The British Amateur Television Club

CQ-TV

No. 275 – Spring 2022

The Portsdown exhibited at The National Museum of Computing

▲ Photo: Lucy Hattersley

CQ-TV 275

Contents:

Contributions

Contributions for publication or for constructive comment are welcome. The preferred method of communication is by email; all relevant committee email addresses are published in CQ-TV.

Alternatively you can write to us at:
BATC Secretary, 12 Petrel Croft, Kempshott, Basingstoke, Hampshire, RG22 5JY, UK

Contributing authors should note that 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 by November 30th

Please submit your contribution as soon as you can before the deadline date. Do not wait for the deadline if you have something to publish as it is easier to prepare page layouts where we have contributions in advance.

Contributions can be in almost any file format - except Microsoft Publisher! MS Word is preferred. Pictures should be submitted in high quality as separate files. Pictures embedded in a file are difficult to extract for publication however if you do wish to demonstrate your completed layout, a sample of your finalised work should be submitted at the same time.

Please note the implications of submitting an article detailed in the 'Legal Niceties'

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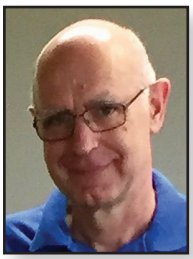


From the Chairman...

Dave Crump G8GKQ

Despite the challenges of supply shortages and continuing political uncertainty, amateur TV in the UK seems to be thriving. As the rally season gets underway again, I'm looking forward to meeting members and restocking my junk box.

The most important event of the year for me is the CAT 22 with the BATC General Meeting on Sunday 7 August. This is the event where you will have the opportunity to shape the future of the BATC. Although I want to continue to be involved, I do want to stand down as Chair; after four years it is time for someone else to come in with some new ideas and possibly a different perspective. Coventry is about as central as we can make it, so please put the event in your diaries.

This issue of CQ-TV sees the launch of the latest BATC project – a simple but comprehensive repeater controller design. The objective is to enable the upgrade of ATV repeaters to a fully digital signal path using consumer HDMI switches. While only a few of these will actually be built, hopefully they will encourage more activity.

If you are looking for advice or ideas, why not join our Thursday evening nets on QO-100. You don't even have to transmit, you can watch online (on the BATC Streamer) and pose questions in the QO-100 chat window. I'd particularly encourage newcomers to join us on the net – all are welcome.

There are a lot of club members who work in the background "just keeping things running". I would like to particularly thank Peter Delaney G8KZG who produces the "Turning Back the Pages" article for each CQ-TV. I'm not sure whether to be pleased or saddened that I have built some of the equipment that he describes!

Lastly – a plea. Please make every effort to get on the air for the International ATV Contest on 11/12 June this year. It is our opportunity to show that we really do use the valuable spectrum that we have been allocated.

The BATC 2022 General Meeting

This is the official notice to members that the next BATC General Meeting will be held at the Midland Air Museum on Sunday 7 August 2022 at 11:30 am.

How often does BATC hold a general meeting? Our constitution does not specify exactly how often meetings should be held but that they should be normally at intervals of two years, but not exceeding three years. However due to COVID-19 restrictions, the committee voted in 2021 to extend this period to four years. Therefore a general meeting must be held before September 2022.

What happens at the GM and how long does it last? Normally there will be a Chairman's report and the treasurer will give an update on the financial state of the club. Then any BATC awards and contests certificates / awards will be presented and finally there will be the committee member elections. The meeting will typically last an hour.

Who can be a committee member? Any member - BATC can have up to eight committee members, including officers, who can serve up to two terms and then need to be re-elected.

This year those who were elected in 2016 (Noel G8GTZ, Ian G8XZD and Rob G8NXG) will need to stand for re-election and Tim G4WIM will also need to stand for election following his co-option on to the Committee during 2020 – they have all said they will stand for re-election.

Brian G8GQS, Dave G8GKQ, Frank M0AEU, Phil M0DNY and Clive G3GJA can continue without re-election.

If you fancy serving the club and would like to stand for election, please let us know 60 days before the meeting and you must have the support of at least two other members.

Who chooses the officers? After the GM, the new committee elects the chairman, secretary and treasurer.

Can I get an item discussed at the meeting? Yes, but as this is a formal meeting for important club business, you must send it to the secretary 60 days before the meeting and it needs to have the support of at least 20 members of the club.

When is the meeting agenda published? The meeting agenda is published 28 days before the meeting and will be sent to all members by email.

Can I get a vote even if I'm not there? Yes, once the agenda has been published you can download or apply for a postal voting form – you should then return the form by post to the secretary and it will be counted as if you were there at the meeting.

The Listing

new and renewing members

Rob Burn G8NXG

I am pleased to report again that the total number of members of the BATC continues to remain steady at about 1400. That is not to say that the underlying membership does not flex and change. Regular readers will know that one of my duties as Membership Secretary is to remove the records of those members who have not renewed for 12 months – usually between 10 and 20 members each month. Be assured that before such drastic action is taken I do write to the members concerned just to ensure that they are made aware that their record is about to be deleted from our member database.

All that effort can result in a few members renewing a subscription however there are those who get into contact a little too late; happily the answer to that is to just join up again as a new member. However, in our busy lives with many pulls on time and attention, it is too easy to overlook any message from the BATC, particularly one that could be more important than normal.

As you can determine from the list, interest in DATV has inspired radio amateurs in many countries, many of whom are lone warriors spreading the word about digital ATV. Despite this, many do buy parts for BATC projects from the shop – largely in the spirit of self-training and education and of course some fun. Some of this effort often results in superb feedback and ideas, so keep it coming.

In keeping with previous editions, the list relates to members who have joined or renewed a membership subscription with the BATC during the three months to the end of February. If you have spotted a mistake do get in touch; meanwhile many thanks to members who have just joined or who continue to support the BATC.

Australia		
Bruce Johnson	VK3MN	Heathmont
Paul Roper	VK2KZO	Linden
Tim Hann	VK5AV	Mount Gambier
Michael Baldock	VK5MCB	Port Pirie
John O'Shea	VK2ATU	Revesby
Jules Corben	VK2EXT	Sydney
Alex Glinski	VK5ALX	Whyalla Playford
Austria		
Werfried Kuneth	OE8FNK	Villach
Belgium		
Eric Van Offelen	ON5TA	Brussels
Robert Robyn	ON5AF	Bruxelles
Roland De Beukelaer	ON4RDB	Diest
Patrick De Troy	ON2AC	Geel
Frans Van de Velde	ON4VVV	Gent
Denis Goffaux	ON4MU	Ixelles
Kenneth Rogge	ONL12658	Lievegem
C. Dumortier	ON1RC	Melle
Brazil		
Hipolito Luiz	PY5HC	Curitiba
Eduardo Erlemann	PY2RN	Vinhedo
Canada		
Luc Pernot	VE3JGL	Ottawa

Czech Republic		
Leo Hucin	OK2UUJ	Olomouc
Denmark		
Michael Wehnert	OZ5WU	Naestved
Mogens Johansson	OZ3BB	Rødby
France		
Geoffrey Decoray	F4GYQ	Ambierle
Bernard Desbiolles	F5DB	La Roche Sur Foron
Antoine Foulquié	F5BOF	Nice
Guy Lemoine	F4DAI	St Christophe Du Ligneron
Patrice Soutoul	F1GIU	St Orens
Michel Amiard	F6ANO	Tournan-en-Brie
Germany		
Raimund Jakob	DG9MAQ	Augsburg
Marinus Jacobs	DJ0MBA	Bad Schwalbach
Frank Schirpke	DL2GFS	Baden-Württemberg
Thorsten Godau	DL9SEC	Gingen/Fils
Helmut Rapp	DL1HEL	Goerlitz
Ralf Gorholt	DL5EU	Gutweiler
Peter Ehbrecht	DL4AS	Hildesheim
Norbert Pingel	DK8DT	Modautal
Michael Rademacher	DG8YP	Münster
Gerhard Härtel	DB4AS	Northeim

Josef Schmitt	DK6RS	Pentling
Jörn Bockwoldt	DL1LQ	Preetz
Juergen Graetsch	DK8AP	Seesen
Ireland		
Tony Baldwin	EI8JK	Bantry
Italy		
Claudio Ariotti	IK1SLD	Casale Monferrato
Roberto Natalini	IZ1PKO	Chiavari
Piero Forno	IK1LYU	Montegrosso d'Asti
Japan		
Hiroshi Matsumoto	JA1SYK	Takasaki
Latvia		
Pavels Rakickis	YL3GCD	Daugavpils
Luxembourg		
Albert Koob	LX1AT	Pétange
Netherlands		
Jelle Meintema	PE1AEE	Drachten
Paul Marcus	PE1NGR	Gaanderen
René Kint	PA1RKT	Haarlem
Reinoud ter Braake	PE1CYM	Lelystad
Martin Groos	PD0RJI	Numansdorp
Bert Fidder	PE2TV	Rijssen
Frits Aden	PE1DWQ	Rohel
johan v. Casteren	PA3HGU	Schijndel
Rick Wesselink	PE2AAB	Waalre
New Zealand		
Steve Fogerty	ZL2ASF	Nelson
John Nettleingham	ZL1TTK	Kati Kati
Portugal		
Jose Assuncao		Carcavelos
South Africa		
Henry Stephan	ZS6MC	Johannesburg
Frik Wolff	ZS6FZ	Vereeniging
Spain		
Magin Casamitjana	EA3UM	Castelldefels
Michael Naylor	EA7KIR	Málaga
Daniel Solé	EA3GEO	Mataró
Francisco Javier Sancho Caballe	EA5GB	Peniscola
Jesus Mª Diaz Marticorena	EA2WM	San Sebastian
Switzerland		
Charly Girardet	HB9ADJ	Roche VD
Thailand		
Sontaya Kumsan	HS2KSP	Rayong

UK		
Lloyd Farrington	M5LDF	Andover
George Miller	G6WWY	Axminster
Nigel Pritchard	G8AYM	Aylesbury
Chris Holloway	G0GGF	Aylsham
Robert Best	GI3VAF	Bangor
Paul Read		Banstead
David Thompson	G7WAW	Barnoldswick
Jon Evans	G8AGJ	Basingstoke
Bryan Steele	G0BDK	Bedford
Luke Rose		Belper
Norman Hunter	G8DQN	Billericay.
Jim Anderson	G0MPP	Bingley
Brian Jordan	G4EWJ	Birkenhead
Keith Prosser	GW8TRO	Blackwood.
Bill Horn	G4GPD	Bodmin
Geoff Mackrell	GW3KAX	Boncath
Roger Ray	G8CUB	Brentwood
Petrie Owen	GW0KAX	Bridgend
Kenneth Vickes	G3YKI	Bridgnorth
Peter Major		Bridgwater
Malcolm Cooper	G8KGH	Bristol
Ken Stevens	G4BVK	Bristol
Brian Smith	G4EQC	Burntwood
Derek Blake		Bury St. Edmunds
Trevor Lumb	G0ARU	Bury St. Edmunds
Phil Longhurst	GW8BVI	Caldicot
Brian Summers	G8GQS	Camberley
Marek Szuba	M0JUR	Cambridge
Raymond Koster	G7BHQ	Canvey Island
Murray Niman	G6JYB	Chelmsford
David Brocklehurst	G4VDB	Chesterfield
David Long	G3PTU	Cleckheaton
Mike Cox	G8HUA	Cleckheaton
David Pickford	G8TNE	Derby
Peter Myers	G3UWT	Doncaster
Ian McCrum	MI5AFL	Downpatrick
Dave Williams	G8PUO	Eastbourne
Duncan Rossiter	G7VVF	Enfield
Allan Mitchell	G3YJZ	Enfield
Ian McLenaghan	G8HPF	Epsom
Brian Bambury		Evesham
Bob Thornton	G3WKW	Fleet
Howard Ling	G4CCH	Gainsborough
Peter Wilson	G0FVG	Gresham
Jeffrey Akines	G8XXI	Grimsby

