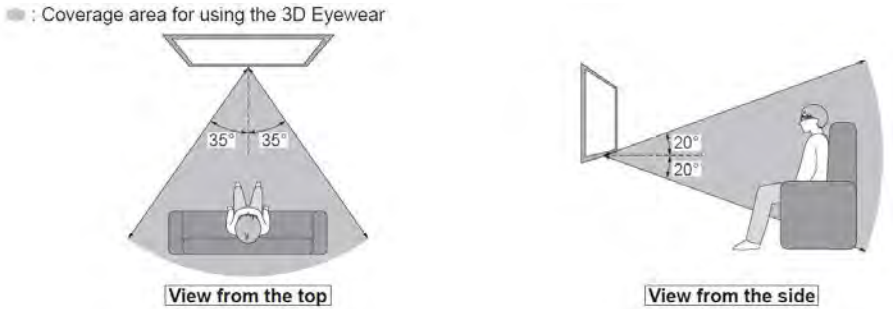
I suggest that 3D TV's are somewhat overpriced as in fact all that changes in the TV is the addition of the infra red synchronising LED on the front, and an electronic switch to alternate the pictures and some software to detect the incoming picture stream. Ok that's oversimplified but I don't believe it justifies nearly twice the price.

There is a user manual warning that the 3D effect may be experienced differently depending on the viewer. "You may not notice the 3D effect at all if you have a prescription for one eye that is very different from the other eye". Also low energy fluorescent lamps are not recommended in the viewing room as they can appear to make the glasses have flicker which is clearly going to be annoying.

Samsung have got a pseudo 3D mode on their TV's which is supposed to make 2D material look like 3D which has solicited a number of positive user comments.

All 3D viewing though has rather stricter rules to obey than standard 2D viewing as regards seating position within the room. If we take the Panasonic Viera TV manual as an example;-

A number of cautions are proposed in the Panasonic manual for using the glasses and watching 3D content, a sample of which are below;-




●Ensure no breakable objects are nearby to avoid any accidental damage or injury.
●Be careful not to strike the TV screen or other people unintentionally. When using the 3D Eyewear the distance between the user and screen can be misjudged.
●Remove the 3D Eyewear before moving around to avoid falling or accidental injury.
■If having eyestrain or discomfort, etc.
●Stop using the 3D Eyewear immediately, if you feel tired, are not feeling well or experience any discomfort.
●Stop using the 3D Eyewear if you can clearly see double images when viewing 3D content.
●After viewing 3D contents or playing 3D games, take a short break to readjust your senses.
■Stopping the usage of the 3D Eyewear
●Stop using the 3D Eyewear immediately if a malfunction or fault occurs, or if you experience any redness, pain, or skin irritation around the nose or temples.

Samsung warn that 3D content may shock or surprise so users with a heart condition should not watch it!

Delivery of 3D content is either from a 3D ready BluRay DVD player or from a broadcaster. Sky are planning to lead with a channel starting October 2010 and I don't expect any moves on Freeview until 2012 when more channel space is available. The DVD player is capable of delivering twice the normal frame rate to the TV and to be a little fairer on the TV pricing it also has to be able to receive twice the frame rate. This sort of methology is called sequential frame. Now you guessed it there couldn't possibly be one 3D delivery standard could there? Of course not. So let's look again at an extract from the Panasonic Viera TV manual. At the top it talks about how the DVD player will deliver its content to the screen which is in Full HD resolution.

**■3D Picture Format (Auto / Side by Side / Top and Bottom / Original)**

Selects 3D picture format to suit the format of the source signal

- When receiving the Frame Sequential format (ex. playback of the 3D-compatible Blu-ray Disc with the 3D-compatible player) via an HDMI cable, the 3D images will be displayed correctly regardless of the setting of "3D Picture Format". (when "3D Picture Display" is set to "3D")

Auto (default) : 3D images are automatically displayed according to the signal.
- This is available when the 3D-compatible player is connected via an HDMI cable.
- This mode may not work properly depending on the signal. In this case, select the appropriate picture format.

Side by Side / Top and Bottom : One of the formats of the 3D standard
- Select these formats as necessary.

Original : Displays the input signal as it is.
- Use to identify the format type of the input signal.

**Table of images that can be seen for each 3D Picture Format and the input signal format**

If the picture appears to be abnormal, refer to the table below to choose the correct 3D picture format setting.

| 3D Picture Format / Input signal format | Auto | Side by Side | Top and Bottom | Original |
|---|---|---|---|---|
| Side by side | | Normal*2 | | |
| Top and bottom | | | Normal*2 | |
| Normal format (2D) | Normal | | | Normal |

The table at the bottom shows how the broadcasters are going to be forced to deliver 3D content to you, which is principally driven by the avoidance of having to supply consumers with new receiver hardware. Now clearly if we are using the same picture space to display two pictures at the same time, as in the side by side example below this is only going to be at half the resolution of the original image;-


The TV's job here is to crop the images alternately and stretch it full screen. So at this point you could feel somewhat cheated as your nice new FULL HD TV is going to be fed a half FULL HD picture resolution in 3D mode. Unless different transmission standards are established with new transmitters, and consumers are disposed to change their receivers (and that includes all the cable and BT Vision viewers) this is 3D broadcasting for the foreseeable future.

Material such as this in the above picture is extremely simple for amateur film makers to produce in an edit given a 3D camera, which records both eye films as separate files. However in the Grass Valley Edius 3D application note there are some cautions for us all:-

Q1) Can you place graphics and text in the video?
A1) It is not advisable to do so. Even if you place the exact same graphic or text in each of the clips, it will look as if it is placed very far away, and can cause viewer discomfort. However, this problem may be avoided by carefully moving the text or graphic from one clip, and adjusting the depth (this, along with colour correction of the video, can only be done manually).
Q2) Can you use dissolve or other transitions, instead of just cutting the clips?
A2) When two 3D clips with different depths are transitioned, the resulting effect can result in viewer discomfort. For this reason, dissolves or other transitions are not recommended.
Q3) What happens if the tracks are out of sync?
A3) Since the Left-eye and Right-eye images do not properly align, the brain cannot properly process the image, thus the resulting image can cause viewer discomfort.
Q4) Is the 3D video played back using EDIUS hardware automatically recognized by the TV as 3D?
A4) No. You must be able to set the television to 3D (Side-by-Side) mode.
Q5) How do I play back the finished video?
A5) Using a 3D television: Connect the 3D television using the Grass Valley HDSTORM• ™ or HDSPARK™ HDMI outputs for EDIUS. Set the television to 3D mode (refer to the TV manual). Play back the Side-by-Side video from the EDIUS timeline•

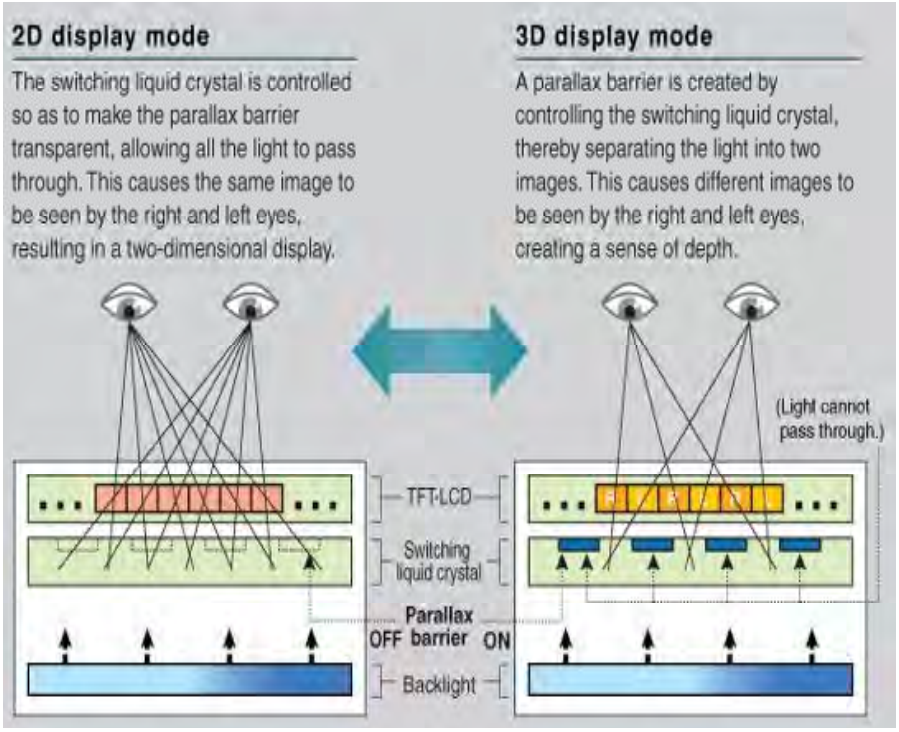
Note: TV sets will only play 3D content via the HDMI input.

**On compatible PC monitors:**

PC monitors support not only Side-by-Side, but also individual Left-eye and Right-eye video channels, so you can play back the video once the correct format has been chosen.

There are lots of comments for glasses-less 3D TV viewing, and indeed the TV set manufacturers are working on this, using for example parallax barrier technology.

The diagram below shows what glasses-less technology Sharp are currently working on. But the current problems



are display quality or resolution and the seating position is even more restricted than for viewing with the glasses described earlier, this technology has a way to go yet and is probably 3 to 5 years away yet according to articles on the web.

Then of course we come to content which of course it's all in the end going to be relying on and driven by. I was very unimpressed with the Sky demonstration at the Production Show last year at Earl's Court, due to the perfect focus of all the players on the football pitch regardless of depth/distance away. Of course when you look at a scene only what your eyes are concentrating on is in focus unless it's all a long way off. That was where the natural world perceived by the eyes appeared to be departing from what I was being shown.

The tennis had some peculiarities about it too in that the court end linesmen almost seemed to be sitting on the bottom of the screen and the electronic score display seemed to be strangely floating above the action. It will be interesting to see what 2011 brings us at Earls Court in terms of improvements.

Amazon are currently only sporting 18 BluRay DVD titles on their list for 3D viewing at home so I guess it really is early days yet to make the whole thing worth while.

**Headline – RSGB launches major Amateur Radio survey**

On the 1 October at the National Hamfest Newark, the RSGB launched a major survey of the UK Amateur Radio, SWLs and those interested in other aspects of radio communication. We want to know how you pursue your hobby, your interests from QRP to "Moon Bounce" what bands you work on, are you a contester? All the information that is necessary to see which way the hobby is moving in the 21st Century. The survey is web based, takes between 10-30 minutes to complete and it is open to all, RSGB members, lapsed members, non-members, Short Wave Listeners, etc. At the end of the first week over a thousand Radio Amateurs across the UK had completed the survey, this is very encouraging. You have plenty of time to go on line at (http://www.rsgb.org/survey/) to complete the survey as it runs until the 31 December. Early completion would be appreciated because we want to start the data collection and keep you posted on the findings as the information comes in.

Although the survey is designed for the individual Radio Amateur a second group of questions, designed for local club participation, so that club members can discuss at length their collective views has been prepared and is available on the same link at the Questionnaire.

Please encourage all your fellow amateurs to participate either or both of these activities, giving assistance where necessary to those who find it difficult to use computers, etc. This is an important moment in Amateur Radio history and the results of the survey are sure to influence the direction and strategy the hobby will take over the next 20 to 25 years.

# Lip Sync

*by Trevor brown, G8CJS*

We all know when sound and pictures are not in sync, and now even with all the modern technology available the problems seem to be getting worse not better, lets look back on the problem and how it was solved at various ages of technology .

Let's start with film camera's which mostly shoot pictures only, for a variety of reasons one of which was editing. The pictures and the sound are not in the same place on the film, the sound is later so if you want a sound and vision cut in the same place then a sound edit and a vision edit are required in different places. To this end the film camera produced pictures only and the sound was recorded on audio tape, in theory providing they both record and replay at the same speed there are no problems, but I did say in theory.

The problems are two fold velocity and phase, and the best analogy is two cars travelling down the motorway, they can both travel at the same speed (Velocity) but may not be side by side (phase) To achieve this, velocity control is required to speed up or slow down one of the cars until they are side by side, and then to maintain the correct velocity once the cars are in phase, Ok enough of the Jeremy Clarkson approach, let translate this into film.

