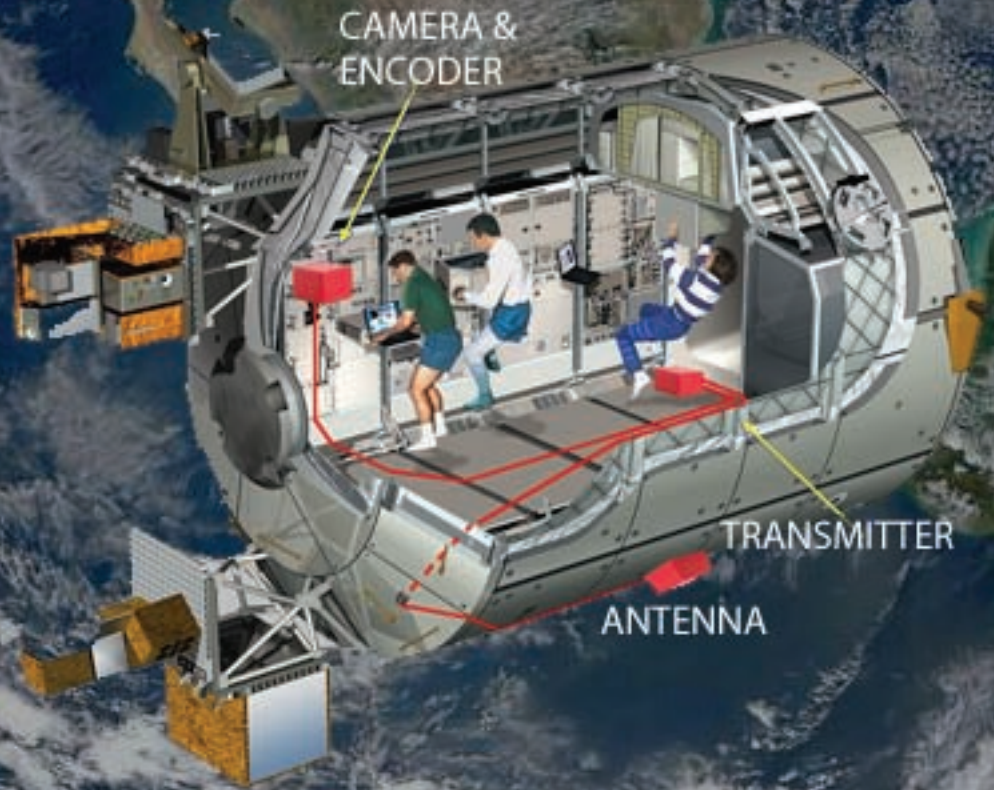


# CQ-TV

Issue 240 June 2013



ISSN 1466 -6790

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Rob (M0DTS) receives the 2012 Grant Dixon award from Keith (G3AAF)

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You can also telephone **01400 414243** but we cannot guarantee availability at any particular time. If you call you will be presented with a menu, so you can be connected to the correct person.

You can also send any committee member a text message on the above number, just prefix your message with their two letter keyword followed by a space, followed by your message.

Finally, you can always write a letter.

## 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.

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# From the Chairman

As most of you already know at a meeting in April, the BATC committee voted for a change of leadership from Trevor Brown to me. I'm honoured that the committee has asked me to step up to the challenge and I will endeavour to lead the organisation and the wider ATV community to the best of my ability. Trevor will be a hard act to follow and I would like to say a very big thank you to him for all the work and support that he has given to BATC over many years both as a committee member and chairman.

As well making sure the club continues to provide facilities such as the very successful streamer, which saw over 400 simultaneous viewers during a recent live event, the committee and I will be looking to see what new things we can do to serve you, our members. In order to find out what you want, we have already contacted a number of repeaters groups and members and we will be running a members survey in the next couple of months which we hope you will all use it to give us your feedback on what we are currently doing and how we can improve in the future.

Things already in the pipeline include rationalising the online shop and introducing new items including a 3rd party shop window of hard to find items that may be of interest to members and potentially a next generation DATV system based around DATVexpress. We have updated the current website and will be launching a complete new look for both the streamer and the website later in the year.

We are also supporting a new initiative by Phil Crump (M0DNY) to produce a dedicated DX cluster and chat room facility for ATVers worldwide – a full feature will appear in the next edition of CQ-TV but see the separate article in this edition to get you started and watch the BATC forum for more details.

If you have any ideas you would like to see the BATC adopt to help drive this

great hobby of ours forward or you can help us by volunteering to take on some tasks, just drop me a line.

CQ-TV 240 is the last one to be edited by Chris Smith, G1FEF. Dave Mann, G8ADM, and myself will be taking over on a temporary basis and we want give Chris a very big thanks for his hard work over the last 2 years during which time he has carried CQ-TV as well as looking after all the club's IT infrastructure. Dave and I will be looking to introduce regular columns in to CQ-TV focussing on things such as repeaters, overseas member's activities, classic cameras and equipment and HamTV on the ISS.

One of the items in the last edition of CQ-TV was the announcement of an online poll to get members views on the potential move of the club to BATC Ltd. The committee has again discussed the situation and reviewed the results of the member poll and has decided to postpone any further action for the time being.

As you will have seen in Radcom and on the BATC forums, we are about to see some significant changes which will affect ATV operation, particularly on 2.3 GHz. The reasons for this and the Ofcom process are documented elsewhere, but you should be aware that BATC committee members have been involved in the process and whilst we may not like the end result, because of this involvement with Ofcom, I believe we will end up with a significantly better situation than in Sweden and Australia where amateurs have lost access to all or most of 13cms. We will endeavour to keep you up to date on the very latest news on the BATC forum at <http://www.batc.org.uk/forum/>. On a more positive note, it is possible that we may be given access to 146 MHz - when this was originally proposed, the BATC technical liaison committee put in a paper lobbying for part of any additional 2 metre band allocation to be used for narrow band (.5 to 1 MHz) DATV. This now looks like it may become a reality and opens a whole

new potential for DX TV working.

The BATC technical liaison committee have also been busy submitting papers on new standards for DATV working to the IARU region 1 conference – Murray Niman, the RSGB representative, said he had never seen so much input from the ATV community! Whilst everything we submitted may not be adopted by the IARU, at least we have started the process to formalise and get recognition for a lot of the ground breaking work that BATC members have been doing on DATV over the last few years.

We are willing to take the BATC out and about more this year and have a booked a stand and are giving a presentation at the RSGB convention in October – I am also in the middle of writing a “getting started in ATV” article for Radcom. We will be having banners and graphics produced for a display stand – these will be available for loan to members and we will be looking for other ways we can support groups at rallies etc to help get the ATV message out there. We will be investing in and upgrading the equipment we use for streaming of live events such as AMSAT and we are looking for volunteers to help crew these events – they are normally good fun and you get to hear some great lectures for free as well as an opportunity to push the ATV message out there.

And finally we have announced that the BATC convention CAT13 will be held “up North” at Finningley Radio Club premises near Doncaster – once again, as things are firmed up details of this will appear on the BATC forum at <http://www.batc.org.uk/forum/viewforum.php?f=74>.

As you can see, there's a lot of going at the BATC, which is so much more than just a magazine, and don't forget that the BATC forums are the place to catch all the latest news on what happening in Amateur Television. Best 73's

Noel – G8GTZ

See 'STOP PRESS' on page 19.

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The BATC DVD that included back issues of CQ-TV, handbook and other books is no longer available. However CQ-TV is available for downloading on line. Only CQ-TV's over one year old may be downloaded by non-members but Members can download the current versions from the BATC website.

# Members News

by Dave Mann

Phil, G8XTW of Dunstable Downs ARC with help from his friends gave a lecture on Amateur Television to the Verulam ARC in St. Albans during January. This covered the history of Amateur Television, the equipment needed to set up an analogue and digital station as well as live demonstrations from stations in the area with a large screen projection showing the BATC streaming service. This was all very well received with one member joining the BATC at the lecture and the promise of more in the future. There is a growing interest in ATV in this area. (See photo to the right)



## BATC Technical Convention

This will take place in Finningly, Doncaster, at the end of October. Details later on <http://www.batc.org.uk>

## Video Streaming

BATC's streaming facility at [www.batc.tv](http://www.batc.tv) continues to provide a fascinating insight into what's going on in ATV around the world.

Ballooning is becoming even more popular these days. Amateur balloons carrying electronic equipment are launched regularly in the UK and around the world. These balloons often exceed an altitude of 30,000 metres and can often be seen on the BATC streaming system in the Live Events section. At it's peak recently 400 people logged on to our system nearly bringing it to a halt. The simplest way of seeing the daily activities and to check transmission frequencies is to log on to <http://www.spaceneer.us/tracker>.

## TV Repeaters

GB3GV, Last month we got Peter G8DKC's callsign wrong. His latest report is that David G8OBP has built a new video detector, to help with false triggering on analogue signals, he has also developed new software for the

site pc that includes a shutdown - sleep timer, to switch the repeater off at night. An input signal will bring it back on. Peter has added a 4 port video switch for selecting the analogue, 23cms digital, 70cms digital and possibly the on site camera inputs. This switch is controlled by a DTMF decoder or a signal from the lock light on the digital receiver. The 70cms digital input on 437 mhz, as others have found, is a bit of a challenge keeping out interference from other transmissions in the 70cms band. We require a narrow bandpass filter and a notch filter on 433.100 to keep out our GB3LE voice repeater. We are only testing at home on bench at present, keeping an eye on developments from BATG GB3SQ and SCART. We are testing Dave ADM's 23cms 90deg and would like to get that up when the weather gets better. Also building Dave's 437 MHz "Halo" from old 3/8 gas fittings and 5/16 tubing, will be testing that soon. Finally Peter has at last found the camera that has been interfering with the repeater input for a couple of years. This was 15 miles from the site and took some finding!

David - G8OBP's repeater control software used on GB3GV is called "ATV-Tx". He would like to make it available for distribution if anyone would like it for controlling their repeater.

EI3DM, Bill reports from South Dublin that Dublin's first ATV repeater is being built on Tree Rock, a mountain South of Dublin. Frequencies: 2.369 GHz output and 1.249 GHz input, analogue. Bill also hopes to get going on 70cm digital ATV soon. You can often see him on the members streaming area of the BATC Streaming Network.

GB3PV, Cambridge. Ian, G3KKD, reports that activity in the Cambridge area is very low and that George G8ACT a normally very active member in Essex has been very ill. I am pleased to report that George is on the mend and expects to be back on the air by the time you read this.

EA6XQ, Louis, On 23rd February 2013 he sent the first streaming video from Mallorca Island off the east coast of Spain via his BATC members personal stream. They are testing a repeater on the local mountain top 540m asl. This is expected to be licensed soon. The output is on 23 cm, input on 13 cm.

GB3IV, Isle of Wight. Unfortunately the owners of the repeater site would not allow the repeater to remain there and it was closed down earlier in the year. This repeater was very busy with a wide coverage along the south coast. Their streaming page often had as many as 30 viewers on some evenings. Howard, G3NZL reports that they have



found a new site on the mainland and are awaiting licence approval before starting transmission. Meanwhile he has taken the opportunity to update the equipment in a smaller cabinet.

GB3TM, Anglesey. John, GW3JGA reports from North Wales. The group is still actively working towards providing a 70cms DATV input to the repeater. A horizontal crossed dipole has been installed by GW4KAZ, 70cm crossed dipole.

A 437MHz receiver and up-converter are ready for installation ahead of the Sat Receiver. The DATV receiving system will be on the same site as voice repeater GB3AN (Tx 433.200MHz and Rx 434.800). A set of band-pass and



notch filters have been built by Garth RF Filters and tested ready for installation on site. The valid signal detection and video switching is already present and was used previously for experimental 3cms tests. Some on-screen captions will be up-dated. Activity night is on Wednesdays at 19.00 hrs. John streams the repeater output under the repeaters call sign

ON0SNW, Belgium JO21BE. Guy, ON4BHM, has written an article on Europe's first multi-channel digital repeater. This appears further on in the magazine.

### Station Reports

GW3JGA John in Prestatyn also reports that the fault in his 23cms TX aerial has been diagnosed. Water in an N-connector was the cause and the aerial should be back in use by the end of March, weather permitting. A 70cms DATV test transmission is proposed using an existing AGAF encoder system and Mitsubishi RA30H4047M1 block. An aerial for this system should be installed by the end of March.

GW4KAZ - Brian, Bethel, Nr. Caernarfon. Work has been continuing on several 70cms up-converters for monitoring and installation at GB3TM, together with the crossed dipole unit mentioned previously. GW7BZY is now being received regularly on 437MHz, see below.

GW7BZY - Peter, Llangefni, Anglesey. Regular 437 MHz digital transmissions are being made using an SR Systems kit and are being received by GW4KAZ during the activity night. These are relayed through GB3TM to the rest of the Group and streamed by GW3JGA

GW8PBX - David, Llanfairpwll, Anglesey. Equipment has now been moved into a new shack in the house and transmissions from the existing aerial system are once again P5 into GB3TM

G1LPS, Terry, reports that propagation conditions have been good this winter from his hill top in County Durham. He recently exchanged pictures with G7AVU in Gainsborough and M0MLJ in Newark.

PA3CRX, Chris van den Berg, the Veron ATV-manager, reports from the Netherlands that there is an increasing interest in 6 cm ATV. He started with PA3CWS as portable stations but now we have many 'home stations' including some with big antenna's. The standard Airwave modules are a good starting point, very small, fixed channels and 100 or 500 mw output. Several Dutch repeaters are already running with 6 cm equipment. For some experiments, please see:

<http://www.pi6ats.nl/zescm.htm> and <http://www.pi6ats.nl/5780ingang.htm> (it is all in the Dutch language but you could read it in English with Google translate). Also over the last few months a few stations are also active on 24 GHz ATV.

VK2CRJ Garry from Sydney, Australia has been visiting the UK recently. He also did some travelling in France and mentions considerable ATV activity in the South East of France. F1ZES near Lyon can connect to the F5ZAR repeater near Grenoble, this links to the F5LXN repeater at Chamrousse and the F5ZRW repeater at Montaud. This repeater can also link to the F6KJJ radio club in Tullins. It would be good to hear more about ATV in France.

### Digital Developments

Computers are getting smaller and cheaper like the Raspberry Pi, a miniature Linux based computer on sale for £25. Similarly the Android MK808 is even more powerful and housed in a USB box.

On 12th February Rob M0DTS with software from Charles G4GUO used this MK808 to run a Digilite based encoder, modulator, transmitter instead of using a conventional huge PC. This saves a great deal of space and power and will be used by Terry G1LPS in the transmitter of the 3.4 GHz addition to the GB3KM repeater. You can read more about this in the BATC forum.



I hope you have found the Members News of interest. Please keep me informed of any news for inclusion in the next issue. Send this by email to: [secretary@batc.org.uk](mailto:secretary@batc.org.uk)

## D-ATV repeater ON0SNW, Sint-Niklaas, Belgium.

(This is the first European amateur multi channel repeater. It has 8 channels in its multiplex. D.M.)



Hi, my name is Guy, ON4BHM and I'm the sysop of the 2 year old d-atv repeater ON0SNW located in JO21BE. ON0SNW is a relative new repeater and is completely digital. It's output frequency is in the 3 cm band (10.270Mhz, 23000Ksym, 7/8 fec, H) We carry at the moment 8 video streams in our transponder. of which 7 are from neighbouring atv stations (ON0AN, ON0ATV-1, ON0ATV-2, PI6ZVL, PI6ATV, ON0TVO, ON0TV). Because of this, we use nearly 30Mhz of bandwidth.

