



The British Amateur Television Club

CQ-TV

No. 244 – June 2014



A Video Processing Circuit

There is something different on
Fast Scan Amateur Television

Using a small ARM based
mini TV box for digital TV

Streaming Student Robotics 2014

VK DATV QSO Party

Rigol Spectrum Analyser discoveries

The New Constitution of the
British Amateur Television Club

4K – what is it?

... and all the regular columns

BATC DTX1 Digital TV Transmitter



MPEG-2 encoder and DVB-S modulator

- ▶ Self contained unit - computer not required.
- ▶ Composite and S-video input
- ▶ 2 audio channels
- ▶ Single PCB design
- ▶ Plug in option for 2nd video & audio channels
- ▶ Size: 165mm wide; 120mm deep; 55mm high
- ▶ Tunes the 70cm and 23cm bands. Tuning range from 150Mhz - 2Ghz
- ▶ -5 dBm output
- ▶ Power 500mA at 12 volts
- ▶ LCD front panel and keypad control
- ▶ RS232 control port



Available from BATC shop

- ▶ DTX1 DATV transmitter PCB
complete with case and front panel
£465
+ Shipping
- ▶ 2nd encoder channel
£199
+ Shipping



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Printed in Great Britain. ISSN 1466-6790

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Contributions

The preferred method of communication is by email, all email addresses are shown above.

You can also telephone 01400 414 243. You will then hear a menu that will allow you to be connected to the correct person if they are available.

Alternatively you can write to us at: BATC, Silverwood, South View Road, Pinner, HA5 3YA, United Kingdom

We aim to publish CQ-TV quarterly in February, May, August and November.

The deadlines for each issue are:
 March - Please submit by January 31st
 June - Please submit by April 30th
 September - Please submit by July 31st
 December - Please submit October 31st

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.

From the Chairman...

Noel Matthews - G8GTZ



Another 3 months has flown by and we are already half way through the year, and although the English weather has been quite good, the BATC summer fun contest earlier this month suffered from some of the worst conditions most of us have known for some time! Having said that activity levels were very encouraging with 18 stations reported to be on 70cms DATV, including several from the new DATV hotspot around Luton and Charles WB8LGA worked 6 other US stations - I wonder who will win the Nexus? Hopefully the conditions will be better for the IARU contest on 13th / 14th September.

The increase in activity is has definitely been helped by sales of DTX1 and the SUP2400 70cms rx convertor. In fact both have been so successful that we are currently out of stock of both items but more are on order – Digilite parts are still in stock and continue to sell and we are now holding stock of the DATV-Express card. If there's anything else you'd like to see in the BATC shop, just let us know.

The next big event is of course CAT14, the BATC annual convention in Basingstoke which is only 2 months away. If you have not been before I really would encourage you to come along – it's a great place to meet other ATVers, learn about the latest developments in ATV and buy some of those hard to get bits. We've a great venue and done a really good deal with a 4 star hotel, so go on and treat yourself and come meet all of those you only ever chat to on the BATC forum! (See CQ-TV 243 for all the details - Ed)

This year we also holding our General Meeting when we review what's been happening in the BATC over the last 2 years and also vote in members of the committee. I know this all sounds really boring and dull to some, but I would urge you to be there and show your support for those who put in so much effort to keep the BATC moving forward and supporting the ATV community. It's particularly important that we have your support this

year as we are introducing a new club constitution to replace the one that was voted in rather hurriedly 2 years ago. We are trying to make the whole process open and transparent and so will be opening a discussion on the BATC forum for one month where you can give your comments and suggest changes before the meeting – so let's have your comments and support.

You may recall the committee set up the BATC grant scheme where, you the members, can propose someone or a group of people who have contributed to the advancement of Amateur Television Community – we are looking for nominations, so let us have your ideas. This is in addition to the Grant Dixon award that is awarded every 2 years and will once again be awarded at CAT14 to someone who we feel has deserved recognition for what they have done to support the ATV community over the years.

Finally, it was great to meet ATVers from other countries at the HAMRADIO 2014 event in Freidricshaven where I also presented an overview of UK ATV activity – there is a lot of interest in ATV in Europe and there are some really advanced schemes for linking repeaters. One big issue being discussed was the problems where DB0QI has been closed down on 23cms due to potential interference with the new Galileo system. Fortunately we shouldn't suffer any such issues as our repeater outputs are above 1300 MHz, but we do still see delays in licensing of repeaters on 23cms. However, as a result of lobbying by BATC, there is a meeting scheduled between the RSGB ETCC team, Ofcom and the CAA to discuss how this can be resolved.

Also, BATC are working with the RSGB spectrum team to counter a paper from the Austrian Radio Society which will be presented at the IARU region 1 conference in September which proposes dropping DATV from the 70cms band plan. Representing the ATV community on such issues is just one more example of how the BATC is so much more than just a (very good) magazine. 🗣️

BATC CAT14 and Biennial General Meeting

When? 6/7 September 2014 – Saturday 12-5pm; Sunday 10-4pm

Where? Everest Community Academy in Basingstoke, Hampshire

What? Presentations, demos, specialist traders, members table top sales, the BATC General Meeting and a 'test it and fix it area'

How (much)? Members £5.00 per day in advance; £7.50 per day on the door
Attendance to BiAGM only will be free to BATC members.

For more information, visit the BATC forum where you will be able to see updated information on the event and register your attendance.





Overseas News

Dave Crump – G8GKQ

New Zealand

Grant, ZLIWTT, reports that all fixed ATV Repeaters there now need to meet broadcast transmission standards – 8 MHz wide DVB-T. The \$5000 cost of such modulators is causing some challenges.

On a more positive note, most domestic TVs sold in New Zealand will receive DVB-T over a very wide frequency range (even 45 – 860 MHz), with some accepting 6, 7 and 8 MHz wide DVB-T. He is experimenting with 8 MHz DVB-T on the 33 cm band (925 MHz).



► François, F6AQO, from just South of Paris (JN18EK)

France

François, F6AQO, reports that he is active from just South of Paris (JN18EK) every day at 0800 local (0700 UK) and 1900 local (1800 UK) on 1255 MHz either FM or digital. He runs 150 W into 4 x 35 element yagis on the very impressive mast as pictured. Unfortunately, he currently only has low power available on 70 cm due to problems with his PA.

USA

Charles, WB8LGA, entered the BATC SummerFun contest from Marengo, Ohio in the USA. He runs about 250 W on 70 cm with the capability for 175 W on 23 cm. He uses a UT-100B dongle for DVB-T transmissions and Digilite for DVB-S. His 60 foot tilt-over mast looks like it just clears the trees! 📡



► Charles, WB8LGA, from Marengo, Ohio

Members News



Dave Mann – G8ADM

ACTIVITY

There has been quite an increase in activity on the 70cm band with DATV here in the Southern UK. The following have recently become active using the DTXI encoder/modulator: Ted 2E0EAZ, Alan 2E0TVL, Don G0WFT, Mike G4CAK, Bob G6OUA, Dave G6JIE, Phil G8XTW, Steve M0SKM all are in South Bedfordshire and members of the Dunstable Downs Radio Club.

Vic G3SDQ in Leyton, N. London, is transmitting across the room with a DATV Express in DVB-S and DVB-T modes. He is building an amplifier to enable him to transmit. He can receive my 70cm DVB-S pictures very well from across the other side of town.

The BATC has sold many DigiLite, DATV Express and DTXI systems so if you have one please tell us where you are and how they are working out.



John GW3JGA reports that while out portable he has received the GB3FY repeater in Fleetwood, Lancashire from North Wales on 10.240 GHz. The signal was P4 with fairly rapid QSB at 19.00 hrs on 15 May 2014 at SJ 087 833, 30m amsl. The weather was ideal, 14deg C, 1300mb, calm, sea path, approx 39miles. John was using a 60cm Satellite Dish, 9GHz LNB (Bob Platts) home built 23cms RX based on G1MFG RX and a Maplin Monitor. The GB3FY repeater runs relatively low power so this was a very good result and confirms our interest in using the microwave bands to conserve spectrum space lower down.

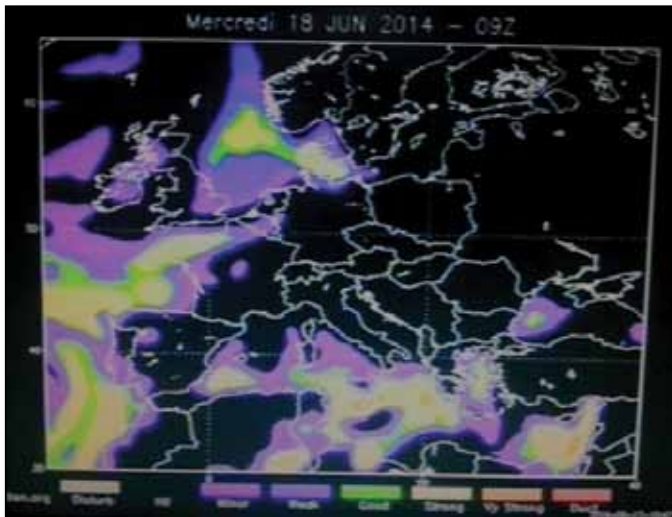
GB3KM

If you watch repeaters on the BATC streaming facility then you may well have noticed some big changes to the output of the GB3KM repeater when it is not in repeater mode. See: <http://www.batc.tv/streams/km>. This has all been possible by having a competent computer programmer in the team. Rob, M0DTS, has made use of



the Raspberry Pie with attached USB receiver to add facilities like a live tropo propagation forecast from F5LEN, a live waterfall display from an SDR receiver that can be tuned across the most bands from 70cms to 3cms RSGB News automated playback at specified times, a variety of weather maps showing air pressure, wind, clouds and satellite images, KM activity/usage monitor and a variety of test cards. These can all be





changed remotely using a web interface that also allows new test cards to be uploaded. Having such a computer controlled facility allows easy upgrades and additions in the future. Our lives are becoming dominated by computers so it is extremely useful to have computer engineers and programmers as part of any repeater management team. This avoids all repeaters looking the same because they use standard repeater controllers. Just think when I first joined the BATC home computers and microchips had not yet been invented!



Other sites worth a look at on www.batc.tv are in the morning while you are having your breakfast in the UK. There is often quite a bit of interesting activity from Australia (VK) both under Repeaters and also under Members Streams.

BROADCAST NEWS

There are many professional broadcast shows and exhibitions held around the world each year showing the latest studio and transmission products. Many of them are free to enter after registration. It is also possible to watch videos of many of these shows on line, see: <http://www.tvbayshow.com/>. The majority of the products and services at these shows are outside the amateurs pocket but they are very useful to learn how television technology is progressing and to give us ideas for the future of ATV as well as grabbing the odd freebee.

In the Docklands area of London each year we have the BVE Show, see: <http://www.bvexpo.com/>. At this show I was quite taken by the latest Studio Camera from Black Magic Design. This minimal facilities camera has a full broadcast specification but is very light and compact with a very nice 10 inch viewfinder.



The cost of the camera may well be within the range of some amateurs budgets but beware, this does not include the lens which may well be many times the cost of the camera. The size of modern broadcast cameras has greatly reduced in recent years due to the very high resolution that can be achieved by the sensor chips. Until recently it was necessary to use 3 chips in the camera to separately sense the Red, Green and Blue channels. These days the chip resolution is so high that even HD sensors can have the RGB channels all on one chip in full resolution. 📹

Please send any news reports for CQ-TV #245 to:
secretary@batc.org.uk



Dave Crump – G8GKQ

Contest News

International Results for the 2013 IARU Region I Contest

The International results for the September International ATV Contest have finally been published and are published on the forum at: <http://www.batc.org.uk/forum/viewtopic.php?f=75&t=3247> Just one UK entry – Rob, M0DTS - who did very well to come 29th of 41 overall, considering just how few UK stations were active. Well done Rob!

The International Contest had 25 entrants using 70cm. I can't help thinking that we are missing out in the UK by not using this great band – either for narrow band AM or digital.

Results for the March Repeater Contest.

BATC Repeater Contest 23/24 March 2014

Section I - Transmitting

	Call	Pts	Locator	QSO	Repeaters
1	GW4KAZ	811	IO73VE	3	GB3TM
2	MW0AQZ	672	IO73QH	3	GB3TM

Only 2 entries for the March Repeater Contest. Where were you all?

Congratulations to Brian GW4KAZ who worked through GB3TM using both the 23 cm and 70 cm inputs.

Proposed Changes to the International ATV Contest Rules

VERON, the Dutch amateur radio society, has proposed some major changes to the IARU Region I ATV Contest Rules. You can read these in detail on the BATC Forum at <http://www.batc.org.uk/forum/viewtopic.php?f=75&t=3850> but the major points are:

- ▶ Contest moved to the second week of June (it would replace our SummerFun Contest) and times extended to "12:00 UTC on the Saturday until 18:00 UTC on the Sunday".
- ▶ Use of remote stations (not repeaters) authorised.
- ▶ "Rover" stations authorised.

Based on members' feedback so far, the BATC will be fully supporting these proposals. Please contact me if you have any comments.

SummerFun and Digital Contest

I have received 10 entries for the SummerFun and Digital Contest so far and I am sure that there are more to come. Some of the attempted contacts can be seen on this composite image from DXSpot.TV. Although the weather was fine in places, most entrants have reported that propagation conditions were awful, but all seemed to have enjoyed taking part in the contest. Good photos from G0KTD out portable, and G1LPS's multi-band home station. (Used elsewhere in this edition of CQTV - Ed) The final results will be published on the BATC Forum and in the next issue of CQ-TV.

We hope to present the prize for the Digital Section at the BATC Convention and General Meeting on Sunday 7 September. 📡



Contest Calendar

1800 UTC 13 September 2014 – 1200 UTC 14 September 2014: *International ATV Contest*

1200 UTC 6 December 2014 – 1200 UTC 7 December 2014: *BATC Repeater Contest*

1200 UTC 21 March 2015 - 1200 UTC 22 March 2015: *BATC Repeater Contest*

1200 UTC 13 June 2015 - 1200 UTC 14 June 2015: *BATC Summer Fun Contest (or International Contest)*

The Constitution of the British Amateur Television Club

A new BATC Constitution

Below is the updated constitution which it is proposed to adopt at a formal meeting during CAT14.

This constitution will replace the one which was voted in at the 2012 BiGM. This is a very important document as it sets out the rules for running your club and so in order to get members input and to gain a consensus before the meeting we have opened a new discussion topic on the BATC forum which closes on August 1st and we invite all BATC members to participate in discussion and provide constructive feedback. Again any comments by post are welcome and should be sent to the secretary before August 1st and they will then be published on the forum and included in the debate.

After the forum has closed for comments, the committee will meet to agree a final version of the proposed constitution which will then be published on the BATC forum & website.

Those who have requested postal notification will receive the final proposed constitution along with the BGM agenda .

The proposed constitution is a complete re-write as many changes were needed, some small, some large!
A few highlights:-

Section 3: Adds in different types of membership, in particular it will allow the few Honorary members of the club, who were disenfranchised by the 2012 constitution, to be members again.

Section 4: Clarification of the way the committee may meet and vote and rules are added for how long a committee member may be in post are introduced.

Section 5: Changed to allow the use of PayPal (based in Luxemburg) and to provide a distinction between "expenses" and "running costs".

Section 6: Clarifies procedures and time scales for the General meeting.

Thanks to Peter Delaney and the BATC committee for their help in preparation of the proposed constitution.

1. General

2. Aims and objectives

3. Membership

4. Committee

5. Finance

6. General Meetings (G.M.)

7. Amendment to Constitution

8. Extraordinary General Meetings (E.G.M.)

9. Dissolution of the BATC

1. General

- a. The Club shall be known as the **British Amateur Television Club** or by the initials **BATC**.
- b. The administrative address shall be that of the Secretary or as assigned by the Committee.
- c. The BATC shall affiliate to the Radio Society of Great Britain.
- d. The name of the BATC, its logos, badges and CQ-TV are copyright and may only be used with the written permission of the Committee, excepting that members may use the logos and badges for their personal, non commercial use without seeking permission.
- e. In this Constitution, the word "term" means the period between two consecutive General Meetings.

2. Aims and Objectives

- a. To further the interest of its members in all aspects of television and to inform, instruct, co-ordinate and represent the activities of television enthusiasts.
- b. To promote the advancement and practice of television in all its forms, together with sound, control and data systems, and any other systems for the transmission or processing of images in any form.
- c. To publish, in any form, the BATC's journal "CQ-TV" and to provide books, pamphlets, or any other medium associated with the objectives.
- d. To supply components or assemblies, or any other items, for use associated with the objectives.
- e. To organise meetings and events, competitions and awards of any kind for the mutual benefit of members and promotion of the objectives.