The audio from the tape recorder needed transferring to magnetic film, i.e. film with no pictures just a magnetic audio track with sprocket holes (sep mag for short) so that the editor could be presented with two pieces of film one with pictures one with sound, and both with sprocket holes so they can be locked together on the film editing table, OK if the sound had the correct velocity when transferred from audio tape to the film audio stock, but battery driven tape recorders on location, and a different machine for the replay could cause the lip sync to drift particularly on long takes

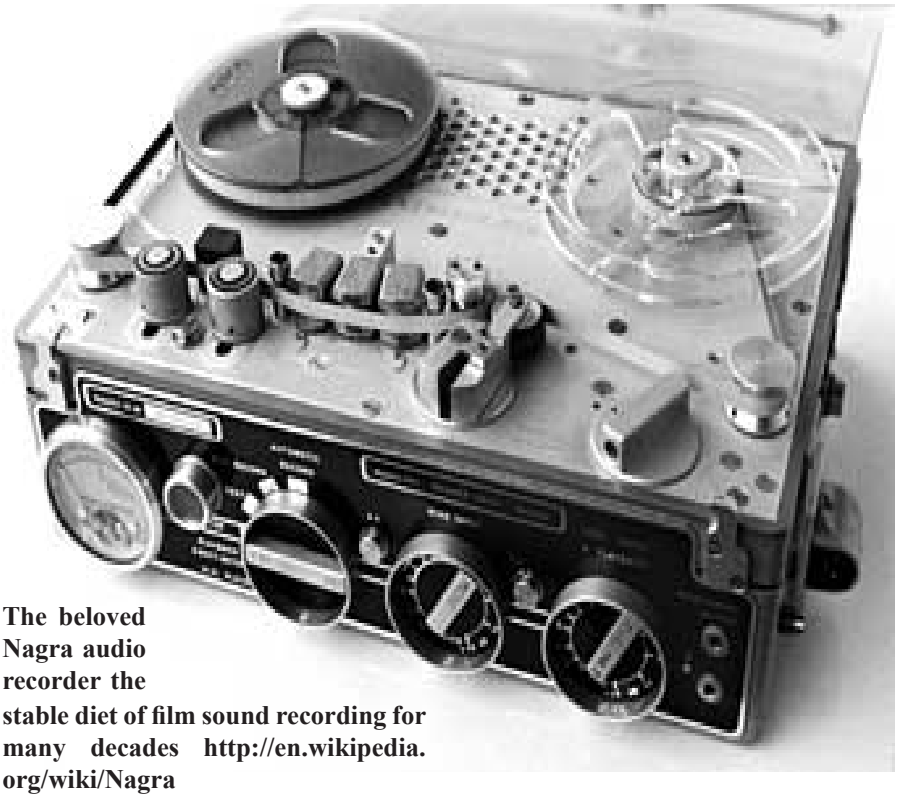
The fix was a second track on the audio tape to record pulses from the camera transport to create a set of electronic signals equivalent to sprocket holes, locked to the speed of the film camera transport. These could then be monitored in the sound transfer suite using an oscilloscope. The X input and the Y input are fed with to sprocket information from magnetic film and the original audio tape, producing a Lissajous figure, a simple speed controller to fine tune the speed of the audio replay for circle i.e. both pulses are at the same speed.

http://en.wikipedia.org/wiki/Lissajous_curve

The only remaining problem was to get the film pictures and sound in phase and here we use the clapper board, find where it closed on the film find the clunk it made on the sound, put them together and you velocity lock, from now on both the film and the sound have sprocket holes and all the editing equipment will use the sprocket hole to keep them in sync.

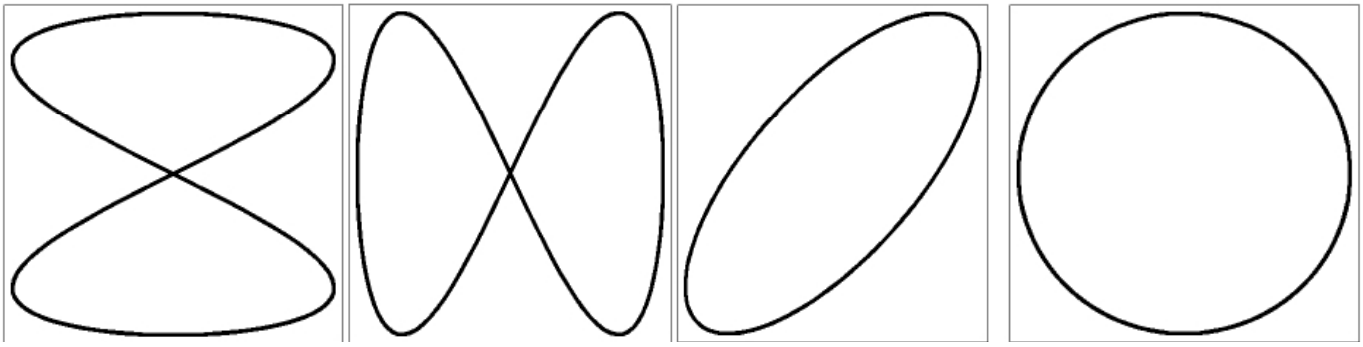
This was not an ideal system as it required the camera and the tape recorder to be connected together, this had its limitations if the film camera was high on a building or in a helicopter and the sound was being recorded on the ground, so enter the next stage of the evolution process, which was to crystal lock the camera and the tape recorder i.e. to precisely control the speed of both pieces of equipment electronically referencing them to independent xtal oscillators with no connecting cables

Let's fast forward into the modern electronic world where the equipment is now all electronic and velocity errors are a thing of the past, well sometimes. At the BATC BGM we recorded lectures and suffered sound loss. So we have some very nice mute pictures except for the one Mike Cox recorded on his camcorder in 3D of Noel Matthews in action, Mike sent me the sound track via email as an Mpeg 3. I laid it along side the multi camera recorded video track and shuffled it into phase. If there were velocity problems it would start in sync because I put it there but may run out of sync as the lecture progressed, luck was our side, it stayed in sync.



**The beloved Nagra audio recorder the stable diet of film sound recording for many decades http://en.wikipedia.org/wiki/Nagra**

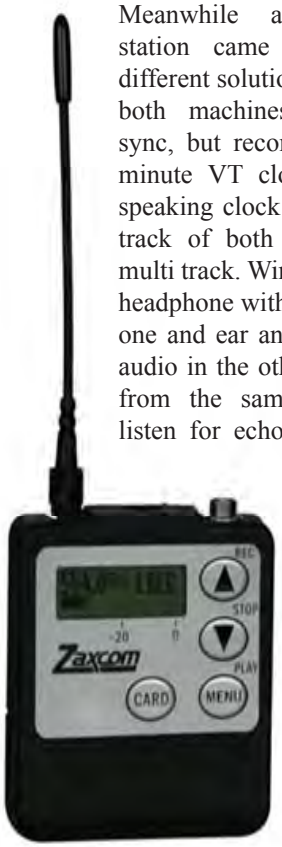
 



X twice the speed of Y  Y twice the speed of X  almost there  X and Y in Sync

Let's drop back a few years to the 70's and introduction of timecode where every electronic frame is given a unique code of hours, minutes, seconds and frames as a linear audio track on the VTR. Could this be used to lock a multi track audio recorder to a VTR for sound mixing, well we tried at the time the Les Dawson show was chosen as an ideal candidate (remember the Sid Lawrence orchestra, no? well I am very old) Big band sound would benefit from a multi track mix in post production. The code was laid on both machines and they were locked to station sync so no velocity problems, just how do you phase them up to replace the VTR sound with multi track sound. Lots of work was involved in generating electronic control over the multi track audio recorder so that it could be interfaced to a VTR edit controller, and yes they could be pulled into phase lock, and the multi track sound laidback on VTR.

Meanwhile another ITV station came up with a different solution, again lock both machines to station sync, but record a full one minute VT clock, and put speaking clock on the audio track of both VT and the multi track. Wire up a pair of headphone with VT sound in one and ear and multi track audio in the other, roll them from the same point and listen for echoes, speed up or slow down one of the sources with momentary disruptions until the echo goes them they are in sync and the VTR can be put into audio record and the multi track sound used to replace the audio.




**The NAGRA SN recorder, in spite of its small size, produces exceptionally high quality recordings. It is much appreciated by reporters, who can record broadcast quality tapes and, at the same time, be more mobile. The SN solves film-makers' synchronous sound recording problems: it can easily be concealed during filming and strict synchronization is guaranteed.**

**http://www.bassboy.com.au/getreel/site/samples/cc/snn/snn.htm**

Modern electronics has given us good velocity control enabling so called free running audio recordings that can be pulled into phase in post production, my favourite was the late Steve Irwin who used to leap out of the crew vehicle to chase snakes, the camera man was happy keeping his distance with a long lens, but the sound man was no so lucky until they came up with equipping him with lapel microphone and a mini disk recorder, not easy to sort out afterwards as there were no clapper boards, but it kept the sound man away from the snakes

This has now been taken one step further by Zaxcom with their combined radio microphone and audio recorder. It backs up the transmitted audio onto a removable microSD card. The TRX900LT operates for up to five hours on a single AA lithium battery , and looks a must for the next time we stream something like the BGM, if only, I don't have price at the time of going to press

http://www.zaxcom.com/

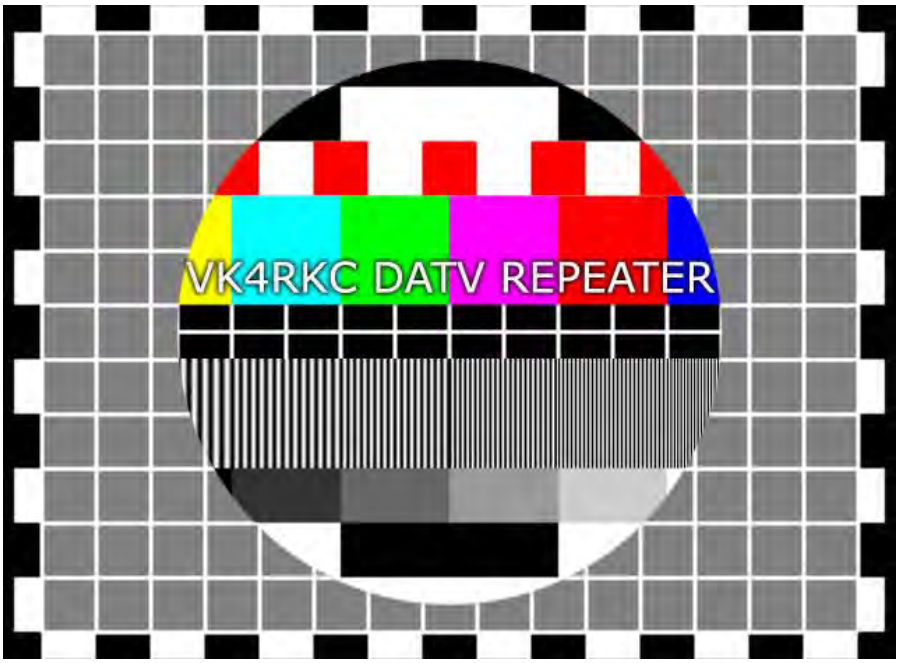
We also have the move to filming with DSLR camera's such as the cannon 7D

http://www.imaging-resource.com/PRODS/E7D/E7DVIDEO.HTM

I am sure the sound sync problems won't be too far behind, Its early days technology, there are numerous reviews on the internet and problems such as rolling shutters, which make interesting reading.

# KISS Repeater - VK4RKC

*by Richard L Carden VK4XRL*




VK4RKC has been operational for over 10 years with an output frequency of 426.25 MHz VSB and with an input of 1250 FM. During early 2003 both Dan VK4KI and I obtained DVB-S modules from Stefan of SR-Systems, so over a period of seven years we have played with digital television. Both systems have since then been upgraded to dual transport systems. Because of this a 1250 DATV input was added to the input of VK4RKC. Also Dan VK4KI added a 2415 MHz output using DVB-S, this has since been rewired for FM to allow more stations to receive it.

Since early 2007 DVB-T modules have been purchased from SR-Systems allowing experimentation to be carried out using this mode of operation for ATV, it only differs from the free to air by the number of carriers been transmitted (2k instead of 8K). I first transmitted DATV to Don VK4TVD and Allan VK4YAR using around 6w from a module. This was later upgraded to 14w (-28dbc shoulders) using dual modules using a modified TEKO power amplifier were very good results have been achieved. A number of different set top boxes have been utilised for these tests and has allowed us to see what units are suitable for ATV reception.

The STB's must be capable of manual tuning been set via frequency not channel. So far the Strong 5049 which is sold as a professional unit and has a signal input level from -20 to -78.5 out classes all others that we have tested. The Olin 2000B also works well where the strong 5006 is down on gain but worked fine in strong signal areas.