In our system we use the digital transmitter, minimod), from sr-systems. Together with a 4 channel mux, 2 video encoders (V4) for our own station and PI6ATV, and 2 sat receiver boards to relay our digital neighbours (ON0TVO and ON0AN). The 23cm output signal is amplified a bit to make it to the top of a 85m tower. We use 100m of ecoflex15 for that. The signal is then mixed with a x-band up converter by Kuhne (ku-up-107b) which is stabilized with a 10Mhz reference signal from a GPS receiver. This 10Ghz signal of 100mW is then amplified with a MKU-PA-1050A. (50W in CW) This gives us nearly a 0.5W digital signal. (30 Mhz width) This is fed directly into a slotted waveguide

antenna with 16dBi gain. This generates 20Watt EIRP. We are located on a 85m mast which is being used to transmit a dvb-t signal in the UHF band. At the same location is also a DSTAR repeater and an analogue phone repeater, both in the 70cm band.

Repeater inputs:

- 436 Mhz digital (for digilite users)
- 1249 Mhz digital (for digilite users) + 1275 Mhz analog
- 2330 Mhz + 2360 Mhz + 2390 Mhz (both digital and analog)
- 5712 Mhz (both digital and analog) (Near future)
- 10400 Mhz (both digital and analog)
- 24125 Mhz analog (Near future)
- skype input (down at the moment)

In order to stream to batc.tv we capture these inputs with an 8 channel real-time simultaneous capture card from EMS-imaging. The output of the composed matrix screen is fed to a decklink studio card. The s-video output is used by the mpeg encoder card. The mixing



of the video input streams is done via a SDK (software development kit) of medialooks. We wrote this software using the vb.net program. This SDK gives me the possibility to mix any combina-

tions of video inputs. So when someone is active on one of the inputs, the sync is detected by the capture card and the input is displayed full screen automatically. When a second user starts his transmission on another frequency, his video is displayed in a PIP window. The 3rd user make the screen go into 3 pip mode (2 side by side, and one underneath). When 4 users are active, we display a 2 by 2 matrix. Of course all the audio inputs are switched and mixed as needed.

Next month we are going to finish a sub project that will display the spectrum of our ham bands onto the screen. We will be using an Advantest spectrum analyzer with a composite video output for this. The end user will be able to switch the band via DTMF codes on 2 meter control frequency. This way, the end user can check his signal strength. Even when he can't open the repeater, he might be able to see his signal in the noise... He can also switch between 2dB or 10dB per division.



In the mean time we are building a real digital ATV backbone network, see below. ON0ATV, Helchteren is sending on 6cm band digital to ON0AN, Antwerp. Which is received by ON0SNW



in digital mode on 3cm. ON0SNW is received digitally by ON0TVO, Gent. Gent will re-transmit the backbone signals in the 6cm band. These signals will be (in the near future) received by a station on the coast.

A few weeks we started doing some tests in 8psk: 1920 \* 1080 \* 25p resolution. We will be making some test transmissions during this summer on our repeater. As our video matrix is completely in software, I can make adjustments to output a real HD image!

As you can see, there is a lot going on in Belgium! I hope the conditions, one day, will bring more distant ATV signals into our repeater. Our 70cm digilite input still needs a bit of tuning. We are using at the moment 1 clover leaf antenna. The gain is too low. This summer we are going to use a 4 way stacked clover leaf antenna. Because we have 2 x 70cm repeaters at the same location (1 d-star and 1 analogue), the input will only work when the phone repeaters are not in use! We will try to filter them out, but I don't think it will be 100% successful.

With best wishes from Belgium, Guy, ON4BHM (sysop of ON0SNW ATV repeater)



For a year or so we have been streaming 24/7 on batc.tv so you can see our pictures there.



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## Finningley – October 26th & 27th

The BATC is pleased to announce that we will be holding our Convention for Amateur Television 2013 (CAT13) over the weekend of 26th and 27th of October at the Finningley Amateur Radio Club facilities near Robin Hood airport in Yorkshire. <http://www.g0ghk.co.uk/club-information/about-fars>

This will follow the same format as last year's highly successful BATC Convention in Basingstoke and feature:

- Technical talks program, with a special emphasis on “getting started in DATV”
- Demonstration area ranging from historic studio equipment to the latest DATV equipment
- Test and fix area
- Selected RF and video suppliers
- SMD soldering class
- Members bring and buy area

We are in the early planning stages but it envisaged the program will start at 11:00am on Saturday and finish around 4pm on Sunday. We will also be arranging a dinner on the Saturday night at the Reindeer Inn in Sandtoft. <http://www.thereindeerinn.co.uk/> The Reindeer also has a limited of rooms available for the weekend with additional accommodation being available at the Red Lion in Epworth and the Travel Lodge at Junction 18 on the M180.

We are looking for talks, demonstrations and help with the organisation of the event so get in touch if you can help. More details to follow, but put the date in your diary now and let's make this an even bigger success than the Convention in 2012.

## ATV DX Spot

*by Noel Matthews G8GTZ*

The BATC is pleased to support an exciting new project called [dxspot.tv](http://www.dxspot.tv), a next generation web based facility open to all ATVers worldwide to encourage and enable ATV activity.

Modelled on the highly successful ON4KST chat rooms, <http://www.dxspot.tv> presents easy to use DX cluster spotting for ATV (analogue and digital) contacts on all bands between 70cms to 3cms and a dedicated chat room using IRC, which will run over a very basic mobile connection, for talkback.

Designed for mobile & PC use and launched in time for the BATC summer fun contest in early June, the site provides the following:

- ATV DX cluster spotting for 70cms to 3cms ATV and DATV
- Interactive map showing all active ATV'ers worldwide
- Dedicated instant messaging IRC channel for ATV DX working
- Open source environment with github for full development co-operation

<http://www.dxspot.tv> has been developed by Phil Crump, M0DNY, from a specification originally generated by Noel Matthews, G8GTZ. The program has been developed using the github open development environment and new members and contributors are welcome to sign up and help us develop this resource for the ATV community.

Note, it is not just for G stations but intended for use by ATVers around the world to work more stations in their own countries and it will be great to see it used for contests / portable and rover expeditions in the USA, Australia and other countries;-)

A page has been set up on the BATC forums to post comments, feedback and bug reports or to apply to join the development team for this and other new ATV related projects.



# Spectrum pressure continues

by Noel Matthews G8GTZ

As you may have seen in the Jan 2013 Radcom article “spectrum release & amateur radio”, available for download at <http://rsgbbeta.org/operating/band-plans/> and also in the recent RSGB news, Ofcom are currently consulting with users about the next round of spectrum release during 2014.

This is particularly relevant to the ATV community as it affects spectrum currently held by government departments such as the MoD, who have committed to hand back 500 MHz below 5 GHz, and are currently the primary user for the 2.3 and 3.4 amateur bands. See <https://www.gov.uk/sharing-defence-spectrum> for more details.

As part of the assessment process, the ETCC and BATC offered Ofcom the opportunity to visit a 2.3GHz ATV repeater and also for a group of ATVers to visit the test labs at Baldock radio with typical user equipment. Ofcom readily agreed to this and on April 3rd, G8GTZ, G3PYB, G8ADM, G3XTW and G4CPE visited Baldock with 6 sets of equipment ranging from a Comtech transmitter to an SR systems digital encoder / modulator and transverter.

We were given a full site tour, during which we visited the operations centre where interference investigation is co-ordinated. We learnt that Ofcom have 26 field engineers and is very willing to undertake investigation of interference to the amateur service – just use the web reporting form at <https://stakeholders.ofcom.org.uk/tell-us/abuse-amateur-radio-system>

The equipment testing was undertaken using a National Instruments spectrum recorder which grabs up to 50 MHz of spectrum and saves it to the 100 Tb storage array for later analysis. As such, no results were made available on the day, but Ofcom were particularly interested in adjacent and co-channel performance to help them plan the re-



location of ATV channels in order to reduce interference to other services. The same exercise was carried out at GB3TZ on April 10th where recordings of both the analogue and digital outputs were taken.

As was predicted at the BATC BGM last October it is highly likely that there will be changes to the amateur allocations at 2.3 GHz, which will almost certainly affect ATV repeaters and simplex operation. However, it is currently anticipated that the proposed new DATV channels between 3404 and 3410 MHz (GB3BA has just received an NoV for 3406 MHz) will not be affected by these changes and could be used for repeater cross band outputs.

This pressure on spectrum, particularly at 2.3 GHz, is worldwide and amateurs in Sweden and Australia have already lost the band. However, there has been a high level of co-operation between Ofcom and the UK amateur community on the proposed changes and it is hoped that the impact, particularly for ATV will be minimised.

Next steps: Ofcom have promised to consult further on the proposed changes during the next few months and to

keep us fully informed of decisions.

We will keep members up to date with news as we get it at the BATC forum topic available here [www.batc.org.uk/forum/](http://www.batc.org.uk/forum/) under General Discussion, Spectrum pressure.

If you haven't already, it's worth subscribing to the Ofcom email list for alerts on spectrum consultations etc at [http://www.ofcom.org.uk/static/subscribe/select\\_list.htm](http://www.ofcom.org.uk/static/subscribe/select_list.htm)

Whilst BATC and RSGB will respond formally we need as many individual responses as possible to show amateurs do use and are concerned about the future of our spectrum.

It is planned to include this as a topic at the BATC convention at Finningley on October 26/27th, when Murray Niman (RSGB spectrum manager) will talk about the changes and the impact for the amateur service.

**Latest update** – Ofcom have published the consultation document. Go to BATC forum for the latest news.

# IARU Region 1 VHF/UHF News

The BATC technical subcommittee recently presented a series of recommendations for DATV operating standards to the RSGB for submission at the IARU region 1 conference at the end of April.

These were approved and Murray Niman G6JYB presented them on our behalf. The most significant is the proposal to adopt 437 MHz for 2 MHz wide DATV operations across Europe. If this is accepted by other countries it will open the possibility of long distance DX working when conditions are good. The BATC/RSGB submission on DATV is printed below:

## INTERIM MEETING OF THE IARU REGION 1 VHF/UHF/MICROWAVE COMMITTEE

VIENNA 19.- 21. April 2013

### Introduction

Digital Amateur TV (DATV) offer benefits for picture quality, spectrum efficiency and promotion of the amateur service. DATV developments should be recognised by the incorporation of new recommendations into the IARU-R1 VHF Managers Handbook.

### Background

The current IARU-R1 recommendations for ATV are based on analogue standards and the relatively large bandwidth used by FMATV. However most consumer television in Europe is now Digital and it is important that the amateur equivalent keeps pace and can also be used to promote the hobby.

Amateur TV (ATV) operators have been experimenting with Digital TV (DATV) transmissions for over ten years, initially using equipment obtained by those working in the broadcast industry. The first DATV experiments were used to determine performance differences between single carrier DVB-S (QPSK) and the wider bandwidth 7- 8 MHz multi-carrier (OFDM) DVB-T modes. Experiments over typical ATV paths using narrow beamwidth antennas, showed no significant multi-path benefits of DVB-T over DVB-S for ATV links.

It has been found that for ATV applications, acceptable video quality performance can be achieved with video bit rates between 2 and 4 Mbit/s. These bit rates mean that, even when used

with high Forward Error Correction (FEC) rates, a very high quality robust ATV signal could be transmitted using DVB-S modes in an approximate 4 MHz bandwidth (4 MBit/s, 1/2 FEC, 4 Msymbols).

The results obtained with these new DATV experiments compares very favourably to the much wider 16MHz bandwidth analogue ATV signal. Benefits include significant spectrum efficiency over current analogue operations, and better sharing with Primary Users. As a result, DVB-S, as defined in ETSI EN 300-421, along with MPEG-2 audio and video encoding, is now adopted as the standard for DATV operation in the UK.

Results have not only been obtained for microwave bands, but also at 437MHz where DX reception of Digital Colour ATV has also occurred –a significant development.

ETSI EN 300-421 has been adopted, along with the use of the DVB compliant service information (SI), as defined in ETSI EN 300 468. The call sign is always transmitted as service name, for station identification compliance. Use of ETSI standards enables decoding and identification of the signal by any consumer decoder without the need for special hardware or software.

### Proposals

It is proposed that ETSI EN 300-421 and EN 300 468 standards, along with a subset of operating and frequency planning parameters, are adopted to ensure interoperability between DATV operators.

The spectrum efficiency of DATV has enabled new activity to occur in the 430MHz band using 2Ms/s.

Advice from the IARU- R1 Satellite Coordinator has been to centre this at 437.0MHz in order to optimise sharing with the Amateur Satellite Service. This is already a feature of the RSGB 430 MHz band plan.

### Future Developments

Whilst DVB-S and MPEG-2 have been adopted for mainstream DATV operation, further projects are underway to investigate the use of MPEG-4 video coding to enable the use of lower symbol rate / narrower bandwidth DVB-S2 signals and the carriage of HD in 4 MHz bandwidths. This work may result in the potential of 'narrow bandwidth' (sub 1 MHz) DATV being possible on bands at 430 MHz and below where spectrum availability and band plans permit. As with the DVB-S developments, one of the main hurdles to overcome, apart from spectrum, has been the availability of suitable encoders

However, it is proposed that future DATV operation should continue to use the evolving open industry standards to enable reception of the signals on readily available consumer hardware.

### Recommendations

To initiate the modernisation of the IARU-R1 Handbook for ATV based on the following:-

- Incorporate a DVB-S based DATV standard, using the parameters as detailed in the Appendix
- That the 430MHz band plan be amended to indicate that DATV should be centred at 437.0MHz, with a recommended maximum of 2M Symbols/s



• Future Proofing: Relevant ATV developments (spectrum, standards and band plans) should be kept under review to accommodate further updates for the VHF Managers Handbook

• That future DATV operation should continue to use the evolving open industry standards to enable reception of the signals on readily available consumer hardware

## Appendix - Recommendations for Digital Amateur Television (DATV)

DATV using DVB-S is recommended based on the following parameters:-

Frequency Band	Symbol Rate (Msymbols/s)	FEC	Maximum Bandwidth
432 MHz	1.66 2.00	1/2 or 3/4	2 MHz
1.3 GHz Repeater i/p & simplex	2.00 4.00	1/2 or 3/4	4 MHz
1.3 GHz Repeater o/p	4.00	1/2 or 3/4	4 MHz
2.3 GHz	4.00	1/2 or 3/4	4 MHz
3.4 GHz	2.00	1/2 or 3/4	2 MHz
5.6 GHz	4.00	1/2 or 3/4	4 MHz
All bands above 5.6 GHz	4.00	1/2 or 3/4	4 MHz

### Comments on UK Usage Information

*UK adopted 437 MHz – proposed as international working frequency*

*FM and DATV mixed operation currently used due to cost & availability of equipment*

*UK sub band 1300 – 1325 MHz*

*No DATV operation at present*

*Restricted sub-band 3404 – 3410 requires 2 Msymbol operation*

*Mixed mode (FM & DVB-S) wireless cameras*

*4 Msymbol DVB-S on UK 10GHz ATV repeaters*

### Notes

ETSI EN 300-421 and EN 300 468 standards, along with a subset of operating and frequency planning parameters, should be adopted to:-

- Ensure interoperability between DATV operators
- Ensure compatibility with readily available consumer hardware

# Digital Television – a Tutorial

by Mike Cox

## Digital Television in The Studio: Part 1

### Introduction

Many of us are using Digital Television [DTV] just for transmission, probably using DVB-S encoder/modulators. These tend to take in an analogue composite (PAL) video signal, and digitise it before encoding.

However, as ex-broadcast kit becomes available in the market, or even new cameras with digital output become available at reasonable prices, knowledge of the digitisation process becomes essential. We need to know how to handle a studio digital signal; what you can and can't do to it. By the end of these articles, you should have a better idea of what it is about.

Analogue to Digital Conversion [ADC]. At the start of an imaging process [what a camera does] is a sensor that samples light on a pixel-by-pixel basis, outputting it either as analogue signals, or as digital streams. These signals represent the Red, Green and Blue values of light falling on each pixel.

