DATV Moonbounce?

... and all the regular features

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
- ▶ Includes TS Dock PCB free of charge!

Specification subject to change without notice

Available from BATC shop

- ▶ DTX1 DATV transmitter PCB complete with case and front panel
  £459 *including postage*

- ▶ The Portsdown Project
  - ▶ Filter Modulator - Blank PCB and ready Built
  - ▶ Preprogrammed SD card
  - ▶ Local oscillator filter - blank PCB
  - ▶ 4-Band decode - blank PCB
  - ▶ GPIO breakout board - blank PCB
- ▶ MiniTiouner USB receiver
- ▶ Blank PCBs for BATC projects
- ▶ Hard to get components at cost plus prices
- ▶ Programmed USB modules
- ▶ 70cms upconverters

... *plus: Renew Membership and Badges & Sundries*

CQ-TV 256

Contents:

Contributions

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

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 March, June, September and December.

The deadlines for each issue are:
Spring - Please submit by February 28th
Summer - Please submit by May 31st
Autumn - Please submit by August 31st
Winter - Please submit November 30th

Please send your contributions in as soon as you can prior to this date. Don't wait for the deadline if you have something to publish as the longer we have your article, the easier it is for us to prepare the page layouts. If you have pictures that you want including in your article, please send them, in the highest possible quality, as separate files. Pictures already embedded in a page are difficult to extract at high quality but if you want to demonstrate your preferred layout, a sample of your finished work with pictures in place is welcomed. Please note the implications of submitting an article which are detailed on the contents page.

From the Chairman...

Noel Matthews – G8GTZ

We really do seem to be entering a new golden age for ATV and everything at BATC seems to be on a high – we have topped over 1,000 members, a 10% increase this year alone and more than we have had for many years, we had over 35 stations active during the May activity weekend, the member's forum is getting more than 5 posts a day on average and shop sales are booming. And it's great to see many of the new and returning members get active on the air, particularly in the North and North West of the country – we even have 2 Portsdown transmitters being built North of the border!

The Portsdown DATV project, with the modular construction and ready programmed software really seems to have caught people's imagination and over 150 stations have bought parts and a lot of construction success stories being reported on the member's forum – we look forward to some stunning entries in the Portsdown construction competition at CAT17! The systems are starting to be used on air and during the last contest John, G7JTT, used his Portsdown to work F9ZG at over 200Kms and we have heard of stations using the barefoot output of 10 milliwatts to access their local repeater.

▶ *The Portsdown transmitter - built by Colin G4KLB*

A few of us are starting to experiment with 5.6GHz video using drone FPV transmitters and receivers – these are available for under £20 for both a receiver and transmitter which runs 750 milliwatts on channels in the 6cms amateur band. The video quality is great and they make a cheap easy way to experiment with ATV for people new to the hobby.

It is the construction and experimenting with new technologies that makes our hobby so fascinating and there is another opportunity to do something different as Tim Peake is likely to returning to the ISS in 2 years time. As well as another opportunity to experiment receiving the HAMTV transmissions, the UK Space agency are looking for novel ideas and experiments that Tim could conduct during his mission. So if you have any bright ideas that may be feasible and ideally involve data processing that the Rpi could handle, now is the time to put your thoughts down on paper.

With all these changes going on in our hobby, it's hard to keep up with the latest developments – certainly we don't have a problem filling CQ-TV at the moment but that only comes out every 3 months and so is not always right up to date. A lot of members are now using the BATC member's forum and Wiki to keep up with the latest developments and you'll find an article in the edition explaining the difference between the 2 services and how you can use them to get all the latest news and information. Also, you may remember in the last CQ-TV we said we were in the process of moving the web site and streamer over to a new platform – well, like all good IT projects things didn't quite work out to plan and the migration has been delayed until August. The good news is that the delay means it is highly likely we will have the BATC streamer facility integrated in to the main web site. We have reprinted the article on the plans – please take time to read them as they will affect you!

We hope you enjoy this edition of CQ-TV and look forward to meeting many of you at CAT17 in September. 🖋

Members News

Dave Mann – G8ADM

Repeaters:

Recently there has been regular overseas activity from the Australian, Belgian and Dutch repeaters via the BATC Streaming service.

The ON0CTV and ON0TVM repeaters have been quite active including field day operation from Montigny-le-tilleul - JO20EI – Belgium. The ON4MNS Club while running field day has been sending pictures from the site through the ON0CTV repeater at 36KM for more than 30 hours as shown in these pictures. It was very interesting to be able to watch the activity, try televising your field day. We hope to publicise more about this in another edition.

Australia: It's worth watching the BATC Streaming in the mornings, mainly Mondays and Tuesdays where both simplex and repeater operation may be seen. VK2CRJ is very active.

GB3FT - Tim Forrester (G4WIM) reports that GB3FT (the proposed 23cms ATV repeater in the Blackpool area) is almost complete and will be going on test, initially from his QTH beaming toward Blackpool and then moving to it's proposed location at Steve G3WGU's QTH in the near future. The tests will be done as personal beacons and the group would welcome any signal reports.

Activity:

Dave, G8GKQ reports his first ATV contact on 5.6GHz. This was an analogue transmission with Noel G8GTZ at a distance of 80 Km using just a dipole in front of a 10 Ghz dish. *(ED: See full article on the kit available for 5.6Ghz on page 26 in this edition of CQ-TV)*

Es'hail-2 Update.

The Es'hail-2 Satellite that contains an amateur television transponder is now scheduled to be launched in March 2018. The satellite will be positioned at 25.5 degrees east and cover much of the eastern area of the world.

Links.

▶ ON4MNS Club Site: **www.on4mns.be**

▶ BATC Streaming: **www.batc.tv**

▶ *Inside the shack at ON4MNS for field day.*

Silent Key

Peter, G3OTN lived with his family in Maidenhead, Berkshire, southern England.

Peter received his licence in 1965 and operated on most bands including ATV on 23cm.

More recently he was getting into the digital world and was building equipment for DATV including a Portsdown and MiniTiouner.

He was a member of the Home Counties ATV Club, GB3HV, and regularly attended the club meetings.

Peter will be sadly missed by his family and friends.

Contest and Activity Weekend News

Dave Crump – G8GKQ

ATV Activity Weekend 6/7 May

The May Activity Weekend saw an amazing amount of activity – mainly on the Sunday. The best that I can remember!

Stations active included:

Saturday:

Call	Location	Locator
G8GTZ/G8GKQ	Near Shaftsbury	IO80WX
G4BVK	Bristol	

Sunday

Call	Location	Locator
G8GTZ/P	Near Didcot	IO91IN
M0DTS/P	North York Moors	IO94MJ
GW3NWR/P (G4EWJ/G6NOI/ GW7MHB)	Bylchau	IO83FD
G7JTT/P	Near Shaftsbury	IO80WX
G4CPE	Upper Sundon, Beds	IO91SW
M1EGI/P	Barnsley, S Yorkshire	IO93FL
G8VDP	Barnsley, S Yorkshire	IO93GM
G8GKQ/P	Portsdown Hill, Hants	IO90LU
G0MJW	Harwell, Oxon	IO91IO
G8LES	Alton, Hants	IO91LC
M0LCR/G7MNP/ M6IID	Winter Hill	
M0SKM	Dunstable, Beds	IO91RV
G0WFT	Dunstable, Beds	IO91RW
G8VAT/P	Beverley, N Yorks	IO93QT
G4CBW	Staffordshire	IO83UB
G1EPL	Fleetwood	
G4WIM	Preston	
G3WGU	Blackpool	
G3RFL	Cleveleys	
G3ZGZ	Cleveleys	IO83LU
G8DKC	Coalville	
G1HBD	Wokingham	
G1LPS	Kirk Merrington	IO94EQ
G3GJA/P	Humberside	
G8DGR	Reading	IO91JJ
G3UVR	The Wirral	
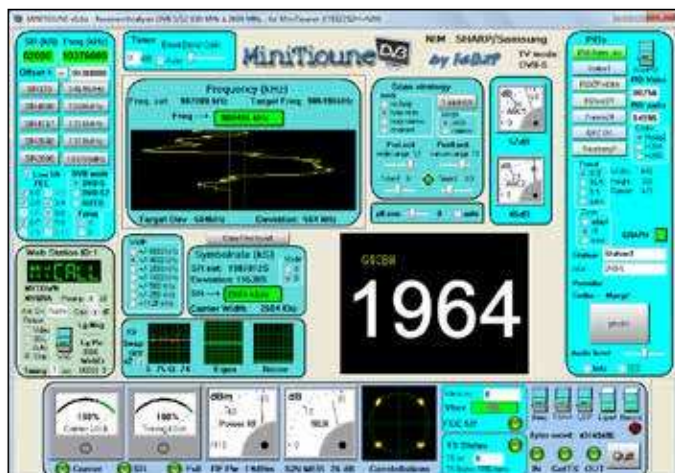
It's great to see an increasing amount of activity in the North and West of England. The GW3NWR/P team seemed to have had a particularly successful day with great weather as well!

IARU Contest 10/11 June 2017

Logs are just coming in to me for this contest. I know that the following stations were active: G0WFT, G1LPS, G3KKD, G4GUO, G4KLB, G7AVU, G7JTT, G8GKQ, G8GTZ, G8VAT, M0DTS/P, G3NWR/P, M1EGI, G3KJX/P, G0EHV, G4CPE, G4CBW, G8LES, G0OUZ, G3UVR, G8DGR, M0IKB and G8VDP. There are probably some more that I am not aware of.

I'm really encouraged to see that so many stations came on the air – activity is definitely increasing. Highlights included G7JTT/P (using a Portsdown transmitter) being received by F9ZG at 236 km on 70 cm, and M0DTS/P achieving contacts on all bands from 70 cm to 24 GHz from his one-man portable station.

Summer Activity Weekends

Please take note of the activity weekends that we have planned for July, August and September. They are getting more popular with upwards of 25 stations now routinely active each weekend. There are no rules; just get on the air and exchange pictures with other stations.

Contest and Activity Day Manager Position

I took over as Contest Manager 10 years ago (and wrote my first Contests column in CQ-TV 216). It was ideal for me as I was about to go abroad for an extended period and wanted to remain involved; and it is a duty that can be accomplished almost solely by e-mail. Now that I am back in the UK and more able to engage in home construction and operating, I consider that it is time for someone else to take over as Contest and Activity Day Manager.

The new Contest and Activity Day Manager does not need to be a member of the BATC Committee, although he could be co-opted if desired. I would wish to remain on the Committee to continue promote ATV and to help the BATC to thrive – as it is now doing.

If you are interested in getting more involved, please contact Noel or I. Don't hesitate – I've enjoyed the last 10 years! 🐭

▶ *The station of GW3NWR out portable on a beautiful sunny day*

Contest and Activity Weekend Calendar

1200 UTC 8 July 2017 - 1800 UTC 9 July 2017:	*ATV Activity Weekend*
1200 UTC 12 August 2017- 1800 UTC 13 August 2017:	*ATV Activity Weekend*
1200 UTC 9 September 2017 - 1800 UTC 10 September 2017:	*ATV Activity Weekend*
1200 UTC 9 December 2017 - 1800 UTC 10 December 2017:	*ATV Activity Weekend*
1200 UTC 10 March 2018 - 1800 UTC 11 March 2018	*ATV Activity Weekend*
1200 UTC 5 May 2018 - 1800 UTC 6 May 2018:	*ATV Activity Weekend*
1200 UTC 9 June 2018 - 1800 UTC 10 June 2018:	*IARU International ATV Contest*

New and renewing members

Rob Burn, Membership Secretary – G8NXG

You will probably be aware that members of the committee are working on a new member database and website for the Club. Inevitably, our preparation for this has revealed various errors and omissions which should be corrected before the new site goes live. Nevertheless, it would be good if you could log on to check that your details are correct, particularly your e-mail address, if you have one. This would to ensure that the information we transfer to the new database is as accurate as possible.

You will see from the list below that the Spring period March to May 2017 has been busy and am pleased to welcome members old and new who joined or rejoined during the period.

If you spot a mistake, please get in touch with the Membership Secretary. Similarly, if you have recently joined or renewed membership and expected to see your name here do get in touch.