Dan Vk4KI has been working on the RF system but has been hampered by ill health for the past several months. However he has been working at his own pace and has a 32w power amplifier up and running using dual RD70HVFI - Mosfets. Armed with this and his DATV exciter VK4RKC changed over to digital operation several months ago from the site at Ocean View. So far good results have been obtained with a number of dormant stations now transmitting through VK4RKC as well as a few new receive only stations.

Some stations like Don VK4TVD have spent considerable time and effort in obtaining satisfactory results from the DATV repeater which has included the installation of a digital pre-amplifier as well as testing quite a few STB's we could muster, the Strong 5049 being the best by far. Further upgrades have now allowed the Olin 2000b to work without dropouts. Our gratitude is therefore extended to Dan VK4KI in spite of his ongoing medical problems to have allowed us that have retired to keep the grey calls working. Without it I wonder what would happen, thanks Dan.

In parallel to this operation we decided to replace the old vision and audio setup with a updated system to allow full dual transport operation in the future.

Brisbane is unique in that two repeaters exist. VK4RMG is operated by the

SEQATV group who started ATV operations in around the late 1970's. VK4RKC started operation around 1996 due to differences of opinions as to where we were heading. Without going into the problems associated with this it is hoped that both groups due to changes of circumstances can now join forces to have one repeater in operation.

**The New A/V system for VK4RKC.**

The new A/V system started life as detailed in CQ-TV 211, however since then a few changes have taken place and I will attempt to bring you all up to date on where we are. Looking at the block diagram you will see a number of different blocks which I will now detail as follows;

**Testcard Generator:**

This is based on the old CQ-TV circle testcard generator by Richard Russell. These three boards are built into a signal 1ru rack module with separate +5v regulators for each board. The one exception is the first board which as an adjustable regulator set to just under +6v for reliable operation of the master oscillator.

**PAL Encoder:**

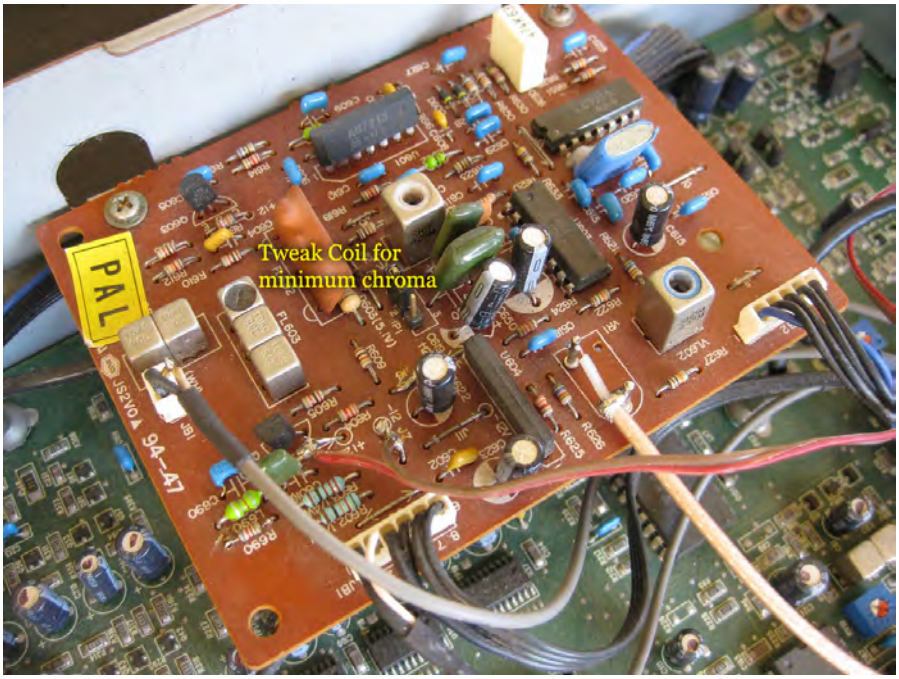
The first version consisted of the BATC club encoder and SPG, however when a MIKE COX 153 encoder and LEITCH 141 SPG became available these were placed into service which now supplies correct levels and sync pulses (the Cropredy didn't). The encoder output feeds a Blackbox ident keyer (modified to improve chrome response) before feeding the video switcher. The second testcard for the dual transport system is derived from the colour bar output from the 141 SPG which is in turn feed via the club ident generator before feeding into the second video switcher.

**The Video Switchers:**

The first video switchers were based on those as detailed in CQ-TV 211, however two Sony video and audio switchers came my way and these therefore have been placed into service. The different inputs can be seen from the block diagram. The spare inputs still have to be determined and could consist of 13cm receive, computer or 3cm receive, further requirements will take place in due course. The audio inputs have been modified for unbalanced inputs and the remote switching socket was replaced with a DB9. These switchers allow remote and local operation so improves the fault finding that maybe required at the site.

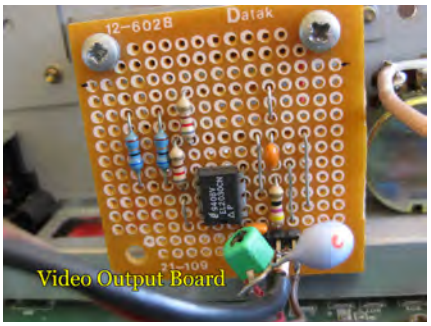
**VDA's:**

Philips VDA's have been added to allow precise level adjustment to bring it into line with required standards. You may notice that the 1250/1283 MHz FM receivers have no VDA's external and is because we haven't been able to source anymore with backplanes.




**1250 / 1283 MHz FM Receivers:**

These receivers are Scientific Atlanta B-MAC receivers that have a PAL board fitted. These provide excellent receivers for ATV. However with the standards that we are allowed to use for ATV on 23cm the output video level is only ½v P/P. Also we require two outputs, one for the video switcher and one for the video detector. This of cause could be done with one output and looped through the detector but direct inputs are more desirable.




A separate video amplifier has been added to each receiver to provide the extra gain and the two outputs. Another requirement was to reduce the audio sub-carrier on the video output (this is due to the use of 5.5/5.74mhz for the sound sub-carries on 23cm) therefore a trap circuit was included on the input to this amplifier. Some SA receivers have been modified to allow dual audio sub-carriers, however in these units the internal unit has been used allowing only one sub-carrier. The internal audio level control has been extended to the back panel to allow some adjustment for alignment.

**VK4RKC-1 and VK4RKC-2 outputs (Video):**

Each switcher output is feed via a VDA to provide inputs to the DATV exciter, waveform monitor, vectorscope and picture monitor. Extra outputs are provided for future expansion as required.

**Audio Outputs:**

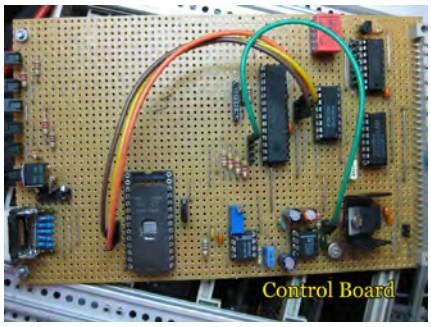
The outputs from the audio switcher are feed via two audio DA's providing three outputs per channel. An output from the DA is internally feed to a VU LED meter circuit so that audio levels maybe adjusted within the repeater system.

**Tone and audio Ident generator:**

This unit is mounted in a 1RU and is identical to the one in CQ-TV 211. It allows for alignment and audio Ident.


**Ident Generator:**

For RKC-1 the ident is supplied from a WD mini Media Player and consists of different location pictures around the repeater viewing area and is switched on for 8minites after the received signal is dropped off and allows some time to check the receiving system if required. The Ident for RKC-2 is the Teletext Pattern Generator as found in The ATV Compendium (page25) and switches between two idents to check if the system hasn't locked up.




**Controllers:**

In CQ-TV 211 I used the BS2 as the controller, however these are expensive compared to the Picaxe. Therefore the controllers have now been re-built and now use a 28X1 Picaxe. Two separate controllers are provided for each transport system and switcher. The controller flow diagram will give you an idea what is involved with each controller.

A simple approach has been taken after much work and experimentation with LCD readouts for control status. LED's and a 7-segment display have therefore been selected for this function.


These been the most suitable for the application as intended. LED's give the status readout for all inputs and are 'on' (green) when activated. The TX 'on' is red when activated. The 7-segment display gives you an indication as to what input has been switched and is set via an EPROM.

**Alignment-Video:**

Video alignment is relatively easy. There are no adjustments within the testcard generator, however the Cox Coder has an internal bar generator so alignment can be carried out looking at a spare output from the coder. Once aligned the output VDA on VK4RKC-1 can be adjusted for 1v p/p via the waveform monitor.

The colour bars from the SPG 141 can also be checked from the second output and again once checked the output VDA can be set to 1v p/p. These then become the standards for the rest of the system. The SA receivers can be adjusted for 1v p/p output when receiving a known correctly setup transmitter.

The DATV receiver can also be set via its associated VDA for 1v p/p. All other inputs have VDA's so again alignment can be completed.

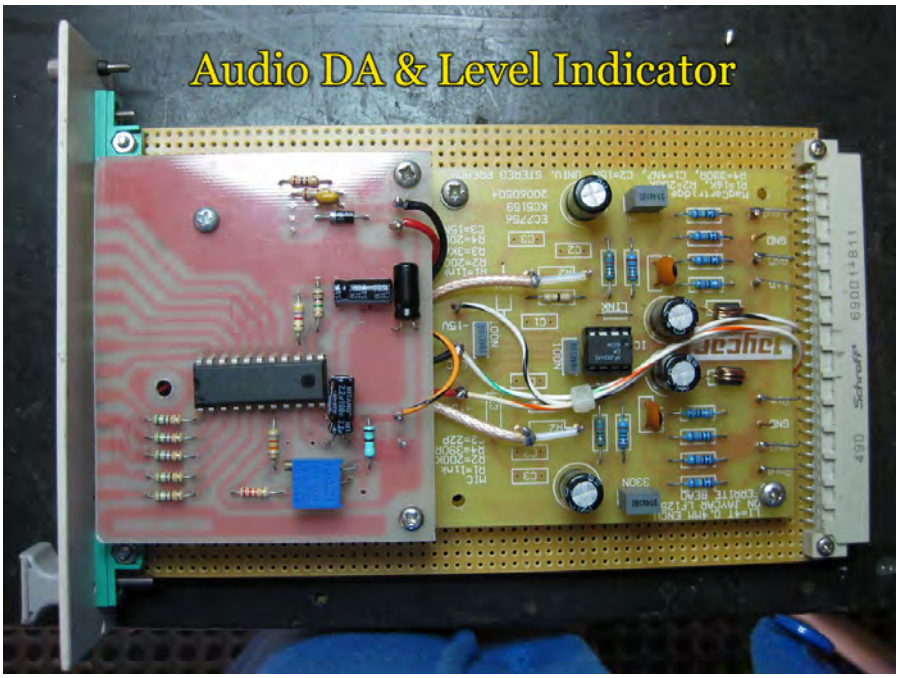
**Alignment Audio:**
The audio always causes problems and most people set for sound levels that are approximately similar when comparing them to other known reference.

What I have tried to do here is maintain a standard level throughout the repeater. The audio oscillator is set to obtain -10 from the switcher output and then -10 from the audio DA output. The internal VU led meter is then calibrated to this level. All other inputs are adjusted then to this level as well as the output from the voice ident generator.

The inputs to the DATV exciter are then reduced to the required level via fixed pads to set the DVB-T levels to -18dbm (0.356v p/p). The fixed attenuators are made up of a series 10k resistor and a shunt resister of 6k8 to ground from its output. These levels have given reasonable results 'off air' and match pretty closely to those from the free to air channels.

**Web:**

http://members.optusnet.com.au/~cardenrj/



# SONY BVP7 Broadcast Camera

*by Trevor Brown, G8CJS*

In the Last issue Brian Summers reflected on the reasons why he collects old cameras. I don't quite have his collection or view point, but I do own a couple of old working cameras. I love working with professional equipment, being able to operate kit to what I like to think is a professional standard, so if it doesn't work then I have little time for it, unless it can be changed from non working to working, not my favourite task, but now and then it comes to us all.

One of the camera's I own is a Sony BVP7, I have a lot of time for Sony kit including their cameras as they are designed to please the operator and I think that's one of the yard sticks to judge any equipment by. They are not the best at longevity, but Sony kit is lightweight and user friendly, viewfinders lenses and tripod plates are interchangeable across a large part of their range which is a big attraction. While their camera kit was designed to please the user and not necessarily the engineers, who tend to go for the more robust battle ship style constructed cameras, once you know your way around the kit you can often find items on eBay, it's knowing which lens to go for, which back, tripod plate etc. I hope this article helps you locate and assemble the various parts of the Sony BVP 7 camera.