John Ferrier	G0ATW	Grimsby
Philip Crump	M0DNY	Guildford
Chris Payne	G4OWL	Guildford
David Johnson	G4DPZ	Halesowen
Paul Marshall	G8MJW	Harby
Neale Davison	G3VFX	Harrow
John Van Dyken	G0SPE	Harrow
Ian Daniels	G4VTD	Hassocks
Andrew Rudd	G6MRI	Herne Bay
Kenneth Griffiths	G3WIC	Heswall
Owen Williams	M7OMW	Heswall
John Hoare	G3PJI	High Wycombe
Geoff Rhodes	G3XDE	Hitchin
John Brown	G0PIA	Hornchurch
Gregory Fenton	M0ODZ	Houghton Le Spring
Clive Reynolds	G3GJA	Hull
Steven Roberts	M0OYR	Hull
Barrie Procter	G8AWN	Ilkley
Ray Hurt	G0HDS	Immingham
Jim Smith	G7NTG	Kettering
Matthew Willis		Kidlington
Andrew Sturt	G8SIK	Kingston-upon-Thames
Sarah Elliott	M1SJE	Leicester
Phil Seaford	G8XTW	Leighton Buzzard
Ronald Sherrard	GI3VAW	Limavady
Robert Butcher	G3UDI	Little Wilbraham
Paul Bicknell	G8KFW	Littlehampton
Peter Smith	G1LTI	Littlehampton
David Ellis		Liverpool
Peter King	G6BOK	Liverpool
Robert Fisher	M5RMF	Liverpool
David Jefferys	G6IWZ	London
Vic Brown	G3SDQ	London
Drew McFadyen		London
Amir Sameny		London
Frank Dimmock	G0CFD	Long Sutton
Ray Groom	G4RKP	Lowestoft
Ronald Claridge	G7DBT	Luton
Robert Saunders	G6OUA	Luton
Ian Webb	G6EFH	Manchester
Gordon Shorley		Market Harborough
Tom Mitchell	G3LMX	Milton Keynes
Richard Johnson	M0YKW	Newbury
Jenny Bailey	G0VQH	Newmarket
Tony Nicholson	G8FLV	Northallerton
Brian Alderson	G3KJX	Northallerton

Kevin Robinson		Northampton
Alisdair Boyle		Northwich
Nigel Watkinson	G0NGL	Northwich
William Hill	M1BKF	Norwich
Jeremy Jago		Nottingham
Dave Sykes	G0JOX	Nottingham
Derek Hughes	G7LFC	Ormskirk
Roger Meakins	G8HKN	Orpington
Graham Niblett		Penarth
Justin Cockett	G8YTZ	Petts Wood
Michael North		Polegate
Peter Kendall	G7RPG	Portsmouth
Rod Smallwood	G8DGR	Reading
Eric March	G8EOJ	Redditch
Geoff Findon	G3TQF	Rugby
Neil Underwood	G4LDR	Salisbury
David Crump	G8GKQ	Salisbury
Jason Barker	M0SOO	Scarborough
David Swale	G8ETS	Scarborough
Stewart McCann	G4HFZ	Scunthorpe
J Oates	G3LZI	Sheffield
Joseph McElvenney	G3LLV	Sheffield
Robert Scarfe	G4TUK	Shipdham
Colin Addison-Lees	G4OHV	Somercotes
Ray Hughes	G8JBQ	South Perrott
T Maton	G4GHU	Southend-on-Sea.
Terry Roxby	G1LPS	Spennymoor
Patrick Kemmis	G4MGI	Stafford
John Stockley	G8MNY	Sth Croydon
Alastair Macarthur		Stone
Anthony jaques	G3PTD	Stretford Manchester
Brian Roberts	G4VYG	Toft
Richard Burrows	G8BYI	Trowbridge
Rob Gill	G8DSU	Twickenham
Myles Sewter		Uppingham
Roger Damm	M1CDQ	Waltham
Andy Chamberlain	G7CFC	Wednesfield
Robert Williams	GW6EUS	Welshpool
Dr Jonathan Gudgeon	G4MDU	Wicken
John Saunders	M1BAI	Wimborne
Paul Reeves	G8GJA	Wincanton
Doug Simmul		Wirksworth
Robert Whitfield	G8TSE	Wirral

David Brooke	G6GZH	Wisbech
Laurence James	G2DD	Wokingham
Wolverhampton ARS	G8TA	Wolverhampton
Robert Swinbank	M0DTS	Yarm
James Kennedy	G4DND	Yelverton
Chris Wherrett	G4IIX	York
US		
Willem van Dam	W4RIS	Boca Raton
Albert Hale	N7AL	Boise
Henry Cantrell	W4HTB	Bowling Green, Ky 42103
Lloyd Weekes		Chattanooga
David Andrews	N1ESK	Loudon
Charles Beener	WB8LGA	Marengo
John Kozak	K0ZAK	Reisterstown
David Moe	K9KPO	Superior
Jim Hansen	KC0TYD	Toddville
Art Towslee	WA8RMC	Westerville

IARU International ATV Contest 11/12 June 2022

The Annual IARU ATV Contest will be held on the weekend of 11/12 June. The contest activity starts at 1pm local time on the Saturday and runs continuously through the 7pm local on the Sunday. All bands from 432 MHz up are included in the IARU rankings and there will be an additional 50 MHz IARU Section as well. For the UK, entries including 71 MHz and 146 MHz will be separately ranked.

How to Enter

Amateur TV contests are based on the exchange of a four-number code by video only. The code must be unique for each band, and if you change location during the contest, a new set of codes are required. The digits in the code must not be the same (e.g. 2222) or consecutive (e.g. 4567 or 5432). As the adjudicator, I treat codes such as 4722 as not ideal, but acceptable.

All other information (such as locator) can be exchanged by talkback. The exchange must include a report and serial number, such as 4002. The report is on a one to five scale and serial numbers start from 001 on each band and location. I find it easiest to allocate a serial number for every attempted contact – even those that fail. These contacts can then easily be recorded in the logsheet.

Logs MUST be submitted on the Excel spreadsheet downloaded from here *https://wiki.batc.org.uk/images/5/57/ATV-contest-log-callsign-20220611.xls* . You may ask why? Well, having to cross-check nearly 100 logs with more than 10 contacts in each is a very difficult task without the information being presented in a standard manner that can be automatically checked. There is no reason why some sort of web-form could not be used for entries in the future, but first of all we need a volunteer to write the web application. If anybody is prepared to do this, please contact me.

Logs should be e-mailed to *atv@iaru-r1.org* .

Reports

Reporting has caused some participants difficulty now that many stations are using digital. Here is a table to help:

Rpt	IARU Analog Definition	IARU Digital Definition	Dave's Interpretation
P0	No picture received	No picture received	Nothing detected
P1	Synchronisation with little picture content	Only occasional blocks visible	Occasional "hump" visible on bandviewer, or MiniTiouner lock with no video.
P2	Only occasional blocks visible	Sufficient blocks to read call signs	A single image with numbers received
P3	Picture noisy but some detail resolved	Some blocking	Noticeably moving images received for some of the time
P4	Picture slightly noisy, but with good detail and resolution	Occasional blocking	Video received with only occasional interruptions
P5	Noise-free picture	Solid picture	No interruptions

Reports of zero and one are so poor that they indicate that no four-digit code was received; for this reason the scoresheet does not award points for reports of P1. Note that in Europe, B1 to B5 tend to be used rather than P1 to P5.

Why Enter?

Quite simply, the main reason for entering is to benefit from the increased ATV activity and to try something different. It should be fun – so take the time to talk; it's not like an HF contest, more a group of friends helping each other out.

You'll find details of planned activity on the BATC Forum here: *https://forum.batc.org.uk/viewtopic.php?f=75&t=7830*

Activity and Contests

Clive Reynolds G3GJA

BATC Christmas Contests 2021

24th December 00:00 - 3rd January 23:59

Christmas Activity Ladder

Position	Country	Callsign	Points
1		G8VDP	103
2		G3GJA	72
3		G0AZQ	58

Christmas Repeater Contest

Position	Country	Callsign	Points
1		G8VDP	3458
2		G4EEV	2340
3		G0AZQ	1740

Christmas Repeater Contest & Christmas Activity Ladder

The Christmas repeater contest attracted a single entry this year from the users of GB3EY located in East Yorkshire. Hopefully, this coming Christmas along with some of the other repeaters, GB3ZZ in Bristol will be back on air to provide a bit of competition.

GB3EY's position on the Yorkshire Wolds at 180m AGL links the counties of East, West, North and South Yorkshire and all four were represented in the user logs that amassed 9266 points. Leading points scorer for GB3EY was Ken G8VDP with 3458 points from 26 QSOs. The East Yorkshire Repeater Group will be the recipients of the £100 prize, which will go a little way towards soaring electricity costs.

The Christmas activity ladder was also led by Ken G8VDP. In addition to the repeater QSOs, Ken arranged local analog on 70cm and 23cm to get his score from 43 QSOs. Well done Ken.