Unfortunately, we don't usually transmit these RGB values<sup>1</sup>, but a transformation of these into Luminance [Y] and two colour difference signals [R - Y, B - Y]. Broadcast practise is to limit the bandwidth of the colour difference signals to half that of the luminance bandwidth. But note that the luminance signal for SD [ $EY = 0.299ER + 0.587EG + 0.114EB$ ] is different for that for HD. [ $EY = 0.2126ER + 0.7152EG + 0.0722EB$ ]

To convert an analogue signal to a digital one, we need to take regular samples of the value relative to a black level reference. The sampling frequency [clock rate] has to be at least twice the signal bandwidth<sup>2</sup>, and is usually higher. An example is the 625-line specification. The luminance bandwidth is 5.5 MHz, and the sampling frequency is 13.5 MHz [Fs].



Pre-Sample Filter  
Fig. 1

It follows from this that the first circuit the signal meets is a pre-sample band-limiting filter.

As a detour, consider what happens if there is no filter. Any frequencies more than half Fs, will give rise to anti-aliasing. This occurs because sampling is essentially a modulation process, and input frequencies at more than half Fs are heterodyned down and appear as low frequencies.

Say  $F_s = 13.5$  MHz. An input frequency at 8.5 MHz will appear as a beat frequency of 5 MHz, ie within the luminance bandwidth. [Fig. 1] So without the input filter, higher frequency noise will appear as much lower frequency beats, and become much more visible.

We must decide how many quantising levels are needed for the particular digital signal. We shall most probably settle for 256 levels, which yield an 8-bit digital signal. However some cameras go for 12 or even 14 bit coding, with added headroom for video processing.

The input filter is a usually linear-phase low pass filter, with sharp cut off after F-3dB. After the filter is the sampling gate or switch, followed by a series of comparators to form the analogue to digital converter.

Early ADCs used one comparator per level, so 256 levels means a lot of circuitry on the chip, with large power consumption. As speeds improved, it became possible to reduce the number of comparators by having one set of comparators for the Most Significant Bits [MSB], and another set for fine setting for the Least Significant Bits [LSB].

There have been many versions of this architecture, but the guidelines are that the comparators have to be fast, i.e. well within the clock-cycle time, typically 50 nS for a standard definition ADC. And each one must not present a large capacitive load to the sample gate. [Fig. 2].

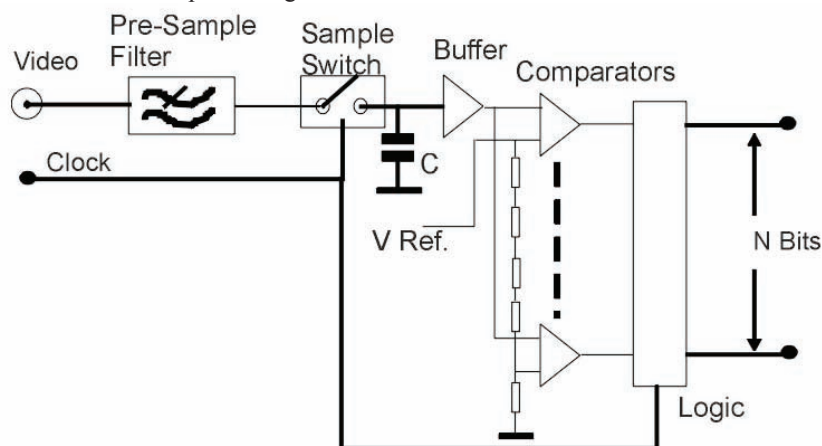
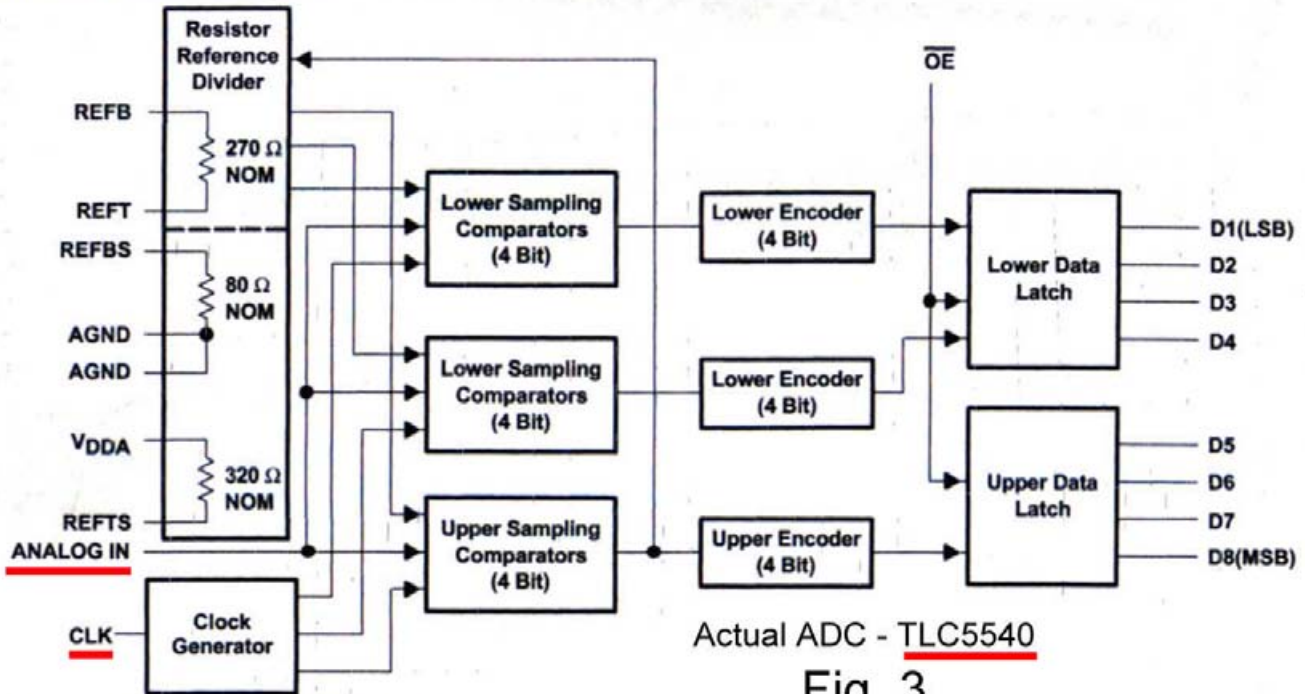


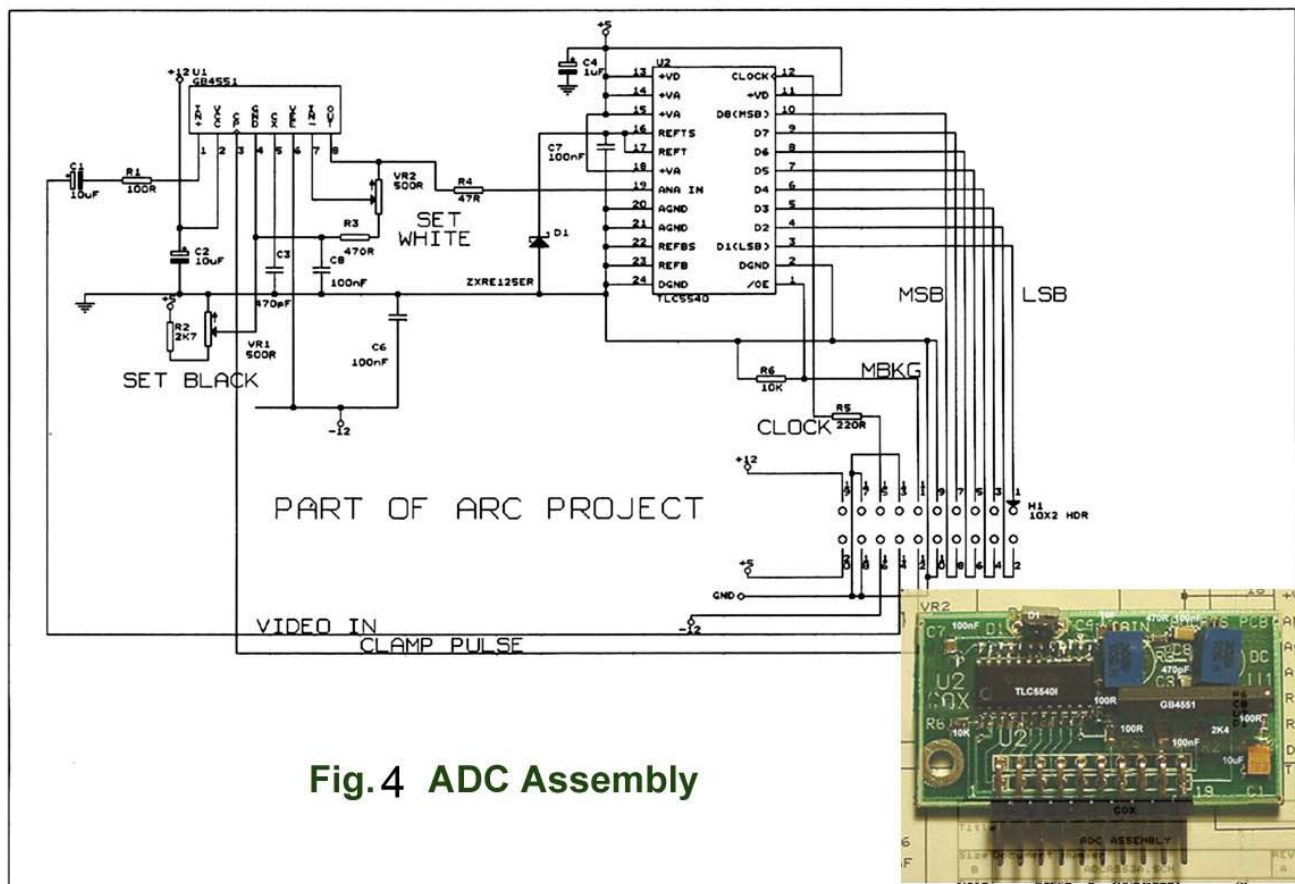
Fig. 2  
Basic ADC



functional block diagram



schematics of inputs and outputs



The comparator outputs are further combined and latched to form the 8 [or 10 bit] outputs.

This is called Parallel Conversion, as the 8 bits exist together and their edges are synchronous. A more detailed look at a

typical ADC [Texas TLC5540] is shown in Fig. 3. As an historical aside, the first video ADCs capable of sampling at 13.5 MHz cost £500 each in the late 70s. Now they are 1/100th of the price.

As we are dealing with colour signals, we will need 3 ADCs to digitise the luminance and colour difference signals. As illustration, Fig. 4 shows an typical ADC card with input clamp, black level and peak adjustments.

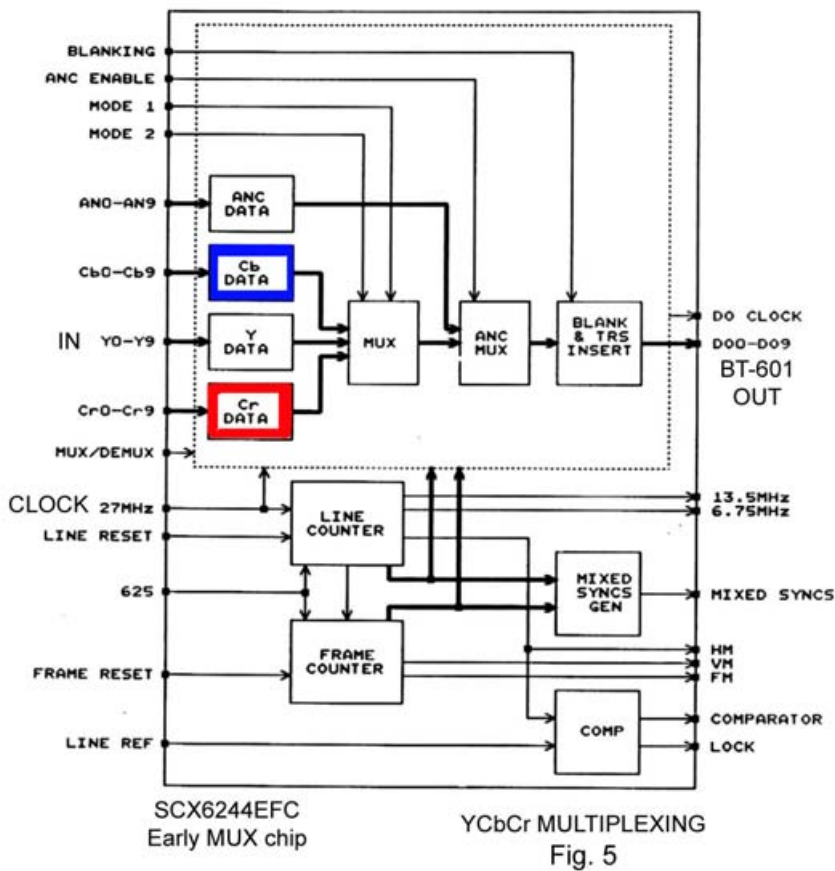


Fig. 5

The relevant digital specification [CCIR/BT-601] lays down that black level is set at 10h [decimal 16], and peak white is set for luminance at Ebh [decimal 235]. We use the 00h to 03h region for start of active line and end of active line codes. To use or transmit a digital stream, it has to be serialised, ie made capable of transit through a single wire or channel. We are now into the realms of high bit rate.

Before this, the three signals have to be multiplexed together.

Consider “cooking” 625 line SDI: the sampling process gives 8 bit parallel signals at 13.5 MHz for luminance, and again the multiplexed chrominance signals at 13.5 MHz [half bandwidth, each sampled at 6.75 MHz].

Fig. 5 illustrates the multiplexing process. These are multiplexed to form a parallel signal at 27 MHz [CCIR or BT-601]. But we need a single wire interface, so the parallel signal is serialised using a clock signal at 270 MHz, ie 10 times the original bit rate. [Fig.6 shows the diagram of a typical serialiser chip]

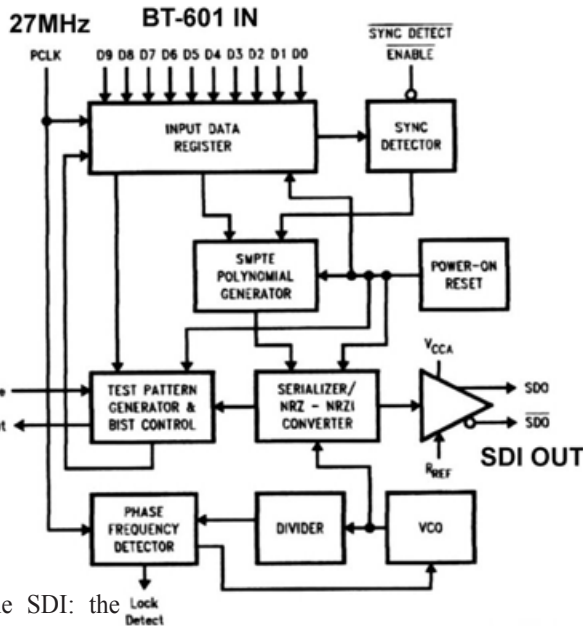
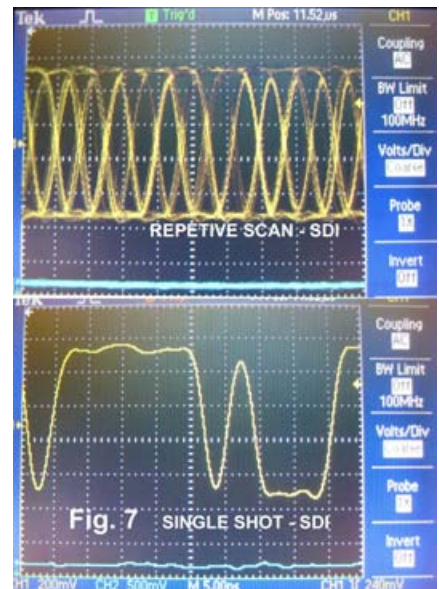


Fig. 6

The blanking intervals are designated by a code word, usually EAV for the start of blanking, and SAV for the end. Therefore the blanking space can be used for data and audio insertion. Thus a single channel carries all the timing information necessary, and up to 16 channels of audio. The price paid is that the channel has to be able to carry digital information at 270 Mbps, albeit a stream of 1s and zeroes.



