CQ-DATV

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Issue 22 - April 2015

VK4XRL
Digital Television

HD

http://cq-datv.mobi

In this issue

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Dave Kenward - G8AJN   Ken Konechy - W6HHC
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New Digital TV Repeater for Kent

Justin G8YTZ is delighted to announce that authorisation and NOV has been received from OFCOM approving a new Digital Amateur TV Repeater at Selling Minnis, between Ashford and Dover, Kent.

The Digital TV repeater GB3DK will use the bandwidth efficient DVB-S2 format with 2 transport streams using 8PSK modulation format; though complicated to transmit, does have the advantage of requiring simple receiving equipment (an old DVB-S2 Satellite Receiver and pre-amp and a 23cm antenna is all you need to receive GB3DK) and therefore encouraging the up-take of ATV in the south-east.

The ERP will be +13dBW to ensure good coverage from the proposed Omni-Directional antenna. The input will be on 1260MHz and the output on 1302MHz. I look forward to "seeing" you all on the new repeater!

I would especially like to thank Noel Matthews G8GTZ for his help in obtaining the license NOV for this exciting new repeater.

Justin G8YTZ

TV Factor

TV Factor Episode 7 is now ready to watch
http://www.txfilms.co.uk/txfactor/txf007.shtml

Our free-to-enter competition to win an InnovAntennas LFA-Q 3 Element Quad-style Yagi for 2 metres (as seen on episode 7 of TX Factor) has closed.
Thank you to the many hundreds of viewers who entered.

The draw took place at 12.00 GMT on Thursday 19th March and the lucky winner is Wim Wautier ON5WW

Go to our TX News page where each week we post our podcast of the GB2RS News from the Radio Society of Great Britain.

3 element LFA-Q quad-style yagi

From 11th Jan 2015

This is the first DATV signal received on 146MHz at my location. (Terry G1LPS).

Apologies for the poor video and breakup, we are still tweaking ffmpeg and libx264 to get the best results at the TX end (links on next page).

A pc encodes the MPEG4 A/V, sends it to the DATV-Express board which converts it to RF as DVB-S. Symbol Rate is 333Ks, path between us is 28km, ERP at both ends about 5W.

continued from previous page...

www.youtube.com/watch?v=fbYBsYu__uY

www.youtube.com/watch?v=QiCcCn73XQk

In the money?

New technology is always appearing and if only it was affordable it would have ATV applications.

This is a directional 16-antenna array and works up to 83GHz.

Makes you think if the Local ATV repeater with its Omni directional aerials could have hi gain directional aerials, the problem would be commanding them to switch to an aerial pointing at you hence the hub switch for up to 16 antennas.

TV DX legend 80 years old

Hans Scholz (called "Scholli") from eastern Germany has been chasing TV DX signals since 1954. His best DX was an "Indian Head" test chart from Oklahoma, USA, in b/w received via multi hop propagation and cashed by photo camera, as it was usual before VCR and PVR.

In the eighties he built up a big parabolic dish (1,80 Meters) with H/V controller for receiving the first telecommunication satellites from USSR and USA (MTV was his passion). Later on he had to ask for permission to receive the early european "birds" - by travelling to Dusseldorf (Western Germany) to Bundespost authorities...

In the new century he was one of the first viewers of HDTV tests on Astra satellite from "EURO1080" (Belgium) in 2003 and again with first Side-by-Side-3D TV tests from Italy (2009).

Still he loves to find 3D TV feeds (and is fond of having a "real 3D" TV test chart from BSkyB), but also Ultra HD TV (4K) demo transmissions on Astra (SES) and Hotbird (Eutelsat).

His latest goodies are a wide-angle double reflector parabolic dish with 15 LNBs side by side and recently a cheap Samsung UE40HU6900 UHD TV set able to receive the latest HEVC 50 fps demos with 10 bit colour depth.

Obituary for Rijn Muntjewerff (1933-2014)

Rijn died on 27.11.2014 in a nursing home near Middenbeemster, Netherlands, where he lived with his wife Ria for some years. Starting his TV DX chase in 1961, he soon erected a 22 Meter tower for rotatable aerials.

His special equipment was a b/w Philips TV set able to receive 3 different TV standards. Test charts were documented by photo camera, film processing and print multiplying included.

He was TV and ATV DX reporter for the AGAF magazine TV-AMATEUR, but in 2011 he had to stop his hobbies for health reasons. Until then he received more than 2000 TV stations from 71 countries and 5 continents, also 550 amateur TV stations.

Another hobby was Dahlia farming getting him many tributes. AGAF board and TV-AMATEUR staff will save his memory for ever.

Ofcom the UK regulator has gone ahead and made the Wireless Telegraphy (Ultra-Wideband Equipment) (Exemption) Regulations 2015.

These amend the existing Wireless Telegraphy licence exemption criteria for Ultra-Wideband (UWB) devices. UWB Devices use very large bandwidth so are able to transmit high data rates over short distances but transmit at very low powers so not to interfere with other devices.

The regulations will implement a European Commission Decision on UWB devices that harmonises the technical parameters for equipment across all Member States.

The regulations come into force on 25 March 2015.

http://stakeholders.ofcom.org.uk/consultations/uwb-regulations/statement/?utm_source=updates&utm_medium=email&utm_campaign=uwb-statement
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The Micro Bit - can it make us digital?

The BBC plans to give a million children a tiny computer this September.

It is called the Micro Bit and it was unveiled at this morning's launch of Make It Digital, an ambitious project aimed at getting us all to be a bit more creative with digital technology.

On hearing about this, I had some questions which I expect occurred to many of you too.

Such as what is it for, why is the BBC spending licence fee money on this, and why not just give children a Raspberry Pi?

What is it for?

The device is very basic, effectively just a chip with some LEDs on it. It has one micro-USB port and is powered by a watch battery. By plugging it into a computer, children will be able to programme the LEDs to flash their name or a simple message. The prototype I've been given flashes "I Love Coding". Nobody is claiming this will teach you coding - just that it is a fun way to introduce children to the idea that you can make things happen with a simple program. But once they have done that they can potentially move on to more advanced projects - you can hook up sensors and a servo to drive a motor.
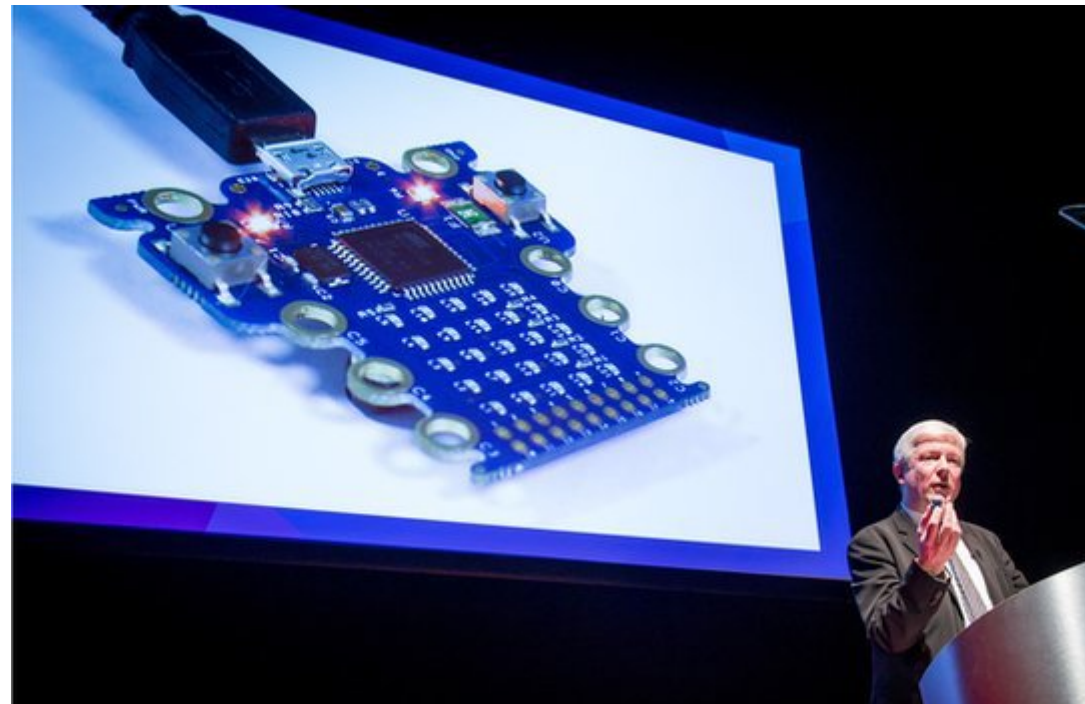
CQ-DATV/GB3FY At Norbreck
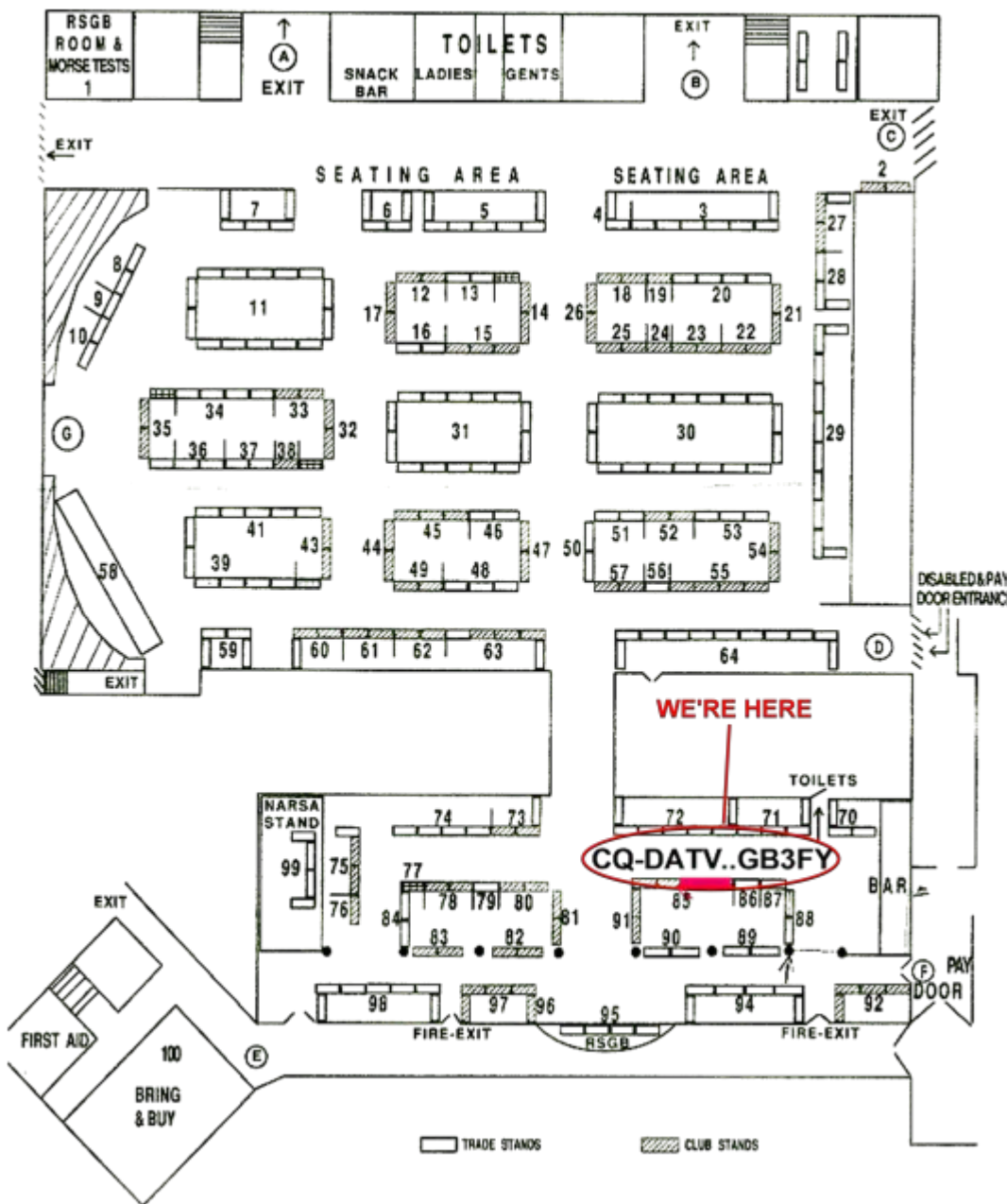
Amateur Radio Roundtable