IARU International Contest

Now a reminder that the IARU Region 1 ATV Contest is scheduled for the weekend of 11 / 12 June 2022. This year there is no separate section for portable stations as the Covid situation has eased. The IARU rules are here *https://wiki.batc.org.uk/images/5/5c/2022_ATV_Contest_Rules.pdf* and the entry Excel spreadsheet is here: *https://wiki.batc.org.uk/images/5/57/ATV-contest-log-callsign-20220611.xls* There are likely to be some shakedown events over one or more weekends prior to the contest giving an opportunity to check out the gear. Check on the forum for further details here: *https://forum.batc.org.uk/viewtopic.php?f=75&t=7830* and send your entry spreadsheet to *contests@batc.tv*

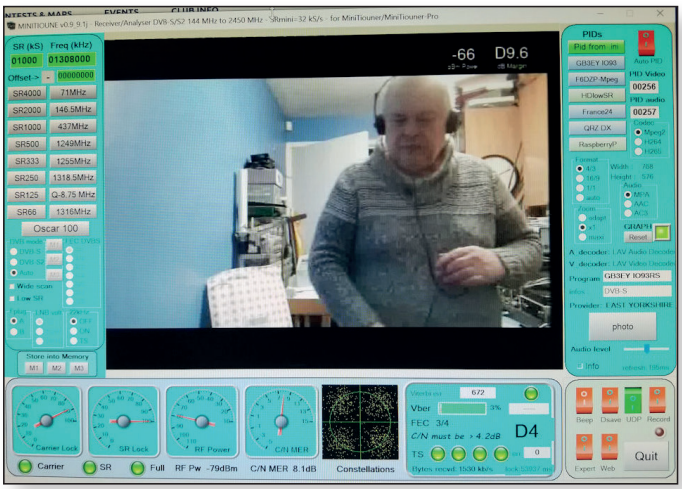
Activity Weekends

Damage to my antennas caused by Storm Arwen has limited my activity weekend participation to operation through GB3EY using Yagi in the loft. A strong gust from the north just after 8am on the Saturday morning snapped the aluminium scaffold pole stub mast and the whole array toppled over, only being prevented from hitting my car parked in the drive by the drop wire from the telephone pole across the road.

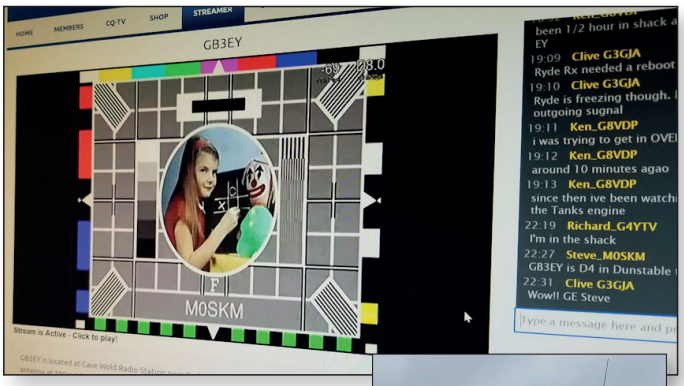
The photo shows the array still suspended by the wire but with the 23cm and 70cm beams removed to reduce weight. The rest came down with the help of an angle grinder and ropes. The 2m crossed-nine element survived along with the 23cm and 70cm beams but the dual band

4/6m four-element was a write-off. I have purchased a replacement stub mast with half-inch thick walls. If that breaks more than my aerials will be in trouble.

The January weekend was cold and foggy, or at least it was in the east of England; that, with burnout from Christmas, resulted in no activity being reported. However, a couple of days later, the high pressure causing the fog resulted in an excellent north-south duct that was exploited by Steve M0SKM near Dunstable. He was able to access GB3EY in East Yorkshire at a distance of 209kms. Steve was getting in with a D8 and EY was around D4 in Dunstable. Two-way QSOs resulted with G3GJA and G4YTV.



▶ *GB3EY as seen by M0SKM near Dunstable*



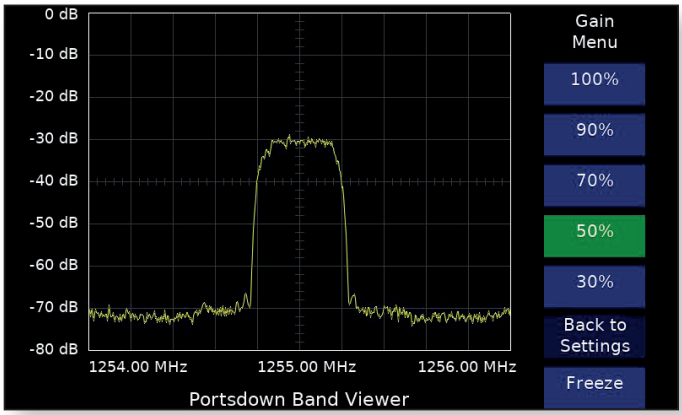
▶ *M0SKM as seen via EY's streamer*

The February activity weekend was better supported, despite being rather windy. Rob M0DTS/P managed a two -way with Ken G8VDP on 23cm, a one way with Terry G0EZY in Doncaster (his first contact without using a repeater) and saw three 23cm repeaters on the last outing of the famous red van.

▶ *The retired M0DTS/P van*

Further south, Noel G8GTZ/P bagged G4FKK at 75km via AS and G8GKQ/P two-way on 146MHz. The 40km path to Dave G8GKQ allowed Noel to reduce the power to 25mW and still get a locked picture.

The March activity weekend was very quiet in the north, with Rob M0DTS unavailable due to work commitments. There was a successful outing for Gareth G4XAT/P (Butser Hill) with two-way 9cm contacts to Neil G4LDR, Dave G8GKQ/P (Thruxton Hill) and exchanging pictures on 23cm with Dave too. Margins were reported to be 'huge'.



▶ *G4XAT/P's signal as seen on G8GKQ/P's Portsdown Band Viewer*

Noel G8GTZ also made a trip out only to be thwarted by equipment failures and missing kit resulting in an early return home.

2022 Activity Weekend schedule

The BATC is holding 12 activity weekends, spaced at four-week (+/-) intervals during 2022. The remaining weekends are scheduled as below:

Wkend no.	Date	Bands
4	9/10 April 2022	70cms + 23cms
5	14/15 May 2022	2m & down + 23cms
6	11/12 June 2022	IARU Region 1 ATV Contest
7	9/10 July 2022	23cms & up
8	13/14 August 2022	70cms + 23cms
9	10/11 Sept 2022	2m & down + 23cms
10	8/9 October 2022	23cms & up
11	12/13 Nov 2022	70cms + 23cms
12	10/11 Dec 2022	2m & down + 23cms

As usual, there are no set times for operating, although you should be aware that stations taking part in the Veron Activity Weekends operate from Saturday 12:00 UTC until Sunday 18:00 UTC.

Please send your activity reports to *contests@batc.tv*

Activity Ladder updates

Position	Country	Callsign	Points
1		G8GTZ	2038
2		G4FRE	1110
3		G8GKQ	940

6cm Ladder

https://batc.org.uk/contests/6cm-ladder/

Noel's first place, with such a large margin, is testament to his dedication in publicising drone modules as a low-cost route into ATV. The Ladder is being run again this year and there's a minor tweak to the rules that affects the use of a specific site within any week, the purpose of which is to encourage activity from fixed stations rather than limit it to at least one station being portable. Rule 4 now reads:

4. Location. *Operating locations must be within the terms of your licence. If operating away from your main station, please get the permission of the landowner. Any (legal) location may be used, but contacts between two locations may only be claimed twice per week. For example, if you have a daily sked, you may claim for it twice per week.*

The full rules are here:
https://wiki.batc.org.uk/2022_6cm_Activity_Ladder

70cm Ladder

https://batc.org.uk/contests/70cm-ladder/

This year the BATC is adding a 70cm Ladder to encourage more activity on this band which has so much DX potential, especially with Aircraft Scatter. The same rules and scoring as used for the 6cm Ladder will apply to the 70cm Ladder. You can add contacts made since the 1st January 2022 retrospectively.

See the rules here:
https://wiki.batc.org.uk/70cm_Activity_Ladder

BATC ATV repeater controller

Noel Matthews G8GTZ

*Over the past 10 years, the ATV community has successfully migrated to digital transmission standards which have enabled transmission of greater resolutions than the 720 * 576 PAL standard and the Ryde receiver has enabled this high quality video to be available in HDMI format.*

However, most ATV repeater systems are still using PAL based video switching and logic systems with the resulting loss in video quality. In order to encourage repeater groups to upgrade their systems, the BATC has developed a simple repeater controller enabling the use of consumer HDMI switches as a repeater video switch.

The controller provides a flexible way to display captions and images, and can be used to replace existing controllers. In order to provide backwards compatibility and enable to controller to be fitted to an existing repeater, an analogue switcher can be controlled using the GPIO outputs and the controller's HDMI caption output can be converted to composite video.

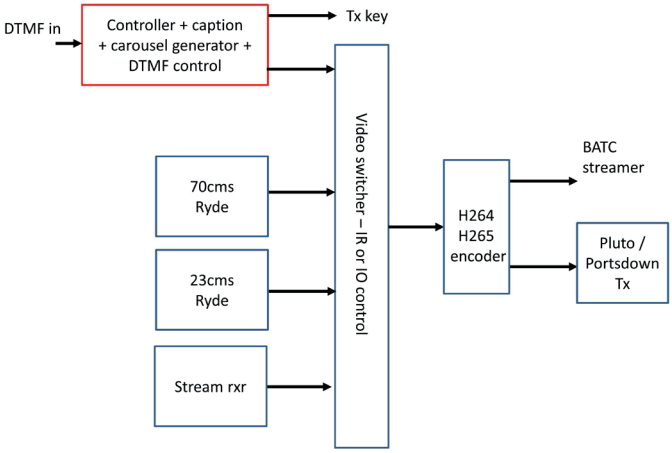
Inputs from existing analogue receivers can be converted to HDMI for use in the system using the composite video to HDMI converter described elsewhere in this issue.

Overview

The core of the system is a consumer IR controlled HDMI switch – these are readily available for multimedia home systems from the normal sources and come in two/four/six/eight-input configurations.

The switch will be fed with HDMI outputs from Ryde receivers, the BATC streaming receiver, analogue to HDMI converters, and the repeater controller.

The switched HDMI output is fed to a video encoder / modulator and also to provide streaming on the BATC streamer.



Every repeater is different and the controller is designed with configurable logic that can be used as the basis for any ATV repeater. The design is flexible with a large number of parameters in a text editable configuration file so that users can configure it to meet their own needs.

Typical operation

The BATC repeater controller controls single or multiple video switchers either by infrared, I2C, webhooks or GPIO pins. It also generates a carousel of scenes and has an on-board DTMF decoder.

Carousel

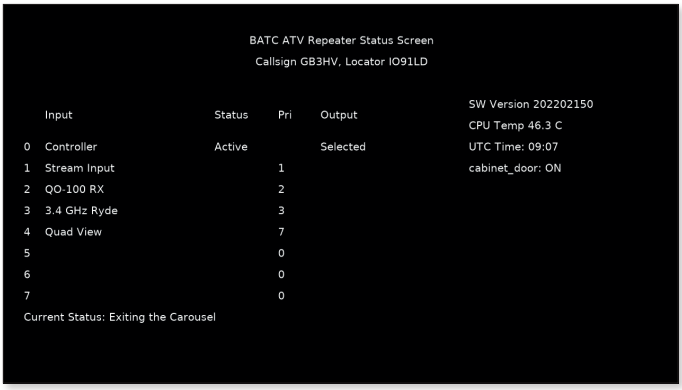
The carousel can be configured to show up to 99 scenes. The content and duration displayed of each scene is set in the configuration file and the scene can be one of the following:

- Status screen generated by the controller
- jpg or png images played out by the controller
- Video files (in future release)
- Any input on the video switcher, so can display inputs such mast cams, weather stations or quad video displays

The still images are read from file each time before display so can be regularly updated by an external source.