Australia		
Russ Jacob	VK2BJP	NSW
Wayne Stringer	VK5BI	Adelaide
Alfred Edwards	VK2YAC	NSW
Peter Sturt	VK2ZTV	NSW
Andrew Wollin	VK4ZXI	Queensland
Ross Pittard	VK3CE	Victoria
Geoff Taurins	VK3GE	Victoria
Peter Schrader	VK4EA	Queensland
Joe Pereira	VK5EI	Adelaide
East Asia		
Nobuo Katsuma	JF1WKX	Japan
Satoshi Yasuda	7M3TJZ	Japan
Akira Kaneko	JA1OGZ	Japan
Europe		
Gerhard Burian	OE3GBB	Austria
Heinz Meschnark	OE8MEQ	Austria
Ronald Supply	ON7FLY	Belgium
Jean Baudouin	ON2BJ	Belgium
Chevalier Jean-Paul	ON7BL	Belgium
Han Van Loenhout	ON4MM	Belgium
Stefan-Konstantin Dimitrov		Bulgaria
Rolf Collette	F9ZG	France
Roger Noyon	F1AEA	France
Bernard Calmels	F1NST	France
Keller Denis	F6GXI	France
Francis Picq	F6DES	France
Roland Etienne	F8CHK	France
Jacques Rambaud	F6BKI	France
Jean Claude Beneche	F1AIA	France
Patrice Boyer	F1NSU	France
Bernard Desbiolles	F5DB	France
Jean-Jacques Metay	F1HUS	France
Patrice Boyer	F1NSU	France

Yves Baron	F6EPT	France
Ennio Bocchia	F4CNY	France
Alain Fort	F1CJN	France
Andres Justus	DK2ER	Germany
Mike Rupprecht	DK3WN	Germany
Ralph Mundt	DG4LX	Germany
Rudolf Pfeiffer	DJ3DY	Germany
Rolf Gerhardt	DG8AR	Germany
Stephen Ormondroyd	EI4KM/ G8RHQ	Ireland
Stevie Brosnan	EI8FHB	Ireland
Mike Wright	EI2DJ	Ireland
Jelle Meintema	PE1AEE	Netherlands
Matt Vd Donk	PA9DX	Netherlands
Peter Van Mourik	PA1RHQ	Netherlands
wlm Meijerink	PA4EVR	Netherlands
Jorge Amarante	CT1XV	Portugal
Juan Garcia Dolz	EA3EDK	Spain
Pablo Cruz Corona	EA8HZ	Spain
Francisco Haro	EA7GLU	Spain
Peter Lundberg	SM7LNJ	Sweden
Pierre-andré Gossweiler	HB9AKP	Switzerland
Pierre-andré Probst	HB9AZN	Switzerland
New Zealand		
Steve Fogerty	ZL2ASF	South Island
South-east Asia		
Sontaya Kumsan	HS2KSP	Thailand
England		
Anthony Nicholson	G8FLV	N. Yorks
John Ferrier	G0ATW	Lincs
Ray Burlingame-Goff	G4FON	Essex
David Andrews		Lancs
Ian Tickle	G4ZJH	Suffolk
Paul Archer	M0PJA	Yorks

Lee Layland	M0LGL	Lancs
Bob McDermott	G6TDR	Yorks
Antony Morris	G0UOZ	Lincs
Paul Lister		Gtr London
Anthony Pearce	G0AZQ	Yorks
David Hazell		Wilts
Keith Webster	G8VMP	Herts
Stephen Catlin		Northants
Jack Darby	G4TVC	W Sussex
Steve Haseldine	G8EBM	Derbys
Ray Hill	G6TSL/ G0IMV	Herts
Michael Groves	G4DME	Derbys
Graham Denton	G8VAT	Yorks
Graham Jefferies	M1ASR	Yorks
Raymond Brooks	G8KPS	Hants
Anthony Parker	G4AXN	Norwich
Dorian Logan	M0SLG	Hants
Andrew Birkhead	2E0ZCM	Devon
Geoff Oliver	G0BJR	Lancs
David Robinson	G4FRE	Worcs
Robin Ridge	M0RRX	Cornwall
Ian Marsh	G4EXD	Cumbria
Julian Baldwin	G3UHK	Bristol
Tony Krvszelnicai		Lincs
David Gell		Notts
John Houldridge	G6KYD	Gtr London
John Manley	M1CNJ	Oxon
Robert Snary	G4OBE	Gtr London
Frank Humphfris	M0BJN	Oxon
Andrew Adams	G1EGZ	Gtr London
Alan Rishworth	G8UHN	Surrey
Nick Garrod	G0OQK	Bucks
Dean Crowe	M1AIF	Hants
Stephen Taylor	G0GQO	Salop
Dennis Fitch	G8IMN	West Midlands
John Newman	G0VDU	Cornwall
Richard Smith	M1BNG	Berks
Ralph Moyle	G0UWB	Oxford
Philip Morris		Surrey
Andrew Lenton	G8UUG	Hants
Adrian Leggett	M0NWK	Notts
David Rudderham	M0YAA	Lincs
Alec Jefford	G8GON	Devon
Michael Walker	G4IJI	Yorks
Bob Kerby	G0CHK	W Sussex

George Brutivall	G4PAV	Northants
David Clarke	G6ELY	Essex
Peter Matthews	M0LBM	Leics
Steve Sorockyj	G0LCG	Notts
Murray Niman	G6JYB	Essex
Chris Smith	G1III	Yorks
Jon Carp	G3NHS	London
Mike Bues	G8AAI	Suffolk
David Edwards	G8BFV	Somerset
Elliot Riddle		Essex
Jeremy Harmer	M6IGP	Yorks
Frederick Ramsey	G4CNX	Yorks
Gregory Wellington	M6ORT	Gtr London
Tony Kelly		Derbys
Ray Gathergood	G4LUA	Hants
Aled Jones	G0UCI	Salop
Richard Harris	M0TUW	Somerset
Tony Pascoe	M0CLE	Devon
David Kenward	G8AJN	Dorset
Patrick White	G6CJB	Berks
John Saunders	M1BAI	Dorset
Paul Bunnage	G8SVE	Hants
Martin Butler	G8KTX	W Midlands
Martyn Vincent	G3UKV	Salop
Ed Magnuszewski	G6UAP	Notts
Michael Drury	2E0GMD	Herts
Paul Goodhall	M3JFM	Oxon
Denis Smith	G4TBG	Bucks
Stephen Darlington		Lancs
Steve Daniels	G6UIM	Devon
Edward Heath	2E0EAZ	Beds
Joe Peerless	G3JPJ	Herts
Howard Chapman	G3NZL	Hants
David Simmons	2E0AAI	W Midlands
Paul Godfrey	G8JBD	Suffolk
Nigel Reeve	2E0EHH	Notts
Kevin Pye	G4EER	Staffs
William Shelley	2E0SHY	Herts
Phil Bourke	M0IMA	Kent
Philip Hardiman	G6HSS	Essex
John Bellis	G7LLQ	Merseyside
Bernie Wright	G4HJW	Cams
Isle of Man		
Phil Smith	GD1HIA	
Northern Ireland		
Joe Bingham	GI4TAJ	Co Antrim
Jack McKinney	GI3TZB	Co Down

Scotland		
Andrew Hood		Lanarkshire
Colin Stirling	GM8 MOI	Stirling
Marcus Bowman	GM4LVW	Ayrshire
Wales		
Peter McFarland	GW7BZY	Anglesey
A Hodgkinson	GW1SAM	Clwyd
Chris Tanner	MW0LLK	Gwynedd
Wyn Griffiths	MW0AQZ	Gwynedd
Terence Cross	GW4LFW	Glamorgan
United States		
Art Towslee	WA8RMC	Ohio
Stephen Ralph	W6SKR	Arizona

Greg Winters	K3RW	Washington
Ed Mellnik	WB2QHS	
Bill Ress	N6GHZ	California
Loren Lang	KG7GAN	Oregon
Bob Tournoux	N8NT	Ohio
Reuben Meeks	W8GUC	
Mike Cullen	K1NPT	Rhode Island
Keith Board	N6GKB	California
Kerry Banke	N6IZW	California
Bob Helling	K9PQ	
Ed Olague	K5OLA	Arizona

Portsdown Transmitter Construction Competition

A Portsdown Transmitter Construction Competition will be held on the Saturday Afternoon of CAT 17 at Finningley. The aim of the competition is to promote the construction of the Portsdown Transmitter and to enable the exchange of ideas for improvements.

Entries can be submitted by e-mailing photographs, or by bringing your completed transmitter to Finningley. Please try to make the effort to get your transmitter to Finningley. To encourage participation, the BATC will be awarding a £50 Amazon Voucher as the first Prize.

Competition Rules

1.   Entries may be submitted physically, or by submitting photos of sufficient quality to enable the judges' assessment. Photos should be submitted to **contests@batc.tv** by 0900 on Saturday; physical entries must be in place at CAT 17 by 1400 on the Saturday and will be released back to their owners by 1530.

2.   The judges will be 3 members of the BATC Committee. The decision of the judges is final.

3.   The Main Prize will be a £50 Amazon voucher. Certficates may be awarded for other meritorious entries.

4.   All BATC members eligible to enter apart from the Judges.

5.   Each judge will award up to 10 points in the following categories:
     ▷   External appearance and ergonomics
     ▷   Mechanical construction
     ▷   Standard of internal wiring
     ▷   Standard of PCBs
     ▷   Added features (power supplies, filters, switching etc)

6.   The winner will be announced at around 4pm on the Saturday of CAT 17.

▶ Examples of built Portsdown transmitters from the Forum. From the top:M0YDH; F5SWB; G0MGX; G4WIM

Power Amplifier for DATV

Dave Mann – G8ADM

Power Amplifiers for most DATV projects including the DTX1 require a large amount of gain and good linearity to avoid distortion and spurious outputs. The Portsdown has a higher output requiring less gain so the first stage amplifier shown below may not be required. For DVB-S modulation most amplifiers may be run at about 50% of their maximum output, for DVB-T modulation the figure is more like 10% of their maximum output. I use the amplifiers below at 30W output on DVB-S. You may also use these amplifiers to drive higher power valve or solid state PA's although I find 30W is sufficient for all my DATV dx working. You will need to reduce the output level of the modulator to keep the PA output down to 30W.

The range of MOSFET amplifiers from the German company DG0VE are well built in a metal box with a built in heatsink, they are very linear and work very well on DATV systems. Amplifiers are available for the 2m band up to the 13cm band and higher. They also make bandpass filters essential for removing any out of band products that most digital systems seem to generate. These filters do not have to be particularly low bandwidth. Full details of each product including their circuit diagrams is available from their web site: *http://www.dg0ve.de*
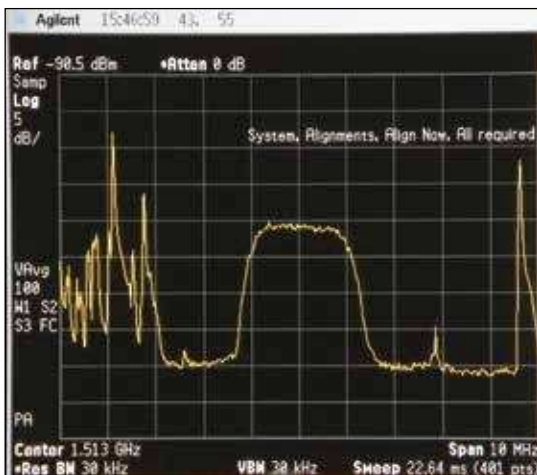
Spectrum

The 70cm output is shown below, this is an off-air display after the up converter so the spectrum is inverted, higher frequencies to the left. The comms signals outside the band can be seen in this busy area of London. The digital transmission is just over 2 MHz wide. Using these amplifiers you can see that surprisingly I cannot see any shoulders on the system. Shoulders are caused by non-linearity in the amplifier.

Power Supply

This needs to be able to deliver up 20A max at 13V d.c.
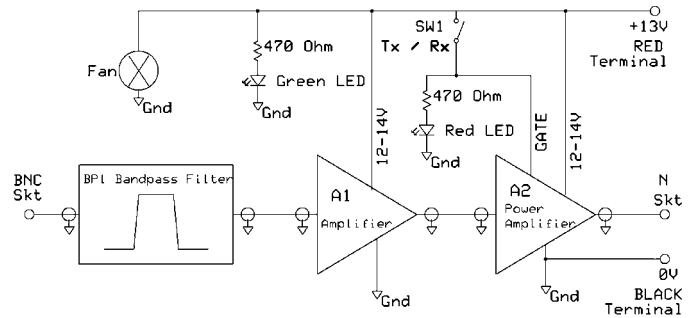
30W High Gain PA

Component References for the DTX1

The Portsdown has a higher output so the first stage may not be required.

Amplifier Model Numbers

2m Band
Filter Special order
A1 Not required
A2 PA146-M80W-Mosfet-KK

70cm Band
Filter BP70-2
A1 PA70-1-700mW (not required for Portsdown TX)
A2 PA70-M-40W-KK

23cm Band
Filter BP23-Helix
A1 PA23-1-5W-KK
A2 PA23-1-60W-Mosfet

13cm Band
Filter BP13-5
A 10 dB attenuator will probably be required with the Portsdown TX
A1 PA13-3-5W-KK
A2 PA2325-1-50W-Mosfet-KK

TV EME from Goonhilly

Brian Coleman, G4NNS; Noel Matthews, G8GTZ; Dave Crump, G8GKQ

Goonhilly Earth Station (GES) on the Goonhilly Down (IO70JB) is the location of one of the UK's main satellite communications earth stations with more than 20 dish antennas ranging in size up to 32m. The antennas are designated with numbers, such as GHY1 – their first large (26m) antenna, also known as "Arthur"– and GHY6, which at 32m is their largest dish and is known as "Merlin".

As previously reported in CQ-TV, BATC and AMSAT have been working with GES and Satellite Catapult (the owner of 3.8 metre low earth orbit dish designated GHY99) to provide the HAMTV downlinks from the International Space Station during the Tim Peake and subsequent ISS missions.

As the communications satellite receivers become more sensitive some of the larger antennas at Goonhilly have become redundant and new uses for them are being sought and so thanks to the relationship built up during the HAMTV project, we were invited to carry out some EME tests using GHY6, the 32m dish! In particular GES were interested to see if we could achieve a world first and successfully do TV EME – what a mouth watering prospect but a big challenge!

TV modulation choices

Having discussed this opportunity to play with some really big boys toys with Dave G8GKQ and Charles G4GUO we determined that the major challenges would be not only to get enough signal back from the moon (even using a 32m dish!) but the multiple phase distortions that occur when bouncing signals off a curved and uneven surface – search for "Libration fading" to learn more.

Because of this effect we decided early on that, although it had the benefits of being very narrow band, single carrier DVB-S RB-TV was very unlikely to work. We therefore decided we should attempt to use narrow band OFDM, which is much more resilient to phase changes and multipath effects, however the narrowest bandwidth available from readily available equipment was 2 MHz so we doubted if we had the link budget.

The path loss for an echo from the moon is around 280 dB and the normal EME mode is CW or JT65 with SSB in a 2.5 KHz bandwidth not considered practical – 250Ks DVB-S would be 100 times weaker and 2 Mhz OFDM nearly 1,000 times weaker.