You are invited to Amateur Radio Roundtable, a new series of W5KUB.com live weekly webcasts. The webcast is every Tuesday night at 8:00 PM CDT (0100 UTC Wednesdays) at W5KUB.com.

Amateur Radio Roundtable is an informal discussion of all aspects of ham radio with the intent of allowing viewers to watch this live webcast at W5KUB.com. A question and answer session with viewers will follow each topic.

The show covers all aspects of ham radio; such as, balloon launches, Satellite, go-kits, emergency communications, SDR, digital modes, DXing, home brewing, and much more. This week's guests include Steve Webster, M1ERS, from England, Paul Huff, N8XMS, president of North American QRP CW Club, and Glen Popiel, KW5GP, author of the book "Arduino for Ham Radio".

To watch Amateur Radio Roundtable go to W5KUB.com, click on Live Events and sign in with your existing User Name and Password. If you don't have a user name and password, just enter your call or name, leave the password blank and hit sign in.

During the last half of the roundtable, viewers are invited to be a guest and make a virtual appearance on the show. Guests will need a Google+ account, microphone, and camera. A link allowing you to join will be provided during the show. This part of the show is very informal; you can just pop in to say hello, or stay a while and join in on a wide range of topics. Google Hangout will allow up to 10 people at a time.

We need your help with topics. If you have a specific subject that you would like to present in a future show, send an email to tom@W5KUB.com.

Join us for fun and interesting ham radio discussions. We'll see you on the webcast!

Tom Medlin, W5KUB

Kempton Park

BATC will be at the West London Radio & Electronics Show held at Kempton Park.

We will have our stand in the main hall in our usual position adjacent to the Home Counties club stand.

- *We will have the DTX1 transmitter available at a special show price of £430 (1)*
- *A demonstration of video measurement, & how to get it right!*
- *Live ATV demo's by the Home Counties ATV group GB3HV*
- *There will be CQ-TVs available, badges, expert?? advice*
- *and of course, BATC membership services*

Do come along and have a chat, make your self known.
(1) Special low price for members only. Pay by cash—no card/PayPal.

See http://www.radiofairs.co.uk/ for full details of the rally.

www.batc.org.uk

We said in the last issue that we would like to track where CQ-DATV is being downloaded.

Well Ian has been investigating and it turns out our largest circulation is in the USA, followed by the UK, France, China, Netherlands, Germany, Australia, Spain, Thailand, Italy and so on. In fact over 150 countries in all and with 80,000 downloads across 21 issues, so a free magazine is pulling the ATV enthusiasts together, which is vital as we are a small part of the amateur radio community in general. Small may be elegant, but it has disadvantages, such as easy to ignore, which does not work to our advantage.

In this issue we have also printed the rules for the Region 1 ATV contest. This used to take place in September, but has since been moved to the second weekend in June, in an effort to revitalise it. This process had to go through an IARU meeting in Varna, which also moved the start and finish times from an 1800 UTC Saturday start to 1200 UTC finish on Sunday, to a new set of times which is now 1200 UTC Saturday until 1800 UTC Sunday, so an 18 hr contest is now a 30 hr contest.

There is some confusion as to if this was intended, or if it was documented incorrectly, either way it has been set in stone by the IARU and will remain that way until the next IARU conference in 2016 (Vienna).

Our thanks to the IARU for taking the time to contact CQ-DATV, let's hope we can work with them to improve the input to this contest.

Logs to be sent to IARU_ATV@uba.be, but CQ-DATV would love to see a picture of your station particularly if you were portable.

We are also going out on our first ham fest or rally as we call them in the UK, this will be at Blackpool on Sunday the 12 of April so if you are in the area pop in say hello and let us know what you think of CQ-DATV

In this Issue we have all the usual news and articles, Dave G8AJN has published the latest version of his video AGC limiter module, Trevor has been exploring the use of Free CAD software, for creating schematic drawings and laying out PCB's. John G3RFL has been looking at using DTFM tones to switch in a 24 cms RX at GB3FY, Richard VK4XRL has written another digital world and Trevor has also added another chapter of moving on with film making.

So please enjoy CQ-DATV 21, and remember editor@cq-datv for all your news, comments and articles.

CQ-DATV
Production Team

Video AGC/Limiter Update

by Dave Kenward G8AJN

Since this circuit appeared as an article, several dozen PCBs have been sold, but, as is so common these days, the manufacturer has now ceased production of this excellent device. I am currently holding a small stock of these devices and PCBs for those who wish to build one of the boards.

Ideal for analogue modulators but essential for digital encoders/modulators, especially those not having any input auto-level control, this video AGC circuit will enable levels from different sources to be stabilised and consistent. It will give a good quality video waveform and will avoid 'pulling' problems often encountered where captions are overlaid.
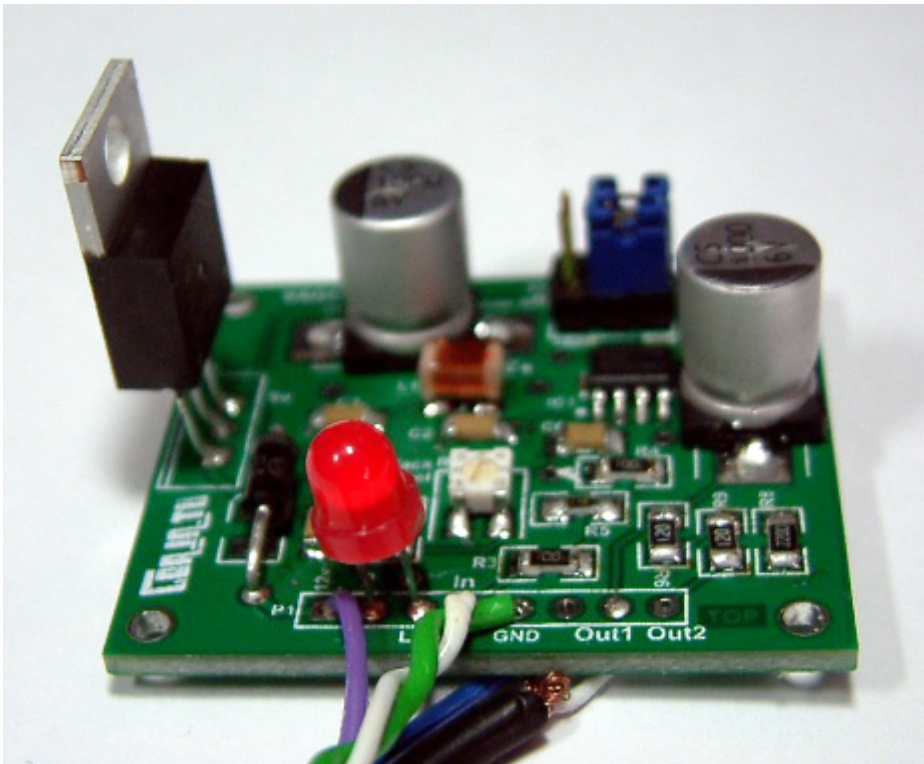
Fig1 The populated board

Using the low-cost MAX7452, this is a complete front-end video-signal conditioner and is designed to improve the quality of standard-definition video signals.

The device integrates an input video clamp, automatic gain control (AGC), loss-of-sync (LOS) detector, and an out-of-band noise/low-pass filter. It also incorporates a user-selectable buffer gain (0 or +6dB) and an AGC disable function. It requires a single +5v supply.

If you put in a badly distorted video waveform it will not sort it out and make it perfect. It is not a Timebase Corrector. However it does mean that inputs to video switchers or modulators etc would not now need an input potentiometer in an attempt to control a video feed level to 1v pk with the usual mismatch occurring as the potentiometer moves away from 75 ohms.