Valid signal input

On receipt of a valid signal from, for example, a Ryde receiver, the controller will key the transmitter, play an image for a short, configurable, time indicating which input has been activated and then switch to that input. When the receiver closes, the logic will play a "K" image and optional "K" in Morse and go back to the carousel.



The receiver input switching line can be fed directly from a Ryde receiver or an external source such as a sync detector on an analogue source. Note do NOT exceed 3.3 volts on the GPIO input.

Ident signal

In order to comply with licensing regulations, a video and/or audio ident can be generated at an interval set in the config file.

DTMF control

An on-board DTMF decoder will allow input selection by remote control and also enable GPIO pins to be toggled to enable the control of external equipment.

Power saving

To enable power saving by turning the repeater transmitter off during quiet periods, a number of options are available such as, only key the transmitter when in repeat mode, do not key the transmitter during the night time and only key the transmitter to display the carousel for the first 30 minutes of every hour.

Repeater controller

The BATC repeater controller runs on a Raspberry Pi 4 (2 GB or more of memory) which has several functions:

Control of the video switcher

The preferred method of control is via infrared commands sent by an IR diode, recovered from an old remote control, driven from pin 12 on the RPi GPIO port. The IR commands sent are totally programmable in the config file.

To increase the number of inputs available, two separate IR transmitters can be connected to enable a second HDMI switch to be controlled.

The controller can also control a video switcher using the RPiGPIO lines – these lines are 3.3v logic and the outputs must be buffered.

At the request of Justin G8YTZ, Dave G8GKQ (author of the controller software) has added the ability to control an external video switch such as the ATEMmini using webhooks – see the separate article on the alternative repeater controller elsewhere in this CQ-TV.

Graphics generation

The RPi generates captions and plays out carousel images using the HDMI port which should be connected to an input on the video switcher. A future update of the controller may enable the composite video port to be used for playout or alternatively an HDMI to composite converter can be used to output to an analogue switcher.

DTMF decoder

The on board DTMF decoder is fed via the mic input on a standard USB audio dongle. All DTMF command sequences are programmable and can be set to select video inputs, toggle GPIO output pins, send I2C commands and several keeper-only commands such as turn the transmitter on / off and reboot the controller.

GPIO connections

The repeater controller uses the RPi GPIO port for the following:

- Accepts up to eight signal detect inputs
- IR / I2C drive output
- GPIO outputs to control video switchers
- Auxiliary equipment status monitoring inputs
- Auxiliary equipment control outputs
- Transmitter switching

The exact pins used for each function are set in the configuration file. Some pin functions are preset due to the Raspberry Pi hardware configuration; full details are on the Wiki.

Configuration file

The controller is designed to be configurable with a large number of parameters in a text-editable configuration file so that users can configure it to meet their own needs.

For full details on the controller configuration see this wiki page: *https://wiki.batc.org.uk/Repeater_Controller_configuration*

Audio switching

While HDMI switchers will switch any audio carried in the HDMI signal, a repeater system may require additional control over the audio, such as talkback audio insertion and multiple audio mixing when in quad mode.

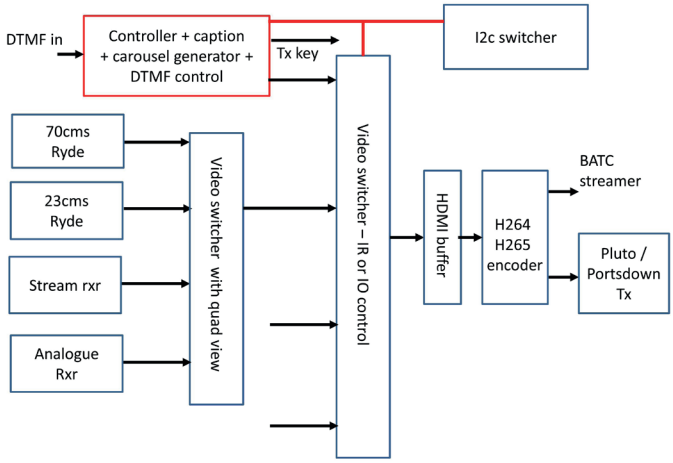
The Ryde receiver and the BATC composite to HDMI converter do provide selectable analogue audio outputs via the RPi multi pin 3.5mm jack socket.

To enable analogue audio switching and mixing, the BATC controller can control an optional I2C audio switcher – see the separate article in this CQ-TV for more details.

HDMI buffering

Experience has shown that although the switches are advertised as seamless, the switch between sources is not truly seamless.

This glitch is enough to cause any encoder following the switch to hang up. This problem is solved by using another HDMI seamless switch as a buffer between the main switch and the encoder. This may seem extravagant but is cheaper than a custom-designed HDMI buffer.



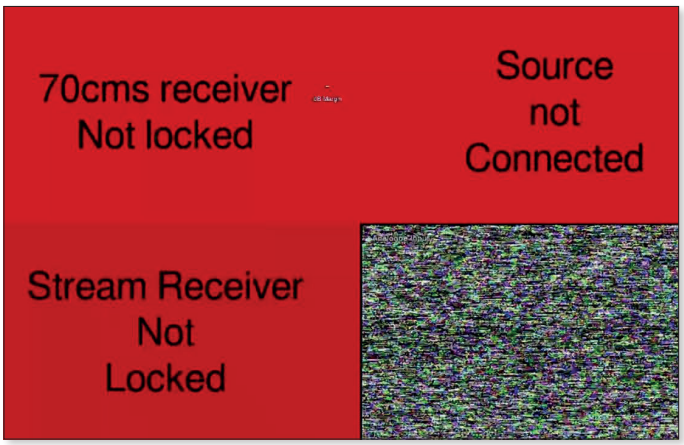
HDMI Encoding

While not the subject of this article an H264 / H265 encoder with HDMI input will be required to encode the output of the switcher for onward transmission to a DATV transmitter and the BATC live streaming server.

The most common approach seems to be to use a "Chinese encoder box" – available from AliExpress these boxes have been used by several repeater groups and can, when configured correctly, drive a DATV transmitter and the BATC streamer simultaneously.

A second option is to use the LKV373 encoder to drive the IPTS input on the Portsdown – however the LKV373 has recently been made obsolete.

A third option used by Benno PA3FBX is the LinkPi – a multi-channel encoder available from Amazon and other sources.



Software availability

The controller software is currently on test at GB3HV (*https://batc.org.uk/live/gb3hv*) and a final beta release is available for download from the BATC Github page *https://github.com/BritishAmateurTelevisionClub/atv-rptr*

We believe that whilst this is a very important project for the ATV community the actual number built will be relatively low and so do not intend to put the pre-programmed SD cards in the shop. However, if you would prefer to buy a pre-programmed SD card (for the same price as a Portsdown SD Card), please send an email to *dave.g8gkq@gmail.com*

More information

More information, including a comprehensive guide to configuring all the options available, GPIO pin outs and DTMF control is available on the BATC wiki at *https://wiki.batc.org.uk/Repeater_Controller*

There is also a forum thread *https://forum.batc.org.uk/viewtopic.php?f=82&t=7750* where you can get support from the community of users and details of the latest updates will be published.

▶ *GB3HV in April 2015 - prior to moving sites.*

Eight channel I2C controlled audio switch

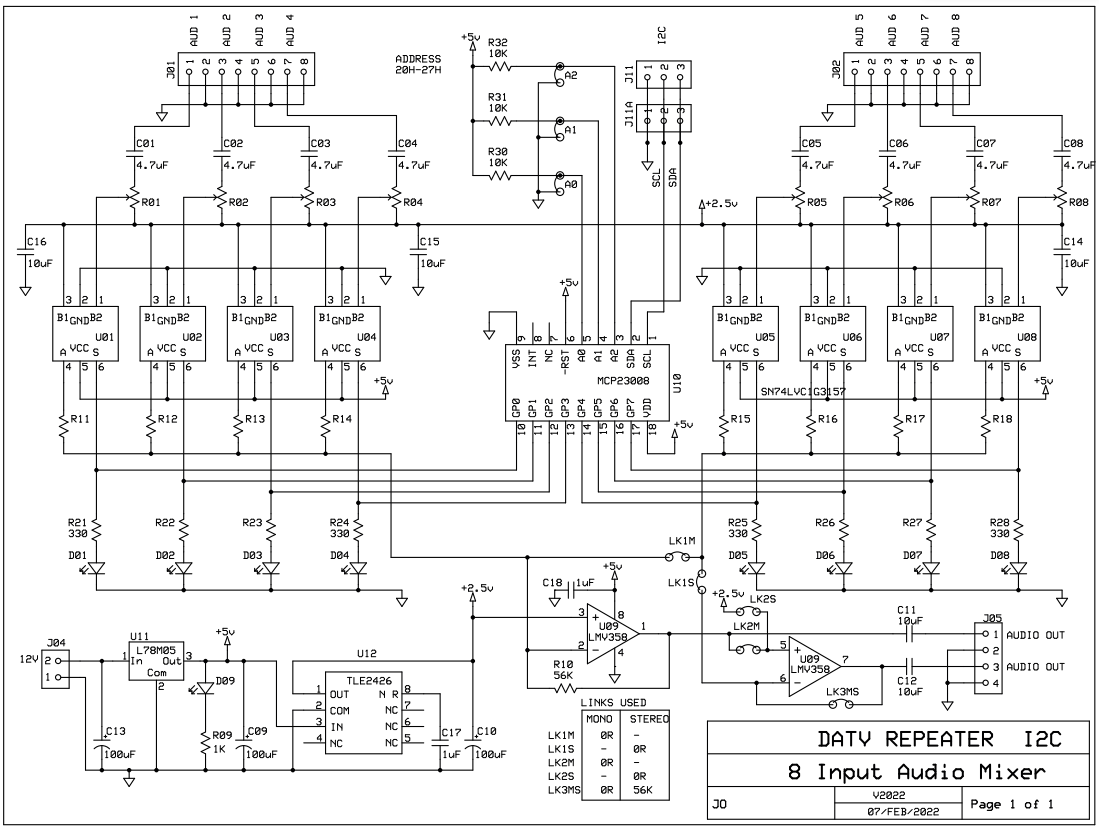
Noel Matthews G8GTZ

During the rebuild of GB3SQ, Colin G4KLB identified the need for an I2C controlled eight-channel audio switch/mixer. This article describes the switch designed to meet GB3SQ's requirements by John O'Loughlin.