Good quality 75-ohm coaxial cable will run for about 300 meters without equalisation. The peak to peak level of an SDI signal is 1 volt into a 75-ohm load. Fig. 7 shows the waveform both repetitive and single shot of a typical SDI signal [Output of SDI Test Generator from CQ-TV 2213] at 5nS/cm time base. Note that it does not quite come up to 1 volt level, but the ‘scope is only 100 MHz bandwidth, and would need 300 MHz b/w to show the rise and fall at the right speed.

Obviously, an RF link is not going to support such a bit rate, and so compression techniques [to MPEG2 for example] have to be used to reduce the bit rate considerably to 3 – 6 Mbps in the case of 625 line digital video to fit the available transmission channels, particularly in amateur bands where space is far more limited.

For HD origination the data rates are that much faster, 1080i has a clock frequency of 74.25 MHz, luminance bandwidth is 30 MHz, and the HD SDI bit rate is 1.485 Gbps. Cable equalisation is necessary for runs longer than 60 meters. Despite the very high bit rate, modern compression technology brings this down to about 8 – 10 Mbps for HD broadcast transmission. In the next article, we will look at adding sound, equalisation and distribution, and a bit about compression and HDMI

1. HDMI, which will be referred to later, transmits digital RGB signals in a multiway cable, together with clock and ancillary signals.

- 2. Nyquist Theorem
- 3. CQ-TV 221, pp26 - 30



# Contest News

## International ATV Contest 8/9 September – International Results

Here are the final results for the International contest.

Position	Call	Points		Position	Call	Points
1	PE1NKT	29813		20	PE1OFO	6990
2	PA7HV	22939		21	M0DTS/P	6613
3	PA1PAS/A	20099		22	PE1OLR	6588
4	F9ZG/P	17434		23	PE1POA	6519
5	PA1RHQ	15247		24	PE1BQE	5109
6	PE2TV	14206		25	PE1AXM	5048
7	PA3DLJ	13515		26	F6ESU	4386
8	PA3CWS	13307		27	PA3CRX	3464
9	PA1RK	12422		28	PE1MPZ	2509
10	F3YX	11814		29	F6BGR	2403
11	PA0AVN	11808		30	PE1CHY	2102
12	PE1EBX	11313		31	G8GTZ	2025
13	PE1ASH	10860		32	F8CDM	1352
14	F6ANO	10214		33	G8LES	1290
15	PE1JMZ	10148		34	F1DTG	1262
16	PA1AS	10025		35	PE1APH	1162
17	PE1HIS	9037		36	IK3YAA	230
18	PA3CGG	7507		37	PA1GF	170
19	F6IQG	7428		38	PE1NWR	30

It's good to see that the UK was able to put in 3 entries, but we really need more activity this side of the water to move the UK stations up the scoresheet. Sorry that there is no breakdown by band – I suspect many of the continental points were earned on 70 cms.

## Repeater Contests

I did not receive any entries for the December repeater contest. I had 2 entries for the March contest and the results are below. All the activity was on GB3NQ:

BATC Repeater Contest 23/24 March 2013						
Section 1 - Transmitting						
Place	Call	Points	Locator	QSO	Repeaters	
1	G3MCD	366	IO73OL	5	GB3NQ	
2	G4OCO	188	IO70MK	2	GB3NQ	

Congratulations to Keith G3MCD and thanks to G4OCO, G0KTD, G8XNH and G4GPD for participating.

The photos show cards from G3IGV and G3MCD received through GB3NQ by Keith, G3MCD during the contest.

## Summerfun Contest

The BATC Summerfun contest is on the weekend of 8/9 June. Plenty of time to make sure that the portable gear is ready to go. Remember - digital or analogue, any band (above 432 MHz, however tempting narrow-band digital looks at 144 MHz!).

---

## IARU Region 1 Contest Rule Changes

There are a number of changes to the ATV Contest rules that were proposed for discussion at the IARU Region1 VHF/UHF/Microwave Committee meeting in Vienna on 19 – 21 April. We were represented by Murray Niman.

The first change, proposed by Noel, G8GTZ is to move the date of the International ATV Contest to the first weekend in October, so that it takes place at the same time as the IARU Region 1 Microwave Contest and does not clash with the International Broadcasting Conference in Amsterdam.

The second series of changes makes provision for moving the Contest Station during the Contest and also clarifies a number of rules. In doing so, it the proposal prohibits the use of remote stations controlled by cable, wireless or internet, where these are 500 metres or more from the operator. Murray opposed this aspect of the proposal, which was felt to be counter-productive by the members I consulted.

Thanks to all those who responded to my request for comments. I'll report back on the changes in CQ-TV 241.

## Contact

I can be contacted through e-mail ([contests@batc.org.uk](mailto:contests@batc.org.uk)), or through my BFPO address: Wg Cdr D G Crump, Defence Section, British Embassy Abu Dhabi, BFPO 5413, London.

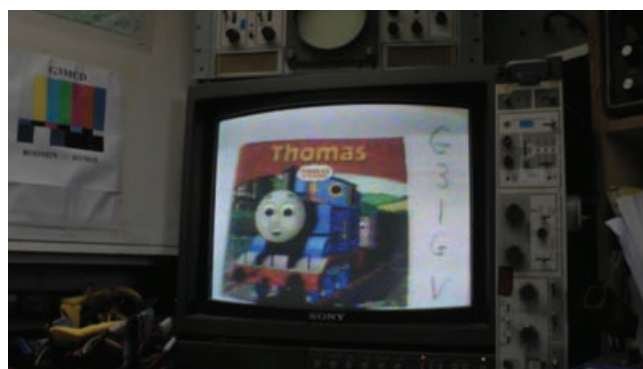
## Contest Calendar

1200 UTC 8 June 2013 - 1200 UTC 9 June 2013 - BATC Summer Fun Contest

1800 UTC 14 September 2013 -1200 UTC 15 September 2013 - International ATV Contest

1200 UTC 7 December 2013 - 1200 UTC 8 December 2013 - BATC Repeater Contest

1200 UTC 22 March 2014 - 1200 UTC 23 March 2014 - BATC Repeater Contest





# From the Chairman - STOP PRESS

Since I wrote the previous introduction, 2 very important pieces of news have happened.

Firstly as you will have seen, a live TV downlink from the ISS has been recently been announced using DVB-S in the 2.4 GHz band. Through the work of G3VZV and G7LWT, the BATC has been heavily involved in the project and will be providing a number of dedicated channels on the streaming server to enable the received pictures to be relayed around the world.

As a result of the BATC's close relationship with ARISS and Amsat Italy, we have early access to an article from ARISS describing the project in some detail. The first part giving a project overview is included in this issue and the second part which describes the technical

challenges and potential solutions to receive HAMTV from the ISS will be included in CQ-TV 241.

I believe this is one of the most important and high profile projects happening in amateur radio today and it is great that the BATC and its members are in a position to be involved and contribute to its success. For more information and the latest updates see the BATC forum page at <http://www.batc.org.uk/forum/viewtopic.php?f=2&t=3182>

The second piece of news is that just as we were about to publish CQ-TV 240, Ofcom have released their report and opened the consultation process on the future of the 2.3 GHz band. This will have an impact on our 13cms TV activities and I would urge you all to at least scan read the 75 page document!

In my opinion the document gives a balanced view of the situation and is very well researched and through the work of the BATC, ATV gets very good coverage. It is a credit to the RSGB and BATC that Ofcom are sympathetic to the amateur cause, unlike the regulator in Sweden and Australia where access to the band was removed without discussion.

The RSGB / BATC will be responding formally to the consultation - we will make known our responses and we would urge every BATC member to respond individually making use of the information we provide as you think appropriate. For more information and the latest updates see the BATC forum page at <http://www.batc.org.uk/forum/viewtopic.php?f=2&t=3176>

## VHF COMMUNICATIONS MAGAZINE



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# A Portable One inch CRT NBTV Monitor

By Steve Anderson

## Introduction.

This is portable but not what I would call pocket sized. For all intents and purposes it looks like a standard NBTV monitor; it has 32 vertical lines, 'Club Standard' scanning and operates in the usual manner. But it is a little different in certain places.

Battery powered it is, not four AA cells as one might think, but a 12V/7Ah sealed lead acid battery. Not for the pocket unless large and reinforced!

## Caution.

*Although battery powered this unit uses both high AC and DC voltages and the author of this in no way accepts any responsibility for any incident, injury or fatality of those attempting to replicate it in any manner. If you're not used to working with high voltages, get some experienced supervision. There is some 600V of potential difference in parts of the device. Do not work on this alone.*

## The Differences.

The first difference is the video signal itself. (Fig. 1). Sampling at 48kHz yields 120 pixels per line at the usual 400Hz line rate, 96 are used for the active video, the remaining 24 are used for syncs. Instead of using the missing pulse system for frame syncs a broad frame sync pulse is used instead thus providing an uninterrupted 400Hz signal for PLLs and other circuitry.

The storage medium for the signal is a standard eight bit wave file at a 48kHz sampling rate, with the use of conventional type sync pulses the video resolution is just over seven bits, enough for NBTV.

## The Circuits.

As this is battery powered and uses a CRT an inverter is used to generate

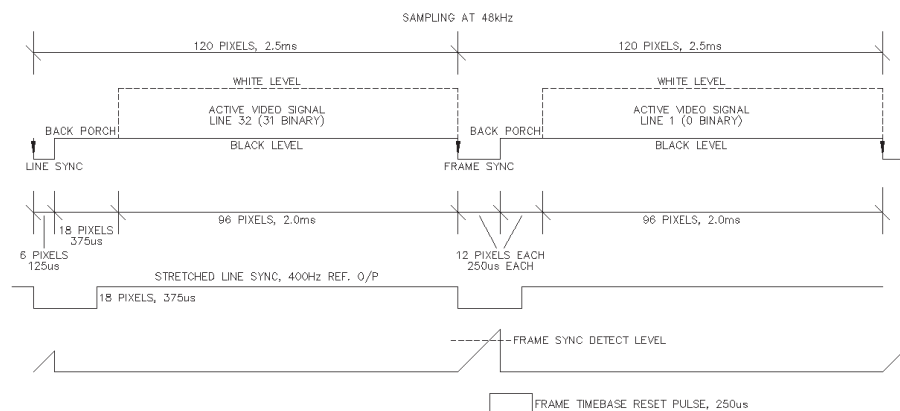


Figure1

two positive high voltages of 260 and 540 volts as well as a negative 21 volt rail which is regulated down to -12V. (Fig. 2). It uses a small standard mains transformer in reverse driven by a bi-phase waveform at 200Hz. The driver transistors don't even get warm and have no need for heatsinks. The total output power used is 1.75W and the input power is 2.66W, an efficiency of 66% which is surprisingly good for what is a bit of a bodge. A high-frequency inverter based on RM cores would have been better but they're not available here. Reverse battery polarity protection comprises of F901 and D901. (Fig. 3).

The rest of it is fairly conventional (Fig. 4, 5, 6 and 7) perhaps with the

exception of the +11V regulator (Fig. 3) which is required to have a low dropout voltage. As I use linear video not Gamma encoded I need to 'un-Gamma' the CRT. This is based on a break-point Gamma correction circuit which is covered elsewhere (Fig. 5).

The CRT is a low voltage type and the cathode sits at +11V rather than the usual high negative voltage easing grid drive and heater insulation requirements. A full charge on the battery will provide some 12 hours of continuous operation, the supply drain being 530mA of which 300mA (57%) is for the CRT heater! SW901 is to turn off the CRT heater about 30 seconds before turning the main supply off. The +12V and -11V supplies collapse very quickly

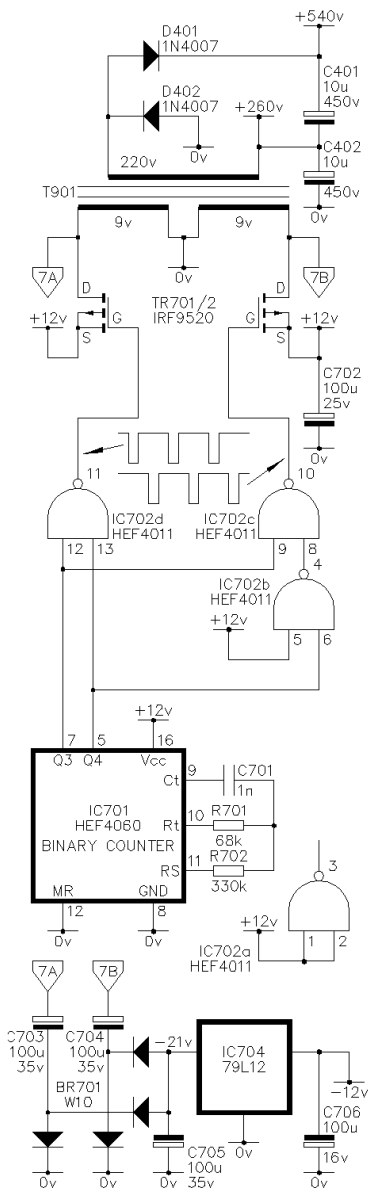


Figure 2  
INVERTER, HV PSU & -12v PSU

but the high voltage supplies do not and the cathode is still hot. The result is a single bright spot on the tube face which could cause a burn mark, doing this prevents this happening. There is a low battery warning that comes on at 11V, at 10.5V a lead-acid battery of this type is considered fully discharged and discharge should be terminated otherwise a short battery life results.