The new version of the GB3SQ Repeater has one IC on each input source, three in all, and another on the output to drive into the encoder/modulator. This ensures equal levels without the need for input pots. To keep input levels within the 0.5 to 2v pk-pk range I have allowed for 75 ohm attenuators on input and output.
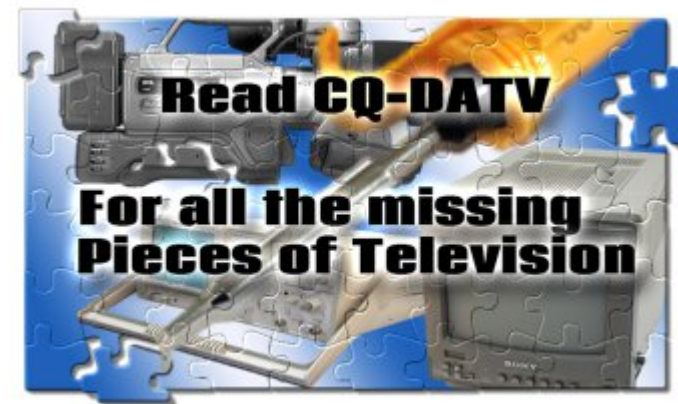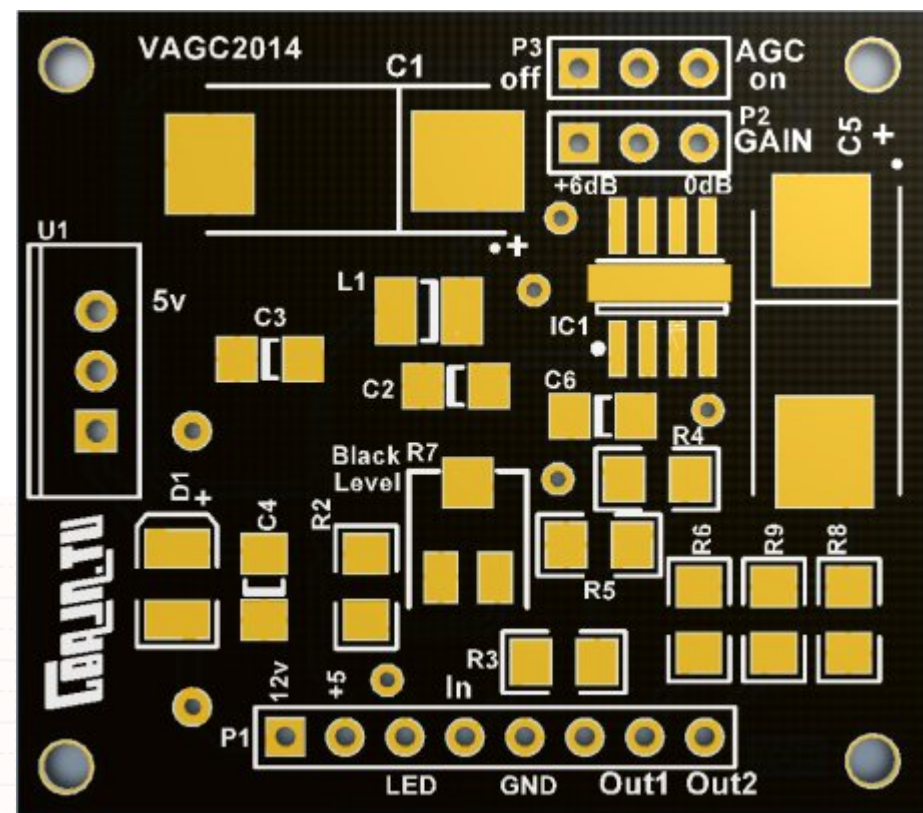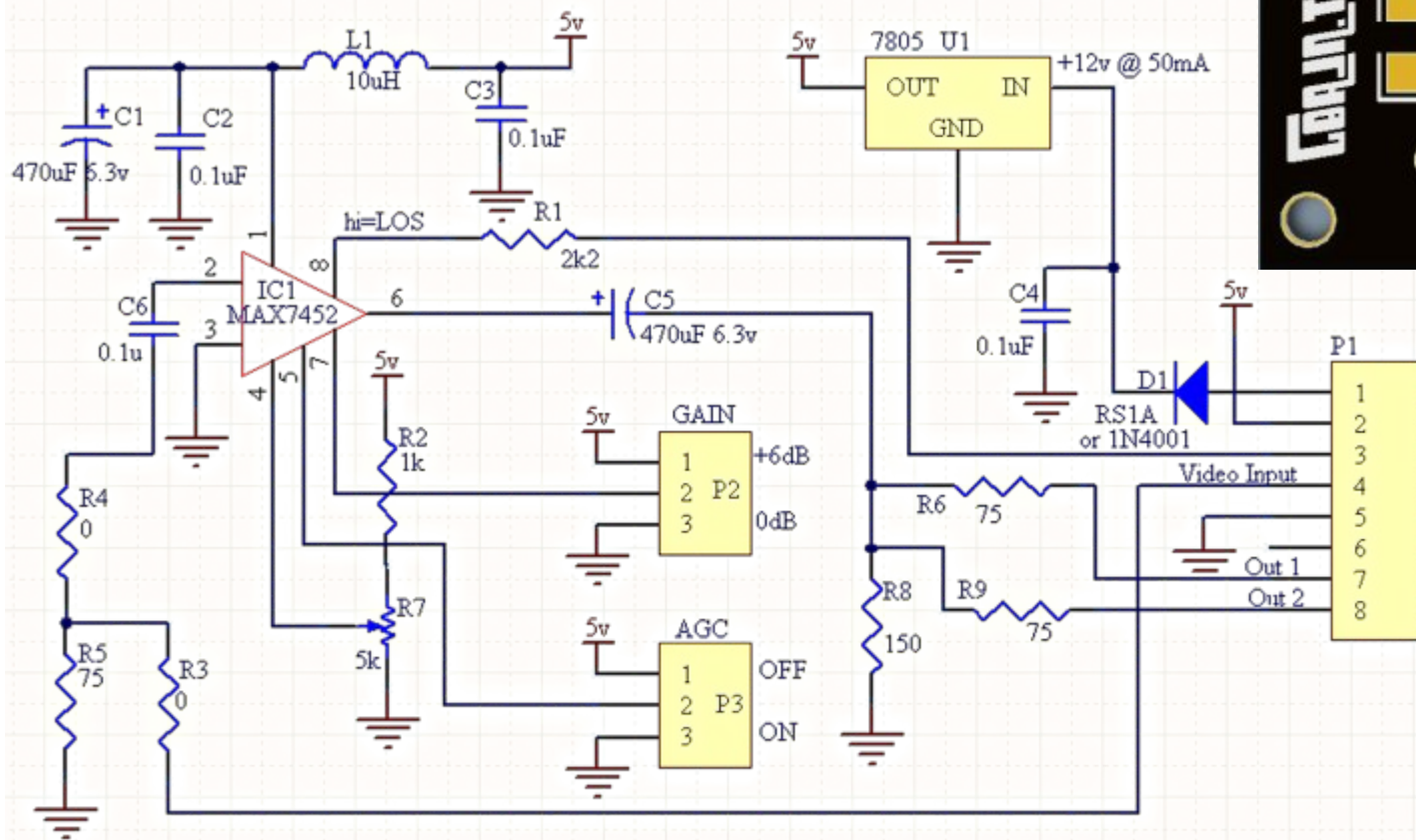
The black level is clamped to an adjustable reference voltage. The AGC circuit operates by measuring the sync size against the preset level and adjusts the waveform to the correct size. When a low-level input signal, say 0.5v pk, is presented it steps the video level up until it is correct at 1v pk.

Output is AC coupled as a precaution, there is about 1.5v standing on the IC output pin 6 (P1/7). If you are satisfied that there will not be any chance that the output will be shorted out, a resistor of about 47 to 75 ohms can be used instead. This should ensure a better black level.

Please refer to the original article for more details.

As these devices are no longer in production I have had to limit the sale of these ICs to a maximum of two per person. PCBs are also in stock.

Please take a look at my website for a full transcript of the original article and ordering details:-

www.g8ajn.tv/projects.html.

Fig2 (below) Circuit diagram and Fig 3 (right) Top Overlay

A Digital World - Digital Conversion

Richard VK4XRL

Having gone DVB-T digital here in Brisbane for some time now using the SR-System boards we have been able to achieve some very good results. However while most would say that's fine there is always room for improvement but sometimes at a price. One of the main problems I have seen with most repeaters is the loss of quality due to conversion between analogue and the digital domain. If we now look at an average amateur setup that has converted to digital using the 23cm band and the DVB-S transmission system as a input, the receiver in most cases use the composite output. A lot of stations are still using analogue as there base system using FM, although I know of a few that have gone SDI.
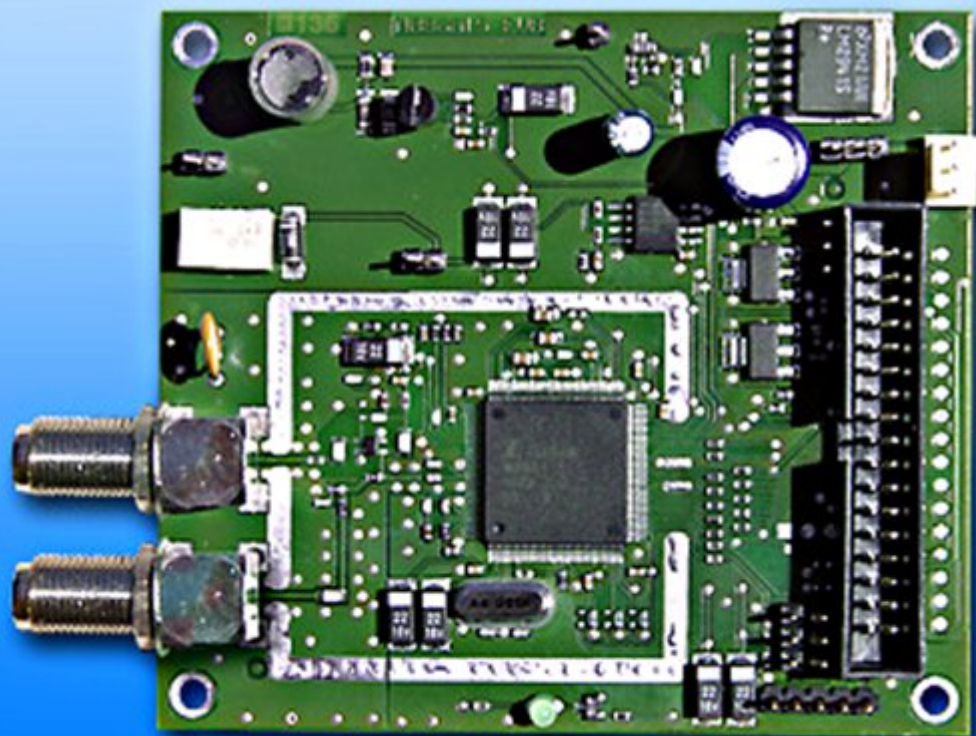
Going full SDI in most cases will still have some conversion to take place. Also note that there is no quality difference between SDI and HDMI. SDI is the normal commercial approach using BNC connectors while HDMI is the home theatre way. Using the analogue signal from a switcher of some sort would therefore go straight to the Digital DVB-S transmitter and be converted into a transport stream either directly via an encoder or a Mux unit if multi TS are used. This signal is received via the repeater digital receiver and decoded into analogue to feed the repeater switcher which again is fed to the DVB-T transmitter where it's again converted to digital. So you see three conversions taking place which will degrade the signal that we wanted kept digital. If we use a set top box with an analogue output supplying the video monitor then that makes 4 conversions? SR-Systems have NIM units that allow for a direct digital signal that by-passes the repeater conversion situation. They also have SDI/ASI interface boards as required. SDI is used in a normal digital studio routing while ASI is used normally as a transmitter input. So how can we improve the system as a whole?