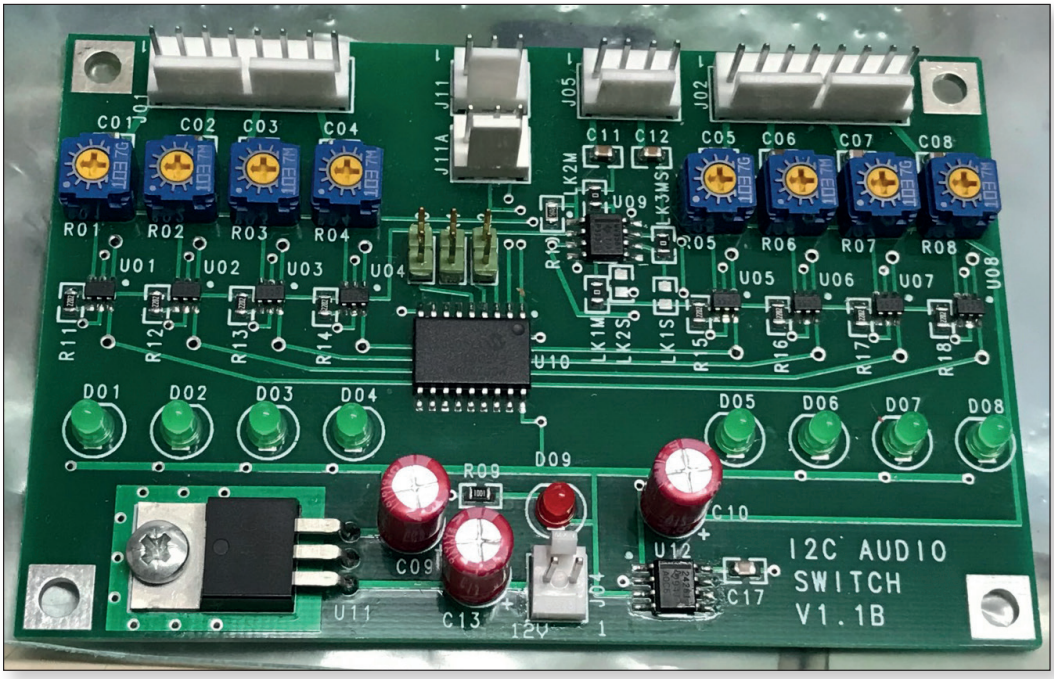
The BATC ATV repeater controller also identified the need for a separate audio switch and control of the GB3SQ design is now included in the BATC controller design.

The switch uses an MCP23008, an eight-bit I/O expander with I2C control. The outputs are used to control eight SN74LVC1G3157 analogue switches which switch the individual audio channels.

The unit can be configured as an eight-channel mixer with two outputs or as two four-channel mixers with one output each.



The I2C address for the MCP23008 audio switch is in the range 0x20 to 0x27. The final digit can be selected by jumpers on the PCB. The address used by the repeater controller is set in the range 0-7 by the audioi2caddress parameter in the config file.



The I2C interface on the Raspberry Pi uses 3.3v and requires 1.8k resistors to the 3.3v supply (GPIO pin one) on both the SDA and SCL lines.

The parts list, schematic and construction details of the board are on the BATC wiki: *https://wiki.batc.org.uk/DATV_repeater_audio_switch*

PCBs will be stocked in the shop from April 2022.

GB3NQ Digital ATV Repeater Goes Fully Digital

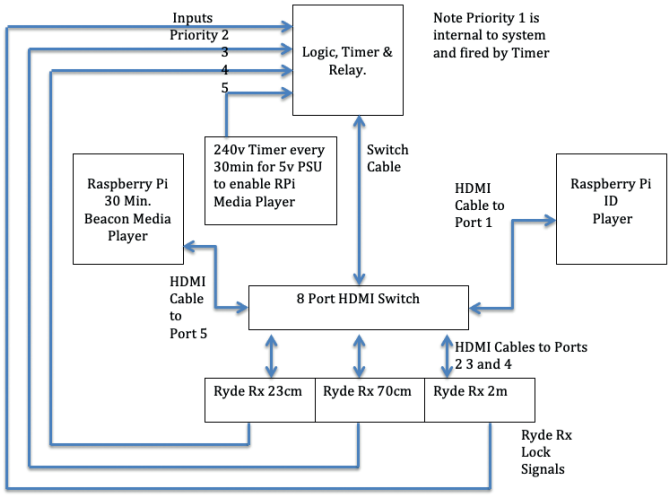
Paul Andrews G6MNJ

What I hear you say? Well our shiny new digital repeater I wrote about in the last issue has settled in nicely and local stations are receiving its signals and some are now transmitting through it. A few new Portsdown transmitters are under construction and by the time you read this I expect input signals on the repeater's three bands. But getting back to the repeater going digital, one compromise was to keep the old repeater's logic, ID and receiver switching using an old ATVC-4. This was all based on composite video with sync detectors on those channels firing relays to cut video and audio through to a video encoder to make the digital stream NQ then transmitted.

So, I thought let's remove all this old analogue kit and make it digital, so I have designed a logic board which with the help of six relays it selects a port on a commercially available HDMI switch (TESmart eight-port HDMI switch) utilising the push buttons on its front panel. The circuit also provides PTT when required.

The logic circuit had to provide priority such that if any channel was busy (i.e. its input had volts raised on it such as a lock from a Ryde receiver) that a subsequent channel would only be selected if it were higher priority than that already in use.

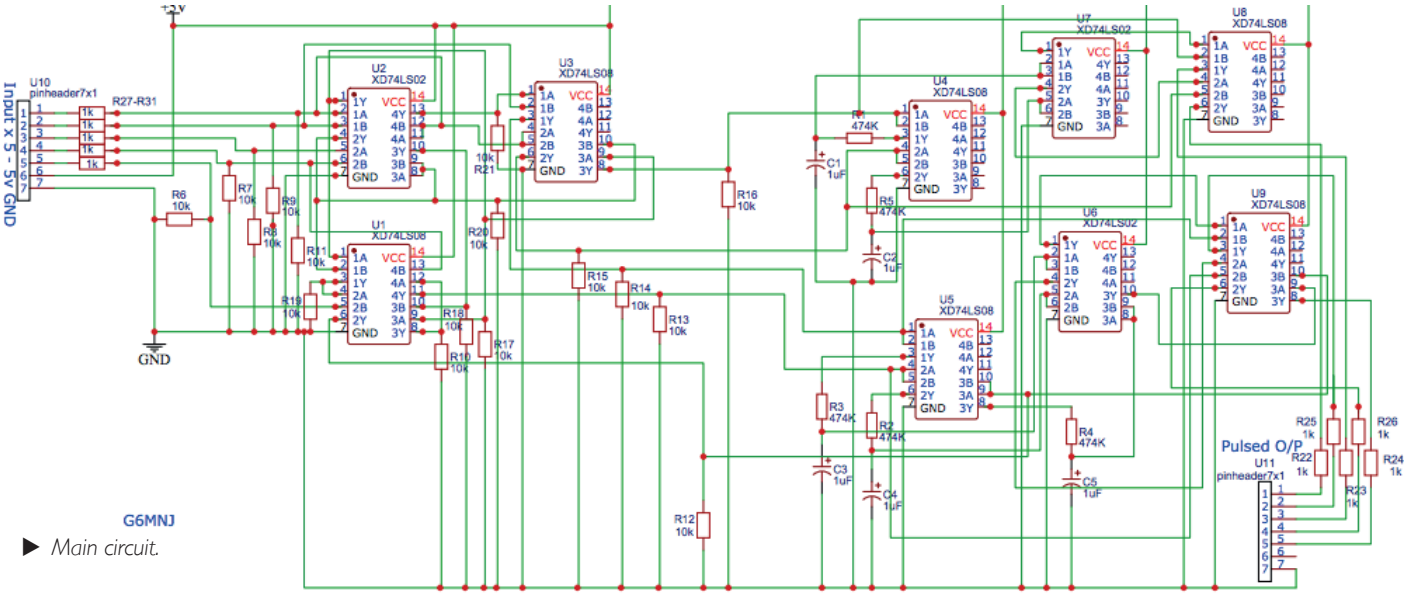
For GB3NQ we have a Raspberry Pi running a video file on loop, a low cost timer obtained from eBay runs an off then on cycle with programmable times for each segment such that it sends a voltage to the highest priority (pin one) of the logic circuit for 30 seconds and then drops the volts to zero for 15 minutes. This Raspberry Pi connected to port one of the HDMI switch thus provides the licence requirement for repeater identification.



A media player also runs a 30 minute video file on a loop, but this one is controlled by a digital mains timer with it's 10 programs which supply mains power to a wall wart 5v power supply on the hour starting at midday until 9pm for 30 minutes every day of the week. The 5v is connected to the lowest priority (pin 5) of the input connector and the media player HDMI to port 5 of the HDMI switch.

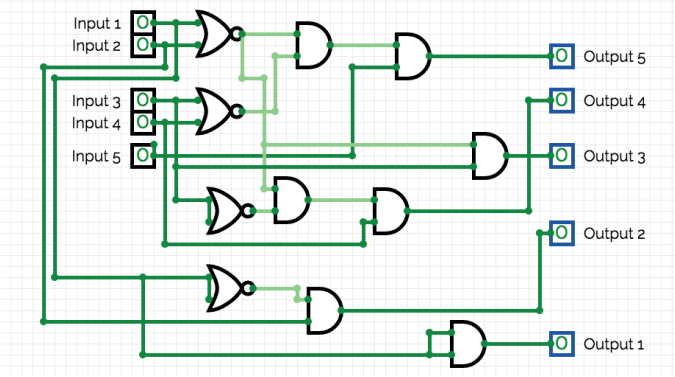
Likewise, the Ryde receivers are connected up on ports two,three, and four for 23cm, 70cm and 2m inputs.

The clever bit (I think anyway) is a delay circuit using a capacitor and resistor to delay the logic level to a gate and in turn pulsing its output. This pulse fires one of the relays whose contacts are across the switch contacts of the HDMI selector switch. Hence it 'clicks' the button.

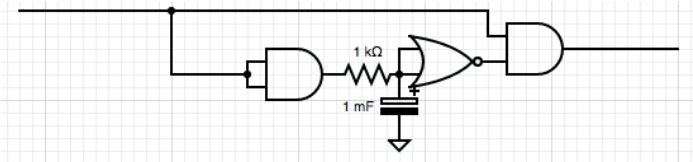


▶ *Main circuit.*

PTT is achieved with diodes on each of the inputs connected together on the remaining input of the relay board such that the current only flows to the relay input and not back to the other four channels. I have also added a small capacitor to prevent PTT chattering on the input to the PTT relay.