However, we borrowed some HiDES 2MHz OFDM equipment from Klaus (DL4KCK) which in the event was not used.

At the last minute, we realised AM TV may also be more resilient and we could run reduced bandwidth around 1 MHz for the initial tests – the video quality would be very poor but it would give an indication of the potential.

With EME, your own signal, or echo, takes approximately 2.5 seconds to return to earth and so the first indication of success is to listen and / or watch for your own echoes. We determined that we wanted to transmit for 3 seconds and receive for 2.5 seconds and repeat this sequence many times – we were also concerned about DATV receiver lock up times and invented various schemes which may have assisted but unfortunately it never came to it.

In order to automate the tests and leave no room for confusion or imagination in the results (it's amazing how the human eye can imagine sync bars in white noise!) G8GKQ made up a test system based around a Raspberry PI which sequenced the transmitter and muted the video to the monitor during the transmit cycle – we also arranged for an SDR display of receive signal.

Clearly within BATC we have the knowledge about TV transmission, however we have little knowledge or capability about moonbounce so we recruited Brian Coleman G4NNS to join the team and provide the high power amplifiers we required for 3.4 and 5.6 GHz.

GHY6

GHY6 is a cassegrain type dish with the wanted signals being bounced off the reflector in the front of the dish and in to the hole in the center of the dish – this hole can be clearly seen in the photos and is large enough to drive an old style mini through!
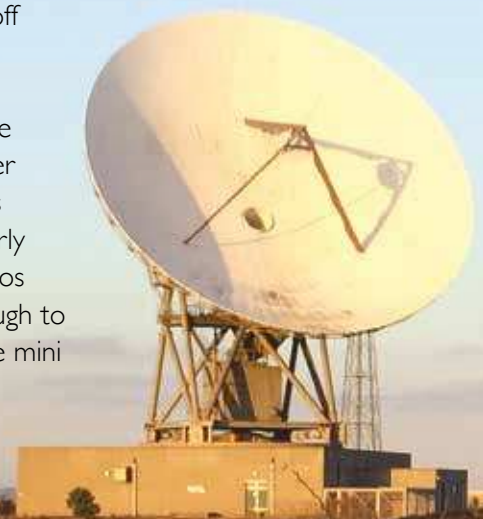
A beam waveguide feed system consisting of "mirrors" bounces the signal from the equipment room beneath the dish to the feed point at the back of the dish to illuminate the cassegrain sub-reflector.

This is a very convenient system as it means that all the RF equipment and the feeds for various bands along with their polarisers for LH and RH circular polarisation are located at ground level and are static as the dish rotates and elevates. GHY6 has four sets of feeds at the base, one for 3.6 to 4.2 GHz, another for 5.8 to 6.4 GHz and Ku band at 10.7 to 11.7 GHz and 14.0 to 14.5 GHz.
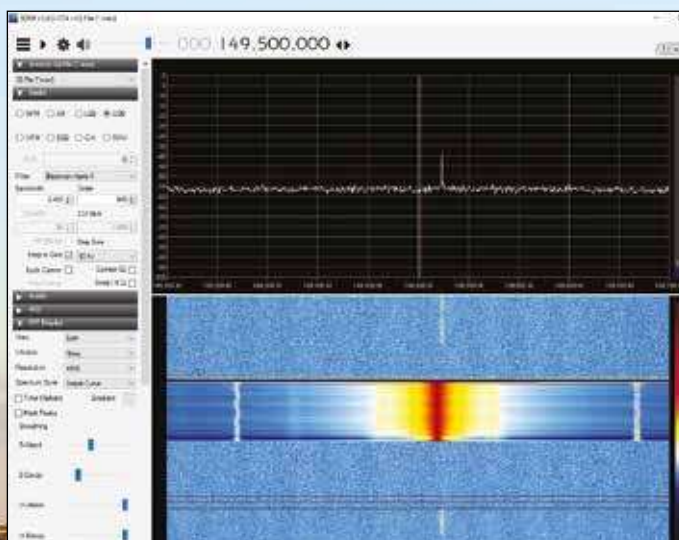
All feeds are provided with left and right handed circular polarisation and the system was designed to use the 4GHz band for receive and the 6GHz band for transmit.

The feeds on GHY are all presented in Waveguide and we did not realise in advance that GES had arranged for waveguide to N type transitions and so we put out an appeal to the UK microwave community – Gary M1EGI responded but we did not use his units in the end.

The tests

Before GES publicly announced any attempt at TV by moonbounce, the team visited the site in early June to test the practicality of using the C band feed system at 3.4GHz.

We knew that there would be a lot of work to do and limited time on site so we didn't want to raise expectations of the ATV and EME communities in terms of our availability to make many contacts. Achim DH2VA, using the Bochum 20mt dish in Germany and Dan HB9Q, using his 10m dish had kindly agreed to assist us with our tests and thus had narrow band QSOs.

GES swept the feeds and the return loss (SWR) increased sharply at 3400MHz and was measured at 8.4dB on that frequency! We decided to proceed anyway as there was no realistic chance to make changes to the feed. We inserted a 3.4GHz circulator in the transmit RHC feed and measured around 4 of our 50 watts being reflected back down. But at least the PA was being protected by the circulator. We also checked isolation to the Receive LHC port and found another 4 of our 50W appearing there! So we took deep breaths and hoped that our isolation relay and sequencer would protect the LNA.

The results

GES had done a great job in getting the 32m dish tracking the Sun and the Moon for us and we started by checking sun noise. We were seeing around 20dB cold sky to sun Y factor with Solar Flux of 104, slightly less than that predicted by the VK3UM software but not too bad and easily accounted for by the less than optimal feed characteristics.

We waited with bated breath for moon rise, saw about 2dB of moon noise and soon heard our first echoes at very good strength. We exchanged 59 reports both ways with Dan HB9Q on both CW and SSB.

▶ *This screenshot shows the received CW signal from the Moon in the upper window. The signal is about 20dB above the noise in the SDR resolution bandwidth of 122Hz. In the waterfall display below, the 1.5 second transmitted pulse is very obvious, with the received signal from the moon (the yellow vertical line at the top of the window) arriving 2.5 seconds later with some doppler shift.*

▶ *The narrowband operating position*

▶ *Brian G4NNS and Dave G8GKQ working hard*

We also heard our own NBFM echoes but these were quite distorted and raspy – not a good sign as it indicated the path was very badly distorted. Also whilst it was a very loud EME signal, Dave and I were concerned that in our experience they were not strong enough for TV reception in any mode.

TV EME tests

On day two and after some more NB QSOs with HB9Q and DH2VA, all on SSB, we concentrated on TV echo tests which had been the main purpose of our visit. Due to the low observed strength of the returns, only Amplitude Modulated fast-scan TV was attempted. Whilst the carrier and the first 15625 Hz sidebands were visible on an SDR waterfall display, no pictures were resolved.

Dave and I agreed that due to low level of AM signals there was no chance of locking either a DVB-S RB-TV or OFDM signal and so terminated the TV tests – EME TV was not to be and although largely unsuccessful, much was learnt.

5.7 GHz

Meanwhile Goonhilly Earth Station staff had kindly provided us with access to the WG14 feeds which enabled us to run a quick echo test on 5.7GHz after our

3.4GHz tests were completed. We had good echoes for CW and SSB but curiously the NBFM echoes were not good with the ripping paper effect resulting from libration. As these tests were carried out after all others we were again running out of time so were unable to make any contacts on this band.

Conclusions

The lower than expected signal levels at 3.4 GHz were largely due to the mismatch in using the 3.6 GHz feed at 3.4GHz but still provided good voice echoes for SSB and NBFM. However, the path loss and likely phase distortion makes TV communications via the moon a challenge yet to be overcome.

It was a fantastic opportunity to play with some very big boys toys and whilst we put a lot of effort in to the project with no tangible results it was a great fun and we learned a lot. We owe Goonhilly Earth Station, Brian G4NNS, Peter G3LTF and Achim DH2VA a big thank you for their support and help in trying to make the tests a success. 🗨

The Portsdown Transmitter Software

Dave Crump – G8GKQ

Introduction

The Portsdown Transmitter is built around a Raspberry Pi (RPi) computer, which not only generates the digital video signals, but also controls the operation of its peripherals. The software has been written by a number of developers, but the core has been designed by Evariste F5OEO. More recently, I have added features to the menu and touchscreen control. This article is intended to provide an introduction to the software structure to enable users to modify the software for their own requirements and to make these modifications available to the community of over 150 users worldwide.

Software Repository

All the Portsdown software is published on GitHub, a website that allows easy tracking of changes to software and encourages sharing of ideas using the "open source" model: **https://github.com/BritishAmateurTelevisionClub/rpidatv** . Discussion of the software features takes place on the BATC Forum: **http://batc.org.uk/forum/viewforum.php?f=103**, and documentation is published on the BATC Wiki: **https://wiki.batc.tv/The_Portsdown_Transmitter**.

Major Components

The information flow through the Portsdown software is shown in a simplified form on the diagram.

The heart of the software is a program called rpidatv. This takes a digital video transport stream as its input, and outputs either I and Q signals to the Portsdown Filter-Modulator board, or an "ugly" modulated signal on one of the RPi's GPIO pins. H264 transport streams are generated by a program called avc2ts, which takes the picture from the Pi Camera, a capture device or the display frame buffer, and uses the RPi's hardware encoder to generate an H264-encoded transport stream. MPEG2 transport streams are generated by the widely-used ffmpeg software.

A Bash shell script called a.sh is run to start the transmitter and controls rpidatv, avc2ts and ffmpeg directly. It reads the configuration required from a file called rpidatvconfig.txt which contains details of the input source, symbol rate, FEC, frequency and many other details.

There are 2 methods of controlling the transmitter: the console menu accessed from another computer, and the touchscreen. The Console Menu is the most comprehensive, allowing all of the Portsdown's parameters to be set and stored in the file rpidatvconfig.txt, and the system to be updated, rebooted or shutdown. The touchscreen can control the basic parameters required for routine operation of the transmitter. The console menu is a generated by a Bash shell script, menu.sh, and the touchscreen is a C program rpidatvgui, compiled from the file rpidatvtouch.c.

Portsdown Software Information Flow (Simplified)
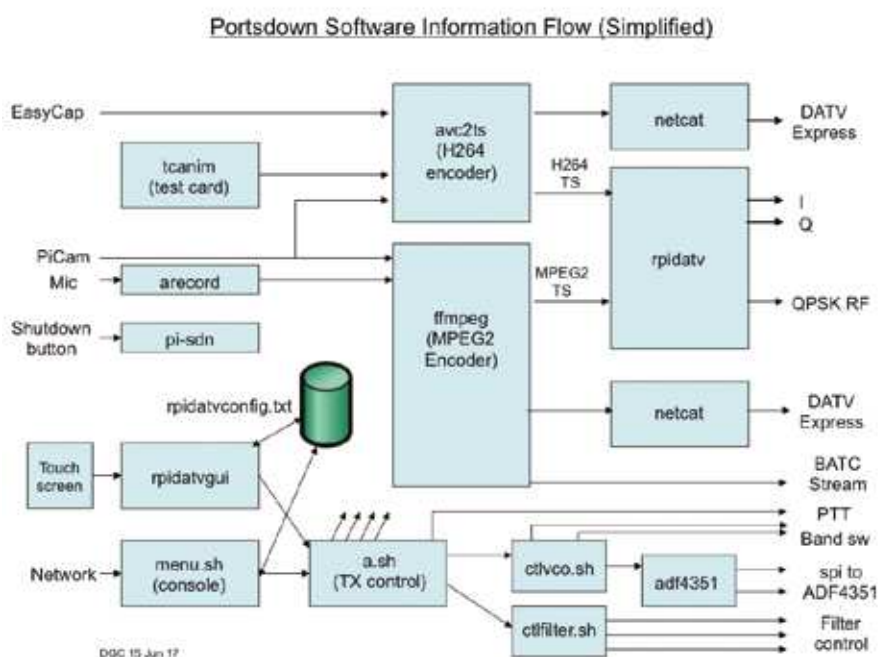
Peripherals are controlled by their own programs and/or scripts. The adf4351 synthesiser is controlled by adf4351.c, which is triggered by ctlvco.sh. This program also controls the GPIO band switching. The IQ filters are controlled by a shell script ctlfilter.sh.

To allow the RPi to be tidily shut down without simply disconnecting the power, a c program (pi-sdn) can be run to monitor a GPIO pin for a shutdown command. Taking the GPIO pin high triggers an interrupt, which causes the shutdown command to be executed.

Directory Structure

Nearly all of the Portsdown software can be found in the /home/pi/rpidatv folder. This has 4 important sub-folders:

scripts – The scripts folder contains all of the Bash scripts. These are human-readable text files. The sub-folder configs has a number of fragments and short routines that are called by other scripts.

src – The src folder contains the C and C++ source files for avc2ts, rpidatv and the touchscreen and test card. These are human-readable text files, and are compiled into executables at install or software update.

bin – When the Portsdown software is installed or updated, the C and C++ programs are compiled into executables, and these binary files (which are not human-readable) are put in the bin folder. Other generic programs, such as ffmpeg, have their executables downloaded from GitHub into this folder during installation.

video – The video folder contains the test card graphics and any transport stream files that the user wants to store.

Making Changes or Improvements

There is plenty of scope for you to customize or improve the Portsdown software and I would encourage you to try. The worst that can happen if it all goes wrong is that you would need to rebuild your SD Card from scratch – this takes about 5 minutes to start and another 5 minutes unattended to finish. Please remember to feed any changes that you do make back to me for inclusion in the published configuration, otherwise your changes will be over-written the next time you perform a software update.

If you want to change the console menu and are familiar with Bash, menu.sh is easy to change.

If you want to change the touchscreen, you will need to be familiar with C, and then you should play with rpidatvtouch.c. You can find the compile commands that you will need in the install script.