3. Membership

- a. Membership of the BATC is open, subject to the discretion of the Committee, to all individuals or groups interested in the aims and objectives of the BATC.
- b. Each ordinary member shall pay a membership subscription fee. The fee for membership of the BATC and the duration of the period of membership shall be as set by the Committee. The Committee shall have the power to waive or reduce individual subscriptions in special circumstances.
- c. Honorary membership may be granted to any person, who, in the opinion of the Committee has rendered outstanding service to the BATC. Such membership shall carry the rights and obligations of ordinary membership but shall be free from subscription dues and of a duration set by the Committee. A list of honorary members is to be kept by the Secretary and may be published at the discretion of the Committee.

- d. The Committee may also grant life membership and student membership on payment of the appropriate subscription. Student members must be under 25 years of age and in full-time formal education.
- e. The Committee of the BATC shall have the authority to grant complimentary membership, associate membership, patron status and other categories as required, these categories having no voting rights.
- f. A group may affiliate to the BATC by paying a subscription as one member. The affiliated group shall have one vote and be entitled to all benefits and obligations as if it were one member. The aims and objectives of any member group should support the BATC and be compatible with the aims and objectives of the BATC.
- g. Members with subscriptions in arrears have no voting rights or any privileges of membership. They shall be deemed to have resigned from the BATC after a period of grace, as set by the Committee, has elapsed.
- h. On ceasing to be a member of the BATC the individual must return, without delay, all BATC property to the Secretary
- i. The Committee shall have the authority to expel any member whose conduct, in the opinion of a majority of the Committee, renders that person unfit to be a member of the BATC. No member shall be expelled without first having been given an opportunity to put their case before the Committee.

4. Committee

- a. The affairs of the BATC shall be administered by a Committee of up to 8 members elected at a General Meeting and, additionally, a President appointed by the Committee.
- b. The Committee, in whom the BATC's property shall be vested, shall consist of :-
 - i. A Chairman who shall preside at all meetings at which he/she is present. No member may hold this position for more than 3 consecutive terms. He/she may serve in a different Committee position but a period of at least one term must elapse before being eligible again for the post of Chairman. The Chairman has a single ordinary vote at all meetings. In the absence of the Chairman meetings shall be chaired by the Secretary or the Treasurer.
 - ii. A Secretary and a Treasurer. The Chairman, Secretary and the Treasurer shall be the Officers of the BATC.
 - iii. Up to 5 further Committee members. These may hold specific posts, as decided by the Committee, which may include:- membership secretary, editor, IT manager, BATC shop manager, contest organiser, RSGB liaison, and such other posts as required.
 - iv. The duties of the Officers and Committee members of the BATC shall be those conventionally and normally performed by those Officers and Committee members.
- c. A President shall be appointed by the Committee to hold office for two terms, but may be re-appointed by the Committee to serve again up to a total of six terms. The President has an ordinary vote if taking part in a G.M., E.G.M. or Committee meeting. Retiring Presidents are to be listed as past Presidents of the BATC. This list is to be kept by the Secretary and may be published by the BATC.
- d. The Committee shall have the power to co-opt additional members of the BATC to serve as Committee members or Officers, but the total number of Committee members and the President shall not exceed 11. All such co-opted Committee members or officers shall retire at the next G.M., but shall be eligible for election at that G.M. Co-opted Committee members have full voting rights.
- e. All Committee members are elected for two terms and then should retire, but are eligible for re-election. Approximately half of the Committee members and half of the officers should retire at each G.M. In order to meet this requirement Committee members and Officers may retire one session early or late to restore the balance.
- f. The Committee should physically meet at least once a year at a date and venue to be selected by the Chairman in consultation with the other Committee members, notice of this Committee meeting and its agenda should be sent so as to reach each Committee members not less than 14 days before the date of the physical meeting. At other times Committee meetings can be conducted, by any other means of communication, and provided that all are informed of the meeting and the agenda the 14 day stipulation need not apply.
- g. A quorum for the Committee shall be 66% of the total Committee membership rounded to the lower whole number; two of the quorum shall be officers of the BATC. A simple majority of the Committee members voting shall be required for a proposal to succeed. An absent Committee member may cast a proxy vote by instructing the Chairman of the meeting to cast his/her vote(s) for the proposals as described on the agenda. The Chairman shall inform the meeting of who has cast proxy vote(s) and if they are for or against the proposal. That proxy vote counting towards the number required to be quorate. In the absence of a quorum, business may be discussed but no decisions can be taken. The minutes of the meeting may published, in full or in part at the discretion of the Committee.
- h. All Committee members shall be unpaid, but receipted travel expenses incurred by the Committee in meeting can be reimbursed at a rate up to the equivalent of the standard second class rail fare. Other expenses must be authorised in advance as described in the finance section.
- i. In the special case of a proposal for a vote of no confidence in a Committee member or Officer that may be proposed on the agenda for a Committee meeting. Notice of that meeting and the agenda for business to be considered at such a meeting, shall be sent so as to reach each member of the Committee not less than 14 days before the date of such meeting. No Officer or Committee member shall be removed without first having been given an opportunity to put their case before the Committee. The effect of a resolution of no confidence being passed is to remove from office and/or, the Committee, the person concerned.
- j. Upon resigning from the Committee or otherwise ceasing to be a Committee member; the individual must return, without delay, all BATC property to the Secretary.
- k. The Committee has the power to make grants of money, awards, books, medals, apparatus, or otherwise for the purpose of promoting activity, invention and research into television or its applications or in subjects connected with the objectives of the BATC.

5. Finance

- a. All money received by the BATC shall be promptly deposited in the BATC's bank account(s) held in the name of the BATC. The principal bank and building societies accounts shall be based in the UK. The BATC may make use of payment services (PayPal or similar payment systems) based in the UK or elsewhere. Withdrawals from any account shall be on the authorisation of the Treasurer. The Chairman or Secretary shall have reserve access to the principal bank and building society account(s) and the BATC's IT manager may have administrator and reserve access to the PayPal account or similar payment system(s).

- b. The financial year for the BATC is the calendar year January to December. The BATC's accounts shall be examined and approved by an independent non-committee member of the BATC or some other qualified person. The approved balance sheet together with income and expenditure summaries shall be presented to the Committee annually and published in CQ-TV at intervals not exceeding 3 years and prior to a General Meeting.
- c. In principle all expenditure should be approved by the Committee in advance. In practice, small amounts for day to day Committee members administrative expenses do not need prior approval up to a total value of £100 per year. Normal regular payments, CQ-TV printing, web fees, renewal notices, shop re stocking, etc., do not need individual prior approval, but any significant changes to the expenditure must be approved in advance by the Committee. If speed is of the essence the Treasurer and either the Chairman or Secretary may approve expenditure.
- d. No member of the Committee may obtain credit or, loans or, cash advances of any form, in the name of the BATC.

6. General Meetings

- a. The BATC shall hold a General Meeting normally at intervals of 2 years, but not exceeding 3 years at a time and place to be decided by the Committee.
- b. The proposed date of a G.M. shall be published at least 90 days in advance together with invitations for nominations to stand for election to the Committee. The date, time, location and agenda of the G.M. shall be confirmed and published at least 28 days in advance in CQ-TV, e-mail and other forms of communication can also be used for distribution of the G.M. details. Only business on the published agenda may be transacted. For clarity the Chairman at the start of the meeting shall chair the meeting until the end of the meeting.
- c. The quorum for a General Meeting shall be the lesser of 30 members or 5% of the current membership, such a quorum to include at least 4 Committee members.
- d. Any member wishing to include an item on the G.M. agenda must forward the item to the Secretary, so as to be received not less than 60 days prior to the meeting in good time to be circulated to the membership on the agenda. This item must be supported by the signatures of not less than 30 members or 5% of the membership whichever is the lesser.
- e. Any BATC member may stand for election to the Committee at a GM. Nominations for election to the Committee shall be proposed and seconded by two paid-up members of the BATC with the consent of the nominee. Nominations should be submitted to the Secretary at least 60 days prior to the meeting to be added to the agenda of the G.M. If insufficient nominations have previously been received by the Secretary, nominations shall also be accepted from the floor of the G.M. The meeting shall then select the successful candidates. The Chairman of the meeting shall supervise the voting.
- f. The Committee may institute a system of postal voting at a G.M. or E.G.M. Such votes to be properly recorded and presented to the meeting and count as if the member was present at that meeting.
- g. No entrance fees shall be charged to members for admission to a G.M. or E.G.M.

- h. A typical agenda for the G.M of the BATC shall be:

- Apologies for absence
- Minutes of the previous G.M.
- Reports by:- the Chairman, the Secretary, the Treasurer and the presentation of the accounts.
- Other Committee reports, contests, editor, shop, etc.
- Other business as itemised on the agenda.
- Presentation of awards.
- Election of Committee members.
- Close of meeting.

After the G.M. is over, the new Committee shall select from its number a Chairman, Secretary and Treasurer; together with additional Committee posts as required.

7. Amendment to Constitution

Any proposed amendment(s) to the Constitution shall be listed as an agenda item for the G.M. or E.G.M. The full text of the proposed new Constitution shall be made available at the meeting and published in CQ-TV at least 28 days prior to that meeting. Any proposal to change the Constitution requires that two thirds of the paid up members to vote, including any valid postal votes, in favour to succeed.

8. Extraordinary General Meeting

At the request of the Committee, or at the written request of not less than 5% of the membership, the Secretary shall call an Extraordinary General Meeting (E.G.M.). The date, venue and agenda of the E.G.M. shall be published at least 28 days in advance and sent to all members by the most suitable means of communication available. The date and venue of the meeting should be the earliest convenient as decided by the Committee, taking into account the requirement to inform all members of the E.G.M. The only business which may be transacted is that on the agenda and no other business may be discussed. A proposal at an E.G.M. requires that two thirds of the paid up members present to vote, including any valid postal votes, in favour to succeed. Where an E.G.M. is called for by a group of members and is not supported by the Committee the cost of that E.G.M. shall be borne by those members and paid in advance. The quorum for an E.G.M. shall be the lesser of 30 members or 5% of the current membership, of which 4 shall be Committee members.

9. Dissolution of the BATC

- a. A proposal for the dissolution of the BATC can only be heard at an E.G.M. called for that purpose.
- b. Upon the dissolution of the BATC the properties of the BATC shall be sold by private treaty, or by public auction. The assets of the BATC shall be used firstly to pay the creditors of the BATC, secondly to refund to paid up members that portion of their subscription remaining, provided that they can be contacted in a reasonable time (28 days). Any remaining funds shall be used to further the hobby of Amateur Television by distributing funds to other groups with closely similar aims and objectives, or by starting a new group, or by donation to the RSGB, or a Registered Charity, all as decided at the dissolution meeting.
- c. If a proposal for dissolution of the BATC includes a resolution to transfer the assets and operation of the BATC into a Limited Company or; a Company Limited by Guarantee which has the same or similar aims and objectives, then clause 9b shall not apply.



Video Processing Circuit

A video amplifier with agc & adjustable black level clamp.

Dave Kenward G8AJN

Ideal for both analogue or digital modulators, especially those not having any auto input 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 problems often encountered where captions are overlaid. 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. Three of these boards have now been incorporated into the local ATV repeater GB3SQ one on each video input and the three corresponding video input controls have been removed.

Using the low-cost MAX7452 it is a complete front-end video-signal conditioner and is designed to improve the quality of standard-definition video signals. The device restores the DC level of the video input, corrects for amplitude errors up to $\pm 6\text{dB}$, detects and indicates fault conditions, and filters out-of-band noise. 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 $+6\text{dB}$) and an AGC disable function. The black level is clamped to an adjustable reference voltage. The circuit operates by measuring the sync size against the preset level and adjusts the waveform to the

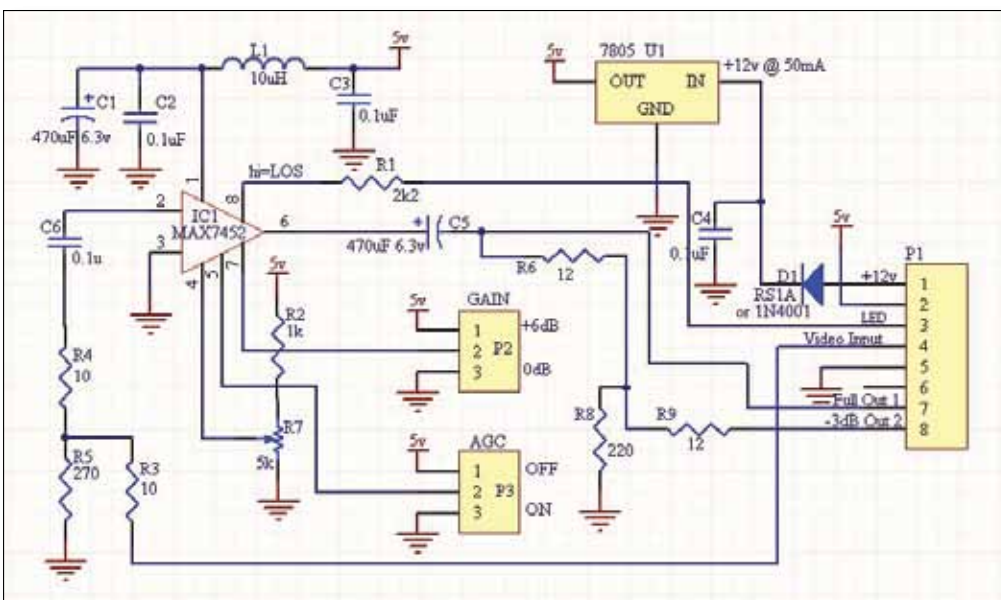


► Board size: 35mm x 40mm (approx: 1.5" x 1.25")

correct size. When a low-level input signal, say 0.5v pk, is presented it steps the video level up until it is correct. Careful adjustment of R7 improves the settling point and smoothness of the transition.

The circuit diagram.

The 5v line at about 30mA – 40mA is supplied via a regulator U1. Input voltage can be from 10 to 14v. If more than 14v is likely to be applied, a heat sink might be advisable on the 7805. D1 is a polarity protection diode and gives a useful voltage drop into the regulator. Any AC ripple present on the DC input is filtered by D1, C4.



Further filtering is provided by components C1, C2, C3 and L1. L1 is not a critical value and can be any value from 5uH to 100uH SMD. It should be kept to a small physical size due to space considerations.

The video input on Pin 1 of P5 is run through R4 and C6 into pin 2 of the IC. R3, R4 and R5 are for an optional 2.5dB 75 ohm attenuator which although not needed for regular 1v pk video waveforms but can be useful

when taking video from a high level source (>2v pk). R3, R4 could be links with R2 left as a single 75 ohms for input matching, the design seems quite happy to operate over a wide range of input feeds with various impedances.

R7 is the black level bias point control. Set initially to midway or about 2v. Adjust it using an input video signal to give smooth operation on a range of different video sources.

If you are intending to use the 'No Video' LED option via R1 you will need to decide whether to have a LOS light or a 'valid signal' light. See later OPTIONS section.

This feature could be more useful in a switcher where several different sources are being handled. Each input could have its own video processor board with a light to indicate a valid input.

The output amplifier exits on pin 8 and is dc blocked by C5 for feeding up to two 75Ω loads, one attenuated to 3dB.

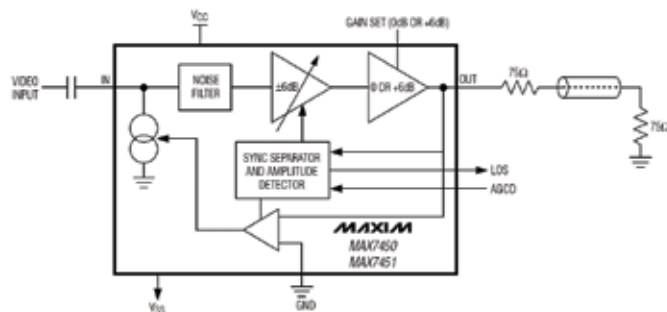
P3 and P4 are the preset options connectors. I suggest using a 3 pin open header and using shorting links such as those found on PC motherboards. Alternatively P3 and P4 connections could be run out to front panel SPST switches.

Using links on P3 the output level can either be 0dB, i.e. output equal to the input signal (assuming AGC is settled or disabled) or +6dB (double the input signal).

Here are the various combinations that the links can give.