Let us first look at the transmission system in the shack, most are analogue so that would have to change. I have changed my system over to use HDMI from a laptop. All files are available via a network drive and with the use of VMix that has been the easy bit. However we still have a problem where we need to convert from HDMI to analogue to feed the digital transmitter. As yet I haven't found a cheap way of doing this so far, SR-Systems however do have an encoder that has HDMI but at a price. It does however have the capabilities to use HD or SD formats. In my situation so far I have used a HDMI converter until something else becomes available.

Now let's look at a repeater situation. Looking at the block diagram below we see that we can change everything over to HDMI. The ident can be a HDMI source from a WD media player, the DATV receiver can be HDMI also. The FM is treated a little different in that we have to convert from an analogue output to a HDMI output to feed the repeater switcher, a small price to pay for those still requiring and using FM. I have used a 4 X 2 HDMI switcher to allow dual transport streams to be implemented at a later date, maybe

HD/SD? Also used externally is a HDMI splitter for monitoring etc. The unit I was looking for also had audio RCA outputs that could be used for monitoring audio levels.

Now what we need is an encoder/DVB-T exciter that can accept HDMI inputs, as luck has it a unit was available from provideoinstruments.com at http://www.pviusa.com/.

The unit arrived but it wasn't like that shown in the photo? I only purchased one single input board at this stage and the handbook was of little use, just sheets of paper. The inputs consisted of HDMI, composite and component, however composite video went to the red component connector which wasn't indicated anywhere in the paper work.

I also found the separate audio connectors were back to front. The composite feeds once sorted (but not happy) worked ok.

Also the web site indicates that the whole system can be set using the front panel switchers but that's not the case the web management pages are also required to set certain other parameters. I did run into problems with the web management system as it wouldn't bring up the pop-up page to set the LCN. I was using Chrome, however Explorer worked just fine.

The front Panel Control only has the following:

1. *Alarm Status*

2. *Input Setting (2.1 to 2.3)*

3. *Modulator (3.1 to 3.7)*

4. *IP Output (4.1 to 4.6)*

5. *Network Setting (5.1 to 5.6)*

6. *Serving Config*

7. *Loading (7.1 to 7.2)*

8. *Version*

9. *For all other settings you need the Web Management pages.*
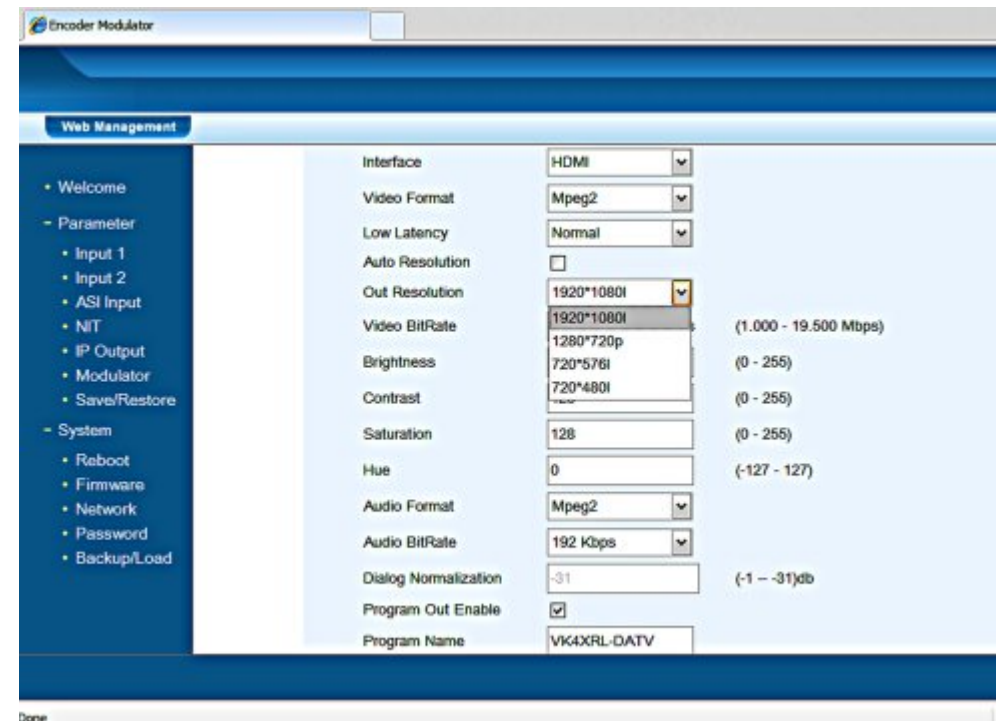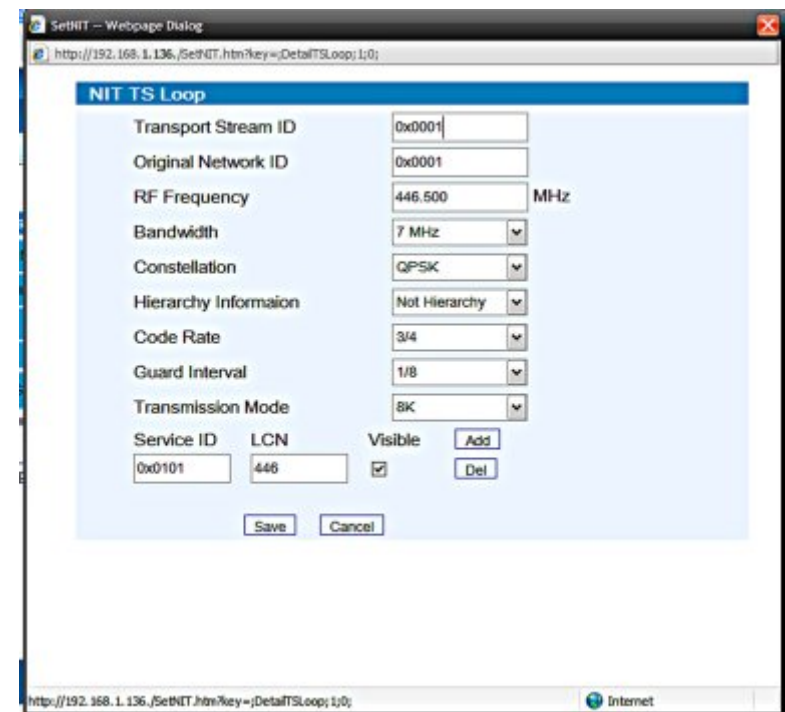
The idea was to use the HDMI output from the switcher to feed the exciter. The web page setting up allows you to auto detect the resolution up to 1080 Full HD and is kept as is for the best original quality. However, a scaler function can also be selected from the web software by un-ticking the auto box and selecting output resolution that will bring up another menu you will be allowed to scale the input to a lower resolution to match your specific requirements. As yet I haven't been able to get that part working, as I have found if you apply this then it switches back to auto when you select Apply? Away to overcome this problem for now is by placing an external scaler between the switcher and modulator which would allow up or down scaling if required. The Atlona AT-HD550 shown here maybe the answer but as yet I haven't one to try out.

Also selecting 720 x 576 allows nothing to pass. I was able to test this as my WD media unit allowed you to set the output resolution as required. Also when a composite to HDMI unit was used it would not pass through the system. I was asked to change to 64QAM, why I am not sure as it's only used when using multiple TS systems requiring larger bit rates. We have used QPSK here for DVB-T for over 6 years now and it works the best. Another annoying problem is that the whole modulator will reset itself if a sync break is detected so I still need to follow this through.

Having said all that I left it a few days and went back to it after a week and found the scaling did work. I set the WD media player to 1080 output and un-ticked auto and selected 576 as output resolution and the information box on the STB indicated that fact. It was handy to have a device that I could set to see all this happening.