Changes to the use of ffmpeg, avc2ts or rpidatv should be made in a.sh. This is a much more complex area.

Lastly, changes to avc2ts.cpp or rpidatv.c need a lot of RPi-specific knowledge and I would suggest direct liaison with Evariste to coordinate your efforts with his.

Display Drivers

One of the hot topics on the Forum has been the use of alternative displays. The only display that I guarantee to support is the Waveshare 3.5 inch display. There are 2 reasons for this: firstly, it is the only display that I possess to test with; secondly each additional display increases the testing time that I need expend before each new release. However, I have provided guidance on how to get other displays working.

Displays that use the RPi HDMI port disrupt the timing of the rpidatv program, so should not be used. I have not had any reports of problems with displays such as the Element 14 7 inch display using the Display Serial Interface (DSI), but have not conducted any tests.

There are 4 steps to getting another display working:

1. Load the correct display overlay in the folder /boot/ overlays. The overlay should be renamed so that its extension is .dtbo (it will probably be supplied as .dtb); the ownership and permissions should be amended to be the same as waveshare35a.dtbo that will already be in the folder. There is no need to delete waveshare35a.dtbo.

2. Amend the file /boot/config.txt to call the correct overlay, by changing the line dtoverlay=waveshare35a to reflect the name of your overlay (without the .dtbo extension).

3. The Waveshare overlay includes the touchscreen details, but some other displays may need them loaded as well. If so, a line such as

    dtoverlay=ads7846,cs=1,penirq=17,penirq_pull=2,speed=1000000,keep_vref_on=1,swapxy=1,pmax=255,xohms=60,xmin=200,xmax=3900,ymin=200,ymax=3900

    may need to be added to /boot/config.txt

4. The display orientation may need to be adjusted in the /boot/config.txt file with the added text :rotate=90. For example: dtoverlay=tft35a:rotate=90

Remember that a reboot will be required to make these changes take effect.

Next Steps

If you are curious and think that you can improve the Portsdown, take a poke around and start reading the files on your SD Card. Make a back-up copy of any file that you want to modify and then try to make changes. If you like what you see, you can publish the change on the forum or e-mail it directly to me for inclusion in the core software. I'd welcome any help that members are able to offer!

8 GHz eBay Power Meter

John McCarthy – G7JTT

If you look on eBay and search for "AD8318 logarithmic Detector Control Module" you'll come across the numerous examples of the AD8318 evaluation boards.

The AD8318 has a 70db dynamic range from 1Mhz to 8Ghz and is linear from -55dbm to 0dbm so has the basis of being a very useful power meter for the shack. With a -55dbm to +5dbm signal applied to the input a voltage will appear on the output, the only thing is the voltage is inverted so with no signal applied the output voltage is around +4v dc.

This is not an issue if you wish to use a DVM to read the signal but you really can't beat a moving coil meter to look for those peaks when tweaking! So what is needed is to invert the voltage to be the right way round ie low power = low volts, high power = high volts. The way I did this was to use the good old 741 op-amp, the circuit I used is below.
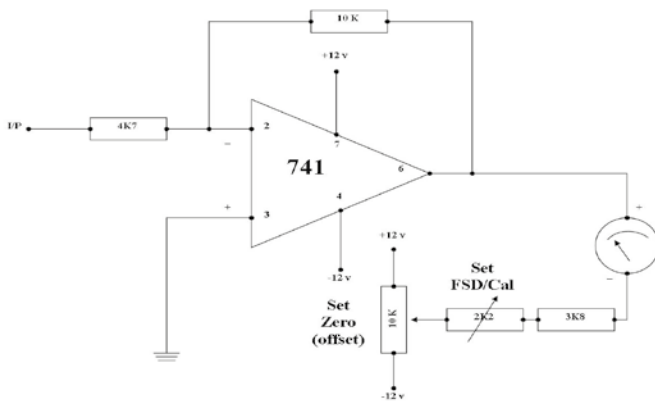
For the 5v dc supply I turned to eBay again and used one of the cheap dc to dc buck converter and also the +/-12v dc supply (item number 191970587551).
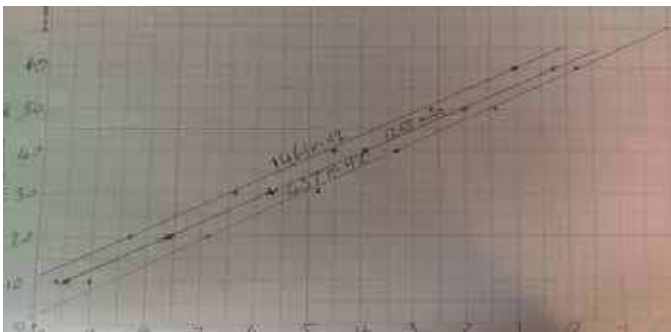
Once all wired up with no signal applied you need to set the zero point/off set with the 10k pot and the FSD/Cal with the 2K2 pot. If the FSD is set to 0dbm then you should be able to see at least -55dbm and this will keep it in it the linear range.

I built mine into an old sound meter that had stopped working, but which had a nice size meter. I also had a 0db to 60db attenuator that I fitted as well to extend the operating range.

To use the unit at higher powers than +5dbm, you'll either need another attenuator or a directional coupler with a -20db to -40db output.

To calibrate, set the FSD to 0dbm on 23cm and then calibrate the meter down to -55dbm. Once set, look at 2m and 70cm without resetting the meter, noting the different readings. If you then plot these results on a graph you can the work out the offset factor for 2m and 70cm due to the linear nature of the AD8318.

The unit makes a very useful addition to the ATV shack and can be used to measure the output of transmitters such as Portsdown or be used to set up filters etc.

CAT 17 – September 9th and 10th 2017

Once again we are holding our Convention for Amateur Television or CAT at the Finningley Amateur Radio Club (FARC) near Doncaster. Kevin G3AAF and club members will be hosting us over the weekend and admission will be £10 a day payable directly to FARC who will be providing lunch and free tea and coffee throughout the day.

We are starting to put the agenda together and below is a draft outline of the weekend – if you would like to see other topics or have an ATV related subject you would like to present, please contact us asap.

It is planned that Saturday morning will be an informal hands-on session with a show and tell area (bring your latest project for other to see) and a member's bring and buy. Rob (M0DTS) will be bringing his multiband TV van and Dave G8GKQ will be running the Portsdown Clinic. This will be followed at 12 noon by an SMD workshop led by Kevin G3AAF.

Saturday afternoon will start with a short presentation on Optical Communications by Bernie G4HJW followed by a Portsdown update from Dave G8GKQ. The Portsdown construction competition results will be announced at 4pm with presentations to the winner and other BATC award winners. The day will close after another presentation on a topic of interest.

We will be making arrangements for us to meet up at the Reindeer in Sandtoft for a meal on Saturday night – this will not be a formal dinner and everyone is welcome.

On Sunday we will start at 9:30 and have presentations on a number of topics lined up – these may include some of the following:

▶ How to receive HamTV in your garden

▶ Eshailsat update

▶ The importance of filters and what happens when you run your Power Amplifier at the "stated output" on DATV!

▶ Cheap but not so simple test equipment - what's available from China

▶ MiniTiouner update

▶ A true digital ATV repeater

▶ DATV Express and Lime SDR update

▶ How to get going on 5.6 GHz ATV - the easiest and cheapest new band for ATV!

▶ How to get going on 10GHz DATV – a bit more difficult than 5.6 but still great fun.

We intend to stream the whole convention online but this may be unreliable as the site does not have good internet / mobile coverage so the only way to guarantee you see and hear it all is to come along! This is a great opportunity to meet other ATVers and exchange ideas and just get to know people, so put it in your diary and we look forward to seeing you there.

CAT17 – Sept 9th and 10th

▶ **2 day program including talks and demos**

▶ **Fix it, test and measurement area**

▶ **Members flea market**

▶ **RF and specialist traders**

▶ **Portsdown construction competition**

Finningley Amateur Radio Club –
Sandtoft DN8 5SX

▶ **Just off M180**

▶ **5 minutes from Robin Hood International Airport**

eBay Amplifiers

Ian Parker – G8XZD

For many years I've been faced with the situation of getting the power level up from something like the DATV Express, DTX-1, and hopefully soon the BATC Portsdown to a useful level to get into my local repeater GB3ZZ in Bristol.

Until recently I have used the G4DDK amplifier ahead of an old 70cm linear from the days of AM TV - and this has given me about 500mW of clean DATV. But the set up was big and bulky so I was looking at doing something more portable.

I did initially look at some of the excellent range of Minkits devices from Australia. At first sight they look quite reasonably priced but postage is the killer - and you also risk getting stung for customs, VAT and handling charges. Of course other amplifier kits are available from European stockists but many of these are "high-end" and quite expensive

A while back I saw some rather interesting modules on eBay - wideband amplifiers from China - which apparently offer gain up to 2GHz from about £7 delivered.
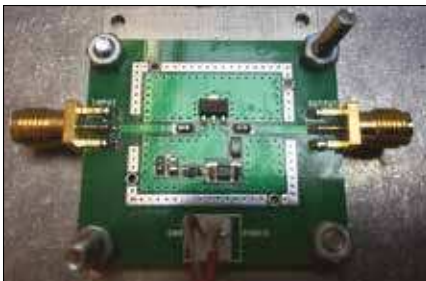

They offer some 20dB of gain and run off 12 V. However they do get quite hot so need some added heatsinking which I've done by putting a small aluminium plate underneath and then bolting it to a diecast box.

I also found they run much cooler, with no apparent loss in performance, at about the 9V level - I use one of the LM2596 step-down regulator modules which can also be picked up via eBay (other sources are available).

I've played with two of these - initially the results were disappointing - but after spending a wet Sunday afternoon I believe I've got them tamed.

All of the DATV exciters I've used need filtering on the output to clean

them up. A simple low pass filter (as detailed on the BATC wiki) worked a treat for cleaning the output up.
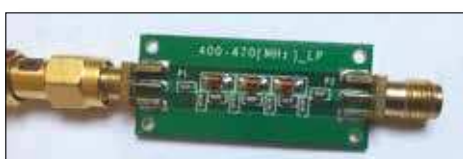
▶ *Left: this is what happens when you overdrive the amp. This at 70cm. Obviously there would be at least 3x more sprogs if you were working on 2m.*

▶ *Optimum level of drive (shoulders about -45db)*

But putting the eBay amplifiers on the output made the sprogs come back with a vengeance. However by carefully adjusting the drive level I found I could still get in the order of 20dBm (100mW) of clean DATV with shoulders around 45-50dB down on the output. This is more than enough to get into GB3ZZ which is a few miles away, albeit not line of sight.

I've also had good success feeding the output into a G4BAO 2.5W amplifier. These are available from John at a very reasonable price though some of the components are very small.

Still I managed to solder it all together and it worked fine - giving just under 1.5W of clean DATV.

Interestingly enough John has just published some modifications (in Scatterpoint) to the bias circuit which was very fiddly to set up - and really only suited for operation on a fixed power supply - as he notes it is very easy pass to several amps through the device if you get it wrong.

I haven't tried the mod yet but would recommend doing it

I write this hopefully to help others but I would add the health warning to say you really need access to a spectrum analyser to achieve these results.

My findings are repeatable (other amateurs in the Bristol area have achieved similar or better results) but it is very easy to put out enough power on non amateur frequencies to make yourself very unpopular with the authorities who may very well knock on your front door ask to see your absorption wavemeter...

As always good filters should be used on the input and output of the amplifier.

MiniTioune Mark 2 DVB-S digital receiver

The MiniTioune receiver project, developed by Jean-Pierre F6DZP, consists of the home constructed MiniTiouner hardware which interfaces via a standard USB 2.0 port to a Windows PC running the MiniTioune software.

The Mk 1 receiver hardware used the original PCB designed by Brian G4EWJ and the Sharp / Eardatek tuner or NIM and was sold in the BATC shop until early 2017. During 2016, the Sharp and Eardatek tuners become unavailable and Brian developed an adaptor PCB to enable the use of the Serit FT4335 tuner, which had a different pinout, with the original PCB. Whilst the adapter PCB worked well it was decided we needed a more compact solution that would fit directly in to a readily available housing and in early 2017 Mike, G0MJW, supported by F6DZP and G4EWJ, designed the Mk2 PCB.

The Mk2 MiniTiouner receiver will receive DVB-S QPSK and DVB-S2 QPSK, 8PSK, 16APSK, 32 APSK

from broadcast and amateur TV transmissions with symbol rates (SR) from 30 Msymbols down to 120 Ksymbols per second. Frequency coverage is from 143.75 MHz up to 2450 MHz enabling reception of the 146 MHz, 70cms, 23cms and 13cms amateur bands without any external frequency converters.

This flexibility means it can be used to receive satellite broadcasts, HAMTV signals from the ISS, "normal" DATV signals and is the ONLY currently produced system capable of receiving Reduced Bandwidth (RB-TV) transmissions.

The major components for the Mk2 Tutioune receiver hardware, including the Serit tuner, the USB module and main PCB are all available from the BATC shop. The board has been developed to fit snuggly inside a Hammond 1455 series 103x120x53mm enclosure and uses standard leaded easy to obtain components so no specialist techniques needed. The board is compatible with both the FTS-4334 tuner (the higher gain version currently stocked by the BATC Shop), and the FTS-4335 (which was previously stocked by the BATC Shop, but had lower gain).

The software is a free download from *http://www.vivadatv.org/viewtopic.php?f=60&t=416* although you do have to register on the vivadatv site before downloading. The receiver can be tested on a satellite signal or your local DATV repeater output and there is a full support network on the BATC forum.

For more details on the project visit the BATC Wiki pages at *https://wiki.batc.tv/MiniTioune*

Help and information at your finger tips...