AGC (P4)	Gain (P3)	Output
0	0	1V _{p,p} fixed
0	1	2V _{p,p} fixed
1	0	V _{out} =V _{in}
1	1	V _{out} =2V _{in}

► Table 1 (0=0v 1=+5v)

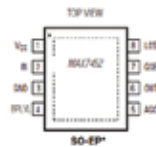


► Figure 2 Internal functions

As shown in Figure 2, the device includes a 2nd-order low-pass filter intended to reject out-of-band noise. There is also an automatic video gain control (AGC), which automatically adjusts the gain to ensure the sync amplitude is normalized to a standard video level;

an AGC disable function; and an output driver that drives a standard 150Ω video load (75Ω x2) with a full 2V pk.

The clamp and the AGC work concurrently. Interaction between the two different control loops is eliminated by the large difference in time constants. The time constant of the clamp settles within 100 lines, while the AGC loop is digitally stepped so that it settles between 1000–64,000 lines. The AGC control works independently of the gain setting of the output buffer. The overall gain is the multiplication of the AGC gain and the output buffer gain. The maximum overall gain is +12dB and the minimum gain is -6dB.



► Figure 3 Pinouts

Back-Porch Clamp

The MAX7452 features a back- porch clamp to set the output blanking level. The devices sense the voltage during back porch and feed back into a control system. The control system provides the appropriate DC-level shift to clamp the output to ground to a voltage set by BPLVL (pin 4). This restores the DC level for further video processing such as on-screen display (OSD) insertion and analog-to-digital conversion. The back- porch clamp to ground also eliminates the need for large value output-coupling capacitors that can introduce unwanted line-time distortion (tilt). This can also reduce board space. The feedback network and the on-chip capacitors introduce a finite settling time after power-up or after any dramatic shift in input voltage.

Automatic Gain Control (AGC)

The device has an integrated automatic gain-control circuit to ensure the sync amplitude is normalized to the standard level, thus normalizing the overall amplitude to a standard level. The accuracy of the normalized amplitude assumes the ratio of active video to sync amplitude is correct in the input video signal. The gain is adjusted automatically by detecting and comparing the amplitude of the sync pulse to a fixed internal reference. If the sync amplitude is less than this value, the overall gain is increased until the sync amplitude is equal to this reference. However, if the sync amplitude is high, the overall gain is reduced accordingly. Disable the AGC loop by taking AGCD high. When installing the board into a system, it is important to note that the AGC can mask termination problems. On initial setting up, disable the AGC and verify that the terminations are correct, and then enable the AGC for proper operation.

Output Buffer:

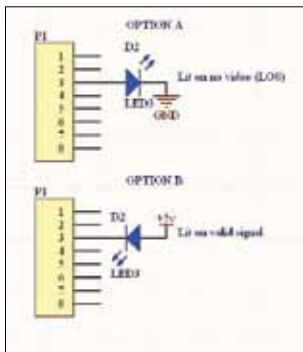
The output buffer of the MAX7452 is designed to drive either standard video loads or high-impedance loads, independent of the buffer gain. Logic levels on GSET (P3) and AGCD (P4) set the gain of the device. Refer to Table I for the different gain-settings.

Noise Filter:

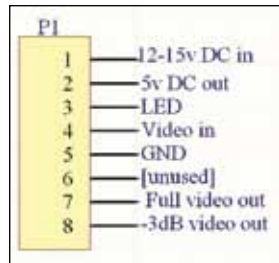
The MAX7452 features a simple 2nd- order low pass filter to reject out-of-band noise that may be introduced by long cable connection between the camera/video source and the switching matrix.

LOS Detector:

The LOS detector outputs a logic high when the sync is not present (loss of video signal) for at least 15 horizontal lines on the input. This can be used to indicate a fault condition of the camera or cable. In most uses this LED is superfluous and can be omitted though provision for the resistor (R1) and P1 pin 3 to the diode have been made on the pcb. Normally the LED would be to ground but an alternative arrangement could be to have the LED lit whilst there is a valid signal input and going off when there is a LOS. This change would be simple as in OPTION B in this diagram.



► Figure 4 Alternative LED wiring



► Figure 5 Connections

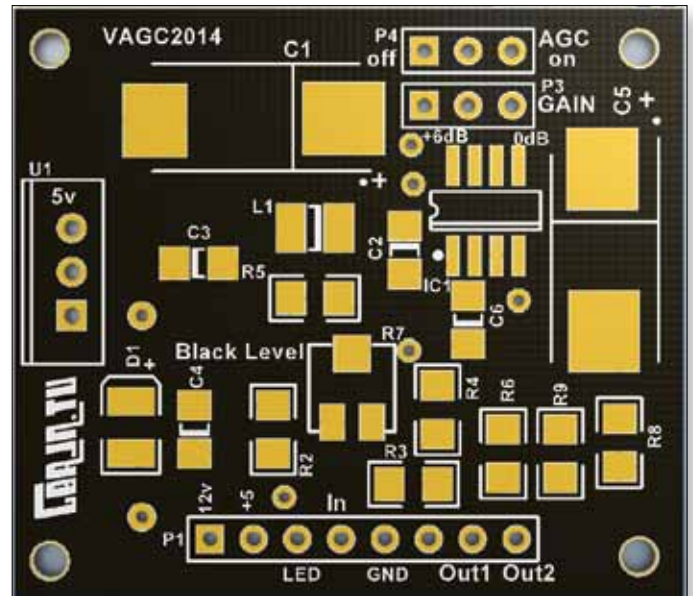
This diode still comes from Pin3 of P1 but goes to +5v instead of to ground. Please note the diode is reversed polarity.

Building the project

There are no real difficulties, the SMD IC being the part needing most care in soldering, have some solder wick handy to clear any accidental solder bridges. Use a small tipped soldering iron and thin gauge solder. The metal tab underneath the MAX7452 needs to be grounded but more for heat dissipation than any electrical reason. I suggest just a fine wipe of solder on the tag, not enough to raise its height as this will make it difficult to solder the eight pins, just sufficient to allow a good contact with the ground connection when pressed down.

Start building by fitting the IC using a single end pin, pin 1 which is the pin at the side with the bevelled edge and a rather feeble dot. Fit R1 (underside) then electrolytic C5 adjacent to IC. Then add the other components at will.

The IC printing should be upright when pin 1 is at the bottom. Pin 1 should adjoin the dot on the overlay. Get the other seven pins aligned before soldering them, then solder a single end pin to hold the device in place opposite the first one and check again that all pins are aligned before soldering them all in. Keep a firm pressure down onto the body of the IC to ensure all pins are flush to the board, this will also ensure a good thermal connection to the printed board. Once all eight pins are soldered, place a soldering iron tip on the exposed copper at the edge of the IC to allow the heat to flow underneath the IC and then apply a little solder.

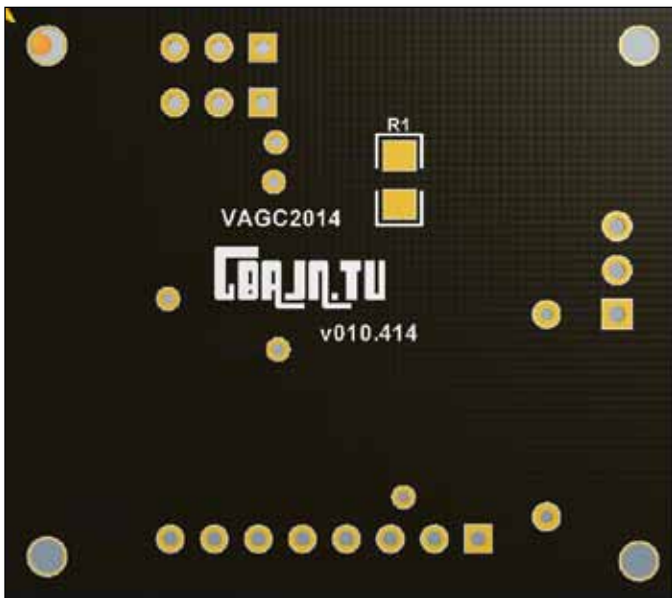


► Figure 6 Component overlay Top side.

Do the same at the other end of the IC. Electrically it seems happy to run with the pad not connected to ground, so it is mainly for heat dissipation, running at 30mA without an LED the IC runs cool. I believe the tab was incorporated for the dual-supply versions that seem to run quite a lot warmer. I have run the +5 volt version we are using here for many days with a 'valid signal ON' LED with no heat problems despite the ground tab being unsoldered.

Headers are optional, wiring directly into the board is fine but P2 and P3 need to be either wired out to switches or have pins fitted to enable links. An example is shown in the photos herewith.

D1 can be any 1A diode of over 25v rating. Extra holes at each end of D1 have been provided for using wire-ended devices such as the 1N4001 if preferred to the SMD.



► Figure 7 Component overlay Bottom side.

CONSTRUCTIONAL NOTES:

If you run the IC with either or both links missing there will be no video output. For an initial setting, with 0dB gain and AGC on, adjust R7 Black Level preset for 1.3v on the slider. Make final adjustment to suit a wide range of video sources.

If you wish to use the alternative 4mm preset with protruding legs shown here, it can be adapted by folding the legs underneath the body before soldering into place. There are also several 3mm SMD versions of the pots, they will also fit onto the solder pads.



Please check at my website www.g8ajn.tv under PROJECTS menu for any updates and for details of purchasing these inexpensive commercially manufactured PCBs. 📺

BILL OF MATERIALS:

Description		Qty		Example Part Numbers
Regulator 7805		1	U1	RS 516-4799
Cap Alum 470mfd 6.3v	SMD 7mmx6mm	2	C1, C5	RS 7110952
Capacitor 0.1uF	C1206	4	C2, C3, C4, C6	RS 723-6704
Diode RS1A	RS1A	1	D1	RS 710-3096
Header 8 way*	2.5mm	1	P1	
Header 3 way	2.5mm	2	P2,P3	RS 712-1804
Inductor 4uH/100uH	1210	1	L1	RS 725-5042
LED	Any LED	1	D2	
MAX7452(SMD)	SOP8	1	IC1	RS 732-6977
Resistor 2k2	1206	1	R1	
Resistor 270 R	1206	1	R2	
Resistor 75 R	1206	3	R5, R6, R9	
Resistor 10 R	1206	2	R3, R4	
Preset 5k 4mm	SMD 4MM	1	R7	RS 691-7492
Resistor 150 R	1206	1	R8	

* Starred items are optional



Summer Fun Contest Images

Left: G0KTD out portable

Right: G1LPS's multi-band home station.



There is something different on Fast Scan Amateur Television

Charles A. Beener WB8LGA

*Change is a coming! You can almost smell it.
Is that U Charlie?*

Something different! IS on ATV DVB-T

There is a lot of activity on Digital ATV on the 70 centimeter band. The activity is called DVB-T. (Digital Video Broadcasting- Terrestrial)

Here is a list of Amateur Radio Operators that are on DVB-T now:

WB8LGA, KA8MFD, W8URI, K8PYQ, AH2AR, W8RVH, W8ZCF, W4HTB, W8RUT, W8ARE, and WB8CJW all with the UT 100-B. (To be explained later) There are some out of town stations with this capability that include WB8ELK, N3DC, K0PFX, N0OBG, WB2AZQ, and KB2ATV.

Those with receive only mode include KC8ZEG, W9NU, and WICTC.

If you are on AM ATV now, there is a possibility that you may want to consider an upgrade to DVB-T if you like high quality pictures.

The pro's are:

It doesn't break the bank to get on this mode. To get a receive only module that plugs into your usb port is about \$9-\$25 dollars. The minimum bandwidth for these modules would be 6 MHz. (Realtek RTL2832U & R820T DVB-T Tuner with Blaze 6 or Presto PVR software)

Here are pictures of the two types that worked for us:



The cost for an all in one transmit and receive dongle that plugs into your USB port is \$230.

This will give you DVB-T transmit at about the one milliwatt level. With a \$5 MMIC you will be able to get the power up to about 60 milliwatts or you can drive a RA60H4047M RF brick and get 30 watts out. Here is a list of some power amps that have worked with DVB-T: Downeast Microwave, old style D1010 or D100, RF Concepts, and Darko. (Darko from Australia)

The cons would be:

- ▶ You will need a computer.
- ▶ The operating system needs to be Windows XP or higher.
- ▶ DVB-T does not like QSB
- ▶ There is not much RF filtering in the UT 100-B so side frequency RF may stop it from receiving video.

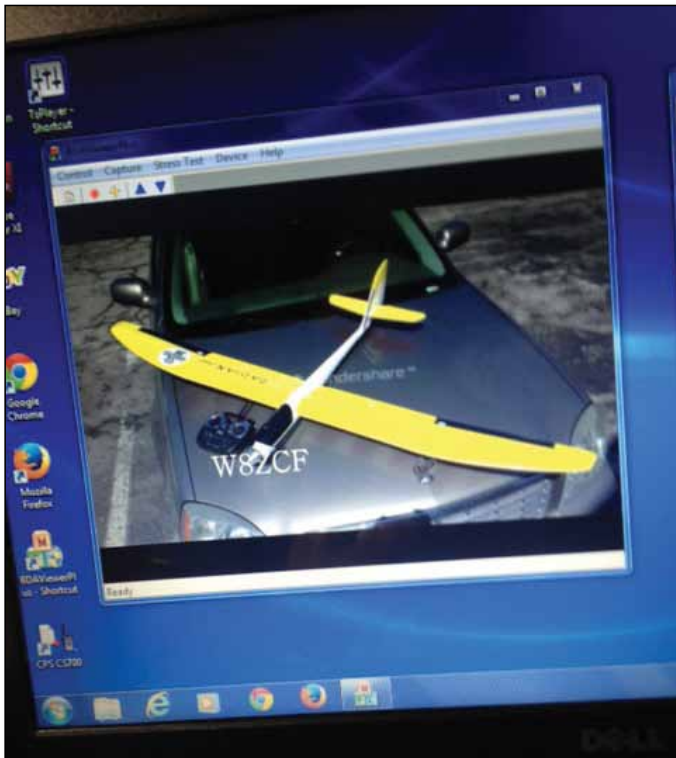
There are a number of us in Ohio and Kentucky that are using the UT 100-B. The bandwidth can be varied from 2 MHz to 6 MHz. There are four of us that use a MMIC device and an old solid state TV amp to get about 250 watts out with about 30 milliwatts input. This is being read with a Bird Wattmeter. Other hams are using a RA30H4047M brick amplifier that can get about 18 watts output.

Here are some power/distance details that have been worked so far:

1 milliwatt/ 5 miles, 60 milliwatts/ 9 miles, 3 watts/ 24 miles, 4 watts/ 36 miles. W8ZCF worked W8RVH at 66 miles. W8RUT has worked WB8LGA, KA8MFD, and W8URI 16 to 24 miles, AH2AR in Vandalia has worked W8RVH 3 watts 15 miles, AH2AR has worked WB8LGA, KA8MFD, and W8URI at 66 to 89 miles, W8RVH has worked W8ZCF, AH2AR, WB8LGA, KA8MFD, and W8URI at 66 to 72 miles, and W8ZCF has worked AH2AR, WB8LGA, KA8MFD, W8RVH, and W8URI at 66 to 137 miles .

W8ZCF has the distance record so far with a DVB-T contact to Hank, W4HTB at 184 miles.

These reports were done in the winter months from December to March.



► W4HTB rx W8ZCF 184 miles

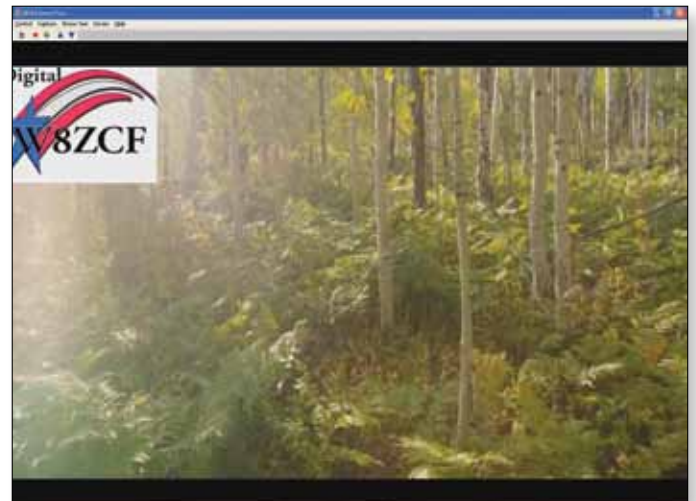
If you are able to see AM ATV at a P1- P2 level than you will probably see those pictures on DVB-T noise free at digital quality.

We are learning more each day. If you would like to join us, we are on the morning ATV net on 3930 at around 7:45 A.M. EDT every day. Most of us use 25 element antennas with hardline and low noise pre amps. The average contact is at 125 miles on AM and in the summer it could be as far as 330 miles.