Let's start with the lens: The BVP 7 has a removable lens, using a B4 bayonet mount, and this mount has been consistent through most of the Sony range of professional camera's, so if you upgrade to a higher spec camera then the lens could often be retained, for this reason you see Sony camera's advertised on eBay less lenses. The B4 mount exists in two sizes 2/3 and 1/2. The BVP7 is a 2/3 mount, beware lenses from JVC camera's that are more likely 1/2. B4 lenses use several different connectors for the electronic controls (zoom and iris control for automatic exposure). This connector is separate to the bayonet on a flying lead. The lead in most cases is equipped with a 6 pin or 12 pin connector. The 6 pin is old and pre dates the BVP7 which requires a 12 pin connector. Lenses with 6 pin connectors can be found on eBay at reasonable prices and updated with a new connector. If you want to use the camera hand held then a wide angle lens will improve your camera work, but I suspect unless you come across a bargain you will have to put up with a something around 9 or 10mm when zoomed to full wide.

The older lenses were also designed for tube camera's not modern CCD camera's, what's the difference? something called achromatic, where focal point is dependent on the colour, not such a problem on tube camera's as the tubes can be positioned independently to cancel errors, this is not the case with CCD sensors. This error is minimised in most multi element lenses by constructing the lens from two different types of glass (Flint and Crown) which have different properties. By using Flint for the concave elements and crown for the convex elements, the theory is the errors cancel out see:

http://en.wikipedia.org/wiki/Achromatic_lens

I have to say I have now used numerous lenses, designed for tube camera's on CCD cameras and have not yet seen any problems when working at standard definition. I have seen lenses that won't make back focus, that is much more of a problem, these lenses were presumably designed for camera's where the CCD or tubes were located in a different position, remember the B4 bayonet is a common mount and used on a wide range of camera's, by manufacturers other than Sony.

There is also what is called external and internal focus lenses, this logic comes from what happens when you rotate the focus ring, on an external lens the front element rotates, on an internal focus lens the front element does not rotate.

Inexpensive external focus lens they can be found on eBay for around £100 upwards depending on condition


Cannon Y20X8.5 (8.5mm when wide) 20:1 zoom and built in 2 x extender . Internal focus, note the square lens hood. Also a starting price of £1,730 on eBay. it does retail at £7k but I might just pass and stay with my external focus lens

To understand why, you need to understand lens filter and hoods. If you screw a polarising filter on the front of an external focus lens and rotate it to minimise a reflection it will need to be reset every time you adjust focus, similarly with square lens hoods. With an internal focus lens this is not a problem. It goes without saying the more modern internal focus lenses command a better price, I only have an external focus lens on my camera, but I live in hope of a wide angle, internal focus lens with 12 pin connector, turning up on eBay at a price I can afford.

The BVP 7 is equipped with a very pleasant shoulder mount that can be simply dropped on to a tripod providing the tripod is equipped with the appropriate Sony plate, for this camera it's a VC T-U 14 plate, again they turn up on eBay for around £50. Once the tripod is equipped with this plate all the Sony

professional camera's will fit this same tripod plate, up to and including the HDW750P (around £30,000 depending on options) so a good tripod and plate is worth collecting, go for a self levelling ball style tripod with 100mm ball if possible, 75mm if you must. It's really important if you are using kit in anger to be able to snap the camera on or off the tripod, instantly and follow the action

VCT-U14
Tripod plate

The camera body is designed to fit a number of interchangeable backs rather like the Hassleblad stills camera, so it can become a camcorder (Beta SP its an old camera) or a cable fed studio camera (CA-50p back) that will connect to an M3 CCU via a 41 pin connector and also work with a reel to reel C format VT like the BVH500 C format VTR, via the 26 pin connector. Triax backs are also available, (CA-55p) for connection to a CCU 355/P these too have the 26pin VTR connector but not the 41 pin CCU connector

BVP7 equipped with Triax back CA-55p for connection to a CCU355/p note there is no 41 pin connector this is replaced by the Triax connector but the 26 pin VTR connector is retained

BVP7 equipped with Betacam recorder, battery mount and Viewfinder, only missing a lens and it appeared on eBay for £124, sold as not working, but produced bars in the viewfinder when powered up so I would say half working, maybe fully working but without a lens the seller could not test it any further.

The view finder can be a standard Sony monocular view finder, or the larger studio view finders (BVF 55CE) both can be fitted to the same socket. This versatility is why Sony cameras are so popular.

External studio Viewfinder BVF 55CE

Both the CA-50P cable back and the CA-55p Triax backs are equipped with a BNC connectors which will accept black and burst for genlock operation, (The BVP7 will free run without this) There is a video output BNC on the main camera for connection to any video recorder or other application. Power requirements are +12v from a standard 12v pag battery, mounted on the rear (CA-50p back) or via the 4 pin XLR connector which is common to both the cable backs and the Triax backs, I have a simple home made mains PSU (mains transformer, bridge rectifier and smoothing cap), which works well although I do have a battery belt , when I need to use the camera on the move.


Pag battery packs and connectors

Battery belt which connect to the 4pin XLR connector some have built in mains powered charger s, one less piece of kit to carry.

So far I have used the 26 pin input for tallies on pin 15. If you apply +5 volts the camera tally lights will illuminate. So I have hidden a +5 v regulator in the camera back and made up a cable to connect it to the tally box on the streamer cues and communications box, I am in the process or exploring the intercom so that talkback will appear on the headphone sockets and enable the camera headphone connections to be used.

VTR (26PIN)

(EXT VIEW)

| PIN No. | VTR | |
|---|---|---|
| | SIGNAL | REMARK FOR SIGNAL |
| 1 | COMPOSITE VIDEO OUT (X) | 1.0Vp-p,75 ohm |
| 2 | COMPOSITE VIDEO OUT (G) | |
| 3 | Y OUT (G) | 1.0Vp-p,75 ohm |
| 4 | Y OUT (X) | |
| 5 | R-Y OUT (X) | 75 ohm<br>700mVp-p(CA-50)<br>525mVp-p(CA-50P)<br>(75% COLOR BARS) |
| 6 | R-Y OUT (G) | |
| 7 | B-Y OUT (X) | 75 ohm<br>700mVp-p(CA-50)<br>525mVp-p(CA-50P)<br>(75% COLOR BARS) |
| 8 | B-Y OUT (G) | |
| 9 | MIC OUT (X) | -60dBs, 600 ohm |
| 10 | MIC OUT (Y) | |
| 11 | MIC OUT (G) | |
| 12 | VTR START/STOP OUT | START : 4.5 ± 0.5Vdc<br>STOP : 0 ± 0.5Vdc |
| 13 | BATTERY ALARM IN | (Note 1) |
| 14 | (SPARE) | |
| 15 | REC/ALARM IN | (Note 2) |
| 16 | (SPARE) | |
| 17 | SHIELD | |
| 18 | PB VIDEO IN (X) | 1.0Vp-p,75 ohm |
| 19 | PB VIDEO IN (G) | |
| 20 | POWER SAVE OUT/ AUDIO MONITOR IN | SAVE: 4.5 ± 0.5Vdc<br>(across 10k ohm)<br>STANDBY: 9.0 ± 0.5Vdc<br>(accross 10k ohm)<br>MONITOR: -5dBs,750 ohm |
| 21 | (SPARE) | |
| 22 | COLOR FRAMING PULSE OUT | This signal is not used in VTR. |
| 23 | (SPARE) | |
| 24 | (SPARE) | |
| A | UNREG +12V IN | 10.6 – 17.0V |
| B | UNREG GND | |

Is there a down side, the bodies and CA-50P cable backs appear on eBay for around £100 and an external focus lens for about the same again, although bargains do appear for non working lenses or 6 pin connector equipped lenses. Reliability, well they are getting old, they are modular card construction so if you have two you can juggle cards to locate the faulty one. The odds are it will be an electrolytic capacitor, Sony

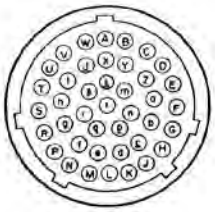
 

are famous for a range of these that seem to time expire after five to ten years. They are not surface mount and this is probably the last camera they produced before the dreaded surface mount capacitor. Locating the faulty board and replacing all the capacitors usually sorts the problem. There are reports of the Bi-refringent glass filter which is located in front of the camera filter wheel delaminating and rending the camera unusable, but I have three of these cameras and non seem to have that problem.

The camera needs a little more light than a modern camera , so although it's got a variable speed shutter and an ND filter selection wheel, to reduce light you might just find you don't get a lot of use out of either of them. The filter wheel also has colour correction filters for changes in colour temperature. White balance is the modern point at a white piece of paper illuminated by the light you are filming with and press the switch on the front, up for white balance down for black and it will automatically stop down the iris on black balance providing you have the lens electronics connected correctly. It will report the colour temperature in the viewfinder and if it won't make white balance and the filters are required it will report this error in the viewfinder, so you can select the correct filter and try again. So all the bells and whistles you come to associate with a professional camera are there.

The switches and controls match its bigger brother so if ever you have to use one of its bigger brothers in anger (I have been there) you will find your hand goes to the correct places for all the switches and you will still feel at home

Remember its old i.e. 4:3, but its DV cam equipped, widescreen bigger brother, the DSR 500 is starting to fall out of broadcast use and may soon become affordable, my favourite the DSR 450 might take a little longer as it's still very new.



(EXT VIEW)

CCU (41 PIN)

| PIN NAME | SIGNAL | REMARK FOR SIGNAL |
|---|---|---|
| A | POWER SENS (-) OUT | Between pin A and pin Y DC16V |
| B | (SPARE) | |
| C | (SPARE) | |
| D | VBS OUT (G) | GND for VBS VIDEO |
| E | (SPARE) | |
| F | PGM IN (G) | GND for PGM AUDIO |
| G | (SPARE) | |
| H | RETURN VIDEO IN (G) | GND for RETURN VIDEO |
| J | (SPARE) | |
| K | MIC OUT (Y) | -20dBs,Zo = 600 ohm |
| L | MIC OUT (G) | GND for MIC SIGNAL |
| M | H SPARE CONT IN | 5.0Vp-p, Zi = 4700 ohm |
| N | SERIAL DATA OUT | 2.5Vp-p, Zo = 470 ohm |
| P | SERIAL DATA (GND) | GND for SERIAL DATA |
| R | INCOM RECEIVE OUT (Y) | Between pin R and pin g -20dB |
| S | INCOM TALK/RECEIVE OUT(G) | GND for INCOM TALK/RECEIVE |
| T | G OUT (G) | GND for G/Y VIDEO |
| U | (SPARE) | |
| V | B OUT (G) | GND for B/B-Y VIDEO |
| W | SC PHASE CONT IN | |
| X | R OUT (G) | GND for R/R-Y VIDEO |
| Y | POWER SENS (+) OUT | Between pin Y and pin A DC 16V |
| Z | VBS OUT (X) | 1.0Vp-p, Zo = 75 ohm |

| PIN NAME | SIGNAL | REMARK FOR SIGNAL |
|---|---|---|
| a | PGM IN (X) | -20dB |
| b | PGM IN (Y) | |
| c | RETURN VIDEO IN (X) | 1.0Vp-p, Zo = 75 ohm |
| d | MIC OUT (X) | -20dBs, Zo = 600 ohm |
| e | SERIAL DATA IN | 2.5Vp-p, Zi = 4700 ohm |
| f | INCOM TALK IN (X) | Between pin f and pin q, -20dB |
| g | INCOM RECEIVE OUT (X) | Between pin g and pin R, -20dB |
| h | (SPARE) | |
| i | Y OUT (X) | 0.7Vp-p/1.0Vp-p,Zo = 75 ohm |
| j | B-Y OUT (X) | Zo = 75 ohm<br>700mVp-p(CA-50)<br>525mVp-p(CA-50P)<br>(75% COLOR BARS) |
| k | R-Y OUT (X) | Zo = 75 ohm<br>700mVp-p(CA-50)<br>525mVp-p(CA-50P)<br>(75% COLOR BARS) |
| m | (SPARE) | |
| n | POWER (+) IN | 10.5 ~ 17V |
| p | (SPARE) | |
| q | INCOM TALK IN (Y) | Between pin q and pin f, -20dB |
| r | GND (POWER) | GND for POWER |
| s | (SPARE) | |
| t | (SPARE) | |


The BVH 500 portable C format recorder that interfaces to the BVP 7 via the 26 pin connector (note the supply reel and take up reel sit one top of the other) The recorder can be stopped and started remotely from the BVP7

To the right is a BVP7 mounted on 75mm ball tripod and fitted with a BFV55CV viewfinder and a CA-50p cable back, it really needs a bigger tripod, but I rarely walk away and leave it like this, it's simple to pull the red leaver and remove the camera, to safety, usually the floor

# GB3TM Overhaul and Upgrade

GB3TM on the North Coast of Anglesey has recently been undergoing maintenence and minor upgrades .