Producing CQ-TV in either printed or electronic format is still a very important part of the BATC activities. We know it is valued by the members, both as a good read at the time of publication and as an archive in years to come. However, things move fast and there is a real demand for instant information and help and support which a monthly or quarterly publication can never meet.

For this reason the BATC set up 2 interactive on line services - the member's forum and ATV community wiki both of which offer up to date information and support from the worldwide ATV community. This article explains what these 2 services are, the type of information that you can get from them and how to use them to get information in an easy and simple way.

So what's the difference between a webpage, a wiki, and the forum?

The main **webpage** *http://www.batc.org.uk/index.html* is a static page of information and is only updated by the club occasionally – think of it as a formal site containing information about an organisation.

So for example, BATC will put details of the formal general meeting or a copy of its constitution on the website. We also make sure the home page has a welcome message for newcomers and lists where you can find information about the hobby.

The BATC member's forum *http://www.batc.org.uk/forum/index.php* is a place where you can ask questions and get help on any ATV related topic from other members. The questions are automatically placed in topics or conversations and you can look back though the topics to see the answers people gave to similar questions that you may have. There are currently 680 people from the worldwide ATV community registered on the BATC

forum and there are on average 5 -10 posts every day, although this varies.

With so much information, one problem with the forum is how to keep track of all the new posts! There is a "view new posts" under the quick links button at the top of the page but there are also 2 easy ways to keep up to date without keep visiting the forum every few hours.

The first method is where you can subscribe to a specific conversation or topic – once you do this, you will receive an email every time somebody posts a new response to the topic.

The second way to keep an eye on new posts is to use the forum RSS feed – this can be found at *http://www.batc.org.uk/forum/feed.php* and is a special web page that updates every time someone creates a new post.
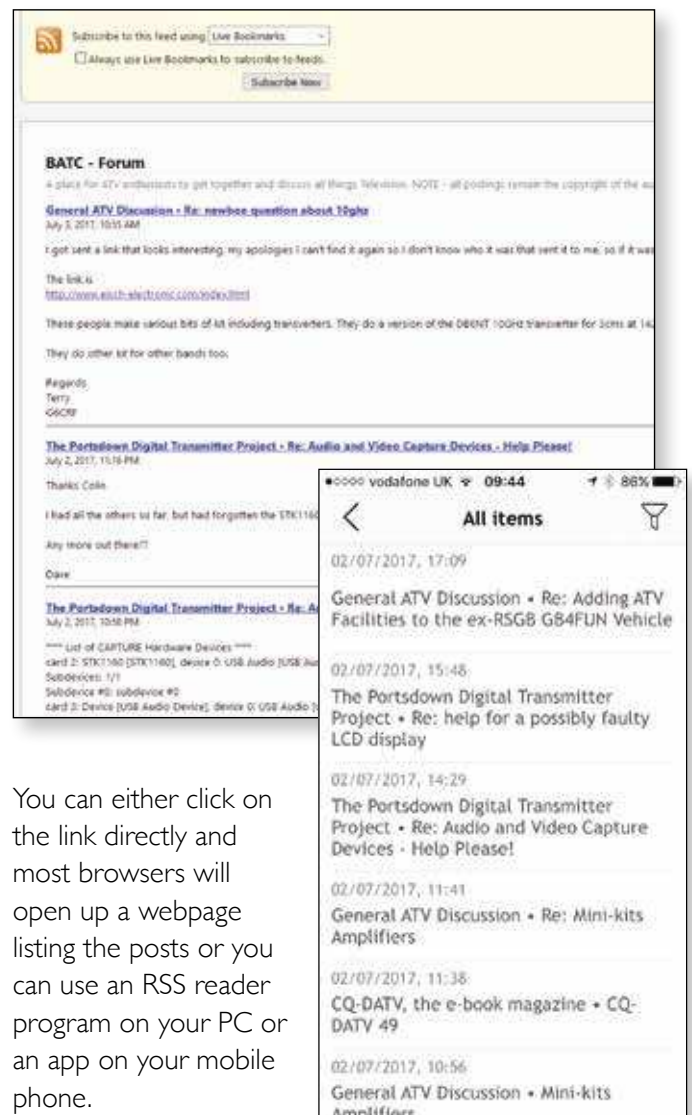
You can either click on the link directly and most browsers will open up a webpage listing the posts or you can use an RSS reader program on your PC or an app on your mobile phone.

I use the RSS reader capability in Microsoft Outlook which creates a Forum folder and lists all the posts as if they were emails and highlights the new ones.

The BATC wiki *https://wiki.batc.tv/BATC_Wiki* is our reference library and is the place to find information on all Amateur Television related equipment and projects.

Information is placed in the wiki by any members who have registered (you do not need to register to view the information) and can be text, pictures and PDFs. So if you want to find out how to build a filter, receive 3.4 GHz DATV or find a manual for that old Microwaves module equipment, the wiki is the place to go to.

The Wiki is a great way to document projects and ALL the Portsdown DATV transmitter and MiniTiouner Mark 2 receiver information has been published on the BATC wiki. Not only does it make it readily accessible but it saves the team a lot of time and can be easily updated when changes are needed.

A great example of how the member's forum and wiki work together was when Ken G8VDP requested some information on the Bob Platts range of equipment – Nigel GM4JOJ replied on the forum that he had the information and once he had received it, Ken then put it up on the Wiki – now it is there for everyone to use! 🖋

Video Fundamentals 11
Studio systems – the Matrix
Brian Summers – G8GQS

We have previously looked at cameras, monitors and mixers. This time I will explain about the Matrix (or router). I suppose the ancestors of the matrix were to be found in telephone exchanges. The earliest of these used jack cords to connect subscriber A to subscriber B and this evolved into the modern electronic exchanges having passed through the mechanical Strowger exchanges.

Video routing, and audio as well, used Musa and Jacks cords for this on large jackfields or patch panels. These became unmanageable in size and prone to faults & errors.

Relays were used in the first matrices arranged into rows and columns with a relay at each intersection which is called a "crosspoint". Transistors and FETs replaced the relays and in turn they were replaced by integrated circuits.

A 6 x 6 matrix with 36 crosspoints and buffer amplifiers on each input and output.
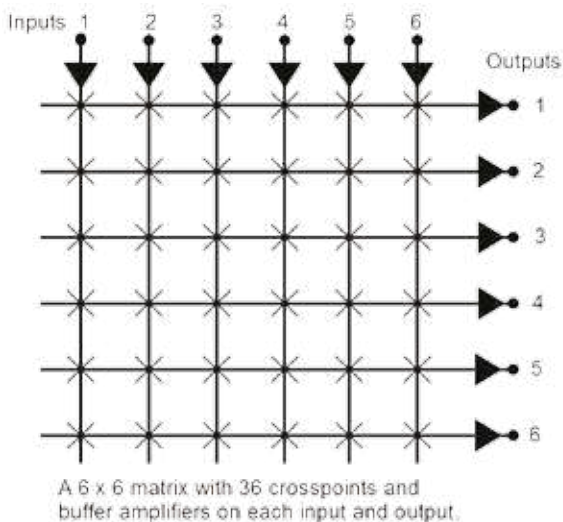
In the figure is a small 6 × 6 matrix showing the principles features. Its worth noting that the size is a square factor i.e. a 20 × 20 matrix would have 400 crosspoints. The buffer amps ensure correct input & output impedances and no (or very little) crosstalk.[i]

Control panels

A matrix needs control panels, these were often located near to the destination device, for example a video recorder would have a local panel that selected its input source. This was easy to do for a small matrix on a wire per function basis, 6 buttons, 6 lamps, 0v, +ve. fits conveniently on a 15 pin D connector. This all gets much harder for larger matrices. A 32 square matrix, with 1024

crosspoints uses a total of well over a 1000 wires even if you use a scheme to use the same wire for selection and bulb illumination. It is good practice to have the matrix illuminate the selected button lamp as a confirmation that the control action has been carried out.

It was not long before the control signals were multiplexed in some way to reduce the cable and connector size. RS232 was popular, as was systems using Co-ax cable. Co-ax was a popular choice as there is a lot of it in studios. At one time the BBC outside broadcasts used an audio tone system on Mic cable, this was called "Two-Max". A common feature in control systems was incompatibility between manufacturers and even different versions of their own systems.

Master panels or X-Y panels

As matrices became larger and microprocessors came into use panels were developed that could select both the source and destination. It became possible to program different setup arrangements for different programs and the studio could be configured in a couple of button pushes, a powerful tool, indeed sometimes they could be locked with a key operated switch.

Button legends

Faced with a matrix panel, you need to know what the button you are about to press will select, sometimes expressed as "what's under the button". The easy solution was to have the button engraved with a legend, or to have a removable button top with a label beneath. When it became possible the next generation had small LED/LCD displays next to the button and latterly even an LCD display on the button top itself!

Multi layer or married matrices

It is easy to see the need for attaching audio to match the video selection, for stereo we now have a 3 layer matrix. This expands with increasing complexity to include, time code, cue signals, talkback, UMDs Data, extra program audio......These could be "married" to all switch together or independently.

OCP[ii] overrides

Another Matrix function is the OCP override, when the iris & lift control is pressed a closing contact drives the matrix to switch that camera to the engineers preview monitor. This is normally a secondary function of a local matrix control panel with a wider selection of sources.

For Outside Broadcast practice, mixer-out might be the main selection and the OCP override allowing the selected camera to be compared with what is currently on the mixer.

UMDs[iii] and Cues [iv]

In front of the vision mixer there would be a number of preview monitors and if these are driven by matrix outputs with the cues and UMD names following it is easy to rearrange the layout at the directors whim.
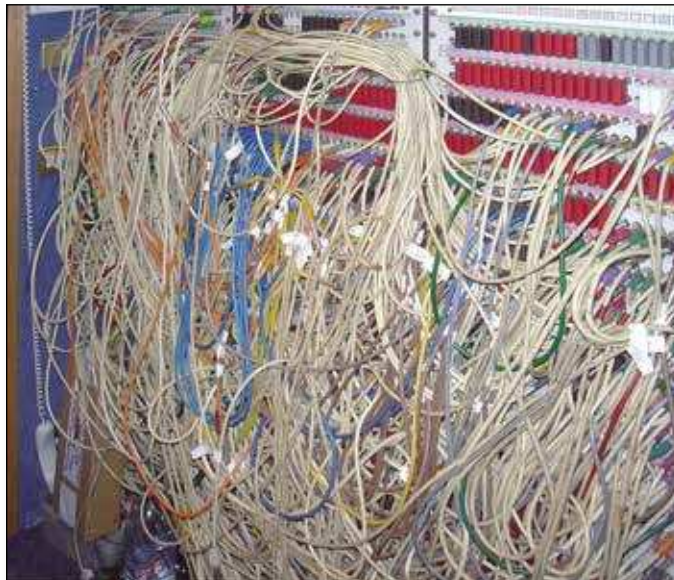
Your Station

How might all this apply to your home station? Once you move away from the simplest set-up the profusion of wires and equipment becomes difficult to manage and the use of a small matrix, perhaps 8x8 makes switching easy. Does away with a lot of plug swapping!

Possible sources:- Camera 1, camera 2, Rx 1, Rx 2, VTR, mixer output, computer, captions, station ident, test signal, bars, test card, etc.

Destinations:- Transmitter, measurements, picture & waveform monitor, VTR input, big screen TV, computer grab, mixer I/ps 1, 2, 3.etc

Matrix or Mixer?

A vision mixer can be considered to be a special case of a matrix and often has additional "aux" row outputs for monitoring but is a single layer just for the picture, sound being mixed separately. As mentioned above a matrix can have, and switch, many layers.

The Matrix in practice

In studio & OB use there has always been the need for switching and historically a combination of small-medium matrices with associated jackfields were used. In recent times very large matrices have been possible and sizes of 1024 square or even larger are possible with every signal going in and out of the matrix. At this point it is worth

thinking about the practicalities of a 1024 square matrix having 1,048,000 crosspoints! Testing is an interesting prospect! The latest studio use is to move away from discrete video signals to IP based systems with big servers, but that is for another day..

A degree of complexity!

This is the video jackfield in a very large OB van at a major sports event. It gives some idea of the degree of signal routing and distribution required. All this was in addition to a 128 square matrix that was full!

The HD vehicle that replaced this one had a 1024 square matrix and a much smaller jackfield. With matrices of this size, a control panel with dedicated buttons was totally un-feasible, so the buttons you needed were assigned by computer and they had "soft" LCD tops that changed names and colours as required.

This 1024 square matrix was a monster that lived in it's own air-conditioned and soundproofed rack in the corner of the vehicle, if it stopped that was the end of your program.

No mention has been made of the type of signals; analogue, YUV[v] SD digital, HD digital, 4K, data, audio, all can be routed via appropriate an appropriate matrix.

This has mostly been about the broadcast applications of matrices but small ones can be of great benefit to the television amateur by adding additional system flexibility. Its also worth noting that PAL matrices are currently available a low prices on a popular auction site.

---

i   Crosstalk, in this sense the signal from the unselected inputs to an output.

ii   OCP = Operational Control Panel

iii   UMD = Under Monitor Display of the source details, Cam 1 or hoist or "Jim"

iv   Cues or "Tallies" normally a Red cue but, depending on complexity, Green is used as well.

v   YUV a version of component video, luminance plus colour separation signals.

My Station

Malcolm Johnson – G0UHY

A brief history

From an early age I've had an interest in radio and electronics and got my first licence in 1978. My first callsign was G8RGV. At the time I was living in Birmingham and there were lots active on 2m and 70cm and a few stations working ATV on 70cm AM. I soon got the bug and purchased a Microwave Modules ATV Tx and converter. From a fairly low site I worked all over the Midlands and was active until the take up of 24cm and my move South.