Here is a picture that W8ZCF received from WB8LGA:



Here is a picture that WB8LGA received from W8ZCF on March 5 2014. Farrell was running about 150 watts:



Here is a picture from AH2AR of his received signal of W8URI on DVB-T:



This is a picture of the DVB-T setup at the location of W8ZCF.....



Now that I have got you to think about going to DVB-T, here is the dongle that is used. It is from Hides Co. The web link is www.idealz.com/hides/product-detail/en-US/35644. If Hides Co. was to be rated, it would be a 20 out of a 1-10 scale. Their support is excellent. Questions were answered quickly. They stand behind their product 100%.

The UT 100-B comes with a CD that has a number of programs on it. These include:

- ▶ **BDA Viewer:** This is a receive program install.
- ▶ **Digital TV 3.4Build 24_20130714:** This folder is a receive program install. It is an easy to use program and works well.
- ▶ **Driver_Windows:** This is where you would point to load the systems drivers for the Dongle.
- ▶ **Media2TS:** This is the install for the conversion program that converts video files to a TS Stream file. It works, but not all of the time.
- ▶ **PC2TV:** This is the install program that allows you to stream to the UT 100-B to transmit to your monitor stream or to stream any video hardware to the UT 100-B. This program is difficult to get working.
- ▶ **SDK_Linux/SDK Windows:** The SDK folders are for code writers for Linux or Windows.
- ▶ **TS Files:** In this file are samples of video's that you may use to see if your system is working.
- ▶ **TS Capture:** This is an install program that allows you to capture video hardware to a file.
- ▶ **TS Player:** TS Player is a Transmit program that allows

you to control The UT 100-B transmit and sends the TS file to the unit.

TS Player Settings for distance would be the following:

Bandwidth 2 MHZ, Frequency 439000 or 437000, code rate at 1/2, guard interval 1/4, transmission mode 2K. The attenuation/Gain controls the output Level.

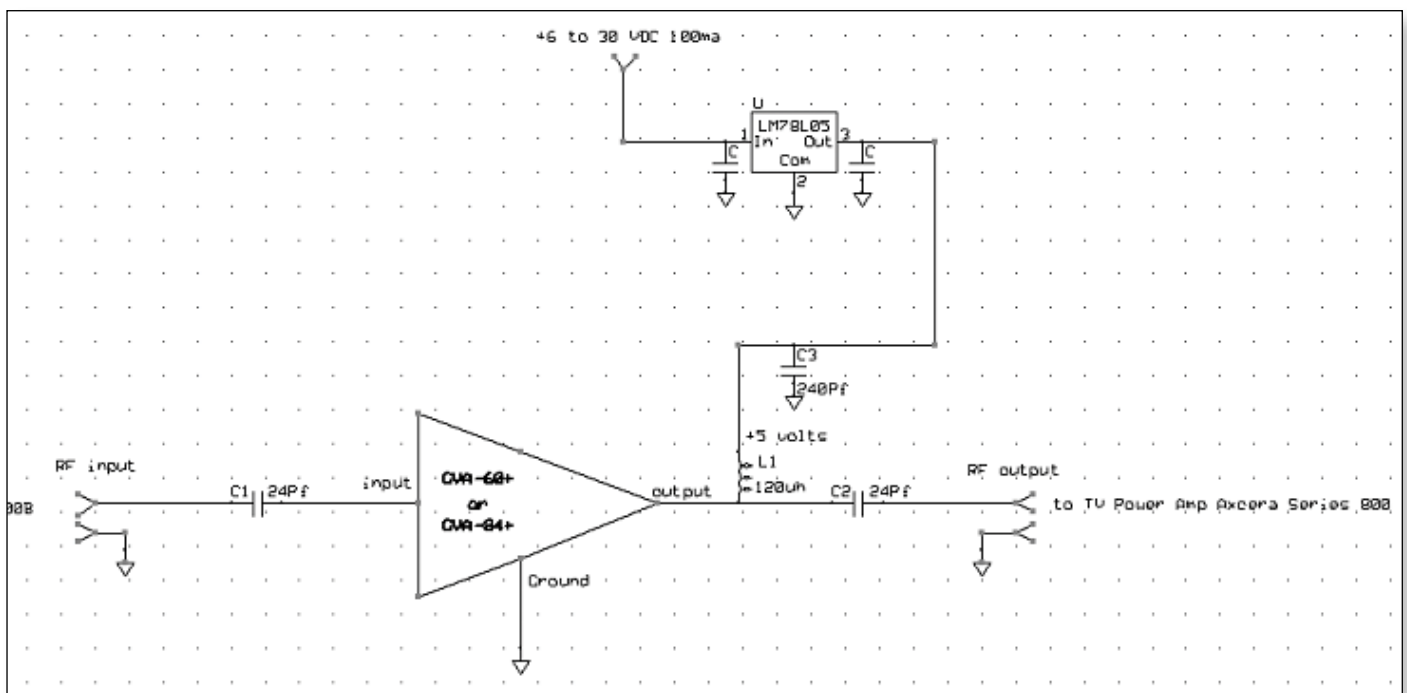
Remember that TS File is the location of the transmit stream that you wish to send.

TS stands for transmit stream

Transmit files are made from videos or pictures. Some use the DC-101 cameras from Hides Co. These will cost about \$125, run from 5 volts, and the DC-101 is in HD video.

Below is a diagram of a GVA-60 MMIC amplifier to increase your output to about 60 milliwatts.

Here are some pictures as received by KA8MFD:





With the purchase of the Hides UT 100-B, the initial set up was a little tricky but worked well. Now you are ready to send and receive digital video terrestrial. Hides software offered us test videos to get everything set up to transmit and receive digital ATV. They were HD with sound. Now we needed to see if we could recreate these for ourselves. The need to transmit TS streams was an experience. After some trial and error we have come up with the following suggestions.

We were able to use Wondershare Video Editor V3.5.08. It can be downloaded from their site. (www.wondershare.com/video-editor/) You may import video and pictures and edit to your needs. This is a trial version and will put watermarks on your converted videos. The cost for the full version is about \$40 but can be had from time to time for \$30 on sale.

We edit all video as needed using Wondershare and export as an AVI file. The TS Player program for the UT 100-B worked marginally well with some lag. Wondershare will import most video formats and pictures. We found making our own call signs very easy with any program. Just save as JPEG and import to Wondershare Video Editor. Wondershare offers many options to modify your video.

When the export file window shows up, under the device option check IPHONE. Under profile, check AVI. The name would be whatever you wanted to call it. On the save to file, you need to create a file somewhere to save this. It will be in AVI. Remember this, you will need to find it later. Advanced settings are all okay.

Now that you have the video edited to transmit, you need to convert it to a TS file. Cyberlink Media Espresso V6.5 is a program that will convert AVI files to TS files. (www.cyberlink.com/products/mediaespresso/overview_en_US.html?&r=1) There is a trial version of this available but it also leaves a watermark. There have been some issues receiving audio on 2 and 4 MHz with this conversion but stay tuned to future articles for updates. WB8LGA has since received a program from a company called Febon that converts to TS files. Testing is in progress and will be reported on at a later date.

All of the tests so far show that 2 MHz bandwidth, QPSK, code rate of $\frac{1}{2}$, guard interval of $\frac{1}{4}$, and transmission mode of 2K work best for distance. Adjustments are made for import data rate (you can go to 16 QAM or 64 QAM to increase modulation data rate) to keep input modulation rate below the output data rate. The very few settings and the ability of the Hides UT 100-B to scan all variables made getting a locked picture almost foolproof. Preamplifiers are used on the receive side.

The above described are only a sampling of what may work. Other programs may be available that will also work. Feel free to experiment and let us know.

- ▶ KA8MFD uses a laptop with Windows 7, 4Gig ram, and 320 Gig harddrive.
- ▶ W8URI uses a laptop with Windows Vista etc etc.....
- ▶ WB8LGA uses windows 7 or old Laptop with XP.....

Good luck to all. Once you see a digital ATV picture, you will be hooked. 🗣️

Using a small ARM based mini TV box for digital TV

Charles Brain G4GUO



► An MK802 device sitting on top of a Raspberry Pi

Recently a number of us have been investigating the use of small ARM based computers for digital TV. Probably the most well known one of these is the Raspberry Pi. However there are a range of other ARM based devices available that run Android which can be converted to run Linux. These devices are aimed at the consumer market for streaming video to standard TV sets. As one can imagine the majority of these TV sticks are manufactured in China.

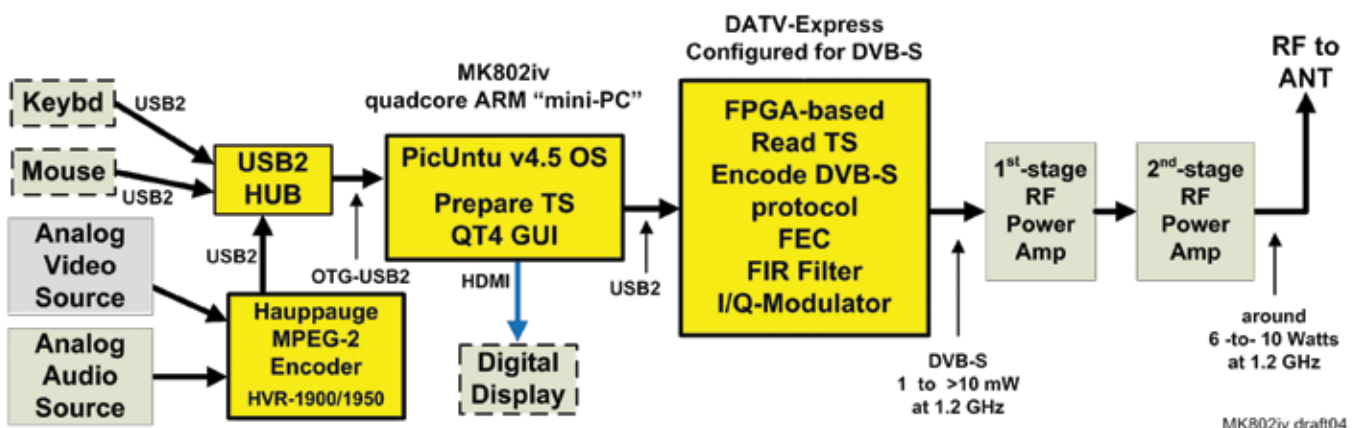
As soon as a new one of these Android boxes become available people start trying to port Linux to it. As you may know Rob M0DTS has had some success in using an MK808 dual core TV stick in a standalone Digilite configuration. There is now a new device in town called the MK802IV from Rikomagic. This is a quad core device running at up to 1.6 GHz using a RK3188 chip with an ARM9 based Cortex architecture using 28 nm technology from Rockchip. As well as the quad core ARM CPUs it also has a MALI 400 600 MHz GPU for graphics processing. Rockchip will be bringing out an even faster device the

RK3288 later in the year. For comparison the Raspberry Pi is a single core 700 MHz device using 65 nm technology and the dual core MK808 uses a RK3066 device with 40 nm architecture. Normally the smaller the gate geometry the less power it uses and the faster it can run.

So the MK802IV is considerably faster than the Raspberry Pi but unfortunately it is not as simple as that. The MK802IV has no GPIO and the OS support is somewhat lacking compared to the Raspberry Pi. The ideal device would something as fast as the MK802IV but with the software and hardware support of the Pi but we don't live in an ideal world.

From listening to feedback from users it seems as if one of the characteristics of the ideal DATV system is portability, the other being low latency (but that is another tale). So I started to investigate using the Raspberry Pi for DATV. As those of you that read the BATC forum will know Evariste F5OEO has done some good work using a Raspberry Pi and a Digilite to send MPEG4 video at around 2 MS/s these tests have proved successful using the hardware MPEG4 video encoder built into the Pi. So I thought I would have a go at doing a similar thing with DATV-Express but this time using MPEG2 encoding using an external Hauppauge HVR1900. To get any success I had to move the DVB-S encoding from the Linux host into the FPGA, this took me about 2 months to get working properly but it does significantly reduce the work the Linux part of the system has to do (tests showed it more than halved it). However try as I might I could not get the system to work reliably at anything above 2 Msymbols/s.

I then put my Pi back in the draw and started looking for a cheap but faster affordable device. I had looked at quad core ARM devices before, most notably the SabreLite

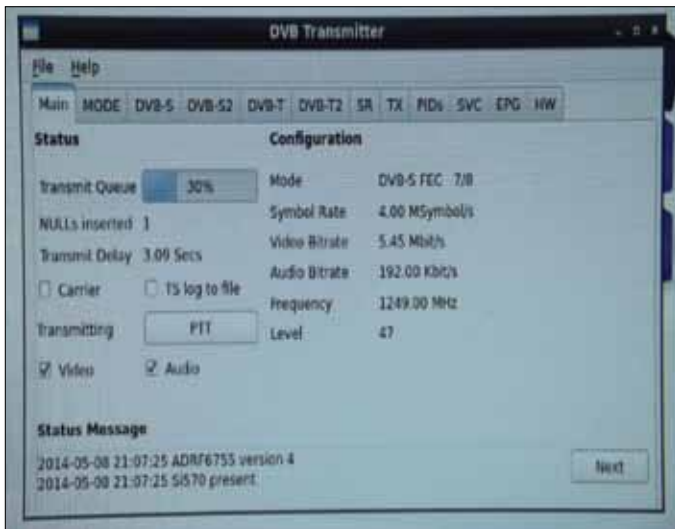


MK802iv draft04

board from Freescale. I did have quite good results with that device but the version of Linux I was using from Linaro was not at all stable and would not make for a practical solution.

A few weeks ago I checked back on a project I had been watching for a couple of years and this was the port of Linux to the MK808, called Picuntu. I was excited to find that Picuntu 4.5 was now available targeted at a quad core device, the reference device being the MK802IV from Rickomagic. A quick trip to eBay / Amazon for the best price and I had one on order.

A couple of days later I installed Picuntu 4.5 on my new



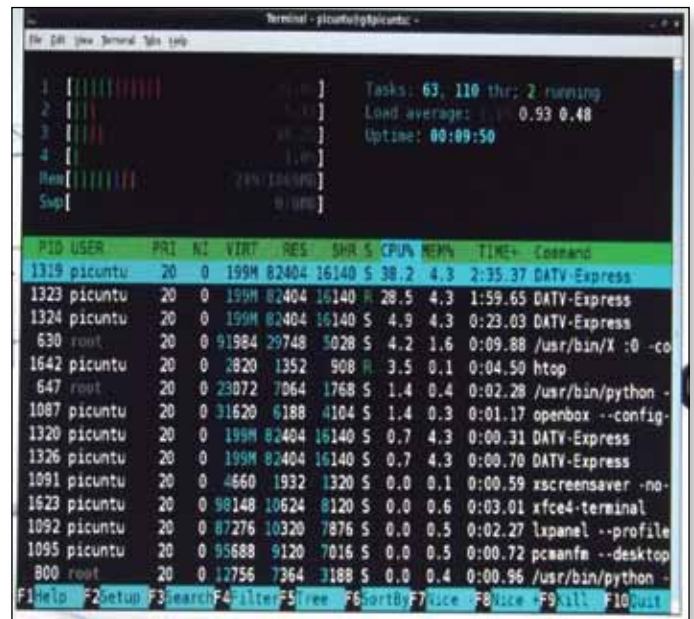
toy and within about 30 minutes I had everything up and running. I then transferred the source code for DATV-Express to my new Picuntu system and compiled it using QtCreator; the compilation took about 10 minutes. Some slight tweaking of various parameters was needed but I was soon able to run DATV-Express on it using the HVR1900 for video/audio capture. The earlier PVRUSB2 works just as well and in fact is preferable in my opinion.

Results so far indicate that I can achieve 12 Msymbols/sec FEC 7/8 maximum for DVB-S, the FPGA is doing most of the hard work. For DVB-S2 I can achieve 4 Msymbols/sec QPSK. The Low Density Parity Check FEC coding of DVB-S2 is much more processor intensive than the equivalent FEC of DVB-S. Unfortunately because of the large data blocks used in DVB-S2 (64K) it won't be possible to fit the FEC encoding inside the FPGA on the DATV-Express board. As yet I have not been able to achieve DVB-T encoding at a fast enough rate on the quad core device. To get it to work I would probably have to use an FFT module written in ARM assembly language or maybe use the MALI GPU to do it.

The block diagram in figure 1 is an overview of the system,

the first picture shows a close up of the DATV-Express GUI running on Picuntu 4.5 and the second picture is the htop program running showing the processor loading.