I did also managed to play with SDI has I had a composite to SDI converter. I then brought a SDI to HDMI Converter thinking that I could use that, however only HDMI output 576 was available so the modulator didn't want to know it. (I may now need to revisit this in light of the above scaler now working).
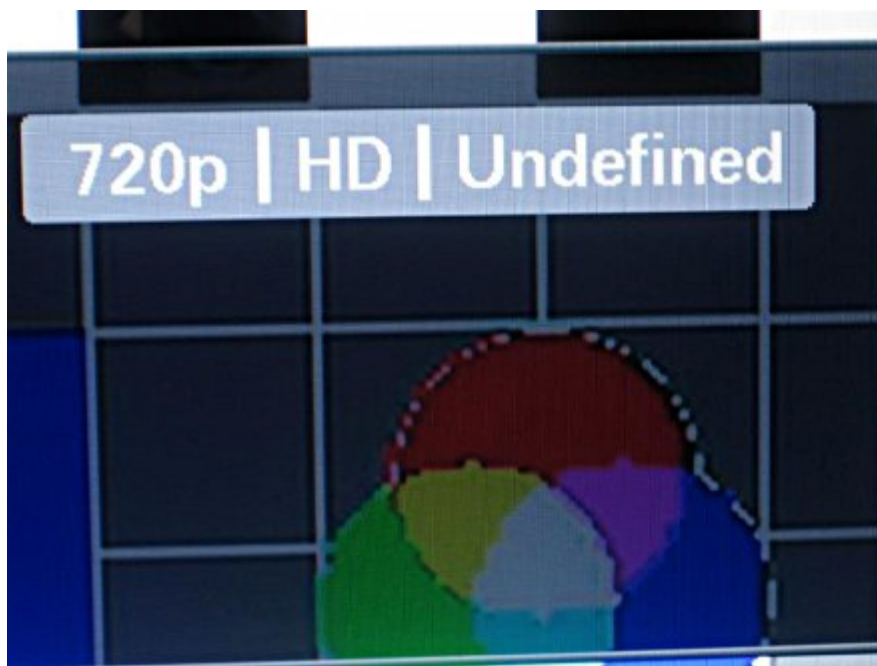
Once these problems have been overcome then I need to interface the HDMI switcher to the repeater controller. If anyone would like to provide any suggestions or updates, then please email the editor CQ-DATV. The following diagram shows the setup for testing purposes.
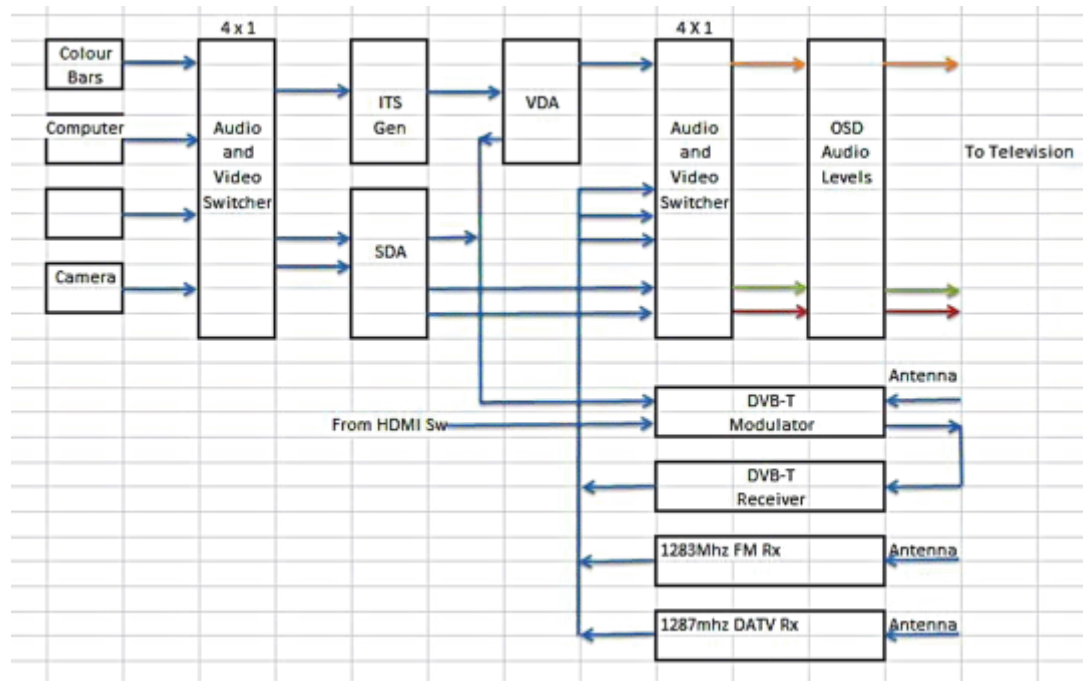

Project Update

Following up on this article, I received some further information from PVI.

One of the problems I have encountered was that every time you changed the HDMI resolution, the modulator must reset and every time you disconnect and reconnect between HDMI inputs the HDMI protocol must be regenerated.

The analogue component does not of course require regeneration. It appears that any HDMI device must redo the regeneration, this is by the HDMI technology itself.

So we will need to rethink as to where we are now. Maybe a scaler external to the modulator and after the switcher, or either try SDI or component inputs.

If anyone has further knowledge on this subject please write to the editor CQ-DATV.
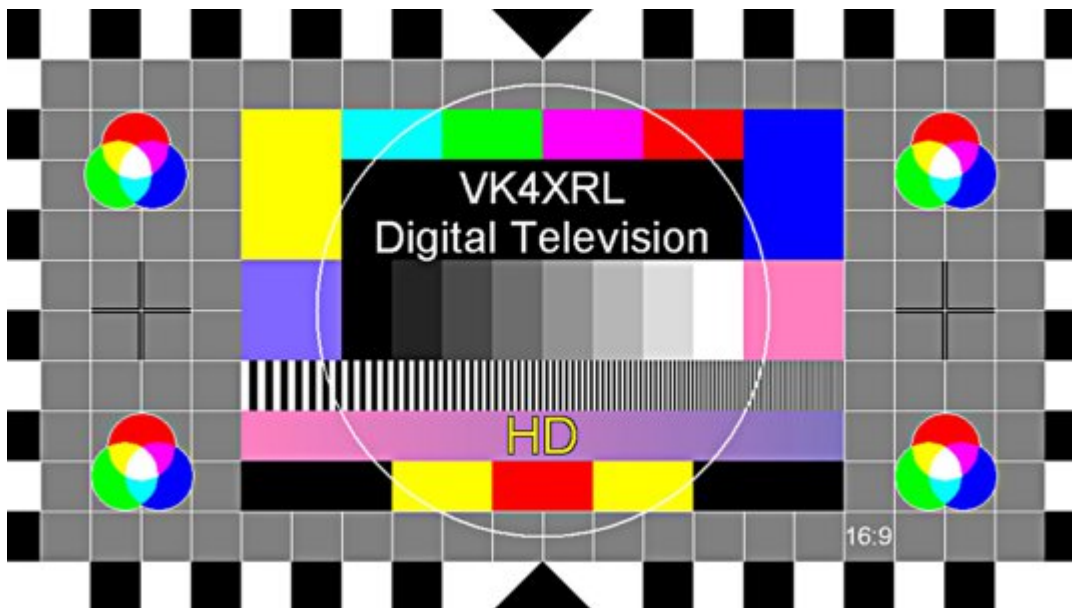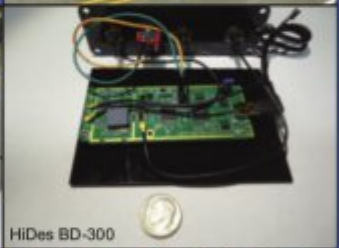
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RULES IARU REGION 1 ATV CONTEST (Varna 2014)

Goal

Stimulation of ATV activity by organizing a yearly international ATV contest.

Terms and Definitions

ATV contest: Competition of licensed or receive-only ATV stations in a certain period of time, on each UHF/Microwave band on which ATV transmissions are allowed, using the mode(s) authorised for that band. The distance between stations that make contacts on several bands define the number of earned points.

Repeater: A public (amateur) service that (re)transmits received signals that are intended to be received by more than one person.

Station: Any person (or group of persons using one call sign) within IARU Region 1 that is able to transmit and/or receive Amateur Television signals from their own location or remotely, without being a repeater. No more than one transmitter may be in use at the same time.

Rover station: Any station that is not fixed to one location that moves at least a minimum of five kilometres. Every time location is changed the moving station should be considered as a new station with the same call sign. For that reason a new log sheet and four digit code should be used by the moving station.

Four digit code: Four random chosen digits. The digits shall neither be the same (e.g. 2222) nor consecutive (e.g. 4567 or 5432).

Contact: Contacts are considered to be valid when a four digit code that is transmitted by another ATV station is received. Contacts made via repeaters or transponders are not considered as a contact.

IARU locator: The six, eight or ten digits of the Maidenhead locator which is related to the longitude and latitude coordinates of the actual position of the antennae that are used during the contact.

Vision report: The internationally recognized codes P0 to P5:

	Analogue	Digital
P0	No picture received	No picture received
P1	Synchronisation with little picture content	Only occasional blocks visible
P2	Only large images (call sign etc.) perceivable	Sufficient blocks to read call signs
P3	Picture noisy but some detail resolved	Some blocking
P4	Picture slightly noisy but with good detail and resolution	Occasional blocking
P5	Noise-free picture	Solid picture

Log sheet: A log sheet has a format not smaller than A4, containing all information that is needed to judge the contacts made and claimed points. It consists of a standard cover sheet and data sheets for every individual band (see annex 3A).

1. A standard cover sheet contains the essential information required to judge the contest entry.

The following information shall be submitted:

- *name and address of the (first) operator,*
- *station call sign,*
- *IARU locator,*
- *bands used, with the transmitted four-digit code group used for each band,*
- *claimed score for each band.*

The coversheet should show the signature of the (first) operator certifying the correctness of the log(s) submitted. In case of digital delivery of the log, typed name is the alternative of the signature.

2. Data sheets for every individual band containing the following columns in the order named:

- *date,*
- *time in UTC,*
- *call sign of the station worked/seen,*
- *report sent: P# report followed by serial number,*
- *report received: P# report followed by serial number,*
- *(seen) four digit code,*
- *IARU locator received,*
- *number of points claimed.*

It is strongly recommended to use the Excel sheet that is developed especially for this purpose (see Appendix 3B).

Responsibilities

Contestants: Operate within the letter and spirit of the contest and in accordance with their licences of their country. Stations operating under special high power licenses shall do so "hors concours".

Completion and delivery of the entry:-

National ATV manager, VHF manager or the National Contest Committee: Judge logs in time, send the results within four weeks after the contest to the IARU ATV manager.

IARU ATV contest manager: Organize, judge logs in time, issue results within six weeks after the contest.

Contest

Date of contest: The contest will be held in the second full weekend of June.

Duration of the contest: The contest will commence at 12:00 UTC on the Saturday and will end at 18:00 UTC on the Sunday. It is recommended that the national societies will run their ATV contests at the same time as the IARU Region 1 ATV contest takes place.

Contacts: For contest scoring purposes a participating station may be worked or viewed only once on each band. A roving station is considered as a new station, every time it has changed its location.

Contest exchanges: The following information shall be exchanged during a contact:

- *Four digit code. For each band used, a transmitting station shall transmit the four digit code that shall not change throughout the contest. For roving stations that changed location: both transmissions should be verified by a new four digit code. For new contacts with stations that were logged before; the roving station should request the involved stations to transmit a new four digit code and mention those digits as remarks in their log sheet.*

THIS FOUR DIGIT CODE SHALL BE EXCHANGED IN VIDEO ONLY AND SHALL NOT BE TRANSMITTED BY ANY OTHER MODE THAN VISION.

- *Call sign*
- *Vision report,*
- *IARU locator (the location of the receiving or transmitting antennae does define the location of the station),*
- *Contact serial number, starting with 001 on each band used and increasing by one for each successive contact on that band, starting from one for the new log sheet in use by roving stations).*

Scoring. A two-way exchange of the four-digit code group by vision together with the exchange of the other information shall score:

- *for contacts on the 435 MHz band: 2 points/kilometre*
- *for contacts on the 1.3 GHz band: 4 points/kilometre*
- *for contacts on higher bands: 10 points/kilometre*

If only one station received the four-digit code group, and the other information was exchanged, the scores for both stations shall be reduced by 50%.

Note: for scoring purposes all valid contacts shall be deemed to have taken place over a distance of at least 5 kilometres, even if the two stations in contact have the same or adjacent IARU locators.