My interests in ATV were rekindled when I moved to Paignton in Devon in 1990. I'd always been a keen constructor and was soon home brewing gear for 24cm and 10GHz. Luckily, there was enough local interest in ATV to get an ATV repeater on the air and GB3TB was born. I'd also got the microwave bug and realised that to work anyone on narrowband microwaves that I'd need to learn CW. Amazingly I passed the test and in 1992 I received my current callsign G0UHY.

My interest in DATV was born from following Rob, M0DTS as he was developing the forerunner to DigiLite. As fast as I would design a PCB for his design and build It, Rob would make improvements so it was a steep learning curve. I was then lucky enough to help with prototyping DigiLite. Its development created a much needed easy route into DATV and got others creating peripherals to enhance it.

Current activities and equipment

Living in the SW means that DATV QSO's are few and far between. However, with the Activity sessions proving popular for /P operators I have had some good 2 way contacts on 70cm RBTV and even accidentally got into GB3HV at the same time.

Currently, the shack is divided into 2 halves. One is for operating, along with computer equipment to aid operation (Vmix, DATV Express etc)..The other side is for construction and test gear. I'm lucky enough to have some really good test gear which is really useful for checking power levels and ensuring clean signals on the bands. . The antenna system at the moment consists of a 48 element Quad Loop Yagi for 23cm, an 18 element Wimo for 70cm and a 10 element Cushcraft for 2m. There is also a dual band 4 element for 4/6m too. All of these antennas have masthead preamps to overcome the feeder losses. Photo 4.

I have equipment for all bands from 160m to 3cm but the microwave activity is now confined to /P operation when time allows. I try to be active for the UKAC contests on the various VHF/UHF bands but my main interest still lies in ATV. I'm currently active on 23cm Digital and 2m and 70cm RBTV. The equipment used is usually the DATV Express or the DTX1 with a Minitioune receiver for reception. The Portsdown transmitter is in the final stages of construction and will be a very useful addition for both fixed and portable operation. Hopefully, with so many units being built there will be plenty of stations on the air?

As I write this short piece I am preparing to pack the shack up and move to a new QTH, but still in Paignton . I have made an offer on a house that is 700ft ASL, so I hope to work a good few of you soon.

Don't forget to point those beams to the far southwest. You never know what you'll find.

73 de Malcolm G0UHY

A cheap and easy 6cm ATV transceiver

Dave Crump – G8GKQ

Just 10 days before the International ATV Contest, Mark (G4WVU) told Noel (G8GTZ) about some 5.8 GHz FM TV transmit and receive modules that were available on eBay for under £20 with free airmail delivery.

The item title was "Tarot 5.8G 600MW Telemetry TX/RX Combo for FPV Image Transmission TL300N"; it was eBay Item number 302350167468, but I realise that this will change.

The units are designed to send First Person Video (FPV) cockpit video from Drones and are tiny but have reasonable FM-TV performance with a quoted spec of 600 Milliwatts out and receiver sensitivity of -80 dBm. The best thing is they cover the 6cms Amateur Band and can be used legally just by changing the channel to one inside the band.


As a challenge to ourselves, we agreed to attempt a contact using the modules during the contest. My equipment arrived 2 days before the contest, and I decided to mount it on a metal plate for robustness, and feed my existing 10 GHz dish with a 5.6 GHz dipole in front of the feed.

The units have 32 available preset frequencies including 5665MHz which is an approved input on GB3KM and so we choose to use the same channel in the hope that it may become the UK ATV standard frequency.

Tests across the bench showed good quality analog video pictures, subjectively better than those that would be expected from the Comtech modules. A quick check with the frequency counter confirmed the correct frequency, and Noel confirmed the power output was +26 dBm or 600mW. The only problem I noticed was that the multi-way 2.5mm video/audio jack on the receiver needed to be pushed in to just the right point to make all the connections correctly – see Noel's footnote for more on this!

On the morning of the contest I was still constructing the unit, making RP-SMA to SMA leads, and adding power and aerial changeover relays fed from a 12V-28V boost converter. I brought the video in, video out power and PTT signals out to sockets on a panel so that I could run long leads back to my operating position. The completed unit can be seen in photo – the aerial connection is made directly to the changeover relay. In due course, I will transfer it all to a waterproof box, but I also want to add a PA, and perhaps a preamp.

G8GTZ decided to mount the units in a diecast box on the feed arm of a Sky Mini Dish with a PCB wideband feed from G4DDK in front of the dish.

Later in the afternoon, Noel was at Lulworth near Wareham in Dorset (IO80WP) and I was 80km away on Portsdown Hill above Portsmouth with a good path between us. I used tape to attach the 5.6 GHz dipole in front of the 10 GHz feed and hung the transmitter-receiver unit from the semi-rigid cable. It was as precarious as it looks in the photo; luckily it was not windy or wet! After spending some time getting the dish pointing exactly right (time never wasted), amazingly I was able to
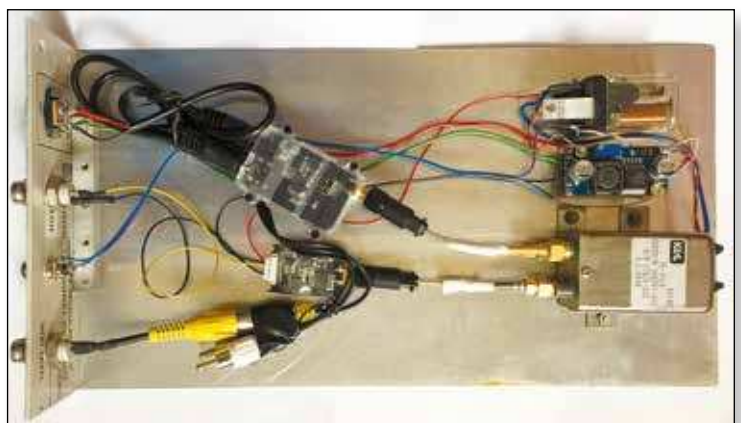
▶ *Dave G8GKQ's more precarious solution*
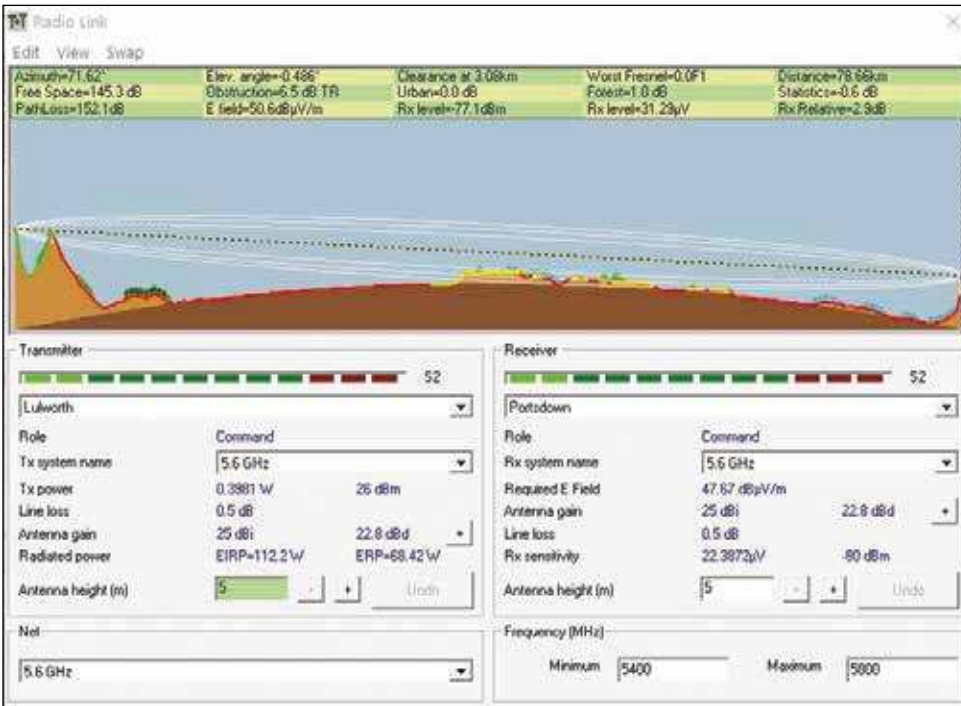
receive P2 pictures from Noel. He was able to detect my transmission but was unable to resolve a picture – possibly due to a video connection issue at his end.

We were really pleased with the results and both hope to improve our equipment for the next activity day. I will be boxing up my equipment and making a better dish feed.

The units proved incredibly easy to get going and proved excellent video performance out of the box. There are plenty of antennas and higher power PAs available for the 5.8 GHz wi-fi band and we hope that other stations will join us on 5.665 GHz FM.

Footnotes

▶ The G8GTZ receiver problem turned out to be a problem with the multi pole jack plug used on the receiver and we have since seen similar problems on Dave's and Ian G8XZD's units. There are also reports from other FPV users of poor reliability of this connector and it is recommended that you hard wire video and audio connections to the receiver board.

▶ A more detailed article on using the units for ATV on 5.6GHz will be published in a future CQ-TV and for more details see the BATC wiki:
https://wiki.batc.tv/5.6_GHz

▶ It should be noted that the future of the 5.6GHz amateur band is currently under review by Ofcom and we urge caution before investing too much time and money in the band – but a lot of fun can be had for less than £25!

▶ A couple of users have reported rx video is on the red phono plug rather than the standard yellow! 💬

▶ *Noel, G8GTZ's dish mounted solution*

DATV-Forum – the latest trends

HAM RADIO
The No.1 in Europe!

July 14 – 16, 2017
Messe Friedrichshafen

Conference will be streamed at https://beta.batc.tv /live/datv-forum

AGAF

BATC

SWISS ATV .ch
The Home of amateur television

IAPC – ATV Technical Group

Since the first edition in 2014, following an initiative of the SwissATV, the ATV Forum has now become an integral part of the Hamradio conference program in Friedrichshafen. It is also a unique opportunity to meet members of the European ATV community, beginners as well as experts !

The three national associations AGAF, BATC and SwissATV are jointly organizing the program of the Forum.

Since last year, many DATV projects based on the Raspberry Pi have been developed thanks to the software designed by Evariste/F5OEO and to the various proposals for the filters and modulator part of the system (F6DZP, F1DJO, BATC, etc.). This open platform has several advantages and should not only contribute to the promotion of DATV but also raise the interest for this mode among the community of young operators.

Thanks to the HamTV project, DATV has also now found a new field of applications in space with the first successful live video transmissions from ISS. New perspectives will be opened in 2018 with the launch of the geostationary satellite Es'HailSat 2 which is planned to support bilateral live DATV QSOs.

Join us to discover these new trends and much more in theory and practice at the DATV Forum of Hamradio 2017 taking place on Friday 14 July 2017, 12h00 – 16h00, room "Oesterreich"

The program will begin with an exhibition and live demos of different ATV/DATV systems and, in the second part, there will be several presentations of current topics for ATV.

Don't miss this unique opportunity to get in touch the most famous ATV experts from Europe !

The updated program can be found at *www.swissatv.ch*

Programme

12:00 -12:45 Exhibition and live Demos of DATV-Systems

▶ The Portsdown DATV Transmitter of BATC (G8GTZ/ HB9AZN)

▶ DATV on SDR-Platforms Ettus/LimeSDR (HB9DUG/ HB9AZN)

▶ DATV in GMSK on 70 cm (DC5QC/DJ8DW)

▶ DATV transmitter with rpidatv software on Raspberry Pi (F5OEO)

▶ Minitiouner: a universal receiver for DATV (F5OEO)

12:45 -16:00 Presentations

12:45-13:15 DATV in Space, Noël Matthews G8GTZ (via Skype)

13:15-13:45 All-in-One - A DATV SDR Experimental TX/RX solution for DATV, Michel Burnand HB9DUG

13:45-14:15 Leistungsverstärker für DATV, Dirk Fischer DK2FD

14:15-14:45 Rpidatv: software for DATV on a Raspberry Pi, Evariste Courjaud F5OEO

14:45-15:15 Hamnet in Berlin und Anbindung in die ATV-Infrastruktur, Jörg Hedtmann DF3EI

15:15-15:45 DATV in the Netherlands, Chris Vandenberg PA3CRX

15:45 Conclusions, Pierre-André Probst HB9AZN

Known Digital ATV DX Records

Updated 1 June 2017   *Ken Konechy – W6HHC*

24 GHz

124 km   JA6DME & JA6EES   2011-11-12

Locations Mont Ten-Zan and Mont Ge-Zan

10 GHz

450 km   HB9JBC & F4CXQ   2005-06-21

Locations JN40CT (Sardinia) and JN12OH (Spain)

93 km   G8GKQ & G8GTZ   2016-07-05

H.264 video - DVB-S protocol at 333 KSymb/s FEC=7/8. G8GKQ used RPI and DigiThin at 250 mW. G8GTZ used PIPO and DATV-Express at 3W. Locations IO80WP (Povington Hill near Lulworth) and IO91GI (Walbury Hill)

32 km   G8GKQ & G8GTZ   2016-06-23

H.264 video - DVB-S protocol at 333 KSymb/s FEC=7/8. G8GKQ used RPI and DigiThin at 200 mW. G8GTZ used PIPO and DATV-Express at 5W. Locations IO91JA (Lane End) and IO91JH (Hannington)

5.7 GHz

341 km   JL1BLF & JH1GED   2011-08-06

Locations Mont Chokai-san and Mont Kashimayari-gatake)

2.4 GHz

~ 1000 km   OR4ISS to IØKPT (one-way)   2014-03-08

~ 1000 km   OR4ISS to IK1SLD (one-way)   2014-03-08

Initial DVB-S protocol live video transmissions from HamTV in orbit aboard ISS SR = 1.34 MSymb/sec and 2.0 MSymb/s using SR-Systems exciter & MPEG2 Locations Orbit to Matera, Italy and also Orbit to Casale Monferrato, Italy

252 km   JA6SPI & JA5MFY   2009-11-03

Locations ??