I would like to add DVB-S receive capabilities to the



MK802IV but to do that I will need to build the Picuntu Kernel myself as the drivers are not included by default. I own a TT S2-3600 DVB-S2 USB receiver. The driver source code for the front end device used in the S2-3600 receiver will not allow symbol rates of less than 5 Msymbols/sec which is not of much use for DATV. Thankfully a one line change to the source code and a re-compile is all that is needed to get it to work down to around 1 Msymbol/sec. I have tested it on my Intel based 12.04 LTS Ubuntu system so I know it should work. I just need to be able to compile the Picuntu Kernel which I have not been able to do yet. I have also learnt that because Picuntu is based on a fairly old kernel 3.0.36+ the required drivers for the S2-3600 are not all present. The kernel source would have to be patched before this can be used. At present there is no MPEG2 hardware accelerated decoding which means the performance will not be very good on receive.

The current attempts at getting DATV to work on these TV sticks has been done with the Express software running as a GUI application (unlike standalone Digilite which is command line based). I would in the future like to use an architecture called Gstreamer to produce a command line version (so reducing the the overhead even further). So far results have been quite poor as while Gstreamer may be ideal for streaming video over the internet there seem to be some major issues when trying to produce a broadcast quality transport stream using it. Vital parts of the MPEG multiplexing and demultiplexing

code seem to have issues judging by a Google of the Internet and my own tests. It looks that if I want to do the job properly I am going to have to write my own Gstreamer objects which is something I had hoped to avoid.

At the end of the day running DATV on these small TV stick computers is becoming more viable. It is still highly dependent on the quality of the Linux ports which is outside of my control. Currently most of the Linux ports do not support hardware acceleration of graphics by the GPU but they are slowly getting there. There are a number of other TV boxes available like the MK902 which uses the same processor but has 4 USB2 ports, 100 Mbit Ethernet, camera, microphone, Bluetooth, composite A/V output, HDMI output and 802.11 b/g/n WiFi. I have recently seen another device which incorporates a DVB-S2 receiver in the box but at present is only available as a dual core processor.

Month by month faster and faster devices are coming on stream so we really are living in exciting times (provided you like that sort of thing). The way DATV-Express is written lends itself well to the multi core nature of these new breed of TV sticks. I hope the Express software will remain portable enough to simply re-compile on whatever new Linux goodies are released. Currently the source code for the Linux part of DATV-Express and the firmware to run on the Express USB2 controller chip are available on github.com/G4GUO. The FPGA source will be placed there eventually. Please be aware that the firmware/FPGA modules that are currently shipping with DATV-Express are no longer compatible with the latest github source, if you need them just email me g4guo@arrl.net or PM me via the BATC.

Since writing this article we have tried running Picuntu 4.5 on more MK802IVs and have run into trouble with stability of the display. The two units with serial numbers starting 2014 have worked well but 3 units we have tried with serial numbers beginning 2013 have had tearing of the display and screens that go blank every few seconds. As yet we have not managed to find why this is happening, if you buy one of these TV sticks I cannot currently guarantee it will work.

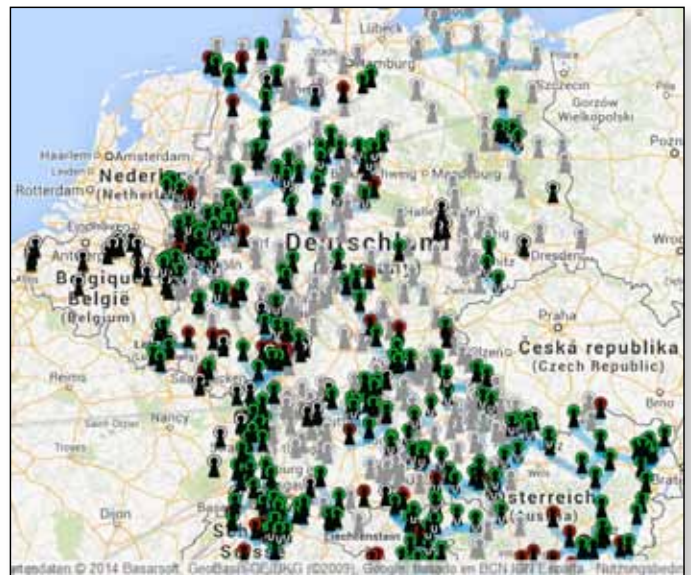
I hope to be able to show some of this stuff at the forthcoming CAT14 convention. 🗣️

News: Online ATV streams and HAMNET

Frank, DL3DCW

After eight years of supplying a free online streaming server with around fifteen german ATV repeater output streams to the ATV community Oliver, DO1OLI, handed over this task to Joerg, DG0CCO, sysop at ATV repeater Tangermuende (Elbe river), DB0TGM. The web address is the same as before <http://www.atv-stream.de/> now supervised by Frank, DL3DCW, at DB0TV (near Wuppertal). Attention: stream links with “call.ampr.org” or “44.168...” in the browser address only connect inside the HAMNET!

This modern amateur radio infrastructure called HAMNET is a fast successor of the pre-internet Packet Radio network, providing rf links and user ports for data, DigiVoice and DATV on 13 and 6 cm bands using WiFi devices and aerials. On some links the TCP/IP data rate is 40 Mbit/s exceeding any normal DSL internet connection! Started in Austria about ten years ago the HAMNET now has chunks or chains of data stations with rf connections and VPN tunnel interconnections via Internet between them all over central Europe.



Many ATV repeaters are providing HAMNET user inputs additionally as well as Skype inputs. Newer developments try to realize ATV stream servers on Raspberry Pi mini computers and “Multicast” outputs. 🗣️

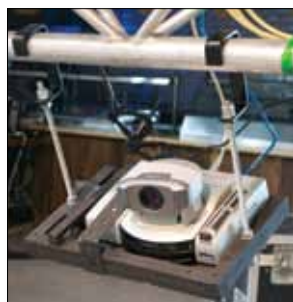


Out and about with the BATC - streaming Student Robotics 2014

Frank Heritage M0AEU

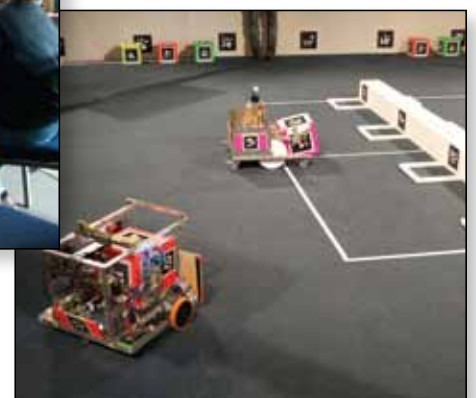
Over the weekend of the 26/27 April, the Student Robotics 2014 competition was held at the Newbury Racecourse. BATC were asked to film the two competition arenas and stream them live to the internet. Noel Matthews G8GTZ, Phil Crump M0DNY and Frank Heritage M0AEU set up and operated 6 remote cameras between the two arenas and streamed both days' competitions live to two streams on the BATC website.

The competition consisted of a series of 3 minute rounds where an autonomous robot had to identify, correctly orientate and place its cubes in 4 designated squares in the centre of the arena - whilst avoiding the competitors robots. Colleges travelled from across the UK, and some from across Europe to take part in a series of heats eventually resulting in the play-offs and the grand final. The degree of sophistication in the robots was incredible, and the rounds were closely fought. The final victors were from Headington School, Oxford.



Two production desks were established, both with IP protocol control of the remote cameras; vision mixer and a computer handling the digitising of the mixer output, the graphics overlay and the encoding of the stream to the Internet. One desk was run

on the Windows based BATC equipment, whilst the other used a Mac OS based system. Both performed flawlessly over the weekend. 🗨️





Treasurer's Report for 2013

Brian Summers G8GQS

The club has had an interesting year with many changes and a new policy to support ATV activity. From the financial viewpoint we have used club reserves to subsidise the provision of equipment and web services. This and other outgoings have led to a reduction of £3980 in our reserves. However our reserves are still very good and the club remains in a financially strong position.

BATC shop and publications

The BATC shop continues to supply the needs of members with the introduction of new items. Our new reduced pricing policy has led to a surplus of £262, a better figure in line with supporting ATV operation. The sale of DVDs and CQ-TV back issues in the first quarter of the year raised £59. DVDs and CQ-TV back issues are currently unavailable.

BATC bank accounts

The last redundant bank account with HBOS has been closed and we now bank with HSBC and PayPal. Our reserves are with the Teachers Building Society.

BATC Ltd.

We have reviewed our decision to move the club into a limited company and have abandoned this plan as we want to remain a members club as we have always been. The equipment purchased by BATC Ltd. has been brought back inside the club and the costs of running the web services are now met directly by the club.

Payments methods

The BATC PayPal payment system continues to work well. This payment system is available for most of the world. You do not need a PayPal account to use it, and it works with credit & debit cards. If you are in the UK a cheque or postal order is very acceptable and avoids the commission charges levied by PayPal. Payment can also be made by bank transfer.

We are not able to accept direct card payments as this has proved not to be cost effective, but most cards can be used through the PayPal system.

In extreme cases payment can be made by Sterling, Euros, or US\$ notes by post at the senders risk. If you have problems please contact us and we will try to find a solution.

Subscription Fees

A review of our subscription fees is due and we shall have to consider an increase.

Notes to the accounts

1. The "PayPal commission" of -£869 appears in the income section as it is deducted at source so we never had it.
2. "CQ-TV printing", the 2013 figure includes postage as the printers invoice does not list this separately.
3. "Benefits and projects" includes the cost of new display banners and logo design.
4. "Web services" includes the cost of a new camera system for use at streaming events and to support web services and hosting costs. 🗨️

Formal notice of Biennial General Meeting of the British Amateur Television Club



This is to advise that the Biennial General Meeting for members of the British Amateur Club will be held on the 7th September 2014 at 2pm in the lecture theatre of the Everest Academy School, Basingstoke.

In order to comply with paragraph 6.3 of the current constitution, the agenda will be published on the BATC website and BATC forum after 17th August. Members of the BATC who wish to include any items on the agenda must forward them to the secretary before that date.

Members requiring an agenda to be posted to them, must notify the secretary by August 1st who will then post them after August 17th. 🗨️

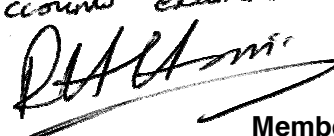
BATC INCOME & EXPENDITURE ACCOUNT YEAR ENDING 31 DECEMBER 2013

Income account	2012	2013	Expend account	2012	2013
Subscriptions	£6,150.12	£6,150.67	CQ-TV Printing	£3,245.00	£5,200.88
BATC Shop surplus	£2,369.54	£262.72	CQ-TV Postage	£1,606.56	£0.00
Publications surplus	£152.79	£59.30	CQ-TV Production	£450.37	£0.00
Donations received	£158.20	£54.31	Office expenses	£812.85	£101.27
Interest received	£475.22	£401.66	Committee expenses	£637.90	£349.80
Miscellaneous Items	£3.40	£44.00	RSGB affiliation fee	£51.00	£51.00
Convention & BGM	£297.50	£0.00	Benefits & Projects	£393.70	£712.60
Less PayPal commission	-£533.74	-£869.48	Web services	£2,000.00	£3,668.16
	<u>£9,073.03</u>	<u>£6,103.18</u>	Convention & BGM	£523.24	£0.00
			Bank fees	£20.00	£0.00
				<u>£9,740.62</u>	<u>£10,083.71</u>

BATC BALANCE SHEET AT 31 DECEMBER 2013

Fixed Assets	2012	2013
Equipment purchases	£2,334.36	£1,993.92
Less depreciation	-£2,334.36	-£1,993.92
Current Assets		
Stock, BATC Shop & BATC Publications	£1,024.73	£7,623.37
Teachers building society	£44,255.06	£38,656.72
HBOS account	£222.24	£0.00
HSBC account	£14,702.00	£3,958.36
PayPal account	£2,827.69	£9,362.40
Less Current liabilities		
Subscriptions received in advance	-£5,036.92	-£5,586.58
	<u>£57,994.80</u>	<u>£54,014.27</u>
Represented by Accumulated fund		
Balance brought forward	£58,562.39	£57,994.80
Surplus	-£567.59	-£3,980.53
Balance carried forward	<u>£57,994.80</u>	<u>£54,014.27</u>

I have examined the books and records of the British Amateur Television Club and confirm that the balance sheet and the income and expenditure account are in accordance with those books and records.

Accounts examined and approved.

 27th April 2014.
 Member Richard Harris


 Brian Summers
 Hon. Treasurer

VK DATV QSO Party

Peter Cossins VK3BFG

The first DATV QSO party was held in 2011 as a part of the 100 year celebrations of Amateur Radio Victoria. Since then it has developed into an annual event, particularly with the help of Don Hill KE6BXT and now Art, WA8RMC.

The concept has been to promote amateur television activity in VK and also in other countries. Whilst it has been called the 'DATV QSO Party' both analogue and digital stations can of course participate. The use of amateur radio frequencies is optimised while the Internet conduit for the international connection is managed by control stations using Skype. It is recognised that other software could be applied for this application, but Skype has been used to date due to ease of use and commonality. We had Skype on the PC's already and were familiar with its operation.

Melbourne is privileged to have the longest continuously operational ATV Repeater in Australia, licenced by Amateur Radio Victoria and **it should be noted that all pictures and graphics in this article have been captured from receiving VK3RTV.**

VK3RTV is located on a hill with a height of about 2500 feet about 35 kilometres east of the city of Melbourne. The resultant coverage is extensive and only modest power is required. In June 2009, VK3RTV was converted from analogue to a multi-plexed two channel DVB-T output on 446.5 Mhz (VK3RTV1 and VK3RTV2). DVB-S inputs on 1255 have an output on VK3RTV1 and 1276 Mhz on VK3RTV2 with only one 1250 Mhz analogue input through to VK3RTV1. There was a 10.41 Ghz analogue input with an output on VK3RTV2, but the antenna has been damaged and has not been repaired to date.

The activity commences on a Friday night, Melbourne Eastern Australian time with Peter VK3BFG acting as the net control.

Melbourne ATV stations work in turn through VK3RTV with VK3RTV also sending pictures and sound through to the BATC streaming site. Stations remote from Melbourne can watch the BATC stream and are called in via Skype by Peter. He then transmits the received video and audio to VK3RTV. This year it is hoped to have net control stations in Brisbane and Port Pirie in addition to Melbourne who will manage their local stations through their local DATV Repeaters.

Internationally we have Don KE6BXT in Southern California and Art WA8RMC in Columbus Ohio acting as



net control stations and managing stations through their local repeaters.

WR8ATV is one of the few repeaters in the US that has a digital output and digital inputs. W6ATN in Southern California provides extensive access to linked repeaters in the area. In the case of the International component of the QSO Party there is a Skype back channel to provide co-ordination. In most cases ATV stations are working through their local repeaters and this maximises the use of amateur radio.

Ken, W6HHC from Orange County makes an appearance via Skype and has given us an update on the developments in the DATV Express project.

This year Noel Matthews G8GTZ has offered to be a control station in the UK using the GB3HV repeater and with the possibilities of including GB3SQ and GB3KM. This is an exciting new development which will increase the scope of the event. Contacts are expected to be made to the US on Saturday 30th in the morning/afternoon Eastern Australian time which will be Friday evening the 29th in the US. Contacts to the UK are envisaged on Saturday evening Eastern Australian time which will be Saturday morning/afternoon in the UK.

Stations wishing to participate via Skype or act as a net control station can contact Peter Cossins VK3BFG email pcossins@bigpond.com 



► Peter, VK3BFG Wantirna South Melbourne introducing the first DATV QSO Party in August 2011. (VK3RTV1)

Picture Gallery



▶ Winston VK7EM, Penguin Tasmania via Skype (VK3RTV1)

▶ Ralph VK3LL and Jack VK3WWW in Mitcham, Melbourne with a blue screen backdrop (VK3RTV1)



▶ Don, KE6BXT in Mission Vieja, Net Control for Southern California via the W6ATN Network (VK3RTV1)

▶ Ken, W6HHC Orange County Southern California (VK3RTV1)



▶ Don, VK5ADM in Adelaide (VK3RTV1)

▶ John VK3ATV in Williamstown, Melbourne (VK3RTV1) (right)



▶ Neil VK3BCU in Delahey, Melbourne (VK3RTV1)



▶ KE6DPS Southern California via W6ATN Network (VK3RTV1)

▶ Mick, VK3CH in Northcote Melbourne (VK3RTV1)



New Rigol Spectrum Analyser discoveries

In this follow up to CQ-TV 243 we explore analysers performing at 3GHz+

Dave Phillips MIET – MOPMZ

There is no doubt today's global economics make high tech very affordable and the same is true of quality instruments for the DX / TV lab – at least for the time being new RF test equipment uniquely affordable. As professionals and radio amateurs alike join the ranks of modern spectrum analyser users (see DSA815-TG exposé in CQTV 243 issue p29), we contacted Telonic Instruments Ltd (based in Berkshire and online at RIGOL-uk.co.uk) with some unexpected results.