**Digital Transmitter 1316MHz QPSK**

The AGAF DATV Encoder and Modulator board settings have been changed to provide improved picture resolution. New settings:

| | |
|---|---|
| Elementary Stream | 6MB/s |
| Symbol Rate | 4.167 MS/s |
| FEC | 7/8 |
| Video-PID | 33 (decimal) |
| Audio-PID | 49 (decimal) |

A 2-metre receiver on 144.750 MHz has been installed and the audio output from this is taken to the B audio channel input on the Digital Transmitter to provide talk-back.

**Analogue Transmitter 1316MHz FM**

The Analogue Transmitter has been in continuous operation for 16 years, since July 1994 and had been suffering some minor problems. These have now been corrected and the various transmission parameters checked and readjusted as necessary.

After checks and maintenance, the Analogue Transmitting Aerial has been moved back from its temporary location to its original (higher) position which should resume normal coverage.

**Logic and DTMF control**

The output can be switched between Analogue and Digital with DTMF tones on the incoming 6MHz FM audio channel. The default mode is Analogue.
Present DTMF codes are:

| DTMF | |
|---|---|
| 1 | Digital TX 15 minutes |
| 2 | Analogue TX continuous |
| 3 | Test Card on 1 minute |
| 4 | Test Card off |

**Analogue Receive 1249MHz FM**

This is now powered from a UPS to prevent problems caused by intermittent brown-outs of the mains supply. The possibility of an additional Digital Receive facility is under review.

Photograph of the GB3TM Technical Team at the Site: (Photo GW4KAZ) Brian GW4KAZ, John GW3JGA and Repeater Keeper David GW8PBX

Submitted by GW3JGA and GW8PBX 18.10.2010

# Letters to the Editor

***Contact with Normandie***

On the evening of Thursday September 23rd at 23:30 contact with F9ZG Rolph IN90AL Normandie @ 1187Km

23cm analogue both ways P4 colour

70cm analogue both ways P4

70cm Digital 2MS 1/2 FEC Tx from G8LES received +30dB above noise at F9ZG good strong digital signal with audio.

Nothing received as Rolph running 1.024MS - too low for my Rx.

Was informed the other French people use 1.667MS which the Alteia will accept.

Mike Sanders

**Drop me an email, let me know what you're doing with ATV. It's good to talk: editor@batc.org.uk**

# Cyber vs Printed...

...what's available to read "on the go"
*by Brian Kelly. GW6BWX*

CQ-TV has been available in both paper and "Cyber" formats for quite a while now. Initially, there was a lot of resistance to change, the paper copy had been sucessful for half a century so any mention of it being repackaged was seen as medling with a time honoured institution. Over the past few months though, there has been a gradual swing in favour of the Cyber copies. More new members choose Cyber than paper and renewing members, even after years of receiving printed copies, are switching the the electronic format.

From a production point of view, it makes little difference which version is distributed, it all starts off in electronic format anyway. In fact the printing house now receives a PDF version of CQ-TV ready to load into the print machines. The Cyber and printer's copies are essentially the same, only minor differences exist to cater for the special needs of the automated printing process.

From the readers point of view, the content is the same whichever format it is presented in but the time between releasing an issue and reading may be just a few seconds in the case of the Cyber version up to several weeks for printed and mailed versions to arrive. Judging by the number of calls we receive from members asking if the next issue is ready, it appears the speed of distribution is as important as the content.

There seems to be two main objections to cyber copies, the craving for something physical to hold and the misconception that they can only be read on a computer screen. While there isn't much we can do to satisfy those addicted to the smell of fresh ink or use stacks of magazines as furniture (it really happens!), we can dispel the myth that you have to be tied to a desk to ingest your favourite quarterly.

Over the past few years, portable technology has taken huge leaps ahead, driven mostly by the demand to pack an ever increasing number of utilities into a mobile phone. The days of a cell phone being just for talking are long gone, you are just as likely to see one being used as a camera or GPS receiver these days. If you have ever had the misfortune to witness the afternoon Harlech to Barmouth train carrying school kids you will see an excellent example of technology in action, and hear a deafening cacopheny of ring tones and key clicks as they 'text' each other. I have never understood the need to send a text message to the person sitting next to you but perhaps I'm old fashioned.

Hot on the heels of the multi-function, do everything, Swiss Army knife mobile phone is the 'Pad', a super sized phone without a phone in it! To be more precise, everything normally in a phone except the facility for voice communication. I am not sure if there really is genuine need for these gadgets or it's just a fashion accessory, I do not own one so I can't speak from experience. They are too big to fit in my pocket so they are difficult to carry and they lack the connectivity of a laptop computer which would stop me hooking things up. The larger screen opens the potential for use as a book substitute perhaps.

Going back to CQ-TV, there are now many portable devices that can show PDF files, from the newer cell phones up to conventional laptops. I decided to see how well some of these performed when showing typical CQ-TV pages from the normal cyber version. I excluded laptops from my tests as their performance is so close to a desktop computer, including the screen resolution, that they are indistinguishable from them. I doubt any laptop manufactured in the past decade will underperform, the only real difference is that laptops get hotter than other devices and leave burn marks on your knees.

Using a combination of buying, begging and borrowing ( I stopped short of theft) I managed to get hold of four other gadgets capable of showing PDFs. They are, in order of screen size, a Nokia N95 telephone, an Apple Iphone4, a Samsung Galaxy S and an Amazon Kindle. All of these have USB sockets and Wi-Fi connections that allow CQ-TV to be transferred to them for reading. All except the Kindle also have Bluetooth which can also be used to download from an internet connected computer. There are two kinds of Kindle, one with Wi-Fi only and one with added 3G support. I used the former as there is no 3G in my area but read on, it may be useful to some people.

**The Nokia N95 8GB.**


The 8GB refers to the amount of memory inside the device that can be used to store applications or files. It is fixed, you can't upgrade it, but there is space to hold about 650 copies of CQ-TV, that's about two average lifetimes worth so it should be enough! Part of the colour LCD screen is reserved for listing the function keys, status and the clock. The remaining part that can be used to read PDF files is 60mm measured diagonally with the phone upright and 65mm diagonally with the phone on it's

side. The difference is due to the way the image rotates when the phone is reorientated. The image is quite usable but the small size made it tiresome to use, especially as it was necessary to visit the menu many times to adjust the image zoom and positioning. One problem noticed was the failure to open large PDF files when lots of applications were loaded. This seems to arise from a lack of system memory rather than main storage, an "out of memory" message was displayed if other programs were running. The N95 can also record video in 3GP format and the quality was comparable with VHS recordings, with a suitable cable it can also be used as a video camera.

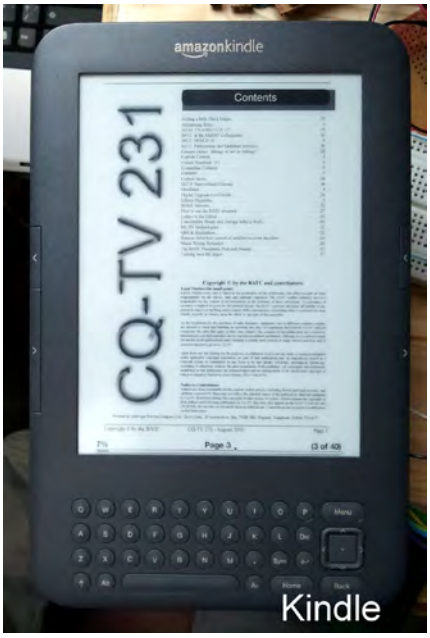
**The Apple iPhone 4**


This was a 32Gb device so it has acres of storage space. The usable screen was measured at 89mm diagonally but some of the area was reserved for phone functions so the PDF file was a little smaller than full screen. The image was sharp and easy to read and the colour LCD was bright enough to use in daylight. The "pinch zoom" which lets you use two fingers on the screen to "stretch" the image was excellent and made it much simpler to concentrate on one specific part of text or a diagram. It took a while to get used to zooming and scrolling but practise makes perfect. It had no problem with large files, I tested it with a 20Mb PDF and it coped perfectly. One difficulty I can report was getting the CQ-TV into the phone, it required a huge file download from Apple's web site and a major install on a PC to provide the transfer link. This is a one-time download so the delay may be worth the wait. The iPhone can also record video although I couldn't see how to use it just as a video camera. I did only have access to it for a short time so it may be a feature I didn't have time to find.

**The Samsung Galaxy S**


Memory on this phone is part fixed and part removable. I had an 8Gb micro-SD card installed in the model I tested. Having swappable memory and a HD camera on board makes this a useful video recorder in it's own right and the recordings which use H264 encoding are stunning. The screen is unusual in that it uses LEDs instead of an LCD. There is huge benefit to using LEDs, they draw no current when unlit, LCDs have a backlight that has to be running all the time. The battery life is therefore much longer than on the other devices. Using a fully charged battery, I played a HD video recording on it for 7 hours and the charge indicator had only dropped to 50%. With a video output cable attached it can also play video to a standard TV and the picture quality matched that from a DVD player. Transferring CQ-TV to it was also very easy, unlike the iPhone, when a USB cable was plugged in, it asked if I wanted to use Samsung's own program, use the phone as external storage or use it as a wireless internet modem. In storage mode, my PC could see the phone's internal file storage and simply copied CQ-TV into it. The process took a few seconds and didn't need any support software at all. Visually, the display is sharp and bright and it had no problem showing the magazine pages. Like the iPhone it has a touch screen to pan and zoom around the pages but the clarity was so good that text could be read even when a full page was in view. The screen is the largest of the phones tested at 97mm diagonally and it uses the whole display area to show the pages. A really useful feature was the ability to reflow the text, for example, rather than zoom into a section of page, it was possible to select a paragraph and re-format it to fit the screen, a bit like word wrapping in a word processor.

**The Amazon Kindle**




This is most definitely not a telephone! The Kindle is purely a reading device, intended as a substitute for a paper book. It achieves it's aim admirably and has some other rather nice features built into it too. As previously mentioned, the Kindle comes in two flavours, functionally identical except for an added 3G modem in the more expensive version. The modem is there to order and download books without needing to connect to another computer, making it completely portable, although both models also have WiFi and USB connections. When buying the Kindle, Amazon give you an email address to use as a download destination, essentially, they send purchased books as a file attachment and email them to you. To prevent the email address being used for "spamming", the owner has to visit the Amazon web site, register and then add acceptable senders to an "approved' list. To send the CQ-TV I used for testing to the Kindle I simply emailed it to it.

The Kindle's display is remarkable, it is neither LCD or LED and it has no backlight, working only on reflected ambient light. The technology is called "e-Ink" which either floats or sinks tiny droplets of ink in a milky liquid. The droplets are black and when floating create the shapes of the characters on the screen, when they sink they return into the liquid and are lost in the white background. The current used to drive the display is so low that Kindle's wafer thin battery lasts for around three months between recharges – and that's when it's left switched on ! Visually, the screen looks remarkably like printed paper but is only in 16-shades of grey, it has no colours. Measured diagonally, the screen is 150mm, making it by far the largest in my tests and it can clearly show a whole page of CQ-TV at a time, in fact it is one quarter of the area of the printed version of the magazine. Zooming is possible and panning is possible but it has to be done by using the menu keys which is tiresome. The text is however, clear and the images perfectly usable.

Which makes one superior to another?

The clarity of larger screens outweighs the advantage of portability offered by smaller devices. However, the ability to zoom and pan easily makes a tremendous difference to how easy it is to read pages that are too large to show in their entirety. As a substitute for reading a paper magazine, the Kindle wins hands down but if other features are of use, the extra gadgets built into other devices makes them more attractive. Certainly, the screen on the Nokia N95 is too small for serious reading and I would not advise using a screen of that size for prolonged use. With larger screens, the iPhone and Galaxy S are strong contenders as multi-purpose tools with built in PDF readers. The purpose of this article was never intended to promote one model or manufacturer, but to look at the implementation of technology they use to find their strengths and weaknesses from a members point of view. New models appear on the market almost daily so the choice of devices suitable for Cyber readers gets ever bigger, hopefully I have helped to make a choice for anyone considering the switch from printed to cyber CQ-TV. My favourite – the Galaxy S, even the owner of the iPhone was impressed with it!