1.2 GHz

440 km   G4KLB to G1LPS   2010-10-11

Locations IO90BR and IO94EQ (tropospheric ducting - one-way DATV)

419 km   G4KLB & MØDTS   2010-10-11

Locations Bournemouth, England and Yarm, England (tropospheric ducting)

379 km   VK3RTV(RPTR) & VK7EM   2011-02-23

Locations Mount Dandenong, Victoria and Penguin, Tasmania (operators VK3BFG, VK3DQ, VK3WWW and VK3TRX)

252 km   JA5GYU & JA6JNR   2009-11-03

(1 Watt)

70 CM

696 km   F1FY to G8GTZ   2013-09-24

(DVB-S 2MS/sec FEC=1/2 - - one way reception)

696 km   G8GTZ to F1FY   2013-09-25

(DVB-S 2MS/sec FEC=1/2 - - one way reception reported by FM) Locations IO91KH (near Basingstoke) and JN16VB (near Roanne, France)

70 CM - continued

600 km   DBØTAN (repeater) to F9ZG   2014-11-28

DVB-S - one-way DATV - Tropospheric ducting (signal 25 dB S/N over ca) Locations Wasserkuppe (Hesse state, Germany) to IN99KC (Normandy, France)

528 km   G3PYB & F5AGO   2013-09-24

(DVB-S 2MS/sec) Locations near W YORKSHIRE and JN06DP (near Poitiers, France)

501 km   W4HTB & WB8LGA   2014-07-26

(DVB-T QPSK FEC=1/2 2 MHz Bandwidth) - Tropospheric ducting Locations Bowling Green, KY and Marengo, OH

235 km   G8GTZ & F9ZG   2016-06-12

H.264 video - DVB-S protocol at 125 KSymb/s using DATV-Express w/ 19-ele yagi Locations JO00HU (Fairlight near Hastings) and IN99KC (near Cherbourg)

121 km   KH6HTV to KØRZ   2011-11-21

(video resolution HDTV 1080i - protocol ITU-T/J.83B QAM-64 - one-way DATV) Locations Cheyenne, Wyoming and Boulder, Colorado

144 MHz

294 km   G0MJW/A & G8LES   2016-12-29

Tropo-ducting - H.264 video - DVB-S protocol at 125 KSymb/s with DATV-Express and 9-ele yagi at GØMJW. G8LES also used DATV-Express with 10-ele X-yagi. Both produced 25W ERP. - on 146.5 MHz - UK temporary band allocation. Locations IO83RO (Winter Hill) and IO91LC (Four Marks)

281 km   G8GTZ & G0MJW/A   2016-12-29

Tropo-ducting - H.264 video - DVB-S protocol at 125 KSymb/s with DATV-Express and 9-ele yagi at G8GTZ. GØMJW also used DATV-Express with 9-ele yagi. Both produced 25W ERP. - on 146.5 MHz - UK temporary band allocation. Locations IO91KF (near Basingstoke) and IO83RO (Winter Hill)

237 km   F3YX to F9ZG   2011-11-09

DVB-S protocol at 1000 KSymb/s using modified SR-Sys MiniMOD (one-way) on 145.0 MHz experimental license 5-Minute max. Locations JN18AP (near Limours, France) to IN99KC (near Cherbourg, France)

195 km   GW8VPG & G8GTZ   2016-12-11

DVB-S/H.264-video protocol at 333 KS/s - GW8VPG using DATV-Express w/ 9-ele. G8GTZ also used DATV-Express w/ 9-ele yagi on 146.5 MHz - UK temporary band allocation. Locations IO81LS (Blorenge Mountain in South Wales) and IO90JO (Isle of Wight)

50 km   MØDTS & G1LPS   2015-02-21

H.264 video - protocol DVB-S at 333 KSymb/s using experimental DATV-Express on 146.5 MHz - UK temporary band allocation. Locations North York Moors, England and Spennymoor (County Durham), England

50 MHz

64 km   G8ADM to G8LES   2015-02-10

DVB-S protocol at 1.133 MSymb/Sec with FEC=3/4 (one-way) on 51.2 MHz using 200W avg Pwr Out and BW approx 1.5 MHz Locations North of Harrow (IO91TO) to North of Alton in Hampshire

See more details at **www.von-info.ch/hb9afo/records/recordse.htm**

If you have any update to these details, please conatct Ken, W6HHC: **W6HHC@ARRL.net**

BATC website development

In order to ensure we have fully tested the new website and member's database we have delayed the release until August. This partly due to the fact that there have been several changes in the proposed development since this article was originally written and the member's forum and batc.tv streamer will now be integrated in to the main site from day one.

As many of you know, we have been considering updates to our web presence for a couple of years but have been unable to find the suitable development effort (either volunteer or contractor) to produce a replacement site. The good news is that we have contracted Inspya Developments to build a new site to replace the main BATC website, the shop, the members' database and members' forum.

The site is under development and uses Wordpress with a number of well proven modules such as woocommerce to give us the functionality we require and should be ready for release during August 2017.

What's new?

As well as updating the rather tired look of the current website, the main reason for the development is to upgrade our membership database and shop – those of you who have experienced password problems will know we have to manually reset log in details for every new user - in fact I got interrupted while writing this article to do one! And that is just the tip of the iceberg of problems that Brian, Rob and I have to resolve every week.

The new shop will use the woocommerce plug and enable us to be much more flexible in pricing and the way we present products for sale – it will also print postage labels and enable us to do reports on the various products we sell. Finally, it will streamline the club book keeping, which is currently done by Brian on a massive spreadsheet!

Will it affect me?

Yes, it will – all the changes are listed below, but hopefully most of them will be seamless

Main website

Clearly all the user data from the main web site / member's database will need to be migrated to the new platform. We are hopeful that this, including passwords, can be done seamlessly and you will be able to use your existing user name and password on the new site.

In the worse case where we cannot migrate the passwords, all members will receive an email requesting them to log in to the new site using a special link in the email. This will invite you to reset your password and unlike the current site you will then be able to login without any problem.

BATC Members forum

All the existing forum posts and threads will be migrated across to the new forum. However, as the forum will be integrated in to the main site, you no longer need a separate login and will use your main website user name when posting.

This means that you may have a different user name on the forum but you will be able to continue posting on live threads under your new user name. It also means that whilst everyone will be able to view the forum, only paid up members with a valid log in will be able to post and start new topics.

The BATC.TV Streamer

The new streamer has been a large part of the project and has been developed by Phil M0DNY and will offer HD and mobile streaming using HTML5. Many of you will have seen the user interface and as it has been used for CAT16 and other special events such as the ARISS contacts.

Phil has now completed the integration with the wordpress and so the new streamer will be integrated with the main web site.

BATC wiki

The BATC wiki will not be affected by these changes – it is already hosted on the new server and only has a few members who log in to edit content and so it was decided to keep it separate from the main website.

DXspot

DXspot.tv will not be affected by these changes. It is planned to update the site in the near future and we may be able to integrate it with the main site login at that time.

Support

We are hoping there will not be too many problems but if you need help, we will be setting up a dedicated topic on the member's forum where we or other members can help you or you can contact us using this email address: *support@batc.tv*

Wideband LNBs

Dave Crump – G8GKQ

A new type of Ku Band LNB has recently appeared on the market: the Wideband LNB. You may think that this LNB sounds ideal for use on 10GHz, or for receiving Es'HailSat 2 in the future. Unfortunately, this is not the case.

The new Wideband LNBs do not use the low band / high band 22kHz switching system that was used on "Universal" LNBs. Instead, they simply have very wideband outputs, one horizontal and one vertical polarity, enabling the new (Sky Q) tuners to receive all of the band and both polarities at once. The LNBs have one fixed local oscillator set at 10.41 GHz. This converts the whole band of each polarity down to a coax friendly 290MHz to 2.34 GHz. By using two coax cables, the Set Top Box (STB) can now "see" all of the channels at the same time. So a tuner inside the STB is free to select any channel without the need for any voltage switching or tones. This opens up the world of multiple tuners. The new Sky Q box has twelve tuners all operating simultaneously.

▶ *This is the Unitron Wideband LNB:*

The 10.41 GHz LO means that most of the frequencies we are interested in the 10 GHz band will convert down to below 100 MHz, and possibly be outside the range of the IF amplifier.

The plus side of the introduction of these new LNBs is that DVB-S/S2 Tuners (NIMs) are now available that cover 290 MHz to 2.34 GHz, or in the case of the Serit FTS-4335, 144 MHz – 2.45 GHz.

A typical spec for the wideband LNB is:

Input: Ku Band Input frequency MHz 10,700 - 12,750

Outputs: 1 Horizontal and 1 Vertical

Output frequency: 290 - 2340 MHz

LO frequency: 10,410 MHz

Conversion gain: Typical 55 dB

Noise figure: Typical 0.7 dB

Cross polarization isolation: 25 dB

Output power: -25 dBm

DC supply voltage: 9 - 20 V DC

Power consumption: 1 W

Operating temperature: -40 to +60 °C

LNB mount fitting Ø: 40 mm

Dimensions: 135 × 120 × 60 mm

There are also a whole new range of multi-switches and distribution amplifiers available for communal systems – which may have future amateur TV use.

Portsdown Competitions

▶ **Portsdown construction competition**

▶ **Awards for the best built Portsdown Tx**

▶ **Portsdown coding competition**

▶ **Awards for most imaginative re-programming of Portsdown hardware**

▶ **To be judged at CAT 17**

Turning Back the Pages

A dip into the archives of CQ-TV, looking at the issue 48 years ago.   Peter Delaney - G8KZG

CQ-TV 68

The magazine opened with an apology from the editor for the long delay in producing CQ-TV 68, which appeared in November 1969. Work commitments had taken him abroad, and then the draft text went missing in the post. This was in the nature of an 'emergency issue', and had been produced with the help of John Lawrence, who had provided the only technical articles to be written all year. As a result of the lack of magazines, the committee had decided to give extend membership for everyone who had joined before July 1969 to cover 1970 as well.

FIG. 1

MV - MULTIVIBRATOR.   PN - PULSE NARROWER.   INV - INVERTOR.
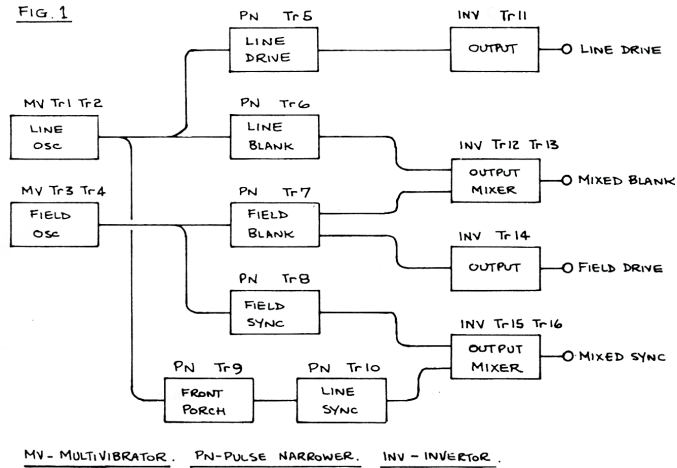
The first technical article by John was a 'simple sync pulse generator'. John's article usefully provided a block diagram, (Fig 1) showing what each stage did, as well as the full circuit diagram (Fig 2). The multivibrators generated either line or field frequency pulses, with component values given for either 405 or 625 line working. In the case of the field oscillator, a feed from a transformer winding would enable the system to be locked to the mains supply. Various pulse narrowers were driven by these multivibrators, and the signals combined as necessary, and fed to an inverting output stage that could put a 2V signal across a 75 Ω load..