A quick reminder of some ways a high performance spectrum analyser might help in our applications and then we'll look at a Rigol DSI030A-TG which can help us with many of these.

Some rigorous tests I often need to do include:

- ▶ Testing at high UHF and into microwave frequencies
- ▶ Inspecting receivers/low level signals/emissions (view f-spectra well below -100dBm)
- ▶ Generating a stable source of RF at a known level up to e.g. 0dBm
- ▶ Ensuring good linearity, eliminating intermodulation, levelling output or mixer powers
- ▶ Make broadband VSWR measurements on both systems and antennas
- ▶ Modulation measurements on video transmissions and monitoring modulation B/W
- ▶ Cavity and filter alignment including deep out-of-band rejection performance

With these in mind, in this issue I am exploring what I can achieve with new performance spectrum analysers reaching 3GHz plus with still lower noise floors – a step beyond our 1.5GHz feature - and as it turns out, very timely if you are looking to buy for best value. There is a bonus for serious RF users, plus an unexpected offer for CQ-TV readers - see end of this article for more information.

Simple modulation testing above UHF.

First I get straight on with monitoring typical modulation sidebands, I'm at 13cm with DSA1030A-TG3 - a performance spectrum analyser from RIGOL incorporating a 3GHz tracking generator. As we'll see, the user of this instrument has a wealth of advanced measurement capabilities at their disposal.

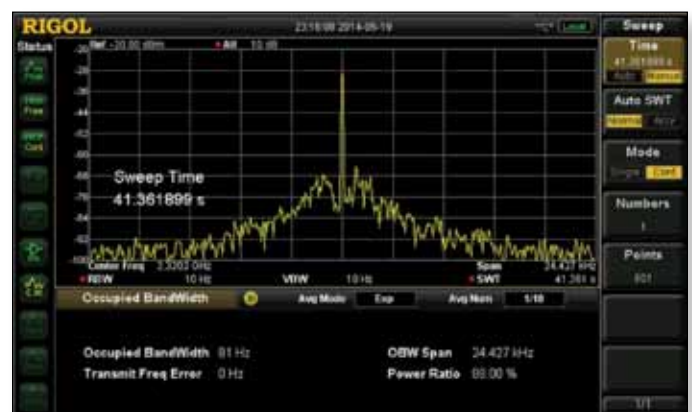


- ▶ DSA1030A-TG under 13cm band RF test. My colleagues in the RIGOL-UK team at Telonic Ltd. let me hook up to a DSG3060-IQ Pro RF source¹.

Rigol headlines their 3GHz model like this:

- ▶ 3GHz measurement Bandwidth (from 9kHz up)
- ▶ Achieve low noise floors down to DANL of -148 dBm
- ▶ Low phase noise -88dBc/10kHz
- ▶ All digital IF Design
- ▶ Easy to read bright screen, plus a VGA-out socket you can display on large lab monitor.
- ▶ 10 Hz Minimum Resolution Bandwidth

So what does this mean when you look closer at real 13cm signals? Can I easily see 40dBc s/n ratio? Well here's my RF carrier at 2,302.2 MHz:



- ▶ Fig 2 - This is quite a demanding plot: the resolution is down at 10Hz, with quite a low noise floor yet my sweep time is a nifty 40-odd seconds. (I mistakenly left in 10dB input attenuation, so it's really 10dB better!). I don't often need 10Hz resolution, so sweeps can be sub 1 second.

¹RIGOL's DSG3060-IQ is rather more than a 'sig gen': it can push the envelope of many an RF test e.g. modulating a 5.6 GHz carrier at 100 million 256QAM characters per second! Here we stick to a modest 2,320.2MHz test!

Now I add my modulation. For no particular reason, I chose Phase Modulating with a 1.1 kHz sine with fairly wide phase deviation setting on the signal generator:

The aim of this test is to explore the analysers ability to quickly measure occupied bandwidth of my modulated signal. The AMK (Advanced Measurement Kit) purport to have many automated functions. One is Occupied Bandwidth (OBW) - the analyser automatically puts internal marker around your transmission, analyses it and calculates and reports the bandwidth.

So let's now take a look at how the DSA1030A-TG gets on displaying this modulated spectrum, and how the AMK feature (standard with -A model) reports the OBW results at the bottom of the screen in fig 4.:



► Fig 4. - You can immediately see the carrier power now spread over a number of frequencies in the expected comb pattern for a phase modulated signal. As per theory the lines of this comb are 1.1 kHz apart (each of the ten horizontal squares is ~2.4kHz of the span).

I get an accurate measure of bandwidth occupied by sidebands with just a push of the button.

Inside the technology - for our RF instrument designers

The Inside track on RIGOL's approach to designing-in advanced performance and stability. RIGOL adopts a proven digital IF approach, citing reliability and performance success of its little brother, the long-established DSA815-TG. The more capable DSA1030A-TG is aimed at the most demanding and widest range of RF applications but this time up to a full 3GHz.

Stability and precision is the primary design goal hinging around its all-digital IF core with 10Hz resolution bandwidth, -88 dBc/Hz phase noise (typical) at 10 kHz offset. The front end is impressive with up to -148dBm



displayed average noise level (10 Hz RBW, standard preamplifier on) and less than 1.0 dB total amplitude error, affording high precision measurements whether your application calls for low noise or narrow resolution.

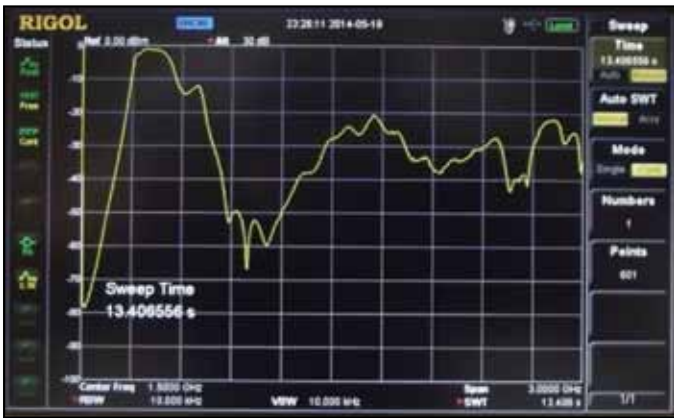
Rigol boils down the advantages you get from their design approach like this:

1. The ability to measure smaller signals: Digital IF design approach and filter technology enables smaller bandwidth settings, greatly reducing the displayed average noise level.
2. The ability to distinguish small signals by frequency: using the IF filter with the smallest bandwidth setting it is possible to make out signals with a frequency difference of only 10 Hz.
3. High precision amplitude readings: this technology almost eliminates the errors generated in traditional spectrum analyser design filter switching, reference level uncertainty, scale distortion, as well as errors produced in the process of switching between logarithmic and linear display of amplitude arising from a traditional analogue IF design.
4. Higher reliability: compared with traditional analogue designs, the digital IF greatly reduces the complexity of the hardware, the system instability caused by channel aging, and the temperature sensitivity that can contribute to parts failure.
5. Your measurements, faster: digital IF technology improves bandwidth precision and selectivity of the filter, minimizing the scanning time to display your results a lot faster.

Using DSA1030A-TG for filter / cavity testing and tuning



► Fig 5. Snap above isn't my best but does speak for itself; showing a black band pass filter under test.



The RIGOL reveals this filter under test is good below 1.2GHz, but it does a poor-ish job of rejecting some frequencies above 1300MHz – with rejection as bad as 20dB at some points e.g. 2 GHz and 2.9 GHz.

The picture shows the dB scale better:

Keeping tabs on harmonics with DSA1030A – courtesy of G3WKZ

Colin Bayliss (G3WKZ) has also used this setup to test the purity of emissions from his 70MHz Transceiver. This is Colin's comment on his build and test:

“Here's my solid state 4m PA unit that I built earlier this year from modules available from Holland. I've managed over 60 IARU locator squares on 4m this summer from both normal ground wave / tropo and from sporadic E propagation. It's built into a self-contained PA unit with associated power supplies. The RSGB's publication "RF Design Basics" by John Fielding, ZS5JF has excellent information on LPFs (Chapter 6 - Design of Radio Frequency Filters) and solid state PA design (Chapter 10 - Solid-state power amplifiers).



In the above test the third harmonic is good and low. We set ourselves a goal of up to 20dB of clear water between carrier (left) and 2nd harmonic (about 2.5 squares from

the left). A tough target because it measures harmonics directly at the transmitter output where it's worst. Antenna systems obviously give a massively preferential gain at the fundamental, with low gain at 2nd. Colin concludes: "My PA underwent spectrum analyser testing using a RIGOL 3GHz spectrum analyser and showed very satisfactory results. The spectrum above is a test of my single BLF177 MOSFET Power Amplifier (PA) and associated 100W throughput, 9th Order, Low Pass Filter (LPF) to give a clean RF output."

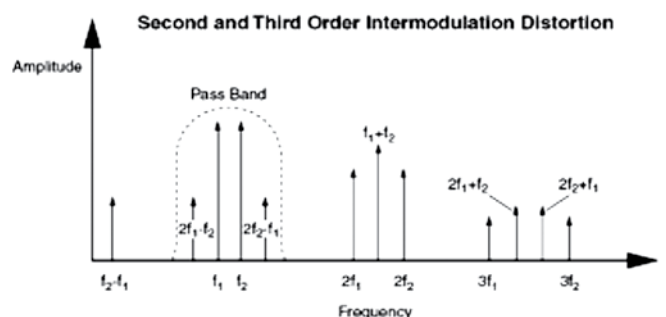
Using DSA1030A markers to make 3rd Order Intercept IP3 measurements

I can't escape without attempting a really professional measuring exercise, so I opt for one of the most important in professional RF design. First I remind myself: why do we 3rd order Intercept Point (IP3 / TOI) of an amplifier?

- ▶ IP3 is an important parameter for nonlinear systems like mixers or amplifiers which helps to verify the quality / linearity of the device.
- ▶ It is a measure of the receiver performance in the presence of strong nearby signals.
- ▶ It can be used to define the upper limit of the dynamic range of an amplifier.

Any devices with nonlinear transfer functions generate harmonics. In the presence of two sine wave signals with a small frequency distance intermodulation products are generated.

The maths looks like this:



$$P_{out} = A1f1 + A2f2 + \text{Fundamentals @ } f1 \text{ and } f2$$

$$A3(f1+f2) + A3(f1-f2) + \text{2nd order IM}$$

$$A4(2*f1+f2) + A4(2*f1-f2) +$$

$$A5(f1+2*f2) + A5(f1-2*f2) + \text{3rd order IM}$$

$$A6(2*f1+2*f2) + A6(2*f1-2*f2) + \text{4th order IM}$$

$$A7(\dots)$$

We can see that worryingly, the 3rd order Inter-Modulation (IM) products are located directly beside the two fundamentals all the other are far away and therefore less likely to interfere. The 3rd order products may well lie within e.g. a receiver pass band, or exactly at frequencies which might trouble adjacent communication channels. Certainly this is one of the main reasons why we look on IP3. Another one is that the two-tone approach has the advantage that it is not restricted to broadband devices and is commonly used for radio receivers.

Why the two-tone approach is commonly used to test radio receivers? The main advantage is that can also be used for measurements on devices with smaller bandwidth, the method itself is simple as long as you set up capable test equipment with good quality output.

But in practice how do we determine this theoretical intercept point of an amplifier? The problem is that the value cannot be measured directly as the amplifier compresses or limits before the IP3 point is reached. In other words, it is an extrapolated convergence of intermodulation distortion products in the desired output. It can be done graphically by expanding the transfer curve (as if the amplifier exhibited ideal linear behaviour). The cross point between the two lines of fundamental and 3rd order product of intermodulation (i.e. two-tones) is the IP3 point.

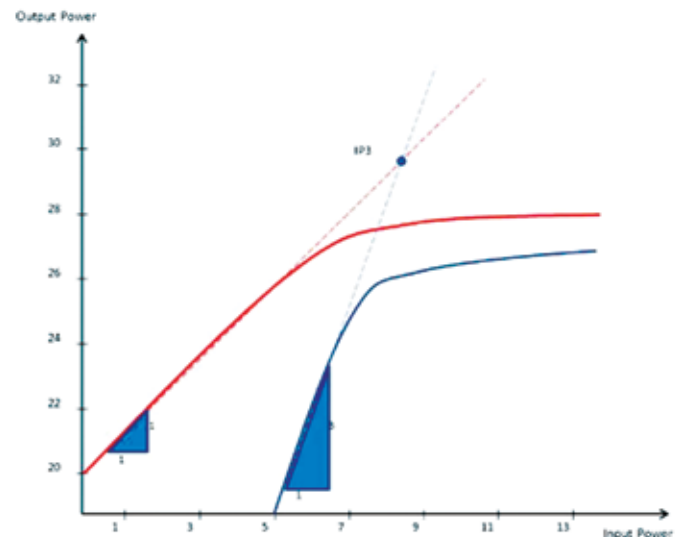
Many of you may also know, the relation between the 1 dB compression point and the IP3 point can be summarised neatly with the rule of thumb that the third-order intercept point is roughly 10 dB above the 1 dB compression point.

How to select the right parameters for frequency and power?

1. The used power settings should be far enough below the 1dB compression point of your device
2. Use frequencies which are near enough together to reduce the influence of different transmission function. Usually, the test frequencies are about 20 to 30 kHz apart
3. Select frequencies of the two test frequencies that fall within your real application values.

Theoretical Measurement and IP3 determination – I find it helpful to revisit the example in the graph below:

We use an Amplifier with 20 dB gain. The graph shows the input power and the output power. The red line shows the corresponding curve of our PA (incl. compression). The blue line shows the 3rd order IM product. It can be seen that if the input power is changed by on 1 dB the



► Fig 8. IP3 point in theoretical transfer plane.

out power of 3rd order IM product is changed by 3 dB, compared to the fundamentals with have a 1 dB/1 dB slope.

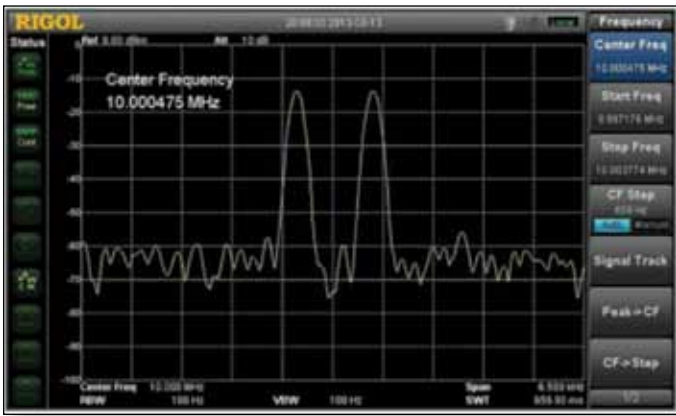
IP3 point is located at the input power level where the output power of the fundamental and the output power of the 3rd order IM product is the same. So it can be calculated when you have the measurement result of the output power of both signals fundamental and 3rd order IM product.

$$IP3 \text{ out} = P1 + \frac{1}{2} (P1 - P3)$$

My real test setup using DSA1030 and its markers to measure IP3:

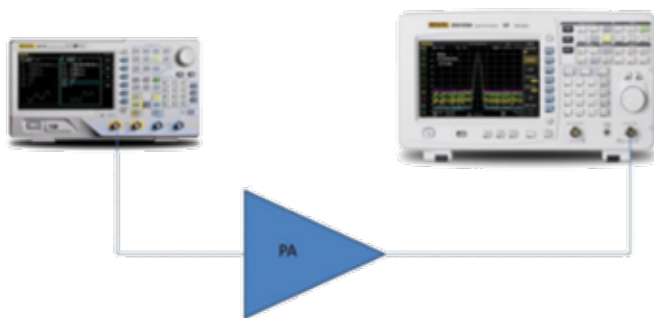
To create my two-tone sine wave test signal I used RIGOL's DG4000 (or DG5000) with the use of Ultra Station software at frequencies @ 10.000 MHz and 10.001 MHz (1 kHz spacing). Prerequisites: high quality two-tone generator (levelled) such as a RIGOL DG4062 Arbitrary Waveform Generator; Ultra Sigma Ultra Station software and about 10 minutes on the PC. This creates a two-tone waveform file in my DG4062 Generator and with 1 kHz spacing.