Entries: The entries must be set out on completed log sheets. A copy of the logs shall be sent to the national ATV Manager, VHF Manager or the national Contest Committee, not later than the third Monday following the contest weekend. The submission of the logs implies that the entrant accepts these contest rules.

The logs will be send at IARU_ATV@uba.be, they will be forwarded to the organizing society

Judging of entries: The judging of the entries shall be the responsibility of the organizing society, whose decision shall be final. Entrants deliberately contravening any of these rules or flagrantly disregarding the IARU Region 1 band plans shall be disqualified. Minor errors may result in loss of points. The claimed contact will be disqualified for an obviously wrongly stated locator, call sign, code number or a time error of more than 10 minutes.

Awards: The winner on each band and the overall leading station shall receive a certificate. The organizing society may also send certificates to all entrants if they wish so.

PCB Design

By Trevor G8CJS

It's one thing have an idea, another about designing it and getting it to work on a bread board, but then how about drawing up the circuit to magazine quality and even augmenting the design with a PCB.

I think we can all say we have passed the age of drawing pens and etch resistant pens for PCB construction and are looking for CAD software.
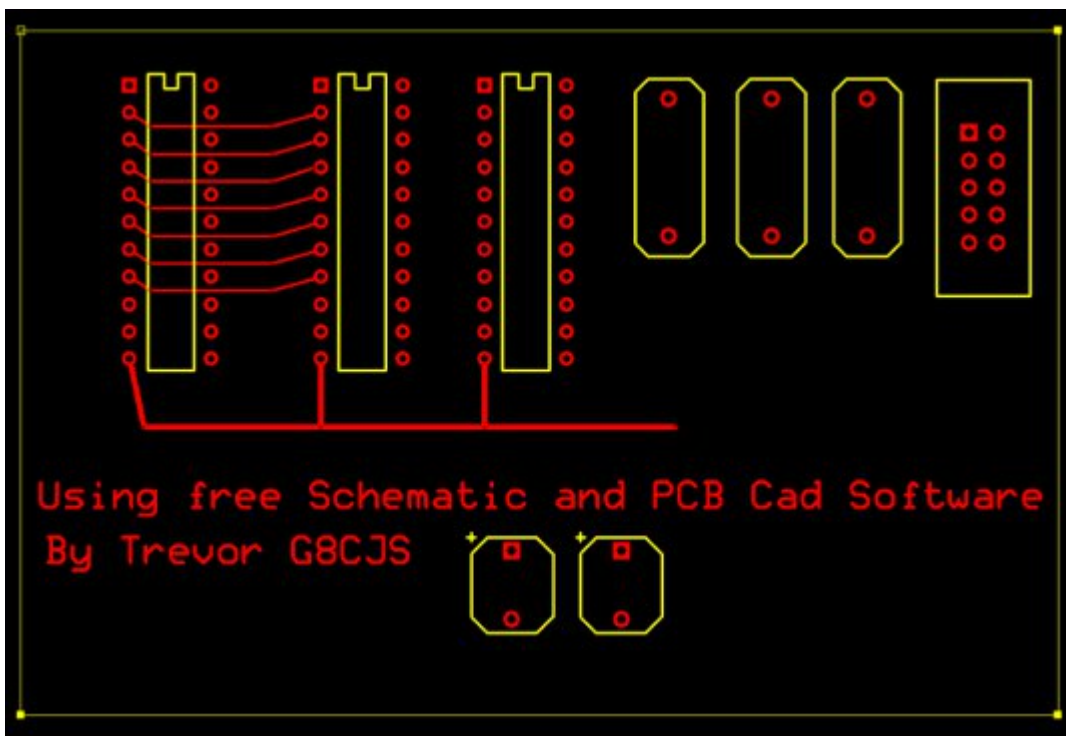
Well there is a free schematic drawing package and PCB design package called Express schematic and it is bundled with Express PCB at:- http://www.expresspcb.com/

Editors Note: This program requires the Windows operating system

Simple to install and it will save your work as a .sch file which can be revised and edited at any time or exported as a 300dpi bmp (ideal for any magazine to publish including CQ-DATV) and we are happy to accept .sch files).

Rather than subject you to blow by blow account of how to use the express package to create a schematic, can I point you at one of the numerous You Tube demonstrations:-

https://www.youtube.com/watch?v=W710W8vTQ_g

One picture, or rather a stream of pictures (video), is worth a 1000 words.
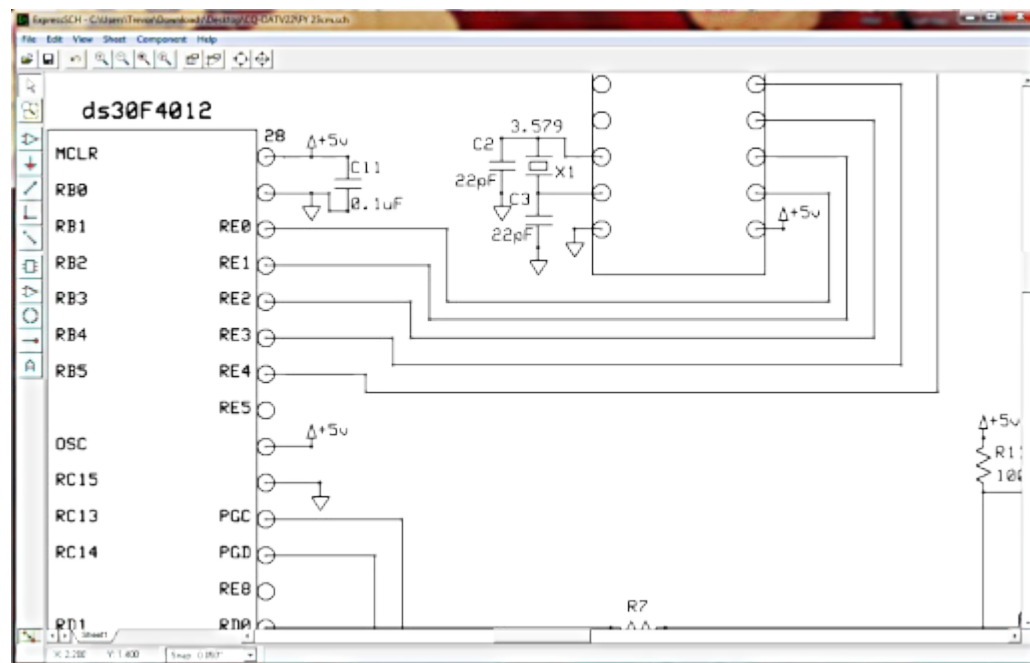
The PCB package which will also be part of the download so you can also design your PCB layout. It's not coupled to the schematic drawing package (always a snag) so you will have to select and place the components and draw the traces, but this is preferable on a computer screen to sticking transfers and connecting tape either direct to a PCB or onto a transparent gel, for photo etching your project.

Again I will not subject you to a blow by blow of how to drive the software and let you watch one of the You Tube video's:-

www.youtube.com/watch?v=sMafgIlZpDM (apologies for the music).

Again you can save the file this time as a .PCB file and we are happy to accept these files for publication. But first you might want to produce a PCB, drill it, populate and test it.

Unfortunately the Express file is not an industry standard so it needs converting if you want to use a PCB manufacturer see:-
http://www.robotroom.com/CopperConnection/Converting-Express-PCB-Files.html

The student edition $25 (approx £16) would be required:-

http://www.robotroom.com/CopperConnection/Buy.html

So this might not be the ideal CAD software, do your research on file formats and prices before you start any serious design work.

There are numerous companies geared up to small number runs, they do this by adding your work to other peoples projects and producing a larger PCB run of multiple projects and then extracting your PCB from everyone else's afterwards, usually identified by some unique labelling in the solder mask.

But why not have a go at home photo etching, by printing your artwork onto a transparency and using PCB board pre-coated with a photosensitive coating.

The transparencies work best on a laser printer but even then can lack contrast, but if you print out two copies and then double them up for a contact print, you will not have too

many problems, again can I point you at You Tube, for a full demonstration of this process:-

https://www.youtube.com/watch?v=tWnfnt2rNO0

As you will see from the demonstration, with a little bit of care and TLC you can end up with a PCB, it won't have plate through holes or solder mask, but well it does have heart.

Other CAD software exists and its worth exploring them all particularly if Express PCB does not generate the file format that the PCB company you want to use requires. There will always be a time and effort overhead in learning to drive any software, but You Tube is full of help.

http://diptrace.com/download-diptrace/ this package has various download options from a 30 day free trial to a not for profit free version and again there are tutorials on You Tube.
https://www.youtube.com/watch?v=UL7LyMpC1WQ

This is a far more comprehensive package than the Express PCB and it will allow you to import schematics, unfortunately not the .sch files of Express.

Cross platform

For a cross-platform solution (Windows, Mac and Linux) there is the Eagle package. A free (Lite) version is available from http://www.cadsoftusa.com/download-eagle/freeware/

The following limitations apply to the EAGLE Light Edition in general:-

- *The useable board area is limited to 100 x 80 mm (4 x 3.2 inches).*
- *Only two signal layers can be used (Top and Bottom).*
- *The schematic editor can only create one sheet.*

Apart from these three limitations, the EAGLE Light Edition can do anything the Professional Edition can do. You can even load, view and print drawings that exceed these limits!

Confusingly, Eagle also uses .sch files which, of course, are not compatible with those produced by Express!

Another cross platform software package is Kicad and also free. This is a very full functioned program, capable of both drawing the schematic and pcb layout.

http://www.kicad-pcb.org

So it is horse for courses:- how complex are your projects, do you want to be able to use a PCB manufacturers and get a result complete with solder mask and plate through holes or do you just want something simple for a single layer home etch.

TV Amateur is a German Language ATV Magazine It is published 4 times a year and if you would like to subscribe go to http://www.agaf.de/

Write for the CQ-DATV Magazine

CQ-DATV NEEDS YOU!

Without reader input CQ-DATV would be an empty PDF file (which I don't think many people would find particularly interesting). We are always looking for articles, reports, anything! Even small things like letters and desktop screens help fill the magazine.

Guidelines

The single rule for an article is that it must somehow be linked to ATV or one of its many derivatives, CCTV, repeaters, aerials/dishes etc.Write your article in whichever software you choose. I would recommend LibreOffice (this is cross platform). But please spell and grammar-check it!

Language

If your first language is not English, don't worry. We will translate your copy using online translation software and then one of the proofreaders will smooth it into English and correct any grammatical or spelling errors that these translation services sometimes create.

Writing

There is no word limit for articles, but be advised that long articles may be split across several issues. In your article, please indicate where you would like a particular image to be placed. We will try to adhere to this, but page layout may require us to move them around a bit. Please do not use any formatting in your document.