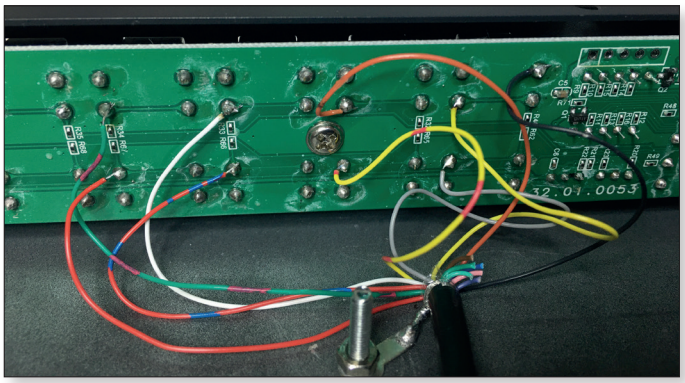
▶ *Initial plans to make the logic to prioritise the inputs for the repeater.*



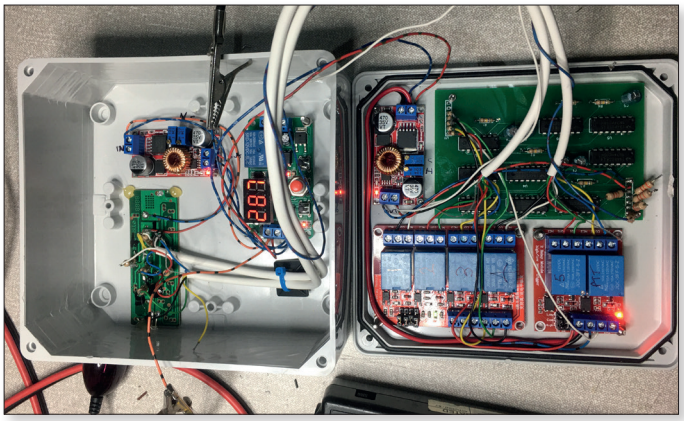
Additional logic to take each output from the logic circuit to change the output from being just on (1), to pulse an on (1) at its output. This is achieved by delaying the logic at the OR gate by charging the capacitor.

The TESmart eight-port HDMI switch is a good candidate for repeater use as it is rack mountable, and can be controlled by RS232 or as I have done solder across its front panel switches relays fired by the logic board.

Inside the front panel of the TESmart HDMI switch, black wire is ground and the other eight wires correspond to the switch connectors.



The logic board can be seen on the right in the picture below (green PCB), this was an earlier version and has the resistors shown in the circuit diagram soldered on the underside. eBay provided the step down power supplies to run 5v for a external Raspberry Pi for the 15 minute ID and logic board. Also, from eBay, the countdown timer can be seen to the left, which fires the ID Raspberry Pi, and six relays (four+two) to provide the final switch action. The green board on the left-hand side was an aborted attempt to use an IR remote control to operate a low cost five-port HDMI but this was found not to be practical.



For those who decide to build this: note the TESmart requires two settings to be changed in order that it works as required:

Firstly press 'M' on the remote control this puts the system into a Manual mode such that no scanning of inputs or swapping should a channel become active, so it only selects an input based on a button press on the front panel or remote.

The second requires you plug the unit into your PC serial port or your LAN then using the Windows software available on the Internet to turn the channel number display timeout to 'never'. If the number display turns off, then the first press of a button does not select that port but just awakens the unit – not good for the logic detailed above.

So, there it is GB3NQ really is a digital repeater.

How to evaluate your signal...

Chris van den Berg PA3CRX

...on frequencies that your spectrum analyser does not have

The old spectrum analyser I had is probably well known by many readers; HP 851B/ 8551B.

▶ *From the 60s when it was new; a 58 kg spectrum analyser and readout unit.*

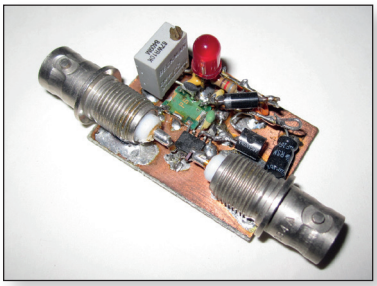
It uses a BWO tube that sweeps between 2 and 4 GHz. By using its harmonics signals could be seen up to 10 GHz. Some operating skills were needed to find out if the signal that appears on the screen used the indented harmonic of the BWO.

On the front a BNC connector is also present for an external mixer. The BWO signal comes out of that connector (with some DC bias) and the mixed signal goes in.

This spectrum analyser is very heavy and takes a lot of space (and mine did spread a bad smell; as lots of older measurement equipment does). So I looked for something new(er) and bought a HP 8590A; despite it has a much lower maximum frequency; namely 1.5 GHz.

How to analyse the signal on the 13 cm band and higher?

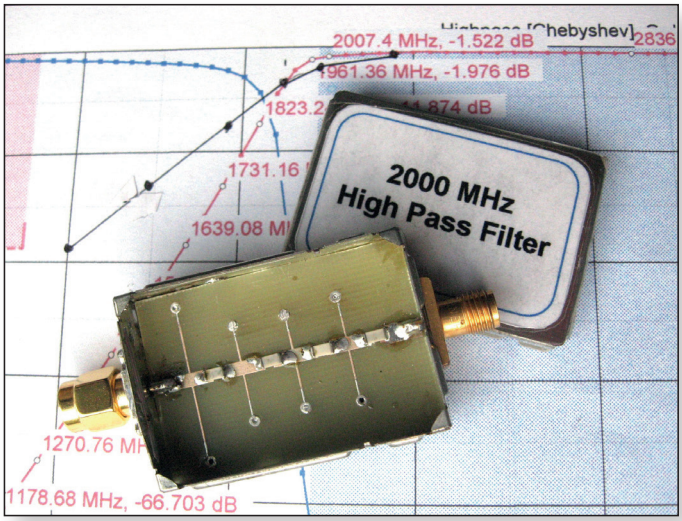
In CQ-TV 270 I described the use of a VCO and an IAM81008 active mixer for the 9 cm band. For the 13 cm band I needed an other converter and came to the combination with this mixer and a VCO from a cell phone. This VCO was found on Ebay and came by post from the UK. The needed voltage for such VCO is very low and I made this with a LED as stabilizer and added a diode. The mixer IAM81008 is directly connected to it and that's all.



▶ *The converter for the 13 cm band.*

Despite the frequency of the VCO is just above the formal range of the HP 8590A; the signal could still be seen by entering a wider frequency range. Then the oscillating frequency of the VCO could be found. The found (LO) frequency can be entered as 'offset frequency' in the spectrum analyser resulting in the correct frequency readout on screen. With a frequency of about 1700 MHz (actually 1712 MHz) the span of about 1.7 to 3.2 GHz could be seen. When a small antenna is connected, immediately a lot of cell phone signals appears on the screen.

Depending what you are measuring, it could be relevant that unwanted signals could pass the converter. A high pass filter could prevent this. This filter is made in a small tin with FR4 PCB. The filter performs well.



▶ *The sometimes used high pass filter.*

For the 6 cm band such converter could also be made, the IAM81008 is specified to 6 GHz. When a signal source like ADF4350/51 is used, many bands and frequencies could easily be covered. In fact, this is part of the circuit in the NWT6000 (MAX2870 as synthesizer), a rather cheap piece of equipment that can sweep and generate frequencies between 25 and 6000 MHz.

How about 24 GHz?

For the old, heavy HP analyser I once was inspired by G8BKE to make an external mixer for 24 GHz with a piece of waveguide and a mixing diode. That diode was a left over from a 10 GHz radar module. This one only has a DRO oscillator and the mixing diode on a small PCB.

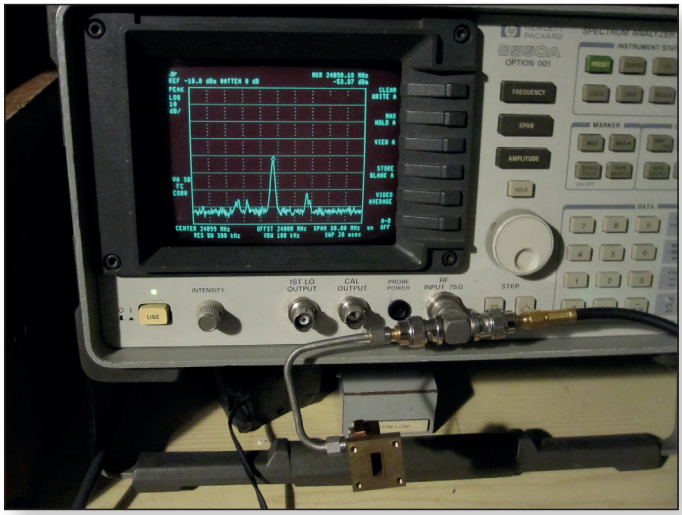
However, the current analyser is not equipped to deliver a useful HF signal that could be used by the external mixer.

By using the harmonics of an external oscillator, and connecting everything together, it could maybe work.

▶ *The simple home made external mixer.*

A 4800 MHz signal (multiplied by five - it will be 24000) generated by a MAX2870 went into a BNC T-connector. One side connected to the mixer and the other connection to the spectrum analyser.

After the 24 GHz transmitter is switched on, the signal appeared on the screen. As frequency offset '24000' is entered; therefore the frequency readout on the screen is the actual frequency.



▶ *Setup of the external mixer with the actual spectrum analyzer.*

The output of the mixer with this setup appeared to be quite low. Apparently the 4800 MHz power was only 0.25 mW. Increasing this level to 0.6 mW did not show much difference.

I realised that analysers that uses external mixers have a possibility to adjust diode bias to increase sensitivity.
In my setup no additional DC bias was used.
After connecting a small circuit (and taking care DC does not damage the connected equipment) the improvement was hardly noticeable so I decided not to use it.

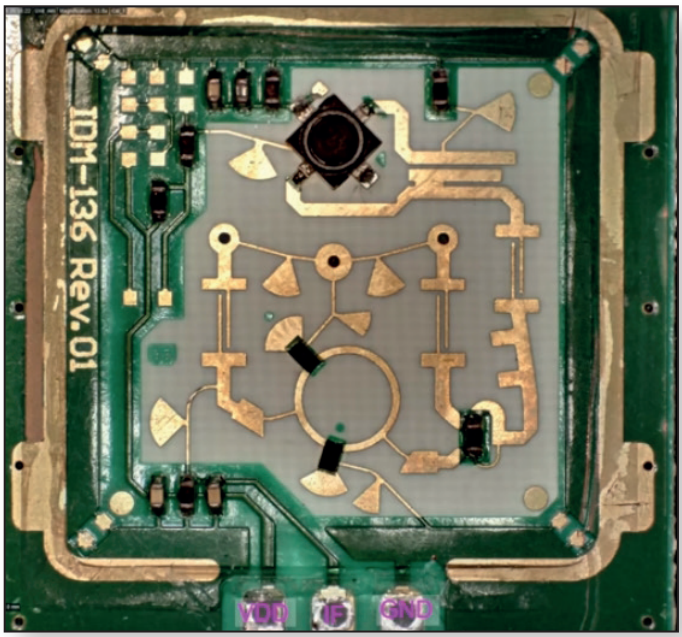
I also checked the influence of the length of the short piece of semi-rigid cable between the mixer and the spectrum analyser. Indeed it made some difference.
Likely the length adjusts some mismatch?

As a side effect I found out during these experiments that my transmitter was not always working. Possibly the 10,85 GHz local oscillator signal (DRO) does not start when temperature is low. After running the transceiver for some time in receiving mode (warms up the housing) it starts working. But this is not really a wanted situation for a portable station as the batteries will be empty at the time the station is usable.

Also, the output indicator seems to be unreliable. My next challenge to solve this with help of the external mixer.

PS: ready build converters.