I've first connected my spectrum analyser directly connected to my DG4062 generator first, to check if the two-tone arbitrary file works as I wanted: my DG4062 can be set conveniently to drive a 50 Ohm Load, I set frequency and output level to -20dBm and the required (straight-through) test signal on the DSA1030A-TG can be seen in the picture below.



► Fig 9. Amp input on RIGOL-UK's DSA1030A-TG.

Now I set up the test with the amplifier under test in between:



Hey presto, the DSA1030A-TG now reveals the in-band mod products (note narrow span):



On the DSA I set the corresponding centre frequency and span. Activate two markers and set one on the fundamental (upper or lower) and the second one on the corresponding 3rd order IM product.

$$IP3 = -32.66 \text{ dBm} + \frac{1}{2} * (-32.66 \text{ dBm} - (-60.67 \text{ dBm})) = -32.66 \text{ dBm} + 14.01 \text{ dB} = -18.7 \text{ dBm}$$

What a result!

Hopefully my long-winded description above has given some practical insights into using markers for a very relevant and necessary test – the RIGOL DSA1030A is well up to the job of many professional RF measurements and there are many like this we'd all benefit from.

The commercial story

The back-story is RIGOL priced its 3GHz range to enter the market at a very attractive price. So it has enjoyed quite rapid adoption and is already in wide use in RF, Broadcast EMC/EMI electronics manufacturing, failure analysis, and R&D. The commercial spiel from RIGOL is all about speed and efficiency: 'Up to date and more transportable, the DSA1030A-TG is easier on your pocket with self-calibration, the professional lab enjoys a lower overall total cost of ownership. A series of automatic setting functions such as Auto Tune, Auto Range, Auto Scale and Auto Couple, enabling the analyser to acquire signals and explore parameters automatically, instead of with a lengthy manual process'. (I can précis this as: 'It's a lot faster and easier on the back, fingers and eyes than on my traditional analyser!')

Likewise on practical note, at power-on, I do indeed find it's nice the DSA1030A-TG can fire up with either Last settings, my choice of User settings, or Factory Default settings (Preset) – with this I can quickly and easily recall previous or favourite measurement set-up. Even as a professional, before I prise open my wallet, I'm conscious of working to a budget and it's worth giving cost-saving choices offered by RIGOL special consideration:

- Models like DSA1030A-TG3 include a 3GHz Tracking Generator:
Note: this also serves as a lab-grade RF CW source, which can save you money on a microwave sig gen with its built-in 1dB step attenuator (up to 0dBm into 50 Ohm)
- A-series has a standard preamp for high performance (-148dBm typ. DANL, 10Hz res.). Note: whilst A-models mean a bit more outlay, you get all the present special offers like Advanced Measurement with -A's too, which may offer you largest savings (see end).

The MEAS Button

The advanced -A series - accesses some very powerful algorithms. An innocuous looking button named 'MEAS' is not the first one my hand would drift to. But one press makes it clear that RIGOL-UK.co.uk is offering some powerful stuff in their deal.

As if by magic I bring to life an armoury of RIGOL's Advanced Measurement functions on my DSA1030A-TG. These are particularly relevant for those of us DXers who want to see professional broadcast measurements swiftly and easily, without the tiresome messing around with multiple settings.

This one-press gives me a rich menu including these automated measurements:

- ▶ Time domain Power, Channel Power, Adjacent Channel Power;
- ▶ Occupied Bandwidth, Carrier to Noise Ratio;
- ▶ Harmonic Distortion, Intermodulation Distortion;
- ▶ Also in quick menus is Pass/Fail, Frequency Count, N dB marker measurements.

I move on to PC control: remote control is easy through USB (as a USB device), there are firmware versions to support LAN too, in fact I'm already dreaming of integrating my regular tests into my lab just by controlling the RIGOL DSA with some standard SCPI commands.

Making records of what you're doing along the way is a good practice I've learned from experience. Saving screens is easiest – whether to PC-folder via USB cable, or to USB memory stick. Or if my memory stick eludes me I can save thousands of measurements and configuration settings using the built-in 1 GB of internal storage that comes as standard.

Interfaces and Optional extras

Here's the range of interfaces that come as standard on all DSA1030 models:

- ▶ USB host is available to use a USB flash device to save the instrument settings and history data as well as for firmware updates but I've also 1 GB of internal storage and I find I can save thousands of measurements and all my common config settings without impediment.
- ▶ USB device is available for printing with a PictBridge printer, or to connect as a TMC instrument.
- ▶ LAN – connection and control via IP address is possible. LXI-C is standard and support for VISA control over Ethernet is included
- ▶ VGA comes as standard on DSA1030 - Connection for extending screen to an external monitor is provided for demonstrations and training

Options (some are included in the DSA1030A-TG special offer) include Tracking Generator; EMI, faster Quasi-Peak scan processor, Advanced Measurement; Rack-kit; GPIB Optional - Add a GPIB port with a USB-GPIB module (option). Carry bag system option 1000 SCBA also available.

For VSWR tests, a Choice of VSWR bridges: the 1MHz - 2GHz model VB1020 is a very flexible and broadband hybrid design – this is the one for widest amateur use; or VB1040 is up to 4GHz for use above 800MHz. Both easy-fit to RIGOL DSAs. (Type 'VB' into site search bar at RIGOL-uk.co.uk).

In conclusion

RIGOL continues to release a succession of good quality test instruments offering outstanding performance for the price. The noise floor on DSA1030A-TG is exceptional and it's very powerful with endless uses. I also find this model a relatively compact and rugged design with extra storage (non-volatile memory) enabling storing of field data swiftly to a USB flash device as we've already seen so could work very well in field applications requiring transportability. You can add a custom designed well-fitting easy carry system if you need it, so spot tests are easier than ever.

A rich range of measurement functions enhance value: with advanced features like Noise Marker, you can tell from its user-friendly menus RIGOL has aimed this to readily meet the requirements of a broad set of user's measurements. In addition, if I like programmed tests I can take advantage of the out-of-the-box drivers or optional Ultra Spectrum to control more analysis and display functions such as building waterfall curves to expand the measurement capabilities to my own tailor-made lab tests.

The RIGOL-UK.co.uk team and instrument web store gets good customer reviews you can read from purchasers of RIGOL spectrum analysers and they come from a variety of quarters including RF professionals, repeater groups and EMC teams and radio amateurs. There is a growing community of satisfied hobbyists who have invested – as an RF experimenter I can well see why many of us would be very pleased with DSA1030A-TG. 📺

Author:

Dave Phillips MIET – M0PMZ, Chartered UK Engineer

Applications Engineer, Telonic Instruments Ltd and Life Member, RADARC

Offer details

(call Telonic Instruments Ltd. for all latest spectrum analyser offers)

When purchasing 3GHz DSA1030A-TG before 30th June from RIGOL-UK.CO.UK, receive these additional benefits:

- ▶ Advanced Measurement Kit plus the Quasi-Peak+EMI filter options free;
- ▶ Special web-order package price of only £3,995+vat (previously over £5,000 with options above)
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BATC members may also order any other RIGOL-uk.co.uk products at -5% (one order/offer only).

State on order if you'd also like to request a free 2/70/23cm Noise Source Experimental Kit (few only, basic PCB kit with noise source, 1st come 1st served).

DVB-T-Receiver HV-110

Darko Banko OE7DBH
Translation: Klaus - DL4KCK

For this device we have been waiting for years, now it is here: small, compact, simple to use and affordable. It is a stand-alone DVB-T receiver for rf bandwidths between 2 and 8 MHz and a frequency range from 170 to 950 MHz. The designer made one mechanical fault: you cannot use CVBS (analog) and HDMI (digital) output ports at once because of the narrow placement. Switching between narrow and wide bandwidth is done at the back side, and the SMA input does not provide an in-line power supply for pre-amplifiers. But that is all of my criticism.

The HV-110 is very small (10x7x4 cm), needs only 600 mA with 5 V DC and no PC support, but brings a pre-programmed channel listing for 23 cm and 13 cm bands (with down-converter). It can receive narrow-band as well as wide-band COFDM signals and saves searching results automatically, but you can choose manually frequency and bandwidth too. As accessory an analog cable for FBAS video and stereo audio is enclosed, the end user price will be 159 US Dollar according to HiDes (Taiwan).



On my lab table without QRM I managed to get perfect video and audio reception with only -102 dBm input rf level, at -105 dBm none of it, using the HV-100EH TX with 16QAM, 2 MHz BW, MPEG-2 on 436 MHz. The HV-110 receiver is made for H.264 video signals, but accepts MPEG-2 video too. Using a DC101 TX on 474 MHz with H.264 video and 4 MHz BW and a HV-100EH TX on 436 MHz with MPEG-2 video and 2 MHz BW the searching function incl. saving was successful, and switching between

both channels by remote control needed about 3 seconds.

For parallel use of HDMI and CVBS ports you have to solder a small patch cable to FBAS video and audio feeding points on the PCB (no modification planned by HiDes). If you need in-line power supply for a pre-amplifier, attach a T-Bias-Feed at the rf input. Avoid strong rf signals there - the sensitivity could get worse!

Update:

In a sensitivity contest I compared the HV-110 and a SR-Systems receiver in this configuration:

TX HV-100EH, MPEG-2, 436 MHz, 2 MHz BW, 16QAM, Pout 0 dBm, -----> fixed 30 dB attenuator ----> variable attenuator ----> coax cable -----> test RX.

Result:

No more video and audio signal decoded with SR-Systems receiver at -87 dBm, dto. with HV-110 receiver at -106 dBm, dto. with UT-100B&D receiver at -107 dBm. With such levels below -100 dBm no pre-amplifier is needed, more important is a good aerial and an input filter against unwanted neighbour signals.

Practical conclusion: if you can receive a 70 cm narrow-band FM station with S5 level, there is a chance to get a DVB-T 2 MHz BW video signal with HV-110 at equal power; aerial and propagation conditions from there...

More information can be found on the Austrian Forum here:

<http://www.oe7forum.at/viewtopic.php?f=7&t=410&start=120#p1309>

► *Out and about at the Dunstable Downs Radio Rally in May with Tony Hornby, G1HPD, operating a 23cm camera link back to the ATV van.*



4K – what is it?

Mike Cox



If you read the technical press in the last year or so, you will have come across the term “4K TV is on the way” or similar.

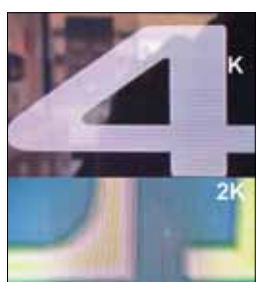
So what is it all about?

The major TV manufacturers decided that as 3D TV hadn't taken off spectacularly well, that perhaps upping the resolution to 4K (or 2160p, if you are pedantic) would be the next retail sprat to catch the public's cash.

At present, apart from a limited edition of Blu-Ray player and about 10 films mastered for 4K Blu-Ray by Sony, there is not much material about, unless you shoot it yourself with a variety of 4K cameras that have appeared on the market.

LCD, and if you can afford it, OLED, panel manufacturers have been able to produce 4K displays economically; they are on the market. Sony offers a 55" TV for under £3000, as do LG and Samsung. These TVs also claim to upscale “standard” HD pictures to 4K. They also include the usual “Smart” TV functions, and a 3D function. What other attributes do they have, apart from the extra resolution? One of the most significant factors is Colour Gamut. Also,

interlace has at last been dropped. Fig. 3 shows a 4K display at the top, with a 2K display at the bottom to roughly the same scale.



It will be a number of years before 4K TV is transmitted regularly, unless some one comes up with a even better compression programme, that would drop the bit rate to around 10 Mp/s. The bandwidth is not there yet. The only alternative at present is by satellite, or by fast broad band. Sony is offering a limited selection of films on a special Blu-Ray player for use with its 4K displays.

I recently bought a Canon Ixus 135 still camera, although it can do movies. This camera has a resolution of 4608 x 3456 pixels, so it is well above 4K, and it cost about £70.

The pressure is on increasing frame rate. At present, HDMI 1.4 will only allow 30 Hz frame rate at 2160p. HDMI 2.0 is out now, which allows 60 Hz working. The new spec. also allows up to 32 audio channels, and up to 48 bits/per pixel colour depth. To show which way the development is moving, it is suggested that NHK are working on a 120 Hz version of their UHD 7680 x 4320 system. NHK have been quietly working on an 8K TV system for some years and gave some very convincing demonstrations during the London Olympic Games in 2012, albeit they only had 3 cameras. Varying dates for a regular service have been given, but perhaps by 2020!

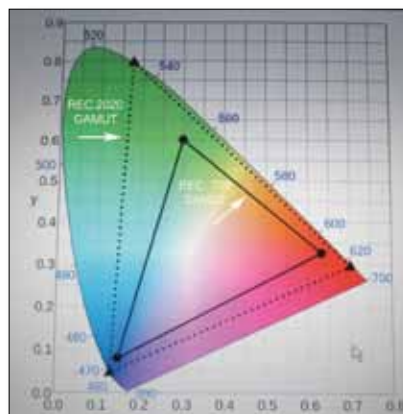


Fig. 5 shows the range of formats now available to the public. (The 2K format is for Digital Cinema.)

So to get the full effect of 4K resolution, you will need to sit about 2 picture/ heights from the screen, i.e. somewhat immersed in it. Is it equivalent to IMAX in your living room?



As the picture encoding uses 12 or 13 bits, the data rate is even higher.

Consider that uncompressed HD is coded to 3G HD-SDI at 2.9 Gbits per second, the bit rate for 4K will be 4 times higher, unless as is done with the NHK system, 16 HD-SDI channels are used from camera to base station.

The later NHK version uses a fibre channel, with WDM to provide the bandwidth required. NHK also used an array of 16 hard drives to record the pictures.

But what is available now? Can we set up a complete production chain in 4K? A few examples of equipment are set out below.

Cameras



GoPro

At the lower end of the price range is the GoPro Hero 3+.

This little camera will record 4K pictures, but only at 12.5 frames/second! However, it will run at 50 frames/second at 1080p, and up to 1440p at 50 Hz.. Total cost for camera and viewfinder is around £450. It records on Micro SD cards.

BlackMagic, a company that is relatively new to cameras, offers the **BlackMagic Production Camera 4K** for around £2600, but although you get a viewfinder and some software in that price, you have to get a suitable lens (EF mount). But if you are upgrading, you may already have one. It records to an SSD card in ProRes 422, so it can port directly to the edit computer.



▶ BlackMagic Camera

Sony has launched several 4K capable cameras, starting with the “domestic” **FDR-AX100** listed at £1699, then the **FDR-AX1**, listed at £3799. The next one up is the professional **PXW-100**, listed at £5299. These all go up to 60 Hz frame rate.



▶ Sony PXW-Z100

Canon has seen its high end digital single lens reflex cameras (DSLRs) used in some major TV productions and has expanded its range to include cameras specifically for HD (and UHD) production.

RED has come up from very little to a major high-end camera manufacturer in the last 10 years or so. Their latest cameras claim to go up to 6K resolution, but be prepared to write a big cheque, for they are not cheap.

ARRI also produce some fine cameras, although they are not fully up to 4K yet.

Recording

Usually to SD card or SSD cards (Solid state hard drive). These can be in the camera, or in a separate recorder. Companies such as AJA make small recorders capable of recording 4K images capable of mounting at the rear of a camera. The Ki Pro Quad is an example of this type of recorder.

One of its attributes is that it can pass on RAW files to an external recorder, while recording ProRes422 on its own card, or passing on HDMI for local monitors.



► Ki Pro Quad Recorder

Displays

High-end domestic TV displays are appearing in stores from various manufacturers. These will certainly check that pictures are there.

Currently a 55" display is around £2600 - £2900, while 65" display are around £4500.

If you want Quality Check, Sony and others offer OLED monitors at eye-watering prices!

For field recording, BlackMagic do a dual 8" monitor pair, Smartscope Duo, with waveform, vector and audio monitoring facilities. It will cost you £625.



Production

BlackMagic has produced a 4K version of its compact ATEM Production Switcher at a very reasonable price. (around £1075, bring your laptop) A clever thing about the ATEM switcher is that you can use a laptop as the control surface. Fig. 12 shows the ATEM switcher I/O panel, and the software control.

If you must have a mixer panel, then 2 are available, but at a fair cost! The ATEM 1 M/E Broadcast Panel costs £3,125.

Snell offer various sizes of Kahuna Switchers covering HD and 4K working.



Editing

There are a number of Editing packages available that cater for 4K workflow.