To help constructors check the working of the circuit, John helpfully provided a set of waveforms (Fig 3) showing what should be seen at each stage (for 625 line systems, the pulse width at Tr12 c would be 12μS, and the line length 52 μS; the pulse width at Tr9 c would be 1.5 μS, whilst the pulse width at Tr10 c and Tr16 c would be 4.7 μS).
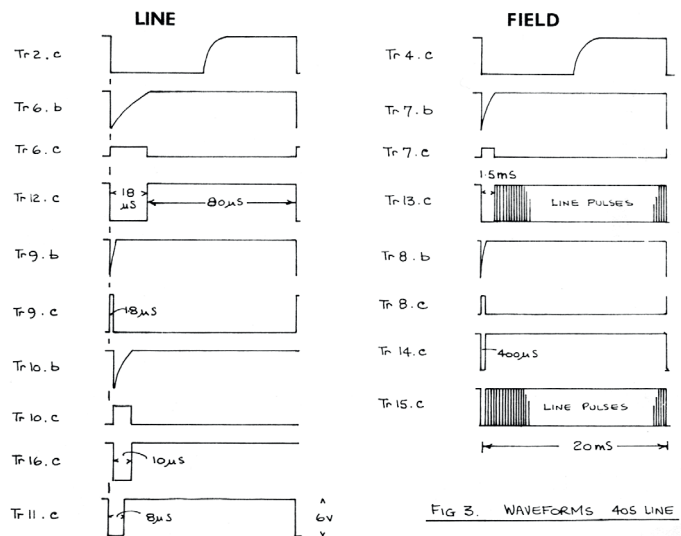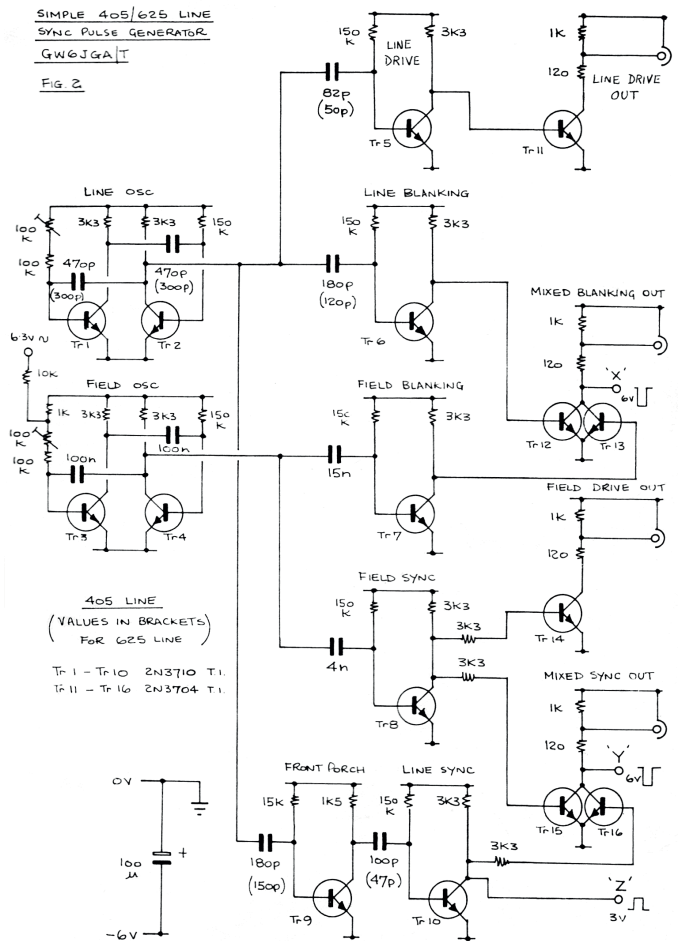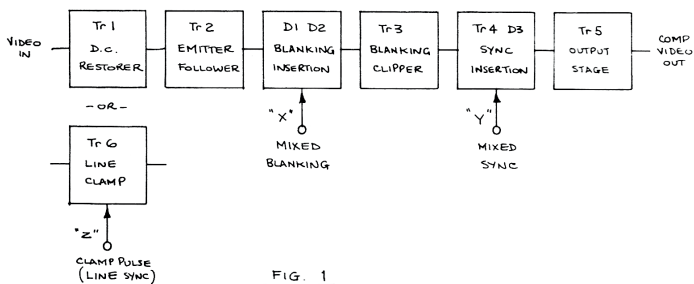

FIG 3.   WAVEFORMS   405 LINE

FIG. 1.

The next article was for a 'simple video processing unit' The block diagram shows how it worked, restoring the dc component of the video at Tr1, blanking the picture signal at the base of Tr3, by means of the diode gate D1 and D2, adding sync pulses at Tr4, and then feeding an output via the emitter follower at Tr5. The full circuit diagram was
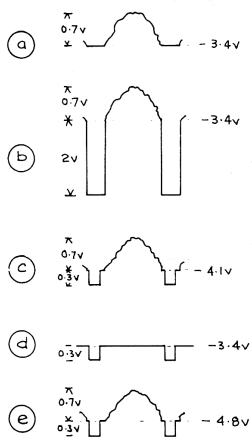

FIG. 4.

given in Fig 2, with waveforms of what could be expected at the various points in the circuit shown in Fig 4. A circuit for an input line clamp was also described for those who felt the simple dc restoration was not adequate.

The points X and Y for mixed blanking and mixed sync (and point Z for a line pulse to drive the optional clamping circuit) were taken directly from the sync pulse generator described earlier.
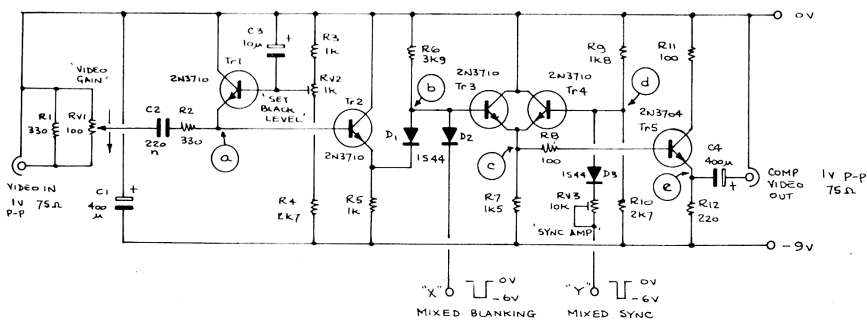
FIG. 2. VIDEO PROCESSING UNIT

The third main article in the magazine was also by John, and called 'Circuit Notebook No 1'' was the first of what became a very long running series of useful articles - often 'building blocks' for use in more complex designs, or ideas based on manufacturer's application notes, which were often not generally available. To start the series off, John's first topic was 'Mixed Syncs', and the basic circuit was the pulse narrower. This generates a pulse shorter than the pulse driving it. Fig1 shows the idea, and the waveforms involved. With no input signal, the current through R1 will

set Tr1 base at 0.6V, and so putting its collector close to 0V, point 'a' being at +6V, so there is 5.4V across C1. If a negative going pulse comes from the previous stage, coupled through C1, point 'b' falls to - 5.4V, and cuts off Tr1. The capacitor then discharges trough R2 in a time set by the values of C1 and R2. When the input pulse ends, point 'a' goes back to +6V, the time being decided by the values of C1 and R1. The operation can more easily be understood from the waveforms below the diagram. John then went on to show a practical application of a pair of such circuits to produce the front porch and line sync pulses.
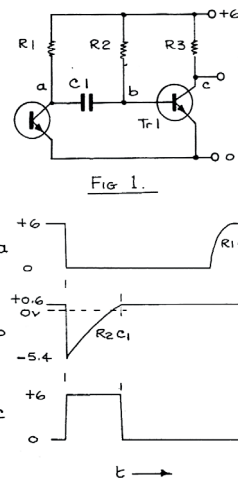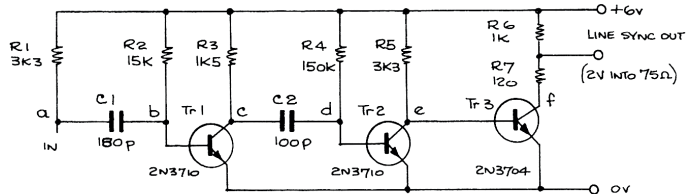

Fig 1.

FIG 2.

The circuit is in Fig 2, whilst the waveforms are at Fig 3. The input at 'a' had the negative going edge at the start of line blanking. The output of the pulse narrower formed of R1, R2, C1, Tr1 and R3 would produce a pulse at 'c' - the falling edge being the end of the front porch. The second pulse narrower, formed of R3, R4, C2, Tr2 and R5 then used this falling edge to produce a positive going line sync pulse
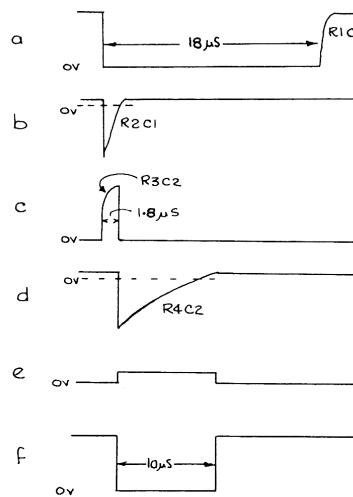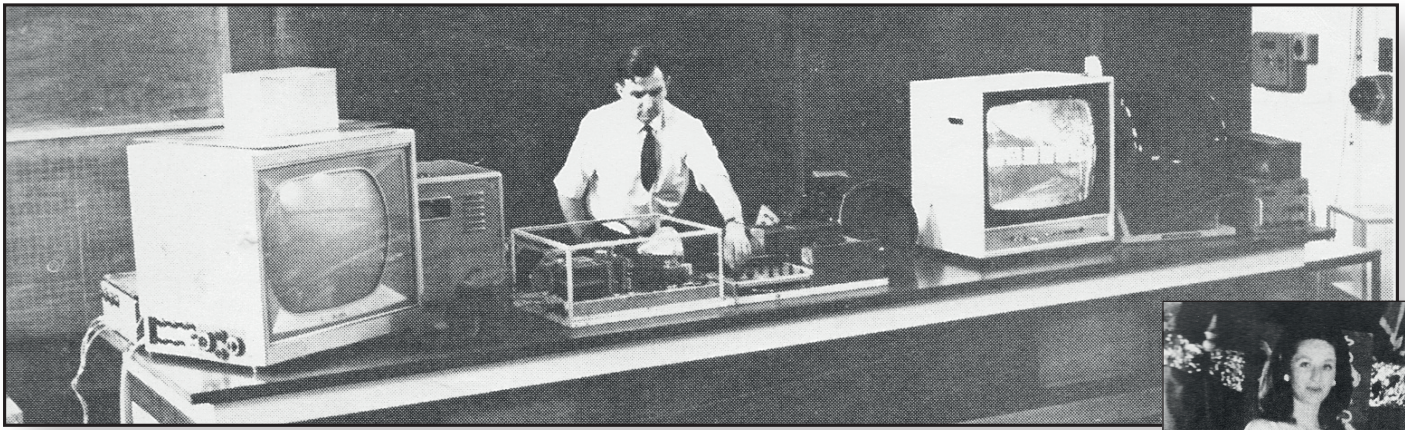
at 'e', which was then inverted to produce the output at 'f'. The application of these ideas was demonstrated in the 'simple sync pulse generator' already mentioned.

FIG 3.

Apart from technical articles, the magazine also included a report and picture of a lecture given to the University College of North Wales Radio Society at Bangor University. The demonstrations included amateur colour television and live television transmissions from the University Club's shack. The lecture had been given by… John Lawrence !

In case it be thought that there was nothing else in the magazine, the front cover illustration showed Tranquille Fabris, F9MF, with his 'creepy peepy' camera and transmitter at an international amateur television convention at Armentieres, France, whilst on page 9 was featured 'Miss Amateur Television' at the same event.
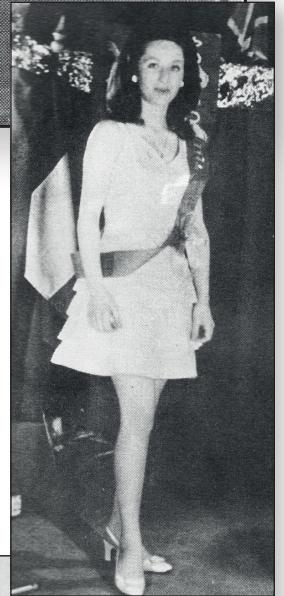
Norman 2E1MNP

Norman was regularly seen on most Friday nights on the GB3EN repeater in Enfield, North London. He built the input switcher for the repeater that is still in use today. Norman sadly passed away in hospital in early June 2017. He was 80 years old and after completing his national service worked for BT for most of his life.

He was also a keen amateur videographer and often showed some of his videos dating back 30 years on GB3EN. He was also an active church member and used to sing in the local church choir. This picture of Norman in his shack was taken in 2003.

Norman is survived by his wife Maureen and two grown up children Jacquline and Dawn.

He will be greatly missed by the local repeater community.

The British Amateur Television Club

BATC

The club provides the following for its members:

▸ A **colour magazine**, CQ-TV, produced for members in paper or .pdf (cyber membership) formats.

▸ **Web site** – where you can find our online shop stocking
hard to get components, software downloads for published projects and much more.

▸ A **members forum** at
www.batc.org.uk/forum/ for help,
information and the interchange of ideas.

▸ A **video streaming** facility at
www.batc.tv which enables repeaters and individual members to be seen worldwide.

▸ An **annual Convention** held in the UK where you can meet other members, visit demonstrations and listen to lectures.

▸ **Meet other club members** at the BATC stand at local rallies across the country.

▸ The **BATC Wiki** for all the details of systems and projects for all things ATV. https://wiki.batc.tv/
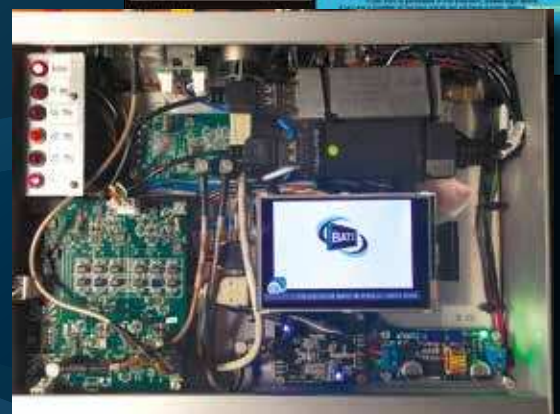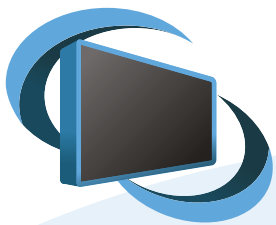
www.batc.org.uk

BATC
Out and About

Rallies and events in 2017 with an ATV stand: (subject to change)

Date	Event	Website
14-16 July	Friedrichshafen.	www.hamradio-friedrichshafen.de
8 - 9 July	BATC Activity weekend.	www.batc.org.uk
16 July.	McMichael Radio Rally.	www.mcmichaelrally.org.uk
12 - 13 August	BATC Activity weekend.	www.batc.org.uk
13 August	Flight Refuelling	www.frars.org.uk
9-10 September	BATC Convention, Finningley	www.batc.org.uk
16 - 17 Sept.	BATC Activity weekend.	www.batc.org.uk
29-30th Sept.	National Hamfest.	www.nationalhamfest.org.uk
5 November	West London	www.radiofairs.co.uk
9 - 10 December	BATC Activity weekend	www.batc.org.uk

For a list of all rallies see: **http://rsgb.org/main/news/rallies/**

If you are able to help on the BATC Rally stands, please contact the BATC secretary.