The negative going edge of syncs triggers IC301a (Fig. 4) which resets the line timebase, this monostable has a duration longer than both types of sync pulse so the line raster is consistent in start point and time. Frame sync separation is performed by IC302 which triggers the frame reset

Figure 4  
SYNC DIFFERENTIATION, TIMEBASES,  
DEFLECTION & SYNC PRESENCE DETECTION

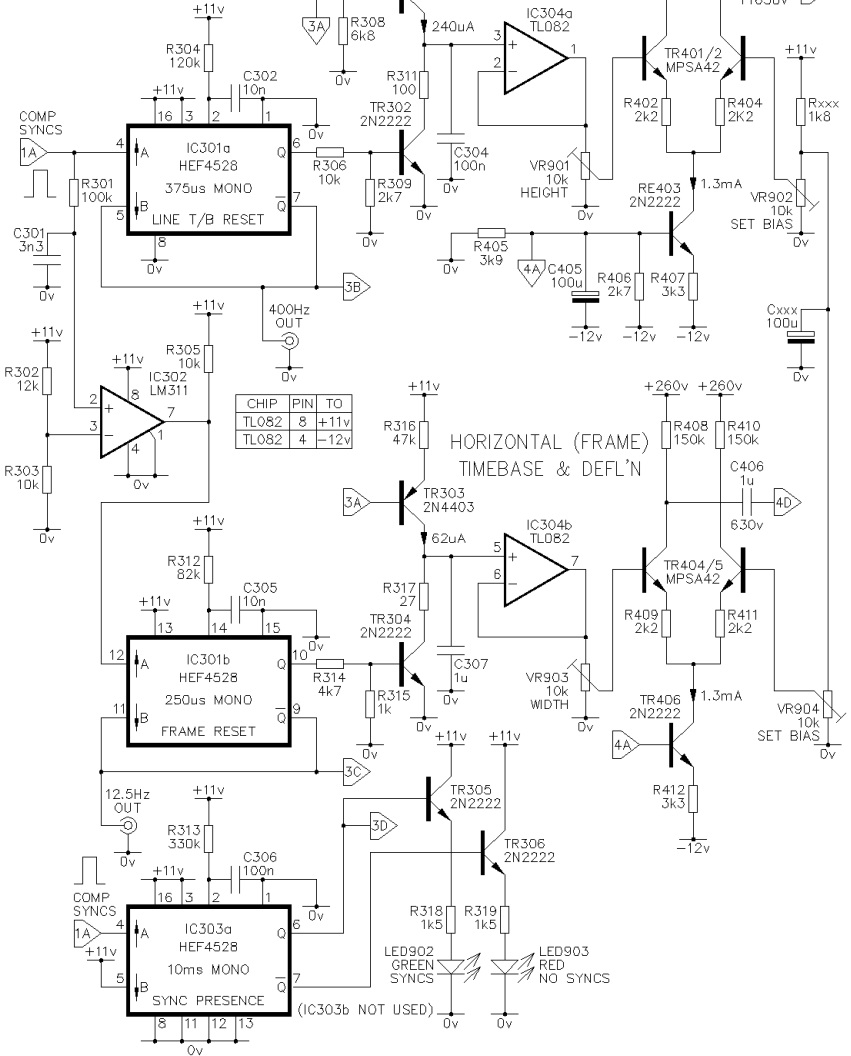
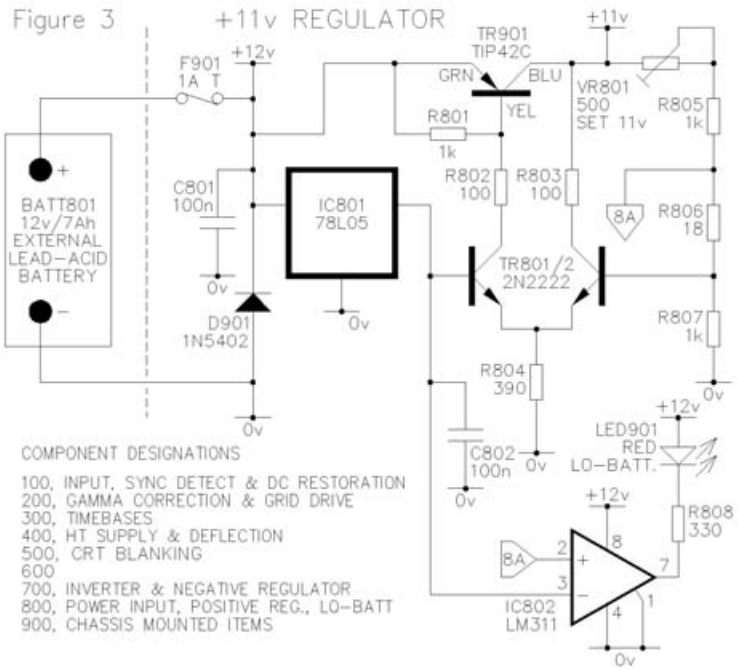


Figure 3



- COMPONENT DESIGNATIONS
- 100, INPUT, SYNC DETECT & DC RESTORATION
  - 200, GAMMA CORRECTION & GRID DRIVE
  - 300, TIMEBASES
  - 400, HT SUPPLY & DEFLECTION
  - 500, CRT BLANKING
  - 600
  - 700, INVERTER & NEGATIVE REGULATOR
  - 800, POWER INPUT, POSITIVE REG., LO-BATT
  - 900, CHASSIS MOUNTED ITEMS



monostable IC301b. In the absence of syncs the beam is shut off by IC303a which also provides visual indication of sync presence or otherwise via two LEDs. Retrace blanking is added to this by a simple two transistor arrangement. (Fig. 6).

A look inside the box reveals that it was a bit of a squeeze to get it all in but not too hard (Photo 2). The only control that is functional on the front panel is the CRT heater switch; the others are leftovers from a previous incarnation.

**The Results.**

Because the display is only some 10x15mm and at quite low light levels and green and flickering it's very hard to take screenshots. This is about the best I was able to get with my...er...sub-standard camera.

It does look better in real life if you ignore the flicker and the green colour!

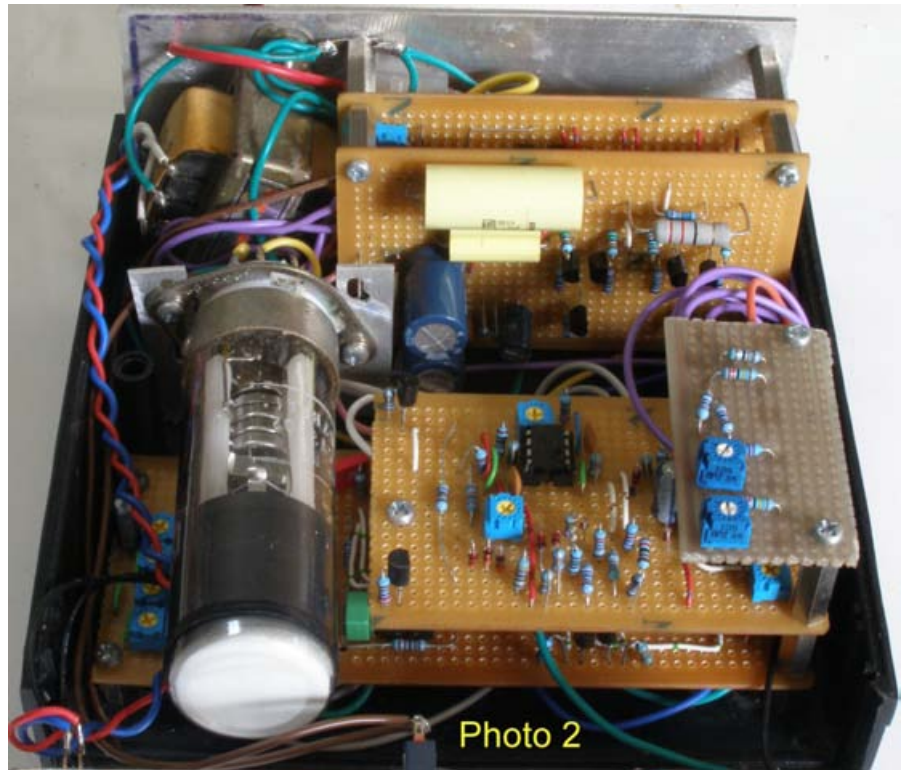
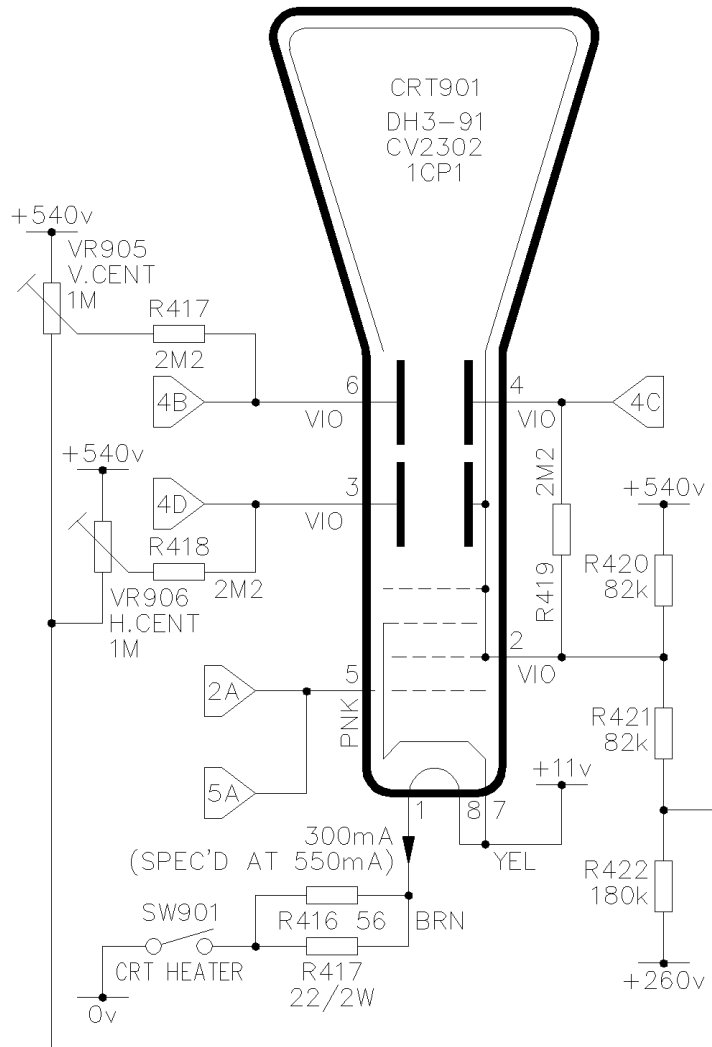
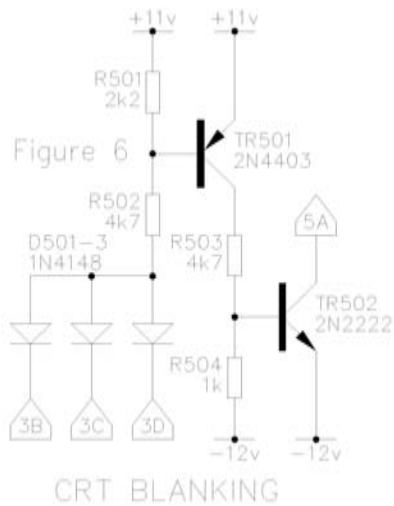
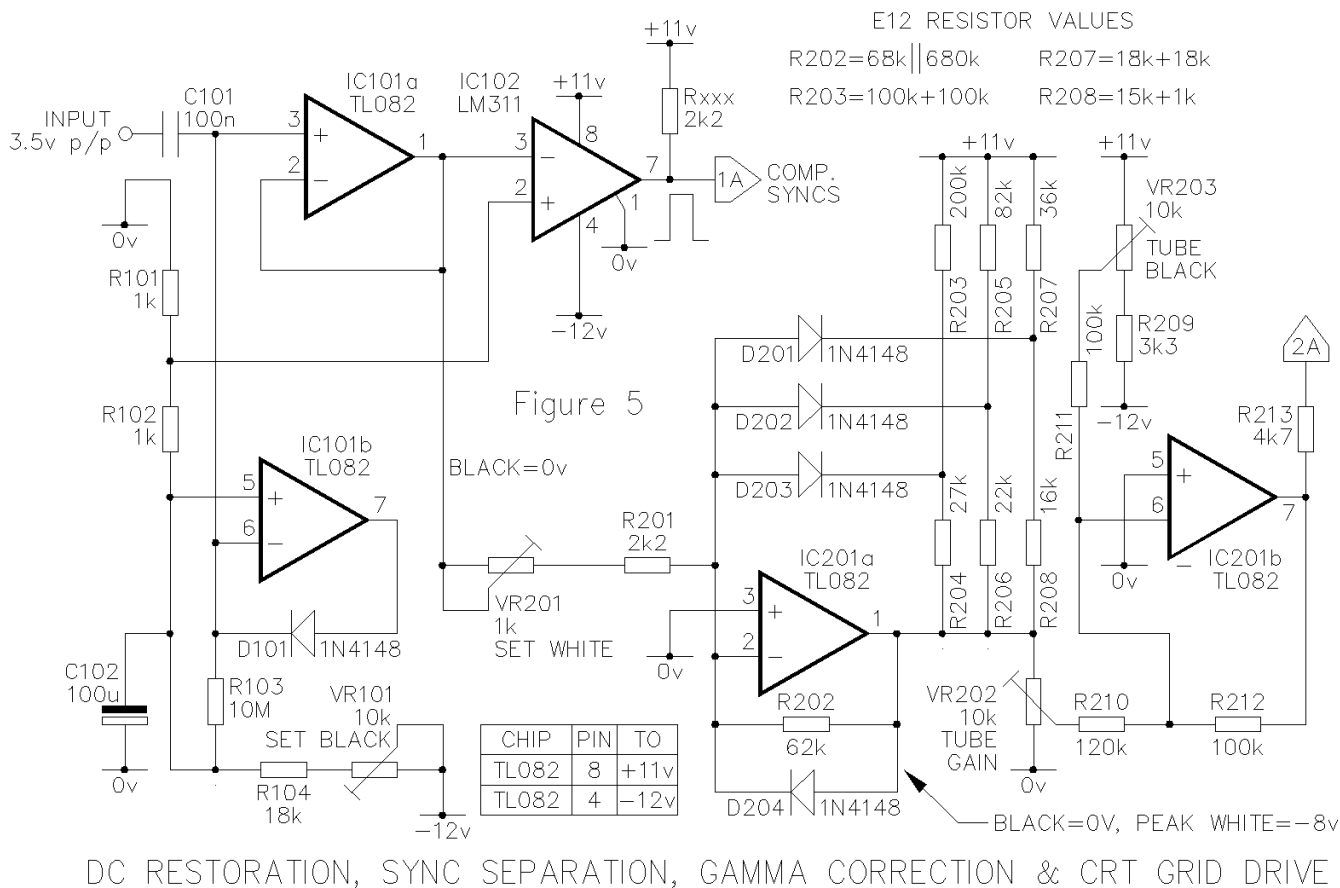


Photo 2





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# Keying the Adobe Streaming Encoder from a Transmit Key Line

by GB3HV

If your repeater or home station is run on a capped broadband line, it is useful to turn the streaming only on when the repeater Tx key line is keyed, just like a voice repeater turns the transmitter on when in use, and thereby saving precious bits in those dead hours...

This article describes how to use an old USB keyboard hardware and desktop shortcuts to turn on the Adobe media encoder from a hard wired key line on a Windows XP PC - use your own call sign where "gb3hv" is used.

Set up the Adobe flash media encoder and save your encoder profile in the programfiles/adobe/flashmediaencoder directory (must be in the flashmediaencoder directory and not the default). This should create an xml file - eg gb3hv.xml

Use notepad to create a batch file called "gb3hvstart.bat" in the same adobe encoder directory with the following lines:

```
FMLEcmd /p gb3hv.xml  
end
```

Use notepad to create a batch file called "gb3hvstop.bat" in the same adobe encoder directory with the following lines:

```
FMLEcmd.exe /s rtmp://fms.batc.tv/  
live/gb3hv+gb3hv
```

Now open the flash media encoder directory, right click on each of the batch files you created in turn and create a shortcut for each - drag these shortcuts on to your desk top.

Test it - Double clicking on the start shortcut should start the streaming in a dos command window, not the adobe program, and double clicking the stop shortcut should stop it!

Take the small PCB out of a old (or even new) USB key board - noting the multi-way connectors that connect to the actual keyboard matrix. Plug it in to a USB port on the PC - you can run more than one keyboard so no need to disconnect the main one - and be ready with some test wires as we now have to find the 2 lines for F9 and F10 which will be used to trigger the streaming.

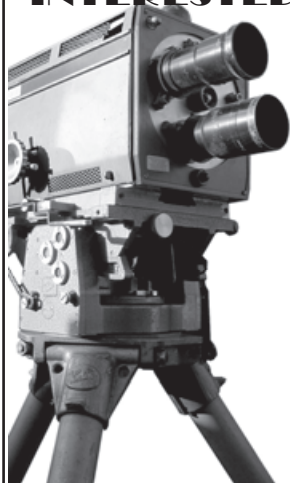
Right click on the start shortcut on your desktop that you just created, click properties. Play around shorting

wires on the PCB matrix input and you will see the key you have hit show up in the "shortcut key" window - if not, check things are OK by hitting a key on your main keyboard, it should show in the window. Eventually, you will find the 2 matrix lines that hit F9 and save the start shortcut. Right click the stop shortcut and do the same again to find the 2 matrix lines that hit F10 and then save the shortcut. We need to use a key in the range F9 to F12 as any other key is probably used and grabbed by other programs. During this process you will probably bring up help, run other programs and even close the machine down.