Images

Images should be the best resolution possible, not cropped or reduced in size and in PNG format (preferred), or JPG with low compression.Images can be embedded in the document to show their position, but must also be included as separate image files. (PNG or JPG)

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Please also check the Information page at the end of the magazine.

When you are ready to submit your article, please email it to:-
editor@cq-datv.mobi

24cm Repeater input for GB3FY

By John G3RFL

Adding a second input to GB3FY has long been on the cards. When it comes to repeaters, is it a good idea to apply for a NOV and hope it is possible to make it work or should we see first if it is practical ?. The intention is not to remove the 10GHz FM receiver, but to look at what would be involved in providing members with the ability to switch the input to a 23cms receivers using DTFM tones. The hardware had to be designed and constructed and that landed on my desk

Most of the chips are standard technology, the HT9170 is a purpose built decoder. It is programmed by a ds30F4012 PIC and the MAX4023 provides the video and audio switching.

Designing a circuit is one thing building another. The prototype worked well on the pin board, but in order for it to be tested in GB3FY a slightly more robust construction was required. So it was down to the garden shed to run up my new PCB etching tank, which I will get around to writing up for CQ-DATV, I promise. Once the PCB had been etched drilled and populated and the PIC code written and debugged it started to look quite smart.

The PCB was a good start but I had one or two omissions on the prototype C8 C10 needs a cut in the print and I had omitted pads for the Xtal C1 and C2, but these were wired under the PCB. Some decoupling was added under the PCB using surface mounted decoupling capacitors on the square pads and C7 was added. Otherwise it worked first time and as a one off I decided not to revise the PCB artwork and rebuild to a final version, as it would have been another day in the cold shed that I could really do without.

The MAX 4023 was mounted on a header plug so as to avoid introducing surface mounting technology to an otherwise simple PCB design and C12 was added across R4 to make up for a little HF loss in the switcher chip, (don't think I deserved that).

The LCD display is going to be vital for onsite visits if problems occur and well when you have a micro running why not add the code to drive a display via the I2C bus.

Alford Slot and its mounting brackets

Any receiver is of little use without an aerial and well the design construction and adaptation fell to Stuart G6NHG. and Ted G4MXR

Sometimes I get the better end of the stick an although my PCB etching shed is not the warmest place to spend a day it beats climbing the mast and fitting the Alford slot. Also gave me time to add rather pleasing box to finish off the unit

The next stage is to test the technology and we might even have it running for the Norbreck Rally Sunday the 12 of April as a manned demonstration for that day only, you never know. I have put the PIC code on the CQ-DATV download If you need any more details you can always contact me via

Ted G4MXR not sure if he won or lost the toss to fit the Alford Slot

editor@cq-datv.mobi
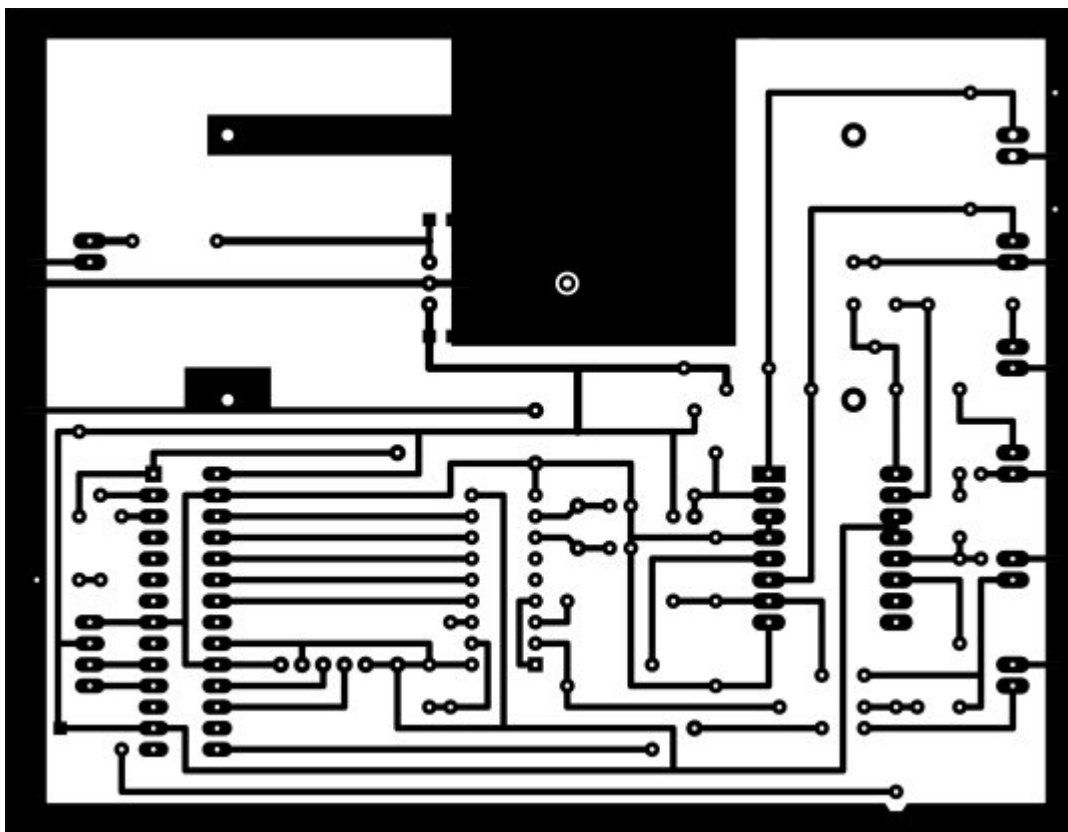
PCB, viewed from the component side
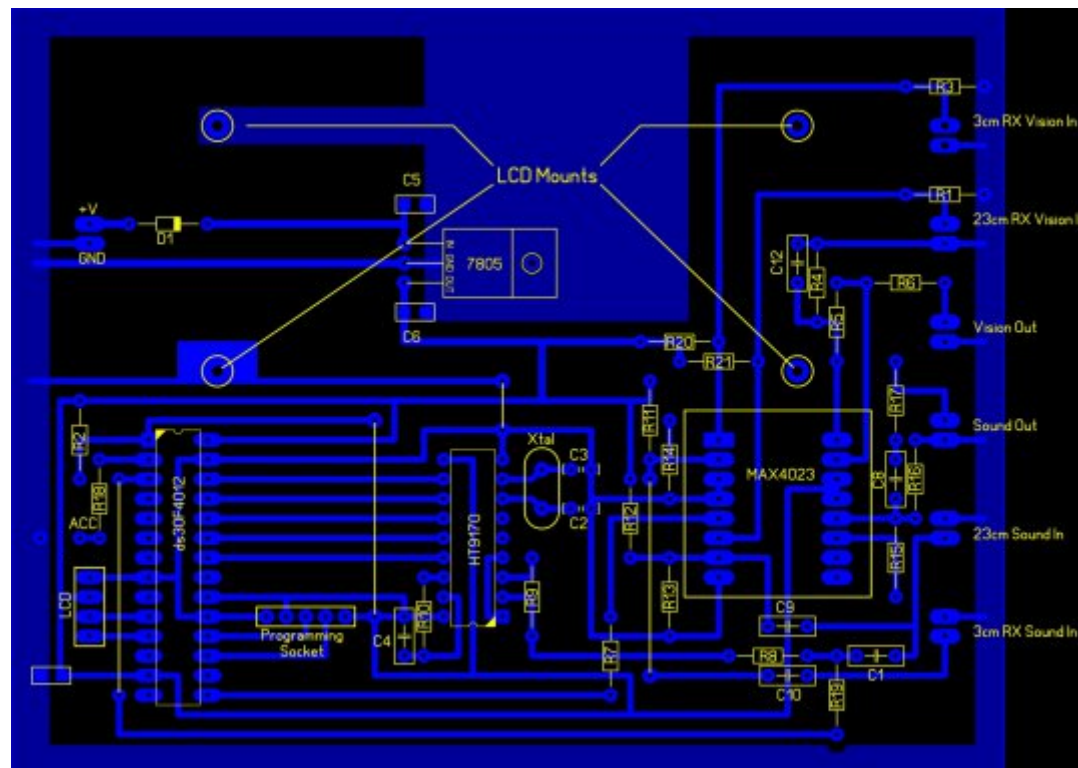
Component overlay. Note that these are an updated drawing and differ from the photo of the prototype

Meet the GB3FY 10GHz ATV Repeater Designer "John Hudson G3RFL" At the Norbreck Rally Sunday April 12th 2015. We very much look forward to meeting you all & talking about ATV.

DATV-Express Project - Febuary update report

Ken, W6HHC, has been unable to submit a report this month due to the loss of his wife through bereavement. He has asked me to include the following statement:

"Ken W6HHC dealt with the illness, death and burial of his wife in February."

Things have been fairly quiet on the Express hardware side and most of what I have been doing has been for the upgrade of my own DATV facilities.

A fair amount of time has been spent on investigating Digital Pre-distortion (DPD). This has shown that useful improvements in the transmitted spectrum can be gained through this technique. However it will require a new board design to achieve the full potential of the method.

Some work has been done on making DATV-Express usable in a Windows environment. I have written a small program that runs on a Windows P.C monitoring a UDP socket and sending the received transport stream to the Express hardware for transmission.

I am using the signed drivers from the HPSDR project and the libusb library for the USB interface with Express.

My current test set up uses vMix (a commercial Windows based video mixer from a company in Australia) for video capture and mixing. This outputs the video and audio as 2 directshow capture devices. I then use a directshow filtergraph to do the MPEG encoding and transport stream multiplexing and UDP framing. The UDP transport stream is then sent via the loopback address to the Express Server application which transmits it over the air. It would also be possible to use FFMPEG in place of the filtergraph. As you can imagine this opens up a huge number of possibilities.

The basic version of vMix is free, it supports 4 SD inputs, two of which can be capture devices. The others can be captions or a virtual studio. If you want to do HD you will have to pay for a licence but compared to other such programs they are not too expensive.

The quality of the transmitted signal will depend on how good the 3rd party codecs and multiplexors are. For further details you can look at my blog http://www.g4guo.blogspot.co.uk/

The last few days I have been working on a networked DATV box. This consists of a DATV-Express board and an Odroid C1 board in a small Hammond box that sits on my home Gigabit network. The Odroid C1 is a quadcore ARM board which costs the same as a Raspberry PI 2. On the plus side it has better USB/Ethernet IO than the PI but on the downside it has poorer software support.