More recently 24 GHz radar modules can be purchased for a few dollars (for example model CDM324 / IPM-165). In fact, such a module is already a complete converter (DRO and diode mixer, including patch antenna). I did not test this but possibly only the IF output filter needs to be changed/removed. As I understood the DRO is not very stable but if removed and a lower frequency is injected like described above, this mixer could be more sensitive then my waveguide model.



▶ *Inside the CDM324 radar module.*

Links:

External mixer: *https://www.qsl.net/g8bke/External_Mixer.html*

Video inside the CMD324:
https://www.youtube.com/watch?v=5vqSX40seqA

An alternative DATV repeater controller - DATV 2.0

Justin Cockett G8YTZ

Introduction

GB3JV is an all-digital TV repeater, but up until now has been operating with a single receiver input. This is about to change with a plan to have four inputs including 13cm, 23cm, 70cm and a BATC streamer input. Adding additional inputs presents new technical challenges, especially when HDMI switching is considered.

GB3JV's output to south-east London is on 3.404GHz running at 2MS/s.

This is in addition to the BATC Web Stream running at 1Mb/s (VBR). The repeater's modulator is capable of dual channel operation using the onboard mux. Plans to include adding an audio relay of the ATV talkback channel are also being drawn up, at present I'm considering the benefits of using a traditional analogue receiver tuned to 144.750MHz vs a DMR or DSTAR talk group. The advantage of going digital is that multiple users could access via a hotspot or direct internet connection (e.g., with an IC-9700) to connect to the repeater's audio channel and join in the conversation outside the range of a traditional repeater receiver.

This all leads to the question of how to achieve reliable HDMI input switching with analogue audio mixing whist still retaining the "all-digital" transmission path, as well as a super-reliable web streaming channel that maintains the fidelity of the original video and audio inputs.

In this article I present an alternative approach to the excellent BATC repeater controller, and an approach that leverages the BATC repeater controller, but also suggest ways in which this alternative approach can offer future integration possibilities hitherto not considered for DATV repeaters.

▶ *Figure 1 GB3JV Transition to an input when an input becomes active*

The pictures in figure one and two show some example of transition effects I've built using the "Repeater 2.0" approach when a signal is received and again at the end of transmission. The picture slides in from the left and the "lower third" graphic gracefully fades out within three seconds. This is all programmable, your creativity is the only limiting factor.

There is an example YouTube video of a transition to a received signal here: *https://youtu.be/iRtKvuAbIvk*

▶ *Figure 2 GB3JV Transition back to the media player when an input signal ends*

HDMI Switching

GB3JV uses a SR-Systems H.264 video codec that feeds a multimode modulator. The modulator is, of course set to DVB-S2 to maintain compatibility with the BATC MiniTiouner and other domestic satellite receivers. However, achieving reliable HDMI switching and HDMI splitting has proved a real challenge, but I've found a neat solution to this problem described in the sections below.

The Blackmagic ATEM Mini and Mini Pro

Blackmagic Design is an Australian company that produces a vast range of broadcast studio equipment. The Blackmagic ATEM Mini is one of a series of live production switchers designed for TV studio switching and mixing. The low-end units have a very attractive price point are particularly popular for YouTubers and web presentations. For example, the four-input Blackmagic ATEM Mini costs just £248 inc. VAT and shipping and the ATEM Mini Pro £389. The main difference between the ATEM Mini and Mini Pro is that the Pro model can support high quality direct web streaming (no additional unsupported Chinese boxes required!) to the BATC web site, simultaneous recording and a "Muti-View" (Quad+) output. A webcam output is supported on

both models, so there's no technical reason why you should not stream directly to a Portsdown like you do with a C920, subject to the Portsdown recognising the Blackmagic ATEM as a webcam. (OBS, MS Teams, Zoom etc. recognise the ATEM web cam).

In summary the Blackmagic ATEM range of live production switchers make an ideal switcher for studio and repeater alike, for repeater operation they offer many advantages:

- Automatic up-scaling of HDMI inputs to the configured output option (1080p 25/50/30/60)
- Stable HDMI output without switching glitches
- Built in still media player, test cards, transition graphics etc.
- A vast choice in input transition effects
- Easy to programme MACROS (XML)
- Picture-in picture effects
- One upstream and one downstream keyer (luminance, chroma or pre-multiplied etc.)
- Colour and luminance balance controls for each input
- Audio on each HDMI input
- Two additional analogue audio mixer inputs, configurable for line/mic/phantom
- Professional audio EQ, compressor, limiter, and expander on all inputs and output
- Built-in and fully configurable H.264 web streamer (Mini Pro and above)
- HDMI and Webcam outputs
- Recording to external USB HDD (Mini Pro and above)
- Comprehensive programming interface API

https://www.blackmagicdesign.com/uk/products/atemmini/techspecs/W-APS-14

Figure 3 Blackmagic Design ATEM Mini Pro Top View

The prices listed on the Blackmagic Designs web site are "list" prices, I've found that CVP offer an excellent service and will match the best web pricing on Blackmagic products. The prices I have mentioned above are the best prices that I've achieved from similar web stores that CVP (Creative Video Productions Ltd.) have price matched for me.

Figure 4 Blackmagic Design ATEM Mini Pro Rear Panel

Bitfocus Companion

Bitfocus Companion is an open-source software product that enables the reasonably priced Elgato Streamdeck to interface with more than 240 products including switchers, OBS, matrixes, VLC, and other related software, but you don't need a Streamdeck to use it! Companion comes with a built-in virtual stream deck emulator, a webpage for touch screens and the ability to trigger buttons via OSC, TCP, UDP, HTTP, WebSocket and ArtNet. It does the same job, without the physical buttons. It's a light-weight application runs on Mac, Windows, or Linux (including the Raspberry Pi) and is fully configurable using a web page accessible via port 8888. In the case of GB3JV I'm using a small solid-state Chinese Intel ATOM based Windows 10 machine to carry out this and other functions as the price point is not that different from a high-end Raspberry Pi, at least by the time you've added all the accessories that you need for a Pi, plus new Pi's at the time of writing are on at least a six-month lead time.

If you choose to use a Streamdeck you would also have a means of selecting sources and transitions using hardware buttons. The Streamdeck is available on Amazon from £69. It's a great product, though not required for the solution described here, it is a very cool product for your shack control of OBS using physical buttons. There is also no reason why Companion should not also control a transceiver via its CAT interface via the TCP integration.

Although for GB3JV I've used the Blackmagic ATEM switcher, there is no reason why you should not implement this proposal using any other switcher, a Roland switcher or even the Blackmagic Multiview, they are all supported by Bitfocus Companion. Bitfocus Companion is, in effect the "mid-ware" that does all the complex software "heavy lifting" and interfacing for you.

Installation & Configuration of Bitfocus Companion

Firstly, download and install the Bitfocus Companion software from here: *https://bitfocus.io/companion/*

- Set the IP address of the machine that you're going to run Companion on as a "fixed" address; this machine will be your Bitfocus Companion server that the Ryde receivers will send their web hooks to. I use fixed IP addresses for all devices at the repeater site and I remote access to them via a second-hand Cisco router/firewall running a site-to-site L2TP VPN back

to my home Cisco router/firewall. The Cisco firewalls also support remote access via a client VPN, which is supported by major operating systems and mobile phones. For network I use a SMARTY SIM card that gives high-quality and reliable unlimited data LTE connection for £18/month.

- You can access the Companion configuration screens from a remote computer within your network or VPN using the following URL: *http://192.168.0.176:8888* (change the IP address to that of your server)
- On the displayed web page select the "Instances" tab add your preferred switching device, in my case that's a Blackmagic ATEM, but if you don't have one of these and you still want to experiment, then just add your OBS server as an "instance"; do this by adding the IP address of your device's IP address and password (see below).
- If you're using OBS you'll have to add the OBS "websocket" plugin to your OBS instance, this will then allow web control of OBS via a web interface. *https://github.com/obsproject/obs-websocket*

Once the OBS websocket has been installed, configure a password, you do this in OBS as follows:

- Tools => WebSocket Server Settings
- Enable the WebSocket server and authentication
- Choose a secure password

In Bitfocus Companion you can then begin by configuring the virtual "buttons". This is easy because all the hard work has been done for you in the Companion software, really it is just the case of dragging and dropping functions to your chosen button. It does not matter if you're using a Blackmagic ATEM, OBS or both as a cascade. The Companion software reads all your preset labels, MACROS or OBS commands and presents you with the re-labelled hooks to these commands. It could not be easier.

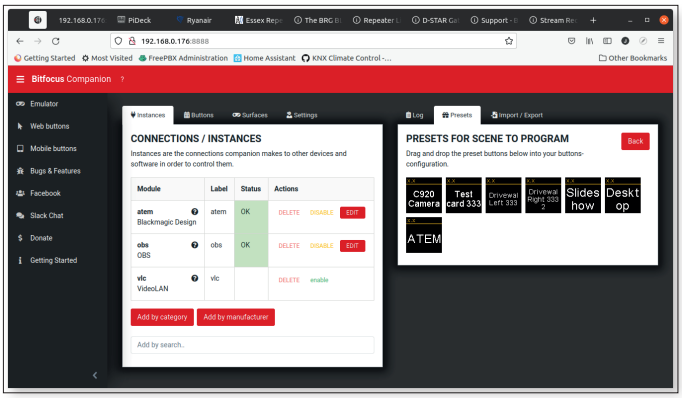


Figure 5 OBS Interface showing Preset

In figure six you can see the button configuration, here you may modify the "preset", for example I added a four-second delay ensuring the Ryde receiver has time to lock to the incoming picture before the transition to that source begins, I felt this gave a more professional transition effect. There is no reason why you should not incorporate multiple transitions and even animated DOGS graphics to confirm the input being received for the whole of the transmission. More on how to achieve this later.