Now use a double pole relay from the transmit key line and use one set of contacts to trigger each of the shortcuts via a 1 microfarad (or similar) in series with the keyboard line to simulate a key press and you have hardware control of the encoder...

It's not as difficult as it sounds and has worked reliably on GB3HV Mark 2, whose only output is on a capped broadband line where we stream to [www.batc.tv/hv](http://www.batc.tv/hv) for the last 18 months with a typical usage of 10 GBytes per month.

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# 23cm Power amplifiers

by Mike Sanders G8LES

We do have a bit of a problem here when specifying amplifiers, with our repeater inputs and the French on 1248/9 and 1255 as well as wanting to utilise the amplifier for 1296 narrow band. This on the basis that if you have the antenna and an amplifier you might just as well multipurpose it. So effectively there is a 50 MHz power bandwidth we need or 4% of the frequency (1270 say as centre). Ideally that would be within 1dB but that isn't that easy to achieve.

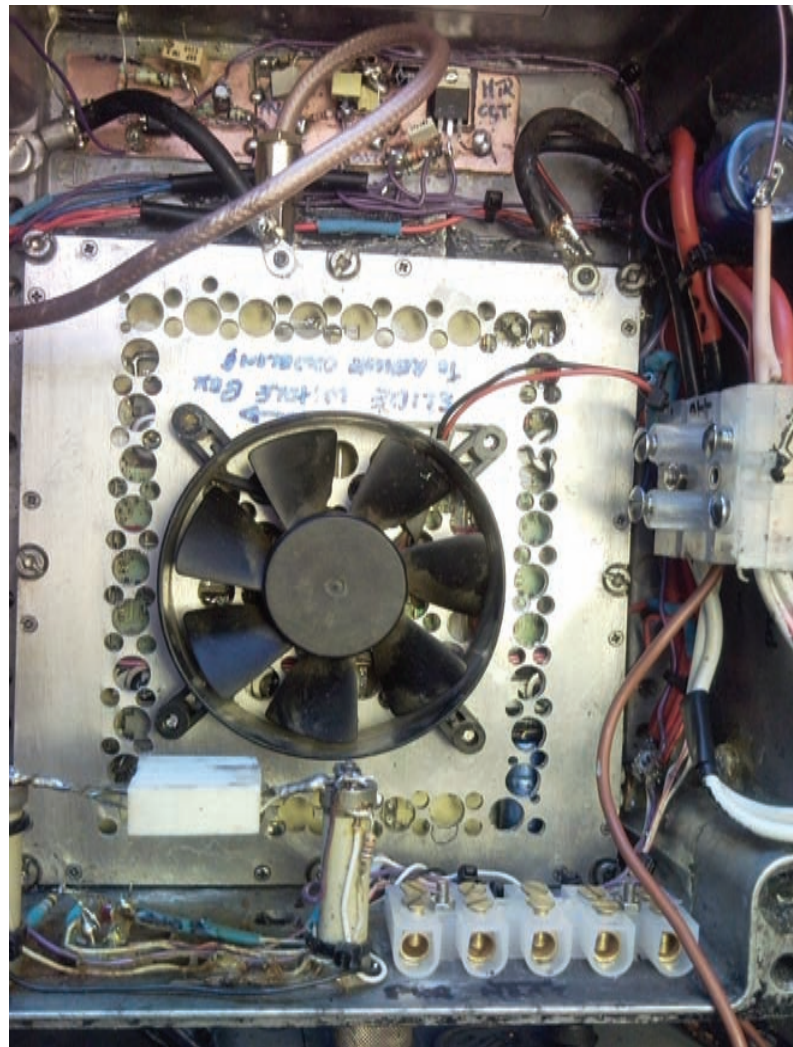
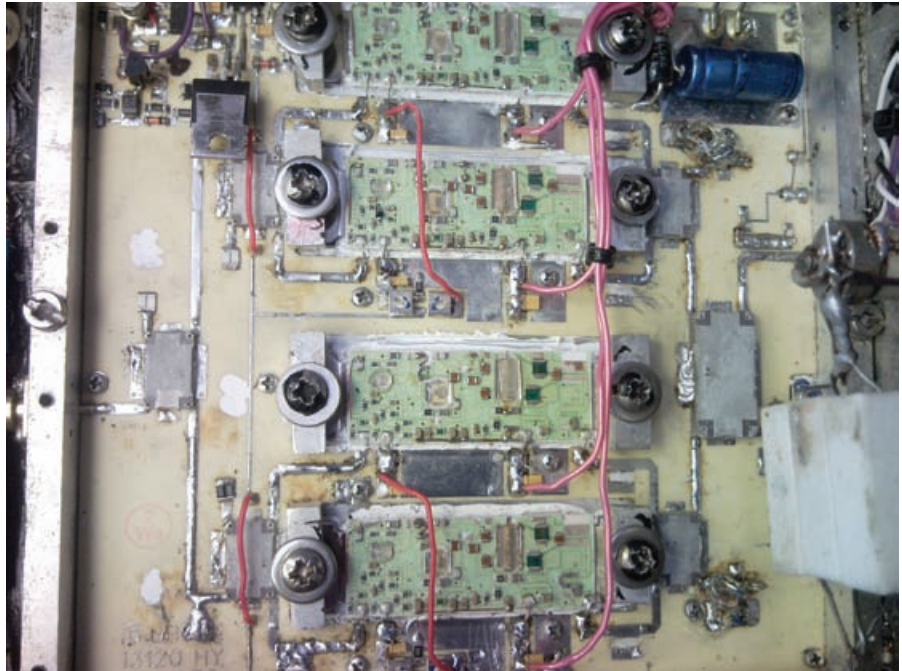
You will notice that the Kuhne Electronics discrete transistor ones such as the MKU PA 23cm-200W A do cover that range but the SWR limit is 1.8:1 and there is no power bandwidth curve available on the website, which I have requested.

Also it now seems the Kuhne 4 Brick amplifier using the RA18H1213 is not being produced anymore which is the one I have, but replaced with the LD MOS discrete transistor one at 200 watts.

Now you will see I have left the tops off the modules; this is deliberate to help cooling of SMD capacitors. The box is sealed with a pressure change breather pipe so there is no dust to circulate. Note the mechanical pressure blocks at the end of the module which are 0.25 inch thick aluminium blocks fixed down with stainless steel screws.

The power wiring needs moving to be near the end of the module where it has no effect on the module's output.

The ceramic resistors on the right are the heater resistors to keep down any dampness in the unit. Balancing of the unit is achieved with copper flags on the track on the input side. The bottom triangle of copper foil balances left pair with right pair and the square on the input line to the bottom module balances the pair. The output flags were removed as they needed less capacitance not more.





The picture at the bottom of the previous page shows the cooling fan and the drilled lid in position. The mounting screws and the blocks are in contact with the lid, which generally helps with the earthing.

To get the best out of the unit the modules need to be fully tested and set up individually. Most come up to about 45 watts out SAT on 14.5 volts, but that is on their best frequency, usually about 1270MHz. Our task is to get the best out we can looking at 1248, 1255 and 1285. For this a module test jig is required.

Warning. These modules are very static sensitive and an ESD workstation is recommended or at least earthing the case of the soldering iron to the test rig PCB is a must. Weller Magnastat irons (the ones you can hear going click) will damage the gates on these devices.

There are several tweaks we can do. The worst part of their performance is at the high frequency end.

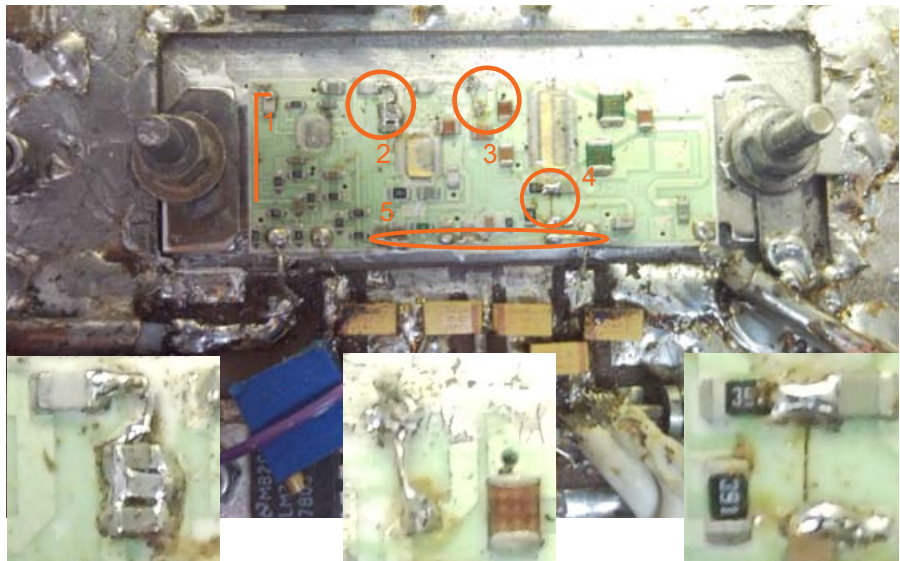
First step is to remove the lid which is now quite difficult it being glued on with some hard silicon rubber. You need to get a model knife in between the lid and on the edge where the number 2 circle is on the picture above. Use along the length movements not up and down or you risk breaking the substrate. You then clear round the wire pins. Tip the lid off from the long pins side and gently lever the lid between the metal base and the end of the plastic. No screwdriver should ever get over the module itself.

Using a hard nylon trim tool to clear all the silicon rubber from the edge of the board, (i.e. a non metallic object), especially removing any silicon rubber on or around the chip tuning caps, as this detunes the module.

Item 4 shows a crack that occurs in some units which is catered for by putting an extra wire along the power track as in 5, and bridging the gap in 4 to the earth pad. This is Mod 5.

Test power is 100mW drive and bias set to 2amps with no drive applied and PSU is 14.5 volts. (The modules are rated to 16 volts).

Good modules will peak at 46 to 50



watts on their best frequency. If the best you can get out of it is 30-ish watts even with more drive, it is unfortunately a bad one and there are some, bearing in mind they are rated at 18 watts out.

Assess the module performance at 1248, 1255, 1285 and 1297 noting the power at those frequencies. Usually you need to pull it up in performance at the top end without losing too much at the bottom end.

First of all the input SWR is fairly bad. It is in fact capacitive which we fix by adding inductance. So this can be fixed by using the whole length of the input wire and forming it into a hairpin loop. Going up from the PCB about 5 mm and back down to the module with about 1 mm gap between the two sides of the hairpin. Now the match will be good and thus require lower drive power.

Mod 1 test @ 1248. This a piece of 30SWG wire and this increases the gain at the bottom end of the band, but will detract the gain at the top end so positioning to balance both frequencies is critical. Lay it as per the orange line.

Mod 2 part 1 test @ 1248. Some modules need an extra AVX multilayer 1pF capacitor to improve the LF end - try the finger test. Just on the 2 caps. Improves with finger needs a cap, no change or worse don't fit a cap.

Mod 2 part 2 test @1308. The piece of line between the coupling cap from TR1 and the gate tuning caps is effectively thickened up by adding a piece of 30SWG wire between the tuning caps and the coupling cap. This improves

the drive at 1308. The track should be cleaned of solder resist first. Just thicken up the solder from the coupling cap but leave the rest sparingly covered.

Mod 3 test at 1308 this effectively shortens the line between the driver and the output transistor array and is another short piece of 30SWG wire.

Retest all the frequencies and a certain amount of tail chasing may go on before you have a good compromise between the top of the band and the bottom. Be satisfied if you achieve nearly full output at 1285 and about 35-37 watts at 1308.

One bad component in the amplifier is the terminating load for the two bricks working together either side. A decent 20 watt Johanson one from Richardson (RFP20-50 TPR) is recommended as a replacement.

So now to the final assembly test. With all the modules set to 2.5Amps standing bias let's see what we get. The picture below shows the output at 1270 with a 250watt bird 400-1000MHz element. (Reads low at 23cm)



And the output at 1248 and 1285:



The dummy load then needs cooling for a soak test – literally!

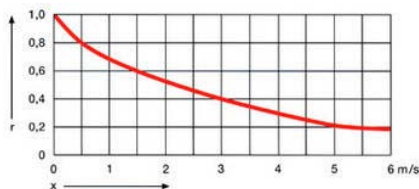


The amplifier is mounted at masthead and is fed with 160 amp welding cable with a sense wire back down to the dual 6V 60A Farnell PSU's.

So the amplifier has to be mounted on a decent heatsink. The following 3 pictures taken from the Kuhne Electronics website.



The cool cube one above needs fan assistance and preferably fans both ends as we need to get the cubic feet per minute up.



As you will see the thermal resistance drops as the metres per second and that is the measure of goodness in getting

the heat away from the modules.

So the final amplifier and heatsink looks like this:



I have used IP65 rated fans with stainless steel ball bearings and they don't mind damp conditions. However some protection needs providing for the amplifier so the final mast mounted assembly looks like this: No prizes for the paint job!



There is a die cast box and the heat sink sticks out at the back. That is then covered with copper clad board and soldered up into a protective cowling.



The long stud top left fixes it to the head unit on the tower next to the Rotator.

You can just see the amplifier on the head unit and there are 4 of Tony G1HBD's 68 element yagis (Masthead Antennas) based on the long Yagi design but with elements on PVC stalks instead of through the boom. (Element lengths recalculated). They also have Dave G8ADM's slot feed driven elements.

The 13cm 100watt amplifier + pre-amp and 70cm preamp and 23cm transverter and 23cm ATV down converter all live up on the mast. There is LDF550 from the power splitter on the 23cm beams down to about 1 metre of Echoflex 15 attached to the changeover relay. So there is pretty low loss between the antennas and the relay. The top antenna is a 70cm 27element loop yagi with stainless steel elements from G3JVL.

The 13cm antenna is a skeleton dish that Giles G1MFG was selling but the feed got damp one day and burnt out. I used one of Tony's 13cm dipoles he makes for the professional 2.5GHz band with some mods for 13cm and that is mounted pointing back in to the dish and held on plastic trunking, supported in 4 planes by nylon rope.



# Signal lock detect on Comag SL30 digital receiver

by Noel Matthews G8GTZ

One of the challenges for repeater builders is finding a digital receiver with a reliable (and easy) signal lock detect line to drive the control logic when a digital signal appears.

Last year, when building GB3HV Mark 2, I purchased a couple of Comag SL30 receivers from Maplin (Part number xxx) to use for 70cms and 23cms DATV reception. The units, as well as being reasonably priced at around £30, are fairly compact and reports from other amateurs who use them at home indicated that they had reasonable RF performance and reliable lock capabilities on a variety of FEC and symbol rates. They also have L band pass through so can be put in line between the antennae / filters and any existing analogue receiver.



lock sits at around 1.8v, with signal applied and locked it sits at 2.4volts.

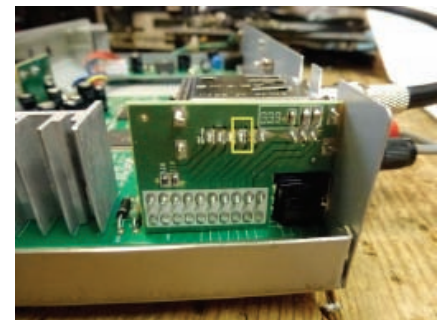
reliable in providing a lock indication for signals with a variety of symbol rate and FEC settings.



Once the unit was set up and locked to a test signal in the shack, I set about with an oscilloscope and multi meter to find any suitable test points which may indicate digital lock.