To manage the box I am using a Web interface, I have an Apache webserver server running on the Odroid which means I can control the system via any web browser. I am a total novice at this sort of stuff though so progress is slow. My own goal is to have the studio located in the nice warm house and the noisy transmitters located in the cold unheated brick shed in the garden.

Yesterday for the first time I was able to transmit DATV from the shed, the webcam video coming from my Windows 7 P.C in the house and the transmit receive switching being done from an old iPhone 5 mobile phone. While it showed up some issues with the CGI script it did work using 3 entirely different OSes with about 1 sec delay across the system.

The aim is not to produce an off the shelf set up for others but instead produce the building blocks that will allow people

to experiment and come up with their own novel solutions. There are just so many different approaches open to us.

The Express team also supports the narrowband (<1 MHZ BW) DATV community and was represented recently at a UK/France discussion on future paths for narrowband. The emphasis seems to be moving from transmitters to better receiving equipment with a number of projects in the pipeline.

I continue to scan the Web for new and interesting technologies that can be used for DATV in the future. There is always some interesting new silicon just around the corner!

I apologise for the rather egocentric tone of this report, hopefully normal service will be resumed soon.

Kind regards to everyone from the DATV-Express team.

- **Charles G4GUO**

A pre-production DATV-Express board
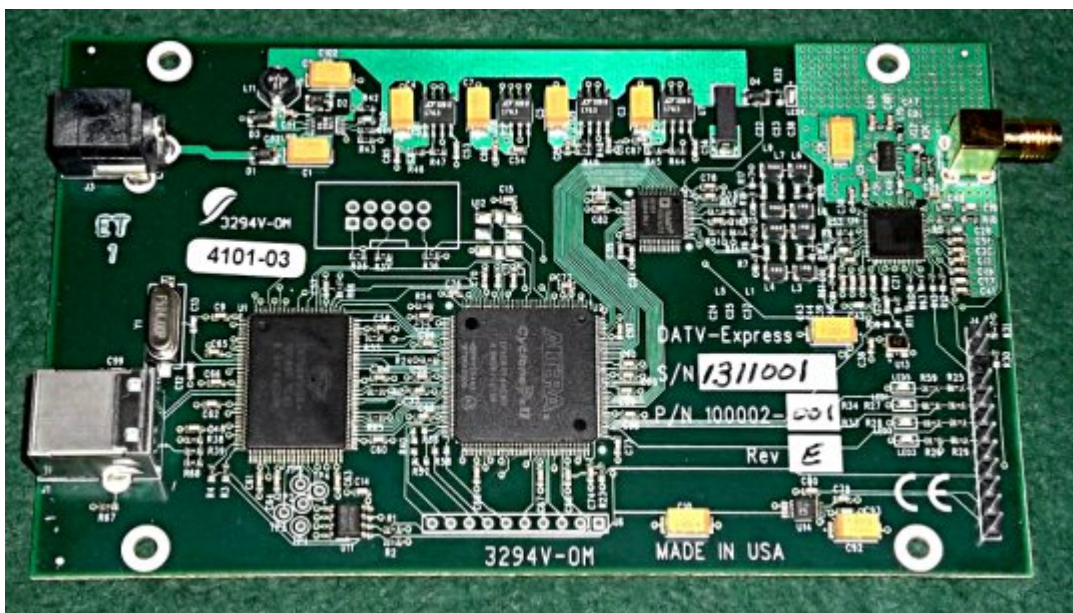
Digital Amateur TeleVision Exciter/Transmitter

now available from
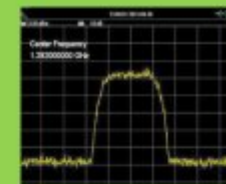
DATV-Express

- A more affordable DATV exciter can now be ordered
- Fully-assembled and tested PCBA
- DVB-S protocol for DATV (using QPSK modulation)
- Can operate all ham bands from 70 MHz-to-2450 MHz
- RF output level up to 10 dBm (min) all bands (DVB-S)
- Software Defined Radio (SDR) architecture allows many variations of IQ modulations
- "Software-Defined" allows new features to be added over the next few years, without changing the hardware board
- As extra bonus, the team has been able to get the board to transmit DVB-T 2K mode, however we cannot guarantee the performance of that protocol. Caveat Emptor!
- Requires PC running Ubuntu linux (see User Guide)
- Price is US$300 + shipping – order using PayPal
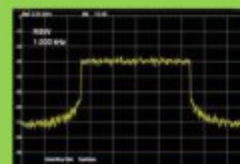
For more details and ordering
www.DATV-Express.com
register on the web site
to be able to see
the PURCHASE page

Moving on with film making - Part 4

By Trevor G8CJS

In part 3, I said that sound would often be the part of your film which would let you down the most and that in camera microphones are just not adequate. Well the BBC click team recently visited the Mobile World Congress in Barcelona. In an attempt to show how powerful the modern mobile phone is they decided to film the event on mobile phones and the first problem they came across was sound and in-phone microphones. A lot of external mics and pluggery was involved in getting around the problem see:-
http://www.bbc.co.uk/iplayer/episode/b055r0cm/click-07032015

Sorry it is a BBC link and may not be available beyond the UK this is beyond the control of CQ-DATV. In the summing up they also commented about the mobile phone lens which cannot have its focal length adjusted. Its pity they limited themselves to mobile phone technology as some of the still cameras would have got around this and probably allowed them to film in 4K, the new Ultra Hi-Def standard which we are yet to feel the impact of.

Samsung are about to launch the NX500 which has interchangeable lenses and will film in 4K, there are lots of reviews out there, but it looks like a cut down NX1 their flagship DSLR and has the same sensor and image processing, I think the Samsung NX 500 would have been my choice to film the event and at $800USD which I suspect will be around £600 in the UK including a mid range zoom lens it is probably less expensive than some of the mobile phones, but then do you want to make a film or a telephone call. https://www.youtube.com/watch?v=9Yo6ZQmpquE

Ok enough of the ads, lets loose the pipe dreams and look at using kit. So far we have used in-expensive editing software. Why should we want to go upmarket, well one reason is Codec's, this seems to settling down a little now so if you update the camera you are not always forced into a new software update in order to edit the film. Base level software does not have some of the features you will soon start needing.

My favourite function is a waveform monitor, I am still a video engineer at heart and to be able to see levels, pedestal

and make adjustments..well I feel like an engineer again. I don't want to see PAL I think we left that behind some time ago and the vector scope never made it into any of the packages except as an NTSC display. A sequential RGB or parade display is really helpful when it comes to colour balance.

Let me give you an example I am part of a scuba club and if you really want to mess up colour balance then try filming underwater, where colour balance changes with depth, the deeper you go the more the spectrum is corrupted starting with the loss of red light.

Absorption of colour underwater
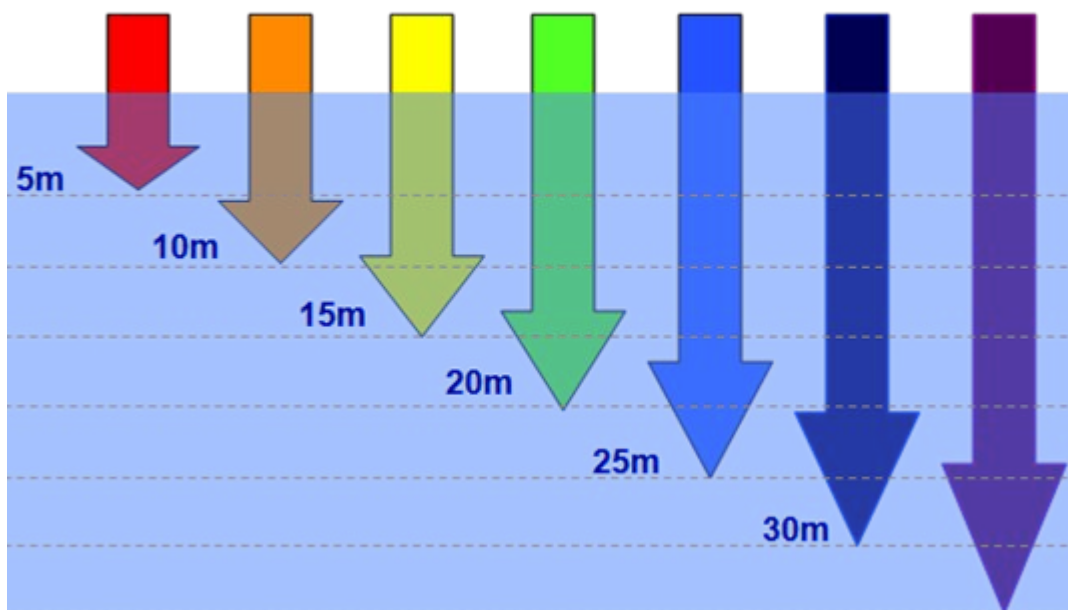
The fix is to constantly adjust the camera white balance as you go deeper, but well you have other things on your mind and pictures that lack red are often the result.

You can see by looking at this frame grab, the camera still had the white balance from the surface and had not been re adjusted for depth, if you were in any doubt look at the

waveform monitor which is part of the software. I should at this point say that is me in the foreground, so I am not filming which I hope makes me part of the solution and not the problem.

The pictures have been heavily compressed to fit on the SD card which does not help when you start to add something in the order of 20db's of gain, but you are aware of the improvements in my dive buddies red sleeves and the orange strobe light on my left shoulder. 20db's of gain at video bandwidth will have introduced some noise, but it is still an improvement and all I have done is match the blue and green levels. Always a good start but not all pictures will have equal amounts of Red Green and Blue.

The trick came from the old photo labs, where they produced cheap prints and had to remove colour cast from prints that

with a couple of photo style lights, thankfully the old sodium street lights that are devoid of red are disappearing fast.

Remember when you white balance the camera your are adjusting the pictures before compression and this will yield a better result than any software working on pictures after compression.

were shot in various lighting conditions often by people who knew very little. If you had spent the evening photographing some spectacular sunsets and then had them processes at a photo lab the results were very disappointing and prompted a rise in photographers shooting slides, which did not have this process in the chain and where what you shot is what you got.

You could still mess up a spectacular sunset on video by tweaking all the colours to the same level. The waveform monitor helps, but you still need some grey matter, not in the picture but between your ears.

Also if the colour is not there it's hard to put it back, no matter what kit you own, there are some very narrow spectrum light sources around, Gymnasiums that were lit by blue mercury lights and covered too much of an area to light

Coming up in CQ-DATV

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