The Grass Valley EDIUS Pro 7 is one example that caters for a number of different file formats. Other makers such as Avid (owners of Pinnacle), Apple, Sony Vegas also provide 4K edit software, but you will need to spend a bit on a computer that is fast enough and has enough memory resources to work properly.

After Thoughts

I have a vision of a wall in a future living room, covered in OLEDs, in fact 7680 of them across in 4320 rows; an 8K display. Now most of the day for news, current affairs etc, you will only watch 1/16th of the total pixels; today's HD. But when there is a drama or film of note, then you will watch the whole screen. Don't bother me about sections wearing out or going dim; by the time this is feasible, there will be a fix for it.

We have looked at a few bits of kit – not an exhaustive list by any means.

What have we achieved? We have got a much greater colour gamut, and more bit depth, if the display makers make use of it all. It is marching ever closer to that realism that I suppose we are all looking for. But we still have to distribute it! Watch this space! 🗣️

Notes: See EBU paper on 4KTV: https://tech.ebu.ch/docs/events/webinar049_BeyondHD-update/hoffmann_beyondHD_update.pdf



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Winter 2014
Volume 27 - No 1
ISSN 1361-044X
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Classic circuits

A Tuneable 70cm Narrowband Filter

It's a fairly recent one but worth repeating as activity increases on 70cms DATV

by Ian Waters G3KKD.

Years ago when most ATV used 70 cm amplitude modulation we had the band almost to ourselves with little risk of interference from other transmissions. Today we have to compete with many other strong signals both amateur and others.

The filter described here is tuneable from 435 to 438 MHz, has a passband of 2 MHz and an insertion loss of 1.5 dB. It has a high Q such that at 2MHz above or below the edge of the passband it offers an attenuation of 20 dB increasing to 30 dB at 4 MHz. Fig 1 is a plot of this response.

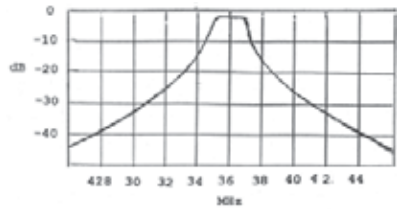


Fig 1

It has been found most useful in digging out weak 70 cm video from a mass of noise and beat patterns. Although I have no experience it should be of value to stations working weak DX in contests. It has enabled pictures from G4IMO in Wisbech, at a distance of 50 km, to be resolved at P2-3 whereas without it nothing could be seen. It is also anticipated that it could be valuable when receiving 70 cm DATV, although this has yet to be proved.

To test the filter I transmitted half a microwatt from the top of my garden, and with my receiving aerial pointing toward a direction of known strong signals, received the test transmission on the back of the beam.

Photo 1 shows the spectrum from 428 to 444 MHz with the test transmission barely visible on 436 MHz in the centre of the trace. What this does not show is that there were many other carriers appearing intermittently for a second or so. Probably some were car keys. I could not catch these with my camera. Photo 2 shows the same spectrum with the filter in circuit. It will be seen

that most of the other carriers, that were beating together to obliterate the picture have been eliminated. Photo 3 shows the TV screen without the filter with nothing to be seen except noise. Again I could not catch short duration bursts of patterning. Photo 4 shows a weak, but useable result, when the filter was in use. Of course the filter can do nothing to protect against signals close to the wanted frequency, which appear occasionally. One has been caught in Photo 5.

On the back cover of this magazine is a photo showing the general view of the filter unit as well as one showing the internal details.

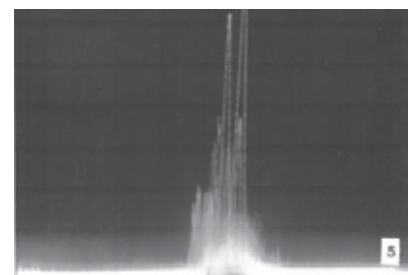
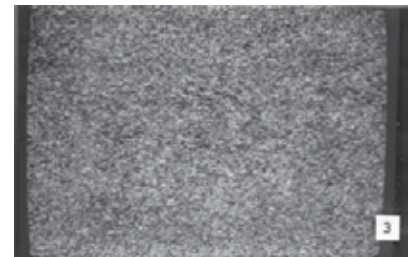
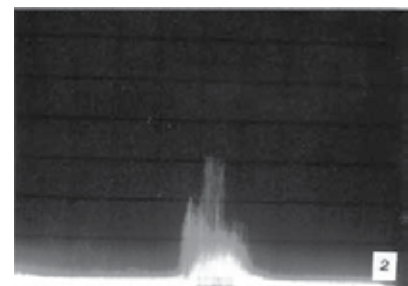
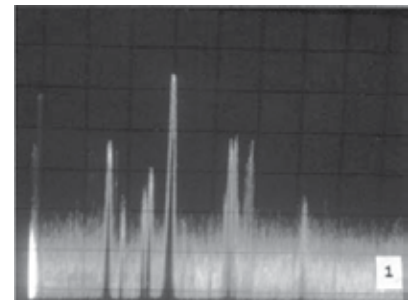
Fig 2 gives the essential dimensions. Standard 22 and 15 mm copper water pipe was used for the inner coupled resonator lines. The dimensions of the outer boxes were then calculated to give the optimum Q with a 22 mm diameter inner line.

The outer ends of the 22 mm tubes were slotted and then bent as shown. Springs keep the slotted fingers in good contact with the inner line extensions.

The 15 mm lines are closed by discs soldered at both ends. Lengths of 6 mm threaded rod attached to the inner lines pass through tapped discs soldered into the outer ends to the outer lines to provide tuning adjustment.

With the exception of the front end, which is made from copper sheet for strength, the outer boxes are fabricated from copper clad PCB soldered together. Lengths of 6 mm square brass strip are soldered in for added strength and are tapped for the screws, which retain the cover.

The sizes of the input, output and coupling loops, made from 16 SWG copper wire, are as shown on the drawing. Silver plating would improve the performance, but is rather expensive.



Turning Back the Pages

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

CQ-TV 57 - undated, but in late 1965

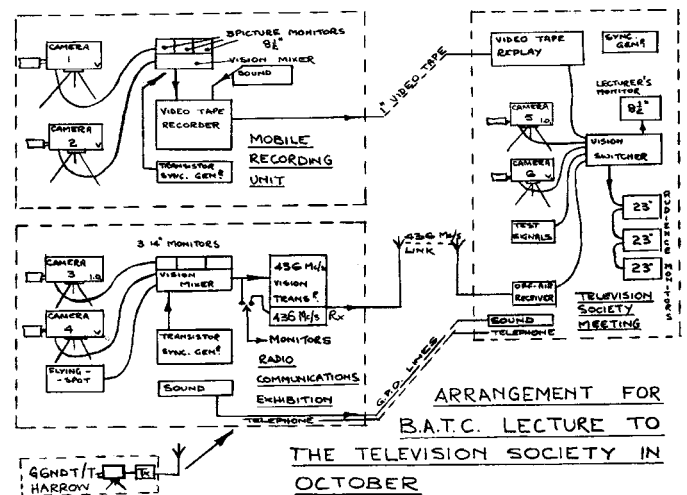
The main item of interest in this issue of CQTV was about a lecture 'Professional Amateur or Amateur Professional? A new look at the British Amateur Television Club'. The lecture had been given to The Television Society (now the Royal Television Society) in October 1965 at the ITA building in London.

Discussions had taken place amongst the team giving the lecture as to how they could give a presentation that would be different to that given in 1959 to the same organisation. It was decided that a series of demonstrations would be put on - but although "a simple closed circuit camera is excellent for the Garden Fete" it was considered "hardly adequate for the Television Society, and in any case the BATC is capable of something better". So it was that an 'over the air' demonstration would be included in the presentation.

Many of the active members were well out of 70cm range, however, so John Tanner, David Mann and John Noakes spent a weekend touring the country visiting various BATC members to make vide tape recordings on a (then very 'state of the art') helical scan video recorder. The first member to be recorded was John Lawrence, GW6JGA/T, who demonstrated his vidicon camera. (the picture of John was taken at the same time as the video recording) John's main interest at the time was colour television, and he demonstrated his colour bar generator and sequential colour monitor - both also seen in the picture. From north Wales, the recording team went to Manchester, where Peter Lambert gave an interview,



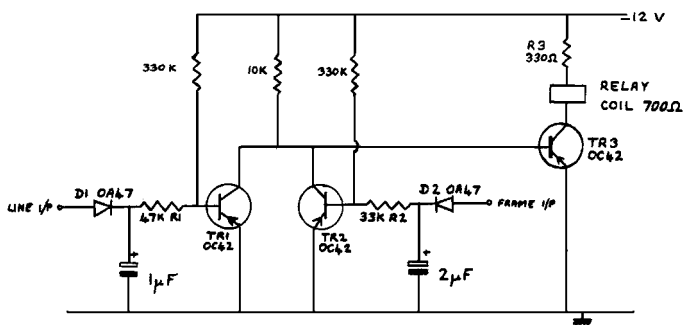
and Gordon Sharpley was seen 'on-air'. From there the team headed south west to Ross on Wye, where Grant Dixon demonstrated his slow scan equipment. Having finished recording at 7 pm, the team returned to London - their 750 mile trip producing a 30 minute recording. Coincidentally, the International Radio Communications Exhibition was being held in London at the same time as the lecture was to take place to the Television Society, and so it was arranged to transmit pictures live from the exhibition to the lecture - thus showing BATC involvement in the major annual amateur radio event.



The technical set up is shown in the diagram. There was not sufficient time to make a combining unit to transmit the audio and video on 70cm, and so the audio was sent by land line - which eased the licencing issues. The transmitter at the exhibition site, at the Seymour Hall, ran 20 watts to a 24 element rotatable aerial, whilst at the ITA building another 24 element yagi fed via a transistor pre amp to a specially tuned tv tuner. The lecture was presented by Mike Cox, and John Ware co-ordinated the demonstrations and interviews at the exhibition site, and John Tanner appeared as the interviewer on the video recordings. The end result was a combined effort that showed that the Club could put on a comprehensive demonstration .

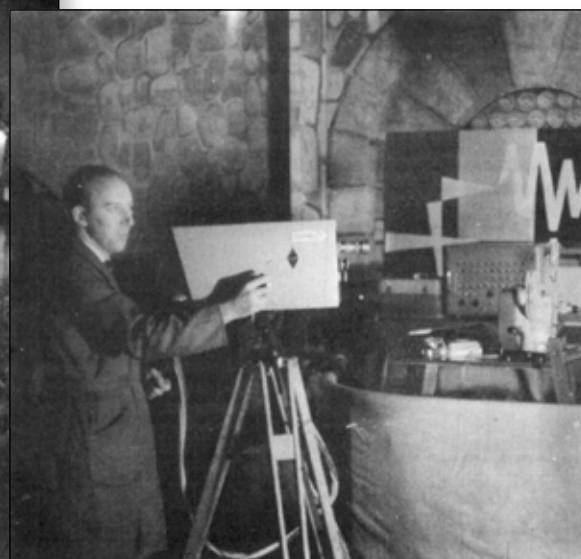
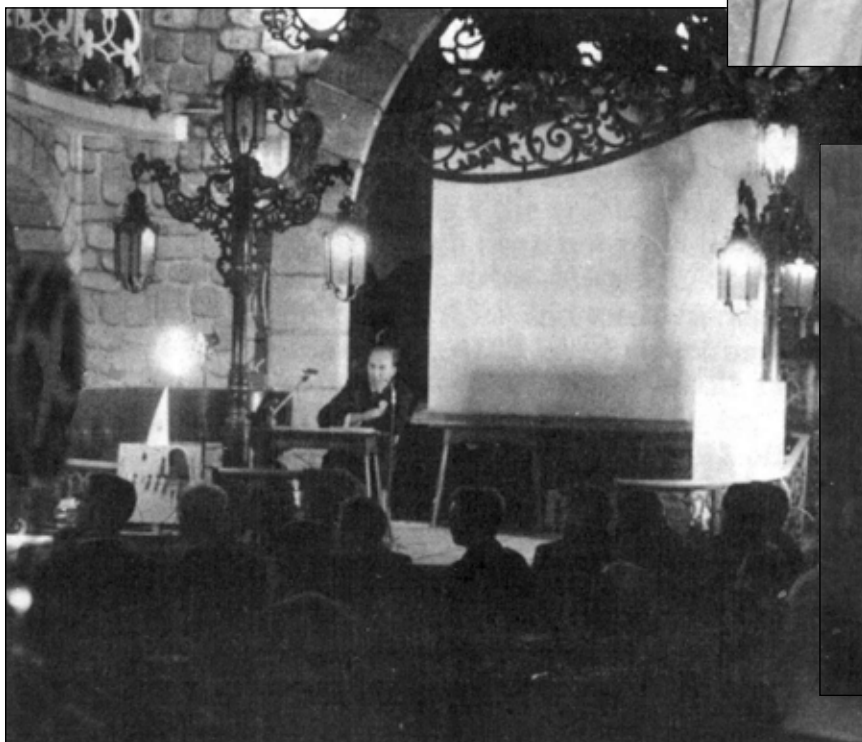
A useful circuit was shown by Dave Lawton, to protect a vidicon camera tube in the event of either of the scan drives failing. The inputs were taken from connections directly on the line or frame scan coils, and rectified by the diodes D1 and D2 respectively. R1 and R2 ensured the circuit did not load the scanning circuits and distort the waveforms. Normally, the presence of the input signals would turn off the corresponding transistor, but if either

scan drive should fail, the corresponding transistor would be turned on, making the base of TR3 positive, and so de-energising the relay, which would then turn off the supplies to the vidicon - and hence preventing a line or spot from being burnt into the target.



Another ATV demonstration had taken place in the September at the International Ham Convention at Knokke. This was the first time amateur television had been demonstrated in Belgium, and as at that time Belgian amateurs were not allowed to transmit video signals, the demonstration was by a closed circuit arrangement. A film of 'Ham TV' was shown to the audience of about 200 radio amateurs, and then Willy Van Marck demonstrated his home made transistorised vidicon camera (which looks to have a BATC diamond shaped 'equipment label' on the side!). The final lecture, given by John Tanner, was on slow scan television, using some of Grant Dixon's equipment. John was presented with a trophy for his contribution to the Convention.

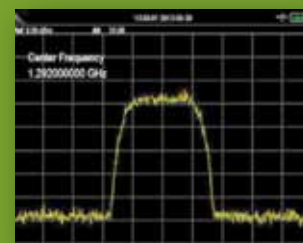
Other news included the results of the very first amateur television contest. Seven stations submitted entries, although it was known that others were active during the contest. The rules for the contest at that time did not allow for 'one-way' contacts, so those had been disregarded in working out the results. Ian Waters had agreed to organise the next event, probably in early 1966, and the rules would be altered to accommodate one-way working. The winner was Len Dent, G6GDR/T, and others taking part were G6OPB/T, G6MEO/T, G6OUO/T and G6NDT/T, with EI3AN and EI4Q tied for 6th place - having worked each other!





Digital Amateur TeleVision Exciter/Transmitter

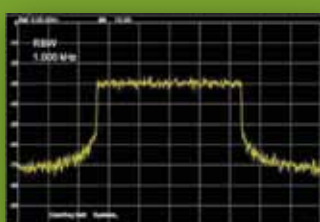
now available from



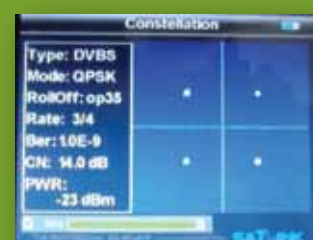
DATV-Express



- ▶ A more affordable DATV exciter; fully-assembled & 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
- ▶ User Guide at www.DATV-Express.com
- ▶ Price is £215.00 - includes shipping in Europe



For more details and ordering
<https://BATC.org.uk/shop/>
 Register on the web site
 to be able to order on
 the **HARDWARE** and **KITS** page





Out and About



You will be able to see the BATC stand at the following forthcoming rallies and events. Come and say hello!



29th June - West of England Radio Rally - Bridge St, Frome, Somerset,

See: www.westrally.org.uk



13th July - McMichael Rally - Reading Rugby Football Club

See: www.McMichaelRally.org.uk



10th August - Flight Refuelling Hamfest - Wimbourne, Dorset

See: www.frars.org.uk



27-28 September - National Hamfest - Newark, Lincoln.

See: www.nationalhamfest.org.uk

10-12 October - RSGB Convention - Milton Keynes

See: www.rsgb.org

6/7 September 2014 - BATC CAT14 and BGM - Basingstoke

See: www.batc.org.uk



November 2014 - West London Radio & Electronics Fair - Details to be announced.

See: www.radiofairs.co.uk

If you would like BATC support at an event you are organising, please contact the membership secretary.