# 3D TV Update

First there was 4:3 and this lasted for over 60 years. But the eye perceives any scene as an horizontally elongated ellipse so the 'old' aspect ratio did not, could not do justice to the original view; meanwhile cinemas were adopting all kinds of wider screen sizes.

So the next step for TV was to increase its aspect ratio and 'squaring' the numbers produced the now standard 16:9 widescreen, presenting a more natural view to the eye and enabling some films to be displayed almost as intended.

Did I say "now standard"? Along comes Philips with its – wait for it – 'Cinema 21:9' screen! Now we are really 'talking wide' here; I had to measure along the walls of the house I was thinking of buying, to see if this would actually fit! Please don't confuse this as just another large TV (and they do come really big these days!); this one should display DVD films as they were shown in the cinema – "as they were meant to be seen" to quote the booklet. An ideal Christmas present for the TV addicts who have everything else?

Graham Hankins

**Don't forget the BATC Forum:**
**http://www.batc.org.uk/forum/**

**For Sale / Wanted**
**Remember, as a BATC member you can place an advert in CQ-TV and on the website**
**FREE OF CHARGE**

# TV Amateur 158

**HAMRADIO 2010**
Nearly 17,000 visitors from all over Europe came to Friedrichshafen for the 35th International Hamradio fair, 185 exhibitors from 29 countries demonstrated their products. Several jubilee events, including a raffle and an exhibition celebrated the 60th birthday of DARC e.V., the German amateur radio club. The traditional HAM RALLY with 19 exhibitors which including the AGAF stand, where Rainer DM2CMB, produced colour prints using a videocam and a video printer for each child to take away so they knew what they would need to receive ATV. 105 teachers had advanced training to make lessons more scientific and technically interesting.

I took the opportunity for a 3D test with visitors passing by the AGAF stand. On the table was an expensive auto-stereoscopic TFT monitor with a switchable parallax-barrier LCD ("Virtual Window" by DTI, VGA connection) which produced 3D-HD videos without '3D spectacles. Most people were trying to find the 'sweet spot' (optimal 3D position about 50 cm away from the screen, two perspectives), but that was difficult.

Another version of modern 3D-HD displays, a 120 Hz-3D-ready TFT monitor (Samsung, DVI connection) under the table, was shown to only a small number of viewers because it needed LCD shutter glasses (Nvidia 3D-Vision with infra-red control), but everyone was excited about the stable and deep 3D vision. The identical 'side-by-side'-3D-HD videos had been recorded on a Windows7 PC from special Satellite-TV channels and were shown by the Windows program 'Stereoscopic Player' (www.3dtv.at). New free 3D-HD demo channels can be found via: Astra 23 degr. east, 11778 MHz vertical, SR 27500, FEC 9/10, DVB-S2, QPSK (Astra 3D); Astra 19 degr. east, 12382 MHz hor., SR 27500, FEC 9/10, DVB-S2, QPSK (Sky 3D Germany, free during most daylight hours).

In 2011 a new face will lead HAMRADIO: Petra Rathgeber takes over from Thomas Grunewald and invites everybody to Friedrichshafen for 24th to 26th June

**Update of 3D-TV live with Windows 7 PC**
For the newer Nvidia graphics cards like GTS or GT220 there are current Nvidia drivers with integrated Stereo3D options (for 3D-Vision LCD-shutter glasses or the old-style red-blue anaglyph version). You need a 3D ready monitor with 120Hz video input capability (i.e. Samsung 2233RZ or Viewsonic VX2265wm) or a 3D-ready DLP-HDTV set from Mitsubishi or a 3D-ready DLP beamer like the Acer H5360 (720p-HD). For 3DTV reception you need an external HDTV-ready USB DVB-S receiver (with CI slot you can put your CAM with smart card into the slot and view pay-tv). The latest version 4.5 of the DVB software "DVBViewer-Pro" is able to show colour anaglyph 3D from "side-by-side"-3D channels on any video monitor, but with some software fiddling it is possible to view full-coloured 3D-HDTV live:
1. In the netstreaming-plug-in of DVBViewer (from Vers. 4.2.1) choose "Unicast" and "Interface 127.0.0.1" (local host).
2. install Elecard MPEG-2 PlugIn for WMP 4.1.100318_76864 (the demuxer is needed for splitting the stream), to find the codec-pack on the net google "Elecard h264 demultiplexer" (FREE-CODECS).
3. In Stereoscopic Player settings at "Decoder" use CoreAVC-Codec as h246-decoder (employing CUDA and reducing CPU load), AC3-Filter as audio-codec.
4. In DVBViewer choose Astra-3D on 23 deg. or Sky 3D on 19 deg. and de-activate audio/video or minimize the window.
5. In Stereoscopic Player choose "open URL" and type "http://127.0.0.1:2345" (2345 given from netstreaming-plug-in), now a settings window should open, choose "Layout side-by-side, 16:9, de-interlacing on".
6. The small stereoplayer window now shows one of the two 3D perspectives, by double-clicking on it the full screen stereo-3D is started. Take the 3D shutter glasses and view 3D-TV.

In my configuration this only works with "Elecard" and "Haali" chosen in settings under "MPEG4 splitters". The CPU load in task manager is showing around 40 percent on the 4 cores, a test of the DVBViewer window parallel to the small stereoplayer window shows stuttering video there, but the recording function on hard disk is running well. A 3D-TV playback from hard disk in stereoplayer needs another mounted MPEG4 decoder, i.e. from CyberLink.
Unfortunately the live stream from DVBViewer to stereoplayer was interrupted after some time (maybe 30 min.), then the URL registration in stereoplayer must get re-activated. This problem is solved by another tip from the german www.stereoforum.org: "In the registry at HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\SessionManager\Memory-Management I have set "Largesystemcache" to 1, on this page at "DisablePagingExecutive" doing the same (then close registry window!) and in the DVBViewer Netstreaming-plug-in setting "buffer" to "200" ended any interruptions."

**LNB re-used for ATV**
DD0CW says: "I have modified LNBs to 3 cm ATV reception and these devices are better than other LNBs for analogue TV. The local oscillator should work on 11.475 GHz, so you don´t have to change the dielectric resonator, as the image band is 10.2 - 10.45 GHz. Our ATV repeater output is on 10.226 GHz, and you only have to "bridge" the selective parts for 12 GHz and maybe optimize the preamplifier with additional copper plates (2 mm). For FM-ATV reception you need an old analogue Sat-TV-Receiver that is able to invert the video output. Near the ATV repeater location you don´t even need a big parabolic dish, only a small horn aerial.

Translations by Klaus, DL4KCK
AGAF e.V.

# ATV Repeater Audit

*by Graham Hankins*

*New Year's Resolution – bring more R.F. ATV into 'CQ-TV', starting with an informal 'audit' of the U.K.'s ATV repeaters.*

The club web site has a 'UK Repeaters' link, which takes you to ukrepeater.net, described as "The web resource for UK amateur radio repeaters from the RSGB Emerging Technology Co-ordination Committee". Further clicking takes you to the 'Alphabetic list of repeaters' which shows all repeaters and their modes. Most are analogue voice but I counted 44 ATV units. Selecting a callsign brings up a Data Page, Data Line and coverage map about each one, so it was interesting to have a look at the state of each and what they were all doing.

A mixed picture, if you pardon the pun! Each data page has space for a link to that repeater group's web site. Some of these links are missing or there is just a statement 'Removed 8/8'. Does that mean August 2008, or 8th August 2010? And why was the link removed? Or not replaced? Not very helpful at all really. Who controls the page – the repeater group, or the RSGB?

Three - GB3AT at Winchester, FT at Newbury and 'XY at Hull are shown as 'not operational'. The data page for 'AT states "Application received August 2009, frequency clearance required" but there is no information dated later than this or if the repeater is off-air for other reasons. For 'FT there is a link to the group's web site, where can be found a statement "Latest News - Jan 2004: We are STILL awaiting frequency clearance by the primary user of the 13cms band but hopeful that the project will go ahead one day". If that date is still correct, that 'one day' is now seven years away? Was Jan 04 really the latest news, or has the web site simply not been updated? The 'Vetting' site http://www.ukrepeater.net/vetting.html carries the statement: "Please note that due to web site maintenance (site refresh project) this page is not currently being updated". So, we just don't know – not from web sites anyway!

'XY is run by the East Yorkshire Repeater Group and the data page has a link to the group's site. But on its 'Repeaters' page there is just a general description of what repeaters do, nothing specific about the fortunes or current status of its ATV repeater.

Although most of the ATV units appear to be in normal operation and some of the group web sites have loads of information and photos, 'No link to group's web site' is too often found on each data page and there are several other mentions of 'Removed 8/8'. Removed by whom – the RSGB or the group? And if the link was removed, why was it never replaced?

I used to be keeper of what was my nearest ATV repeater – GB3RT, located at the time at Tile Hill in Coventry. Is it still there now, or moved to Leamington Spa as was being suggested many years ago? The ukrepeater.net Data Page gives Coventry in the Data Line, but shows Leamington Spa on the map!

The biggest surprise during this 'audit' was that the Bristol ATV repeater GB3ZZ, which perhaps has the most active following of all the units, does not have a link to its web site from the Data Page! But perhaps the saddest news came from the Kent Television Group that runs 'KT on the Isle of Sheppey: Although shown as operational, using the link to the group's web site there is a statement dated November 2010 from Chris G4AYT. Due to lack of funds, the group expects to close down the repeater by or before April this year. Chris comments: "It could have been sooner if the expected rise in rent this year (ie. 2010) had materialised". The deduction from this is that the rent did not rise last year, which 'begs the question' of how much was the rent and could something have been done to help with the costs? Had the club informed the BATC of its situation?

Although the Kent TV Group only has 11 members, Chris emphasises that the group itself is not being formally closed down as the ATV repeater was only part of its activities and adds: "This leaves the 'door open' for future possibilities should they arise. The Group could have a new lease of life if a suitably enthusiastic person or persons came forward". Let's hope someone does.

It would be good for at least the 'image' of ATV if on-line information could be brought up-to-date. I know it is some work for someone, but anyone interested in using the repeater would not be impressed by 'not operational' with no further news.

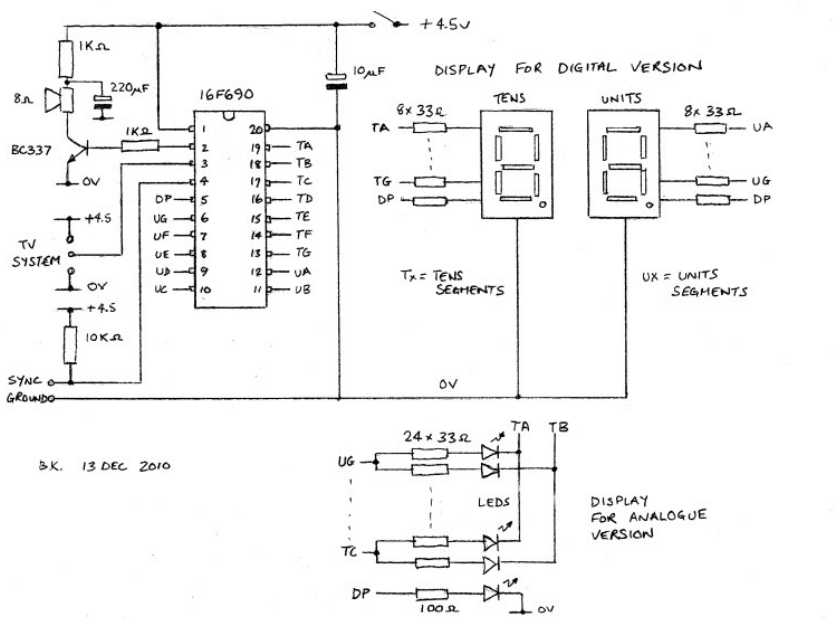
# Electronic Clapper Boards

*by Brian Kelly. GW6BWX*

Long, long ago in the earliest days of talking movies, the producers hit a snag. They had to use a different medium to record the pictures from recording the sound track and that made it difficult to line them up for editing and distribution. Ingeniously, they invented the clapper board, named because it had a board to write the scene details and it made a noise similar to a hand clap when the hinged lid was slammed down. It greatly simplified the task of aligning the events because the visual event and the abrupt sound were such distincive actions.

Moving forward almost a century, we have gone full circle, this time not because of the media itself but because the compression techniques used to reduce video data rates introduces significantly longer delays than those used to compress the sound. In essence, although the source material is of course aligned, by the time it has been through an editing and production suite, there can be several seconds difference with the video usually lagging behind the sound to some degree.

I have developed simple and inexpensive tools to assist in lining up the tracks again. They are modern versions of the mechanical clapper board. Both serve the same purpose, to give simultaneous visual and audible cues, one digitally and one using a more analogue indication. Before going further I must point out that due to circumstances beyond my control, the




second of these has not actually been built, it does however, work in theory and in computer simulations.

In both cases, the indication shows not only the relative alignment of tracks but by how much and in which direction they may be misaligned.

**The digital clapper board:**

This is based on a PIC16F690 microcontroller, chosen because it has higher than normal current capacity at it's pins, making it very suitable for driving LEDs. It also has an accurate internal oscillator which helps to keep the overall component costs down as it does not need a quartz crystal to maintain timing accuracy. When the display cycle is completed the device goes into a low-power 'sleep' mode until switched off and on again.

It works by using two 7-segment LED digits to count down from 50 to zero then up to 50 again, at zero count it discharges a capacitor into a loudspeaker to make a distinctive "pop" sound to give the audio cue. While counting down, the decimal point dots are off, they both turn on during the up count to make it easier to see if the picture is advanced or retarded with respect to the sound. The number recorded in the video at the time of the sound cue tells how many frames they are apart.

To start the device, the power switch is turned on, the unit then waits for one second with "--" on the display, during this time it is waiting to see if sync pulses are present on the external sync input pin. When the first second is up, the display changes to either "Sy" if syncs


**BATC Streaming Website**
**http://www.batc.tv/**

were found or "In" if not. The syncs are used to advance the frame count, in their absence it defaults to internally generated timing delays to advance the count. The Sy/In message also lasts for one second. When internally counting, the Mode pin sets the count interval for either 50fps or 60fps by tieing it to +5V or ground. External syncs should be negative going and at TTL logic levels. Regardless of the mode and counting rate, after a few seconds the unit powers itself down to save the batteries. In sleep mode, the current drawn from the batteries is only about 1uA so leaving it switched on for prolonged periods will not drain them significantly.

**The analogue clapper board.**

This works in a similar way to the digital version but instead of using a digital representation of frame numbers it uses a sweep of light across a line of LEDs instead. This has an advantage over the 7-segment display because although a numeric result is not possible, the LEDs can be very much brighter. This makes it more suitable for use in bright lighting conditions. The LEDs could be different colours to indicate "counting down" or "counting up". The LEDs are multiplexed, the drive signals are sequenced with first the TA pin acting as a current sink, then sequenced again with TA disabled and TB sinking current instead. The DP output is only active in the centre time slot between the two sequences which is also the time the audio cue is generated.

The software for both versions will be posted on the web site "www.atv-projects.com" and should be present by the time you read this.

If there is enough interest in this project, I will consider designing a more "pro" version with a real time clock, reel and shoot number displayed. This will be relatively complicated in comparison to this simple design but might have wider appeal to video producers.

# A plea from the RSGB

**Can YOUR CLUB help us bring the NRC into being ?**

Work is progressing well with the National Radio Centre at BletchleyPark. We have an exciting internal concept, we already have the core of many of the interactive displays, and of the other multi-media exhibits.

Where we need help now is in circuit engineering! Part of the NRC will have some hardware displays (what we are calling "turn and learn" displays), where the visitor interacts with the basic building blocks of a simple radio system. Concepts like the oscillator, resonance, modulation, bandwidth and antenna gain will be handled in a simple easy-to-access way. We're looking for volunteers to take one of these and design the circuit to show the effect. We have the block diagrams completed for each display. What is needed is to construct a breadboard to prove the circuit design, and to work with other members of our team to produce a final version of the circuit. None are particularly complex, but we need more effort to spread the load a bit.Needless to say, all costs will be covered by the Society.

Are there people in YOUR club who might be able to help with one of the projects? Please, if you think you can help, contact Don, G3BJ (g3bj@rsgb.org.uk). Time is short (we need the project completing by March 2011) so please let us know quickly.

Peter Kirby, G0TWW
RSGB General Manager

**Remember, we will pay you for constructional articles published in CQ-TV. Send in your latest project for publication and earn some money! We will currently pay £50 for each page published at the editors discretion.**

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***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.***



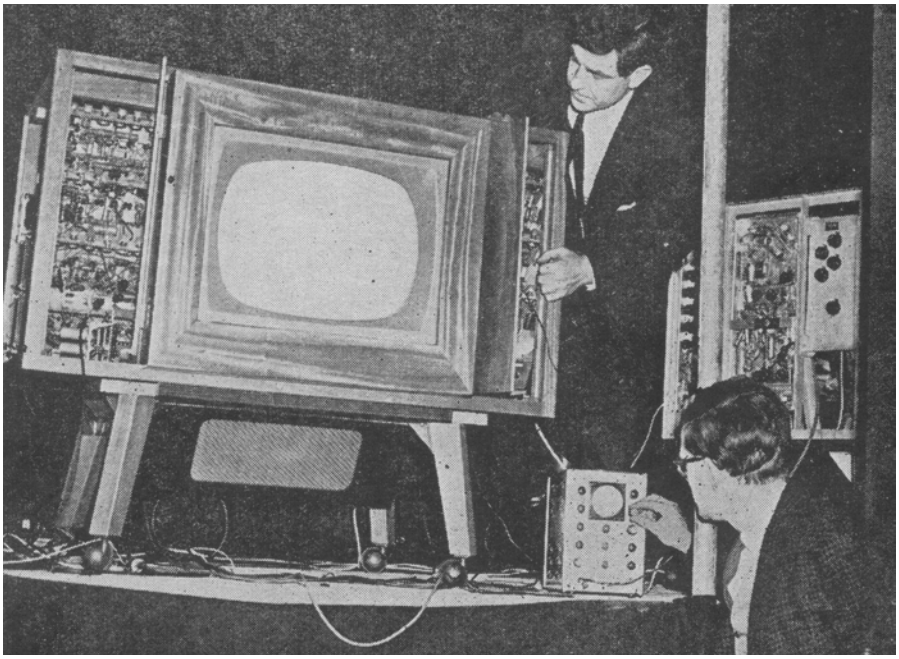
 

# Turning back the pages

A dip into the archives of CQ-TV, looking at the issue of 49 years ago.

CQ-TV 46

This issue of CQTV was a little delayed in its appearance, as the editor, John Tanner, had been busy working on his colour camera for display at the Radio Hobbies Exhibition. The front cover featured a photograph of John Ware's 21" shadowmask colour monitor - with Mike Cox at the oscilloscope on the right.



A planned article on a pulse generator had been delayed, and so this issue was devoted to the reception and transmission of amateur television in the 430MHz band'. First came a 6/6 slot aerial for 70 - said to be 'very simple and can be made from start to finish in a couple of evenings cost about ten shillings' (50p, for those who do not remember pre-decimal currency). The elements were made of " 1/8" aluminium brass or other metal - bicycle mudguard stays 'highly recommended!)", the booms of ½" wood dowel, the boom support of 1" x 1" deal, and the slot from 4' 6" of 1/8" brass or copper tubing. The arrangement is shown fig 1, the details of the boom support in fig 2 and the dimensions for the elements in fig 3.

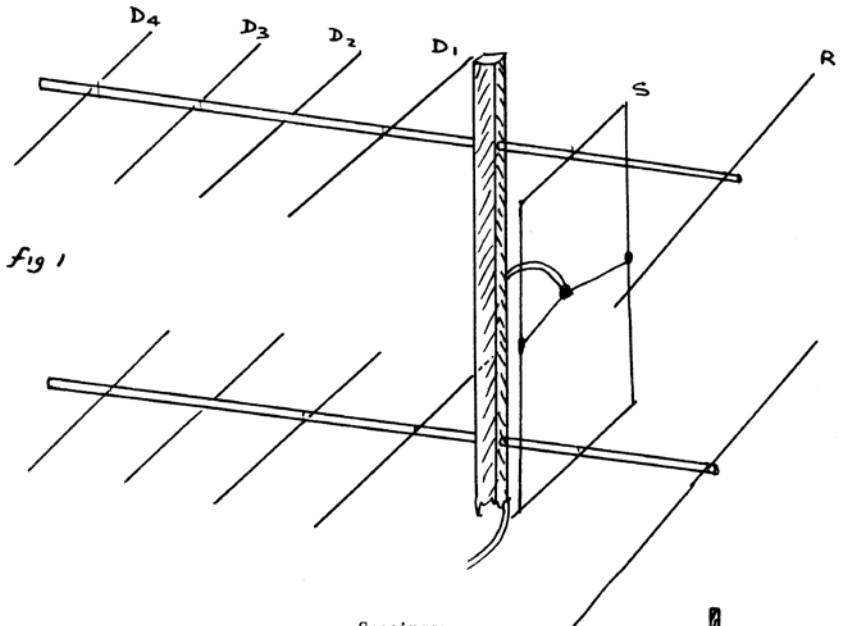



fig 1

Next came a converter for receiving the 70cm signals. The mixer circuit used a silicon diode, with a valve local oscillator at around 380MHz - the i.f. output being chosen to match 'channel 1, 2 or 3 on a tv set' 'the channel to be used should be selected to avoid possible interference from the local BBC TV station'. (At the time, the only broadcast stations in the UK were the BBC in band 1, and ITV in band 3). The mixer trough was made from 18 swg brass or copper sheet, with an inner line of ¼" copper tube with a ½" disc soldered to one end. The tuning capacitor was another ½" disc soldered to a 2BA bolt head. The other details were given in the diagrams. After alignment, members were advised not to 'forget, however, that your converter must have a respectable aerial feeding it, well clear of surrounding local obstructions for really good results'.

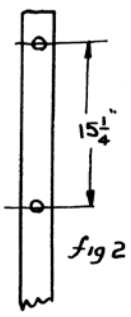



fig 2

Spacings:

| | |
|---|---|
| R-S | 3 3/4" |
| S-D1 | 3 1/16" |
| D1-D2 | 7" |
| D2-D3 | 6 3/4" |
| D3-D4 | 6 3/4" |

Lengths:

| | |
|---|---|
| R | 13 5/16" |
| D1 | 12" |
| D2 | 11 13/16" |
| D3 | 11 5/8" |
| D4 | 11 3/8" |

Matching Bars:
3 3/4" each.

Slot dimensions:
5 1/4" x 15 1/2"

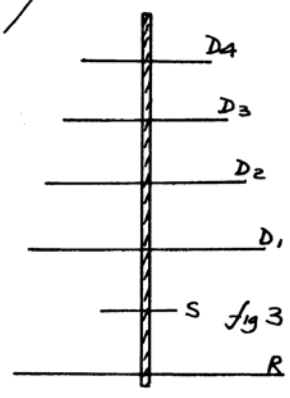
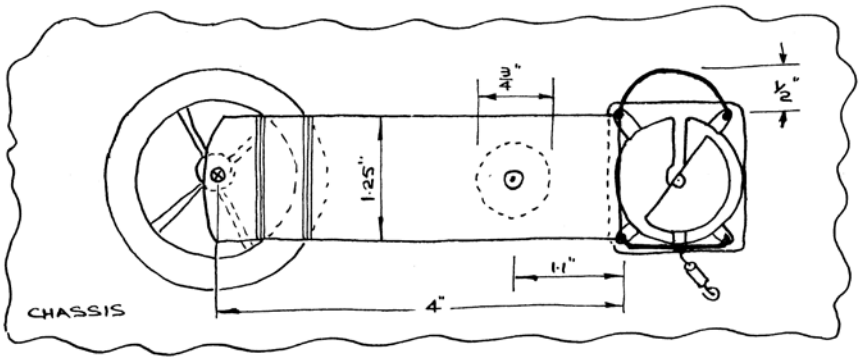
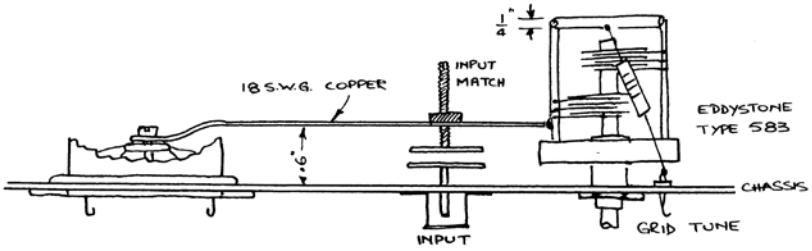