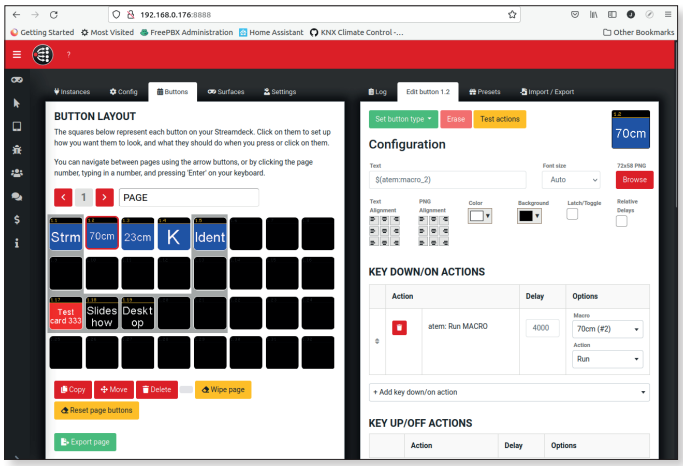


Figure 6 Button Configuration Page

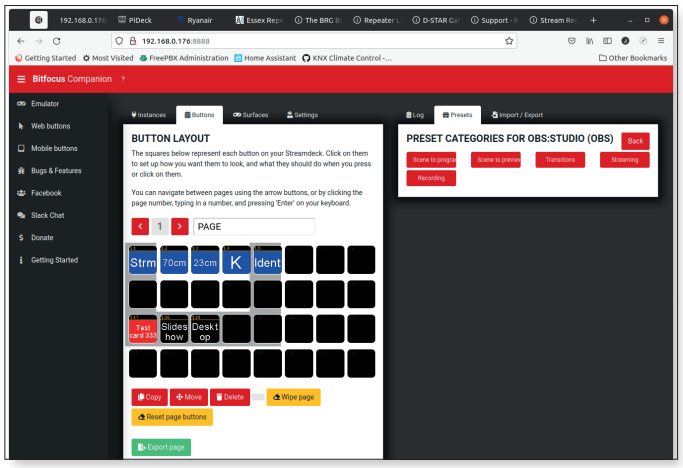


Figure 7 OBS Presets having been dragged to Companion "Buttons"

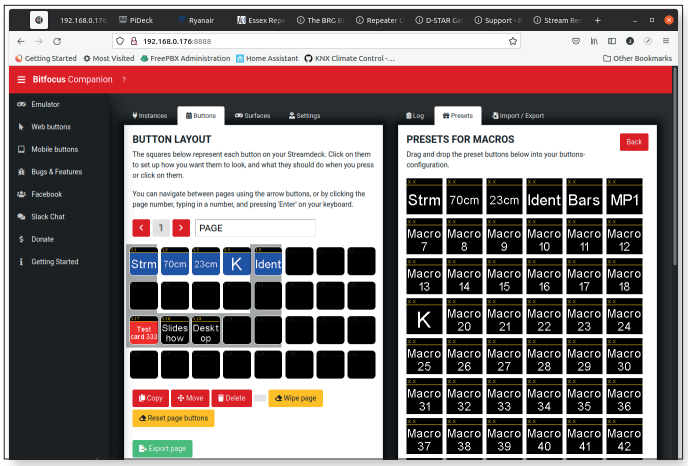


Figure 8 ATEM MACRO Preset

If you then click the "Web Buttons" icon on the left-hand column, a new tab will open with all your web buttons, if you click on one, the operation will be actioned. You'll notice each button has a distinct button label. It is this label that we use when instructing our web hooks (from the "Ryde" receiver of BATC Repeater controller) that will perform a remote "button press' to instigate the action that the remote system has commanded.

For example: button 1.4 (bank 1, button 4) would be controlled from a web hook:
http://192.168.0.176:8888/press/bank/1/4

You can test this simply by pasting this command into a browser, remember to change the IP address to that of your Companion server. There are 99 banks of 32 buttons available, so that should be enough for most.

Interfacing the BATC "Ryde" Receiver with Bitfocus Companion

Out of the box the BATC "Ryde" receiver provides the "Locked" signal indication via a GPIO pin, however there is a very useful URL library that can be used to provide this indication via a webhook that Bitfocus Companion can act upon without the need to use any GPIO pins.

Add the highlighted line to import the URL library in the second row of the player.py file:

```
import pydispmanx, pygame, enum (Existing line)
import urllib.request
```

▶ *Figure 9 Adding the URL Library to the" Ryde" configuration*

Then we need to add the following highlighted commands to the playback.py file:

```
  # update the state and redraw the message if
required
  def setState(self, newState):
    if(newState != self.state):
      self.state = newState
      if(newState == States.LOCKED):
        # state is locked so send request to
companion
        urllib.request.
urlopen("http://192.168.0.176:8888/press/
bank/1/2").read()
        self.backSurface.fill(self.theme.
colours.backgroundPlayState)
        self.drawMessage("Locked", self.
backSurface)
        self.backDispmanxlayer.updateLayer()
        self.frontSurface.fill(self.theme.
colours.transparent)
      else:
        self.frontSurface.fill(self.theme.
colours.backgroundPlayState)
        displayText = "ERROR\nNOT FOUND"
        if(newState == States.NOSOURCE):
          displayText = "Source\nnot\
nConnected"
        elif(newState == States.SOURCELOAD):
          displayText = "Waiting\nfor\nSource"
        elif(newState == States.NOLOCK):
          urllib.request.
urlopen("http://192.168.0.176:8888/press/
bank/1/4").read()
          displayText = "www.gb3jv.co.uk\n70cm
Input"
        self.drawMessage(displayText, self.
frontSurface)
      self.frontDispmanxlayer.updateLayer()
      return True
    else:
      return False
```

▶ *Figure 10 Adding the web hooks to the "Ryde' configuration*

In Figure 10 the IP address in the highlighted line is the IP address of your Bitfocus Companion Server. The bank reference refers to the virtual "button" you've defined within the Bitfocus Companion app. (in the example above 1/2 calls GB3JV's 70cm HDMI input, and 1/4 calls the media server HDMI input). Basically the "Ryde" is just sending a webhook, or URL that causes Bitfocus Companion to press the designated virtual "button". In Companion we'll define the button action to perform a function on the Blackmagic ATEM, in the case of GB3JV we call an ATEM MACRO command that we've set up to perform an input switch command with an artistic transition and to display a graphic transparency using the downstream keyer and that graphic shows the repeater ID as a "lower third" graphic in vision.

The process looks like this:

- Under quiescent (no input) conditions the repeater plays a video and still carousel as defined in the media player under ATEM MACRO control
- The "Ryde" receiver then detects the "locked" condition
- "Ryde" sends a web hook (command) to Bitfocus Companion
- Bitfocus Companion then waits for four seconds to give time for the input video signal to lock-up
- Bitfocus Companion then sends a command to the Blackmagic ATEM to initiate a MACRO that performs the actual switching transition and displays a "lower third" graphic that announces the input that the signal has been received on. The macro fades out the lower third graphic after about three seconds (150 frames in the ATEM MACRO)
- When the received input signal is no longer detected (i.e., the "not locked" condition is detected by the Ryde)

another webhook is sent that presses another Bitfocus Companion "button" to initiate the transition back to the repeater's media server that plays the video and still carousel. The lower third graphic that is called in this case shows a "K" indication in the middle of the screen.

- The media server is also under control of ATEM MACROS and specific videos and stills can be initiated from Bitfocus Companion on a time-of-day or even from external web hooks or conditions, for example you might choose to display a live weather chart during weather events or display the status of other repeaters, perhaps when they become active. Really the sky is the limit when you see the possibilities of using Bitfocus Companion as an integration tool. Integration with the BATC Web chat to display "iPhone text message" style chats in vision using the upstream keyer might also be an interesting future development. Bitfocus Companion integrates with YouTube chats, SLACK and Twitch for example.

Media Server

There are many choices for a media server. For this article I suggest two alternatives:

PiDeck (by Guy Plunkett, M0GUY)

PiDeck is a Raspberry Pi Application that emulates the capabilities of Backmagic's Hyperdeck Broadcast Deck. The starting price of a Blackmagic Hyperdeck is £399, but Guy's PiDeck performs just about all the functions of the Hyperdeck for a licence cost of £45 and it runs on Raspberry PI hardware. The software supports a remote web interface where you can upload media files and manage the media server. The main advantage of this method is that you can control the PiDeck from the ATEM MACROS, so you can also start a media file from the beginning each time the repeater goes idle mode and you can use the PiDeck to play animated transition graphics and Animated "DOGS" (Digital on-screen Graphics) as used by many commercial TV stations for in-vision station idents, as PiDeck supports both ProRes4444 and HEVC transparencies. More about how to generate transparencies and animated graphics later.

http://pideck.m0guy.com/

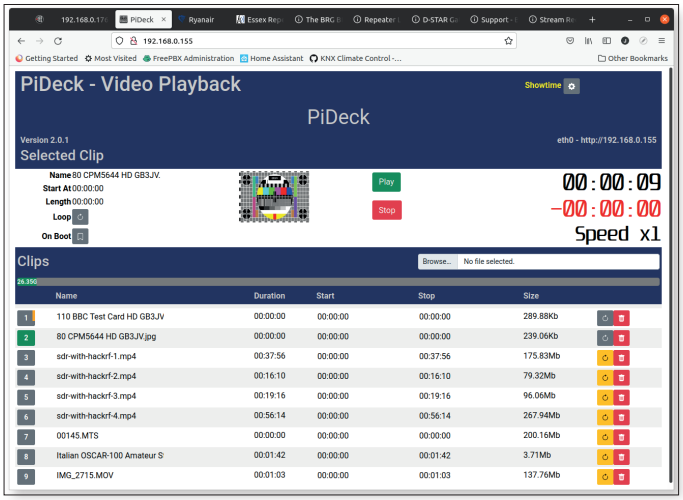


Figure 11 PiDeck Web Management Page

The BATC Repeater Controller (by Dave Crump G8GKQ)

Dave Crump's Repeater controller is another fantastic piece of software. Dave has kindly created a web interface so that the controller can interface with Bitfocus Companion. In this case the "Ryde" interface to the Repeater controller continues to use the GPIO connection between the Ryde and the Controller, but the Controller will send the web hooks to Bitfocus Companion to initiate the transition MACROS.

In an implementation that uses the BATC Repeater Controller the Controller as the media server, the Controller provides the media server functions whilst Bitfocus Companion would provide the MACRO switching functions. The advantage of this approach is that the BATC Controller provides all the repeater logic, DTMF switching control, and pre-configured audio and Morse ident functions. It's worth remembering at this stage that you don't have to use a Blackmagic ATEM or other physical switcher; Bitfocus Companion can interface with OBS and its media player function so, you could just do all your input switching in software, or build a hybrid system, the choice and possibilities are endless.

Configuration of the BATC repeater controller for the web hooks integration to Bitfocus Companion is simplicity itself, the details are on the BATC forum here:

https://forum.batc.org.uk/viewtopic.php?f=82&t=7815

Creating Transparencies for the ATEM

I've found that the easiest way to create transparency graphics is to use Apple's Keynote application (that's the Apple equivalent to Microsoft's PowerPoint). When creating your slides observe the following configuration items:

- Under Document => Slide Size => Custom Slide Size, set to 1080 x 1920 (this ensures you exported file will be 16 x 9 HD)
- Under Format => Background, set to "no fill" (this ensures your slides are the transparent and ready for export as transparencies

When you have set up these items and made your basic slide layout you can save this as a theme and create variations using the same fundamental theme.

When you have created your slides now is the time to export these as transparencies:

- In File => Export to => Images
- Select "All Slides"
- Select the format to be: ".png" and check the box "export with transparent background"
- The programme will then export a series of .png transparencies into a folder, one for each slide.
- You can now import these into your Blackmagic ATEM, OBS or your preferred switcher.

Figure 12 Example GB3JV Graphic Transparency

To create animated transparencies, use the same settings as above and then create an animated slide using the Apple tools within Keynote. When you come to export:

- In File => Export to => Movie
- Select the slide(s) to include in your movie
- Select "Custom" in the drop-down box
- Select the resolution and frame rate as required
- Select "Apple ProRes 4444" for your movie