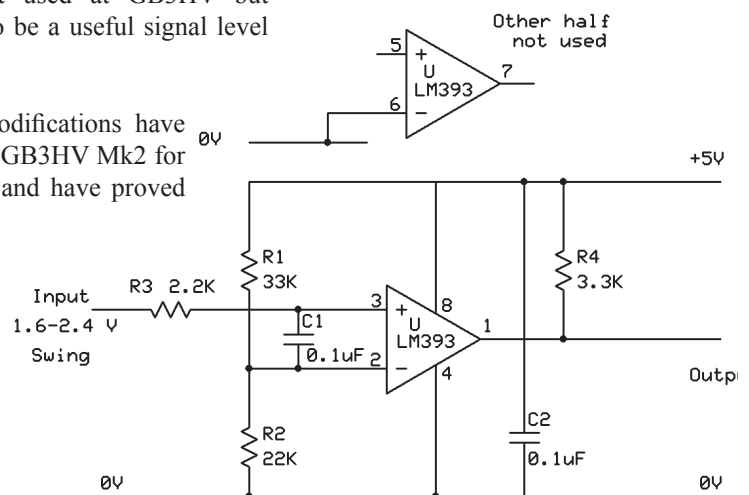
Investigations showed that the left hand end of R6, which is not fitted, goes to the big chip on the left and with no signal

In order to make this a more useful 0 – 5v level shift, the end of R6 is fed in to a LM 393 comparator circuit which will interface directly in to the repeater controller logic or fed to a transistor relay driver for other levels. The value of R1 may need adjusting to give a clean output depending on drive and rail voltage in an individual receiver.



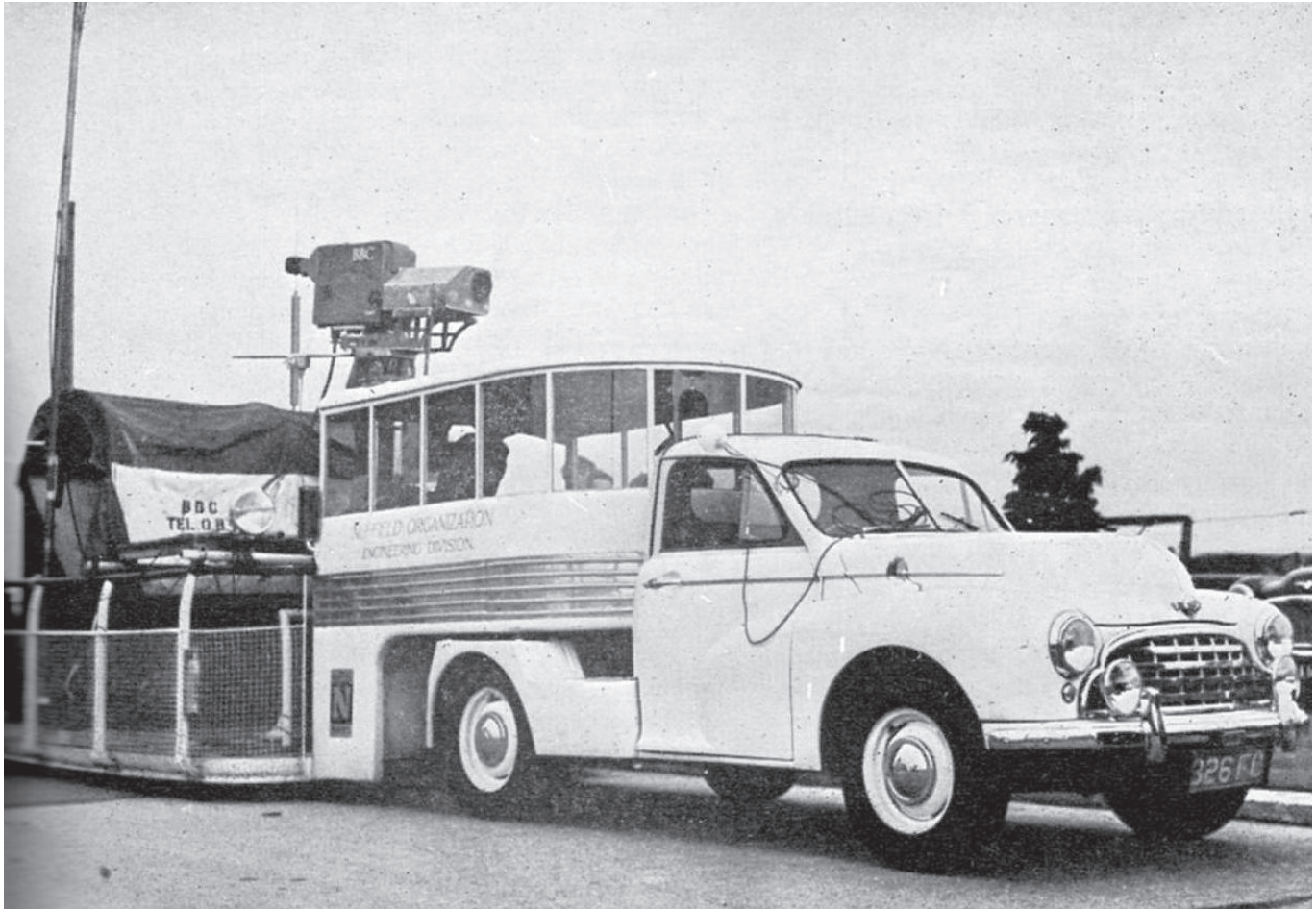
Further investigations showed that the 4th pin along on the tuner module (see picture below) seems to go between 0v and 2.5v depending on signal input. This was not used at GB3HV but could prove to be a useful signal level indicator.

The above modifications have been in use at GB3HV Mk2 for nearly a year and have proved



# The BBC Roving Eye

*Dicky Howett poses a question*



Here's something we don't see very often. In fact we've never seen it before (or since). A BBC television 'Travelling Eye'. Way before the Granada Tv vehicle of the same name, this picture, published in an 1953 edition of 'TV News' magazine, shows a Marconi Mk II camera with its Watson 5:1 zoom lens and a transmitter somewhere under a sheet. This collection was installed on a trailer arrangement courtesy of

the Nuffield Organisation Engineering Division. Apparently, this motorised medley was capable of 30 m.p.h, racing along, whilst 'on air'! A vaguely American-looking rig, this was used first (and probably last) during a programme called 'Night Flight'. During the show, the lorry and camera, transmitted live images as it went, trundling along an airport runway, pacing the takeoff of a B.O.A.C airliner no less. Later in

1954, the more familiar BBC 'Roving Eye' vehicle entered service, and in 1956 a two-camera version, built on a Karrier Bantam chassis could be seen out and about, most famously at the 'Lincolnshire Handicap' race, following alongside the horses in a sequence during the 1959 documentary, 'This Is The BBC'.

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# Time Line 3

by Trevor Brown

When I started Time Line, my thinking was to review free software from the internet that would enable simple film making. I have had some feedback from the recent BGM; where the consensus of opinion was “can you start at a lower level with some really simple software”. So for part 3 I have taken a step backwards and also, one sideways because my original aim of free software has had to be replaced with budget software, so apologies in advance for the review in this issue; it is not free but it is only \$39.99 or less !!.... all will be revealed..

The edit package is called **wondershare**. It must be the simplest edit package ever and can be downloaded as a free demo from: <http://www.wondershare.com/video-editor/>. It is fully functional in every way except that any renders are watermarked.

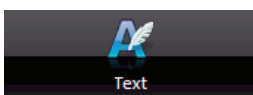
It is a JAVA based programme so please make sure your JAVA is up-to-date.

It is available for both the Mac and Windows XP/Vista/Windows 7 Mac OS X 10.5, 10.6, 10.7, 10.8 (Mountain Lion).

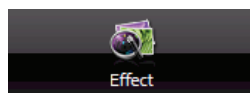
I downloaded the Windows version. The desktop is simple and clean, the small folder at the top of the screen will take you to the windows filing system that will allow you to locate video files on your computer and load them onto the desk top. Below the desk top are six buttons:



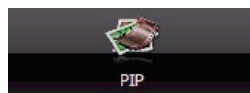
Media allows you to see the video clips you have imported.



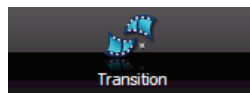
Text displays several caption templates.



Effects are just that - several templates from bubbles to picture warmers that can be superimposed on any clip.



PIP are some interesting pre set cut outs that can again be superimposed on any clip.



Transition can transform your cuts into interesting wipes or even some DVD moves.



This will open a library of animated titles that are again just drag and dropped onto a time line.

Let's start with media:-

Clips can be dragged onto the video part of the time line, that can be re-scaled from the slider at the top right of the time line. A simple mouse action will allow you to adjust the in and out

points, before adding the second clip. The clips are complete with any sound that was recorded at the time, but there is no display or control over this. Which I originally thought was a problem, i.e. drop a Jpeg onto the video line and it will break up the sound.

Below the Video track is a PIP (Picture in Picture) useful for titles, but you can also drop video clips and Jpegs onto this line, and they will be mute and not interfere with the audio from the video clip above. Clips on the PIP line will be reduced in size and shown as overlays, but they can be resized to full frame with a right click on the material in the PIP line.

Text can be selected and dragged onto a section of the time line just above the video time line, put the scrubber needle on it and it can be seen in the picture monitor and resized. Select the edit function just above the time line and a Text editor will appear top left and you can type your titles in.

Return (bottom right just before the picture monitor) will take your Desk top out of Text mode.

Effects can be dragged onto the timeline, so you can add bubbles (not sure of a use for that).



Clips can be recorded with the record button at the screen top, in my case it brought up the webcam in a record control panel, with an interesting count down to the recording. The record clips appear in media selected desk top and can be pulled into the time line if you require the sound, or onto the PIP line and resized as mute drop-in's. Ideal if you want to take someone through a constructional project on your desk.

There is a timeline for audio and I pulled an MP3 onto it without any problem; in fact I did not find any files it had problems with. I mixed PNGs, JPEGs, FLVs, AVIs and MPEG2s and had no problems at all. The AVHCD came from the club's XA10 and the MOV files were from my Canon Sure Shot S95s; the only files I could not import were VOBs and strangely enough WAVs.

The create button will let you render your project to every device from a PS3 to an Iphone or DVD.

All the menus are clear and well laid out. It really is just a matter of pressing the buttons and it does what it says on the tin. If you have any problems, then You tube is full of help. So download the demo and start playing, it really is that simple.

The down side I said it was \$39 - well a couple of weeks after the download I received this pop up:

I suspect this might be standard to all those who download a copy, so wait you might get a special offer! Some Helpful hints can be found on you-tube Try:

- <http://www.youtube.com/watch?v=dxgtQZQpA18>
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# Classic Circuits

In “classic circuits” we intend to re-publish circuits and projects which have previously appeared in CQTV but people are still using today. If you have a favourite past article or circuit which you keep referring to, let us know and we will reprint it.

We start with a transmit / receive sequencer which first appeared in CQTV 125 in 1984 by Ian Waters G3KDD (formerly known as G8ADE). This circuit is as relevant to the modern shack running a mast head pre-amp as it was when published and is the simplest and most effective circuit published to date.

by I.M.Waters G8ADE

Those who use mast-head preamplifiers with exotic expensive transistors, need to be careful about the timing of events when changing from receive to transmit and vice-versa, if damage is to be avoided. I have seen various circuits advocated for this purpose but, since all of them use slugged magnetic relays, it was thought that something better could be done.

The circuit shown in fig.1 ensures that, when going to transmit, the head amplifiers and converters are off and aerial relays changed over before any RF is generated. Conversely, RF has been shut off before head-amplifiers and relays etc. are energised for receive.

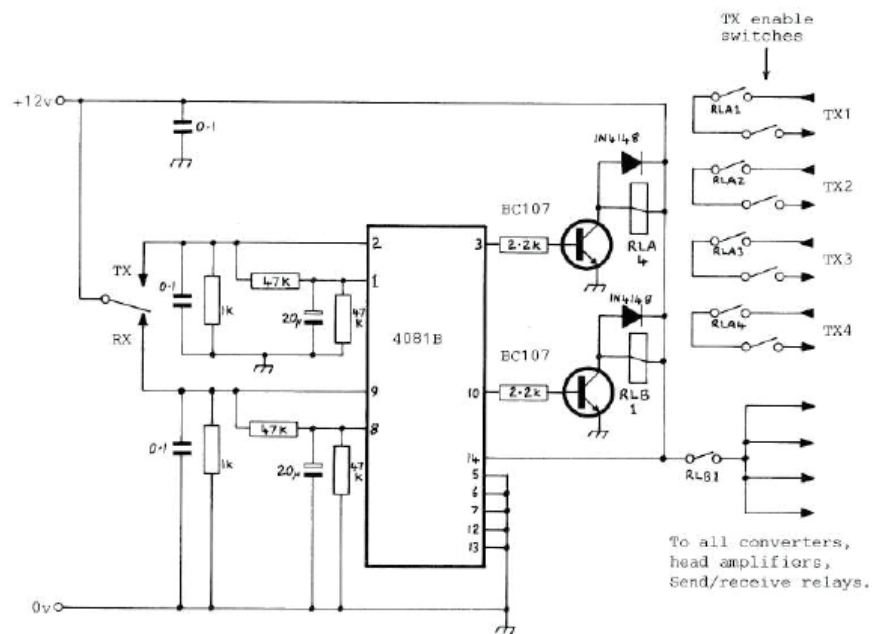


Fig.1 TRANSMIT/RECEIVE TIMING SYSTEM

## Circuit Description

Assume that the station is on receive. Upon operating the master station TX/RX switch, Din 9 of IC1 (a quad 2-input AND) goes low, pin 10 goes low, RLB opens and all converters etc. are shut off.

Almost instantaneously pin 2 goes high but pin 3 will not go high until a time delay, determined by a 47k resistor and 20uF capacitor, has charged up, allowing pin 1 to go high too. RLA then closes and transmitters come on. The delay can of course be adjusted by the values of the R-C time constant.

On returning to receive, pin 2 goes low, pin 3 goes low instantaneously, RLA opens and the transmitters shut down. Pin 9 goes high but RLB will not close

until the receive RC time constant on pin 8 has charged up.

There is thus a separately adjustable delay introduced in both directions. The 47k resistors in parallel with the 20uF capacitors discharge these after a change in either direction.

## Application

At G8ADE all transmitters are controlled by the one station master TX/RX switch. The transmitter (or transmitters) which actually comes on is determined by which TX enable switches are closed. This is a safety measure to prevent the possibility of, say, a 2-metre transmitter being independently controlled and left on

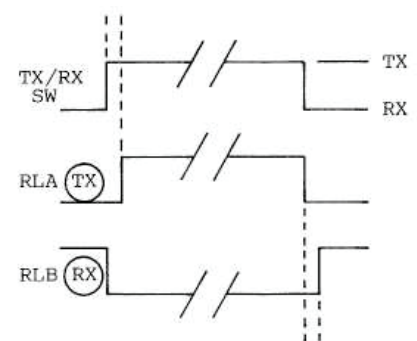
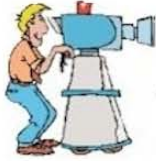
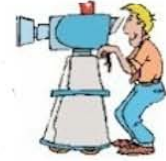


Fig.2 TIMING RELATIONSHIP

whilst receiving on 70cm. Harmonics in the 2m output might couple between aerials and damage the 70cm mast-head pre-amplifier.



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The web site has sample articles and a full index from 1969 to the present that can be searched to find articles.

Back issues are available as printed magazines or photocopies, most are £1.00 each. There is a full list on the web site.