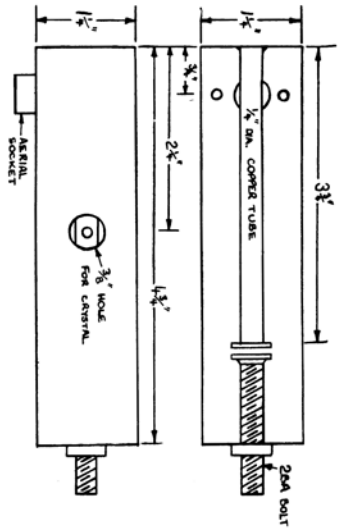

fig 3

To boost the transmitted signal, there then appeared details of a power amplifier 'easily capable of running the maximum permitted input power under the British GPO regulations'. Again, most of the constructional information was included in the diagrams. The output valve used was a 4X150a, with the anode circuit built from two coaxial brass tubes. Berillium fingers were soldered to the valve end of the inner tube, to ensure good contact with the valve anode. The grid circuit consisted of copper sheets and an Eddystone type 583 variable capacitor - constructors were warned that the capacitor spindle would be 'hot', so they had to be careful of rf burns and the effects of hand capacity. Setting up instructions were given -- when correctly tuned the anode current would be about 190mA at 800 volts, producing rf power 'in the region of 60 watts'. An important aspect was cooling. The method advised was to enclose the grid circuit into a box and 'pressurise' this with a blower - about 3 or 4 cu ft per minute were needed - but an absolute minimum of 6 cu ft / min if the valve was 'run near its maximum ratings'. An alternative suggested was to connect the air out put of the anode cavity to the 'suck' end of a domestic vacuum cleaner! What was also important was to ensure that the air cooling system was on before even the heaters were powered up. This was because the 4X150a would produce enough power from the heaters alone to crack the glass-metal seals!!

The magazine also contained news that on December 13th, 'the BBC West Region magazine programme 'View' featured amateur television'. Outside broadcast cameras visited John Tanner's home in Bristol, and live pictures from John's image orthicon camera were shown on-air - unfortunately a partial failure of the IO tube dynode supply took some of the 'sparkle' out of the pictures. A 16mm film was made of the 4 minute broadcast item.



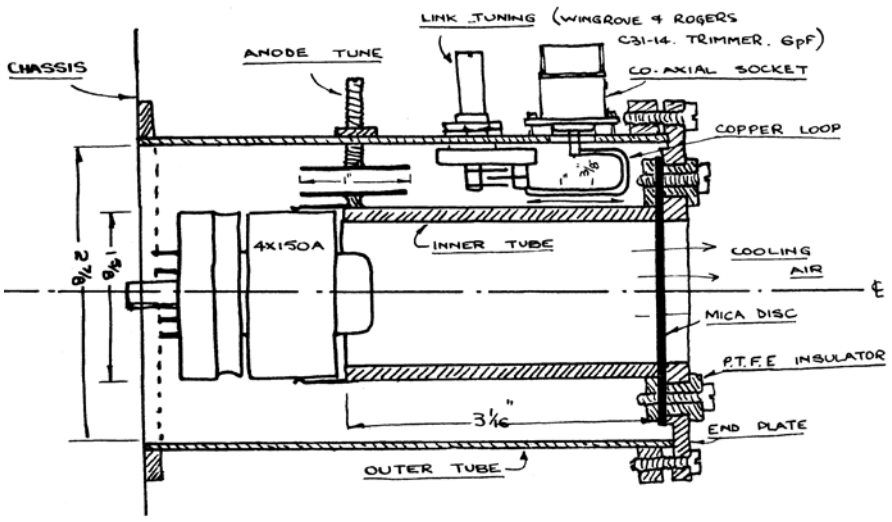



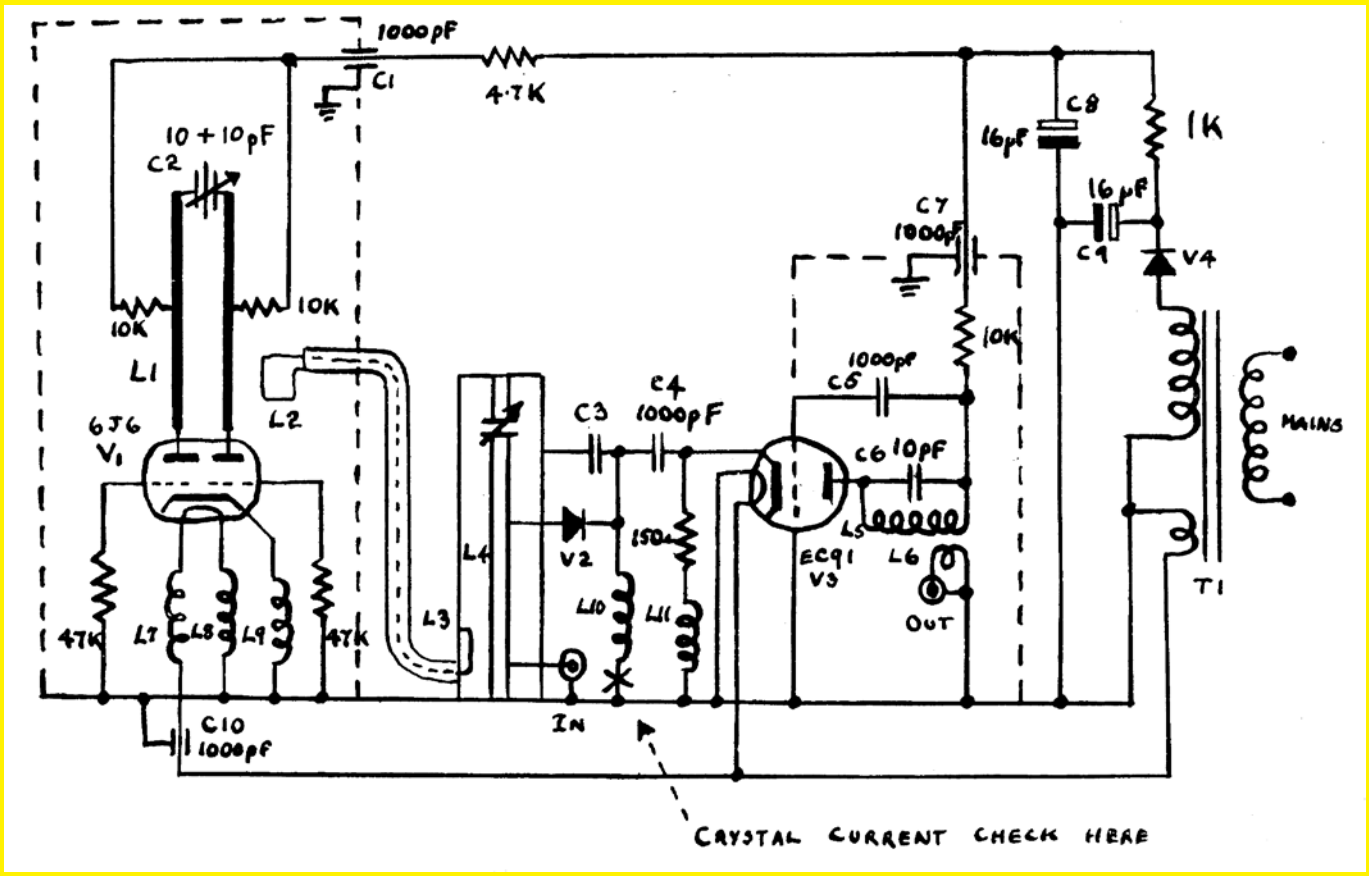

L1 Two 3¼ inch lengths of 14 swg copper wire, HT feed connected 2 inch from C2 end.
L2 1½ inch co-ax inner bent round to form a loop and connected to co-ax outer. Fitted in between L1 wires.
L3 ¾ inch long co-ax inner, end of which is connected to trough wall, standing off by ¼ inch.
L5 8 turns of 24 swg enamel copper close spaced on ⅜ inch diam. former.
L6 2 turns of 24 swg enamel copper wound on top of L5.
L7,L8,L9 8 turns of 26 swg enamel ¼ inch diam.
L10,L11 30 turns of 34 swg enamel ¼ inch diam.

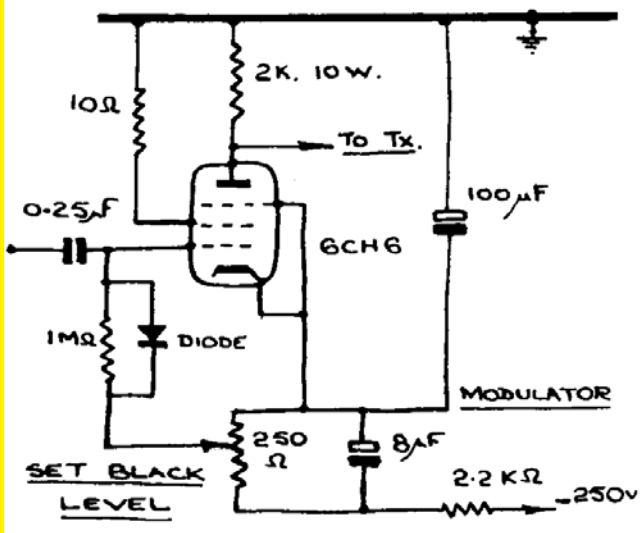
V2 CV102 or similar
V4 Contact cooled metal rectifier 30mA 250v.

T1 Convertor type mains transformer 230v input.
200v @ 25mA) output.
6.3v @ 1A )



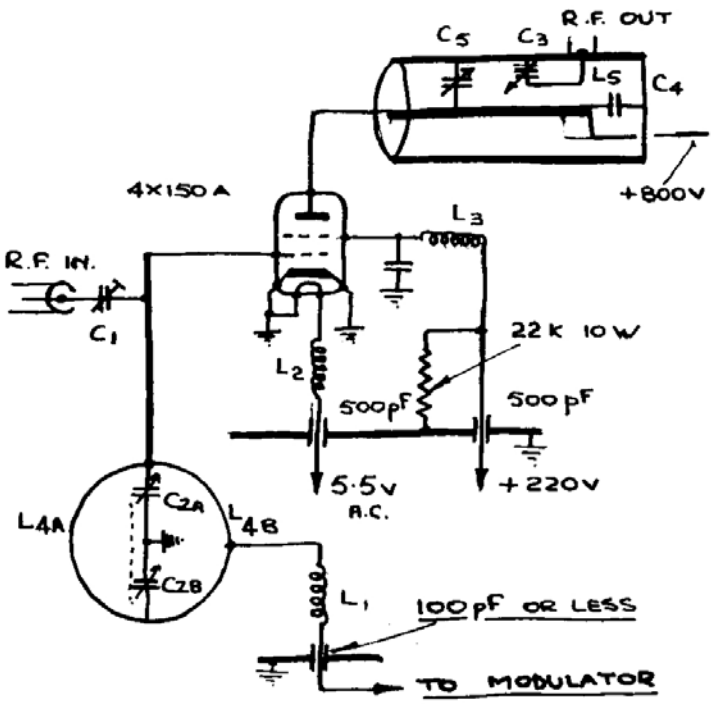

 




DIODE - ANY SMALL GERMANIUM DIODE.

L1 10 turns 22 swg on ¼" Polystyrene
L2 18 turns 20 swg on ¼" Polystyrene
L3 4 turns 30 swg on ¼" Polystyrene
-all case wound.
L4a 1.6" x ¼" copper strip connected to tabs of C2 a & b
L4b 1.1" x ¼" copper strip connected to tabs of C2 a & b, L1 connected to its centre.
L5 1" x ⅜" loop, 16 swg wire - see anode tank drawing.




C1 ¾" copper disc - see grid circuit drawing
C2 a&b Eddystone type 583
C3 Wingrove & Rogers type C31-14 (6pF)
C4 See text
C5 1" dia copper discs.


**ATV Network Day**
**22nd August 2010**

The aim of this activity day was to provide high power ATV signals from a number of high sites in UK.

This was a joint event with the UK microwave Group who were running a 5.7GHz cumulative contest and we anticipated that several sites wouldl have 5.7Ghz narrow band and an ATV group on the same site.

Some of the stations had Digital ATV on 23cm and 70cm and this was a rare opportunity to work stations running Digital Transmission. Dish gains on 3cm can provide ERP in the KW ranges and this was an opportunity to work 3cm ATV station.