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# Turning back the pages

*A dip into the archives of CQ-TV, looking at the issue of 48 years ago.*

by Peter Delaney

CQ-TV 54

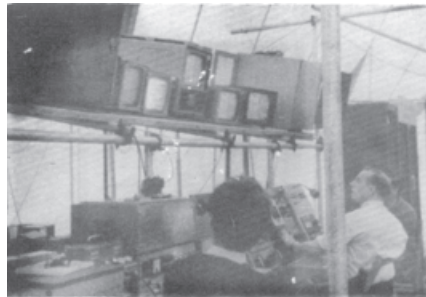
Two events during 1964 provided plenty of pictures for this issue of CQTV. Dave Mann reported on the Dagenham Town Show, where the Club's Chelmsford Group had put on 'a very ambitious demonstration of colour and monochrome television' (colour on BBC2 did not begin until 1967 - the first in Europe - whilst colour on the more popular BBC1 and ITV had to wait until 1969.) A large tent had the stage and equipment in one half, and the audience in the other. Two cameras, a flying spot scanner and a monoscope were used to produce the BATC monochrome pictures, which included local pop groups and audience shots - to be 'seen on television' was



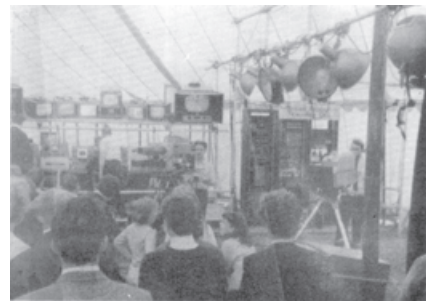
Dagenham Town Show - the tent with prominent BATC signs

still a great novelty, and so the audience 'generally thought it great fun'. For the colour demonstrations, the BBC made demonstration transmissions specially for the show, showing films and slides in the longest such transmission at that time. The pictures were viewed on 3 sets in 'a darkened enclosure', and it was estimated that 1500 people saw colour television there for the first time.

The other event was the Club Convention - aimed at the members rather than the general public. This was held at the ITA headquarters building in Brompton Road, opposite Harrods in Knightsbridge. The new venue had



Dagenham Town Show - inside the tent with BATC control area



Dagenham Town Show - audience view inside the tent

'improved surroundings and parking facilities, and the most excellent co-operation of the ITA made the move worth while'. The member's equipment



Members assembling for the AGM



Andrew Tucker (l) and Terry Lane (r) adjusting Terry's image orthicon camera - Andrew's vidicon camera is in the left background



John Tanner's image orthicon camera

displays included 3" image orthicon cameras made by both Terry Lane and by John Tanner, whilst Grant Dixon showed his slow scan equipment. Andrew Tucker showed a vidicon camera, and there were several 'fully transistorised pulse generators' on view, including one made by the City and Guilds Radio Society. Pye had donated equipment at 'bargain prices' which members were able to buy. There was a programme



City and Guilds Radio Society pulse generator

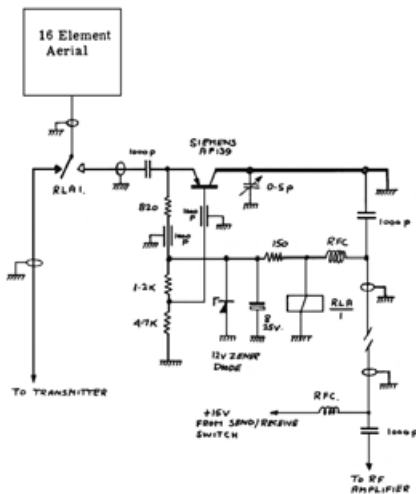
of lectures during the afternoon - John Noakes on pulse generators, Mike Cox on video testing techniques, and John Tanner on camera tubes. As time was running short, he gave a 'lightning and enlightening description of vidicon and image orthicon camera tubes' - in five minutes !!! A further lecture was given by Dave Mann over-the-air on 70cm from Wembley - on the use of semi-conductors in 70cm equipment. The Club General Meeting also took place





BBC film cameraman for the Time Out programme

during the afternoon, as did a raffle - first prize a separate mesh vidicon presented by the English Electric Valve Co, which was won by the City and Guilds Radio Society. The BBC were also in attendance, and filmed an insert for 'Time Out', a programme on BBC2. (the channel had only opened in the April of that year).

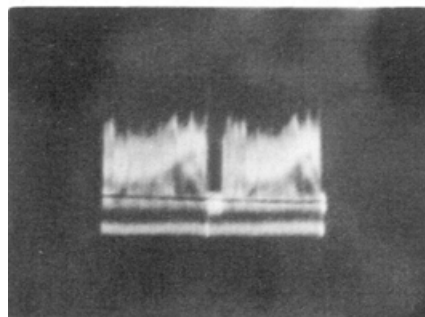
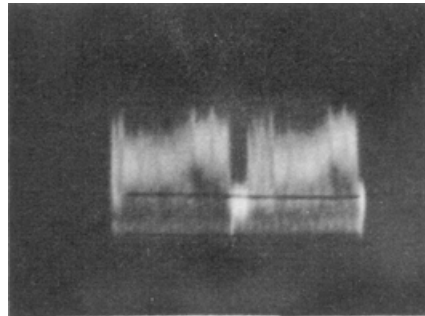


70cm PreAmp Diagram

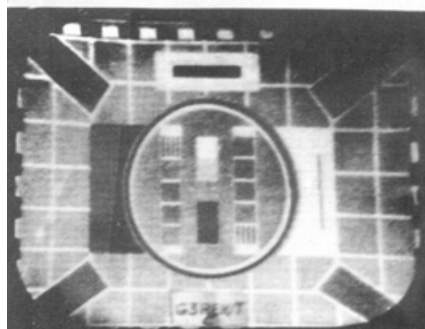
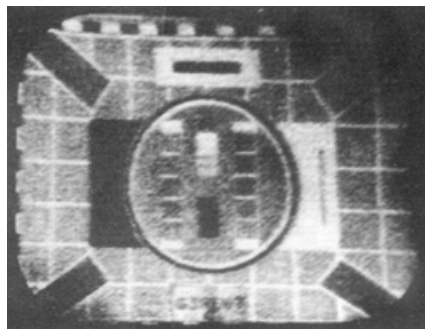
Two 'practical' articles featured in this issue of CQTV. Ian Waters, G3KKD/T, described a mast head preamplifier for use on 70cm, which aimed to have 'the best low noise amplification possible'. At Ian's station, he could receive signals from G3REH/T, but they had a peak noise to peak signal ratio of about 30%. (top picture and oscilloscope trace in the illustrations). By the use of the transistorised amplifier, ahead of the previous 2 valve one, and placing the pre-amp at masthead, the peak noise was reduced to about 15% - implying a 6dB improvement compared to the previous arrangement. (lower picture

and oscilloscope trace). The amplifier was assembled with a changeover relay in a 'polythene lunch box', fed by two co-ax cables - the 'original' used for transmission, and the second to connect the mast head pre-amp to the original valve unit. The relay was de-energised on transmit, but by sending a 15V dc feed up the receive co-ax, the amplifier was powered and the changeover relay activated.

Ian Hillson's article gave advice on how



70cm traces without (above) and with (below) the PreAmp



70cm reception without (above) and with (below) the PreAmp

to achieve professional looking lettering on control panels and caption boards. Manufacturers of equipment 'have expensive machines at their disposal to produce labels on control panels. Television Companies employ artists to produce caption boards. Because of the costs involved, amateurs have had to label these items themselves instead of paying for the job to be done by a professional. Luckily there are methods of producing professional looking lettering simply'. Ian went on to describe the panel transfers made by 'Radio Constructor', and, in more detail, the relatively new 'instant lettering' Letraset system, (it was first produced in 1959) which was available in a variety of typefaces, sizes, and colours.

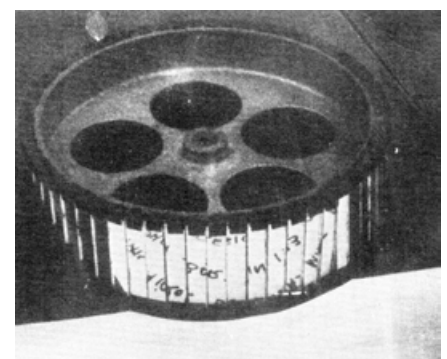
The back cover consisted of a full page

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advert for EMI - BATC was seen as a good source of engineers by the industry at that time.

Lastly, the magazine included a photograph of an item that had been on display at the Convention. Under the title 'Puzzle Picture' the question posed was "What is it? Solution and write-up in our next edition. Sorry no prizes!" - which remains the case !!





# International Space Station

## A DATV transmitter on Columbus

### Technical Details Part 1

#### 1. The Columbus project

As far back as the year 2000, a proposal for an ATV system on the International Space Station was submitted to the ARISS Project Selection and Use Committee by Graham Shirville G3VZV.

November 2002, a request for amateur radio facilities on the then under construction Columbus module was submitted to Mr Jörg Feustel-Büechl, Director of Manned Spaceflight and Microgravity Directorate of the European Space Agency (ESA).

The request was to install wideband amateur radio antennas on the nadir of Columbus, facing the earth. With such antennas, the on board amateur radio facilities could be extended to amateur TV.

In 2003 the request was examined in detail and finally accepted. ARISS would pay for the development, manufacturing and qualification of the antennas. ESA would support the installation cost.

ARISS-Europe started a funding campaign, all donations being published on the website.

In 2004 coaxial feed throughs were installed on the port cone of Columbus. This was needed for accessing the antennas with feedlines from inside the module.

In 2005, the Royal Belgian Amateur Radio Society (UBA) signed a contract with the Wroclaw University of Technology, Poland for the development and manufacturing of the antennas. Whereas initial plans were for UHF, L-band and S-band antennas, only L- and S-band antennas could be ordered by lack of funding. The cost of the project was 47.000 Euro.

Early 2006 the antennas were delivered

to ESA. Meanwhile main Columbus contractor EADS and subcontractor Alenia Spazio had reviewed mechanical and thermal constraints. Wroclaw University proceeded to qualifications tests (cost 3.000 Euro) and the antennas failed.

In 2007 an additional contract was signed with the Wroclaw University for the development of modified antennas. This amounted to 36.000 Euro. These antennas were accepted and installed on Columbus, October 2007.

The cost of the antennas finally amounted to 86.000 Euro and was covered by a worldwide funding campaign.

ESA supported the total installation cost of the antennas, including feed throughs and coaxial cables.

After the successful launch of Columbus and its integration into the International Space Station complex, an ARISS-Europe working group started a study for the development of an amateur television transmitter on Columbus, using one of the S-band antennas. A debate started between the supporters of analogue television (ATV) and the proponents of digital television (DATV). The working group, which met monthly per teleconference, made progress, but was stuck by the lack of funding.

Meanwhile a possibility opened for the installation of VHF/UHF antennas on Columbus. The European Space Agency wanted a VHF antenna for a specific payload and was interested in the manner ARISS antennas had been attached to handrails on the Russian service module. A similar system was adopted for Columbus and, in the same time, ESA accepted the installation of a dual band VHF/UHF antenna for ARISS. This antenna project was funded

entirely by AMSAT-NA and volunteers who built the antennas for both the ESA experiment and for ARISS. The installation was done per EVA, 21 November 2009. Soon an Ericsson UHF transceiver, which had served in the early ARISS days, migrated from the Russian to the American segment of the Space Station and started Packet Radio operation.

As time went by, the debate on ATV versus DATV evolved at the advantage of the latter, but no funding was in sight... Then, suddenly, supported by the enthusiasm of Italian astronaut Paolo Nespoli IZOPA, who had performed many ARISS school contacts during his 2010-2011 expedition aboard the Space Station, at the initiative of AMSAT Italia, an Italian manufacturer, Kayser Italia, presented a project for an amateur radio DATV transmitter to ESA's educational services. In 2012, this proposal was accepted and ESA signed a contract with Kayser Italia for the development and the manufacturing of a DATV transmitter on S-band. This transmitter, dubbed "Ham Video", is presently slated for launch on HTV-4, August 4, 2013.

#### 2. Ham Video

The Ham Video DATV transmitter, developed for installation in the Columbus module, features the following characteristics:

- Downlink frequencies:  
2.422 GHz  
2.437 GHz
- DVB-S standard  
(QPSK modulation)
- Symbol rates:  
1.3 Ms/s and 2.0 Ms/s
- FEC : 1/2
- SIF: 352x240 or D1:720x480
- RF radiated power :  
approximately 10 W EIRP

Ham Video will operate with a Canon XF-305 camera, provided by NASA. Power will be provided by a portable power supply, also known as KuPS, another Kayser Italia product. The KuPS is a standard equipment on Columbus, used for several experiments. It converts the 120VDC, which is the standard main voltage in the American segment, to 28VDC.

Ham Video is downlink only. No DATV receiver is presently considered on board Columbus.

From a technical perspective, Ham Video is a standalone payload.

ESA puts Ham Video at the disposal of ARISS for educational outreach.

When video enhanced ARISS school contacts will be performed, the downlink audio and video signals will be produced by Ham Video and the uplink audio signals will be received with the Ericsson transceiver. In this two way setup, the global system is dubbed Ham TV.

### 3. Ham TV

An important element of the Ham TV system is the ground segment.

Receiving DATV signals from Columbus will be far more demanding than receiving VHF or UHF. A careful study of the link budget, conducted by Piero Tognolatti IOKPT, shows that DATV decoding should be possible, for a ground station equipped with a 1.2m dish, when the ISS is within a range of about 800 - 1000km. This limits the time of DATV reception to about 3 - 4 minutes during a favourable pass.

A 1.2m dish has a beam width of about 4 degrees (between -1 dB points). ISS tracking will be far more demanding than it is for receiving VHF signals.

ARISS will establish a chain of 5 volunteering amateur ground stations, located at carefully chosen places along a typical ISS pass over Europe. These stations will receive and decode the DATV signals and stream the audio and the video over the Internet to the BATC server in UK. The school will connect

to the BATC server which offers the possibility to visualise up to 6 images simultaneously. With this setup, Ham Video reception is expected to reach the 15 minutes goal ESA has fixed.

ARISS' expectation is, that similar chains of ground stations will be established in other continents, allowing more flexibility for Ham Video enhanced ARISS school contacts.

Ham Video transmissions will not be limited to school contacts. Automated transmission of recorded video can also be envisaged. Several amateur radio experiments can be developed, within the limits proper to the International Space Station.

A new era opens for amateur radio on the International Space Station.  
Gaston Bertels, ON4WF  
ARISS-Europe chairman

In the next issue Gaston will describe the complete receiving system.

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# BATC UK ACTIVITIES 2013

Mr Noel Matthews  
12 Petrel croft  
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16<sup>th</sup> June - Newbury Radio Rally, Berkshire.  
See: [www.nadars.org.uk](http://www.nadars.org.uk)



14<sup>th</sup> July □ McMichael Rally □ Near Reading, Berkshire  
See: [www.McMichaelRally.org.uk](http://www.McMichaelRally.org.uk)



19 □ 21 July □ AMSAT-UK Colloquium □ Guildford, Surrey  
See: [www.uk.amsat.org](http://www.uk.amsat.org) Live video streaming.



11 August □ Flight Refuelling Hamfest □ Wimbourne, Dorset  
See: [www.frars.org.uk](http://www.frars.org.uk)



27 □ 28 September - National Hamfest, Lincoln.  
See: [www.nationalhamfest.org.uk](http://www.nationalhamfest.org.uk)



11 □ 13 October - RSGB Convention  
See: [www.rsgb.org/rsgbconvention](http://www.rsgb.org/rsgbconvention) (soon)



26 □ 27 October □ BATC Convention CAT13 □ Finningley, Doncaster  
See: [www.batc.org.uk](http://www.batc.org.uk)



10 November □ West London Rally □ Kempton Park, Surrey  
See: [www.radiofairs.co.uk](http://www.radiofairs.co.uk)

We hope to meet you at one of the above.  
If you would like BATC support for your event please contact the membership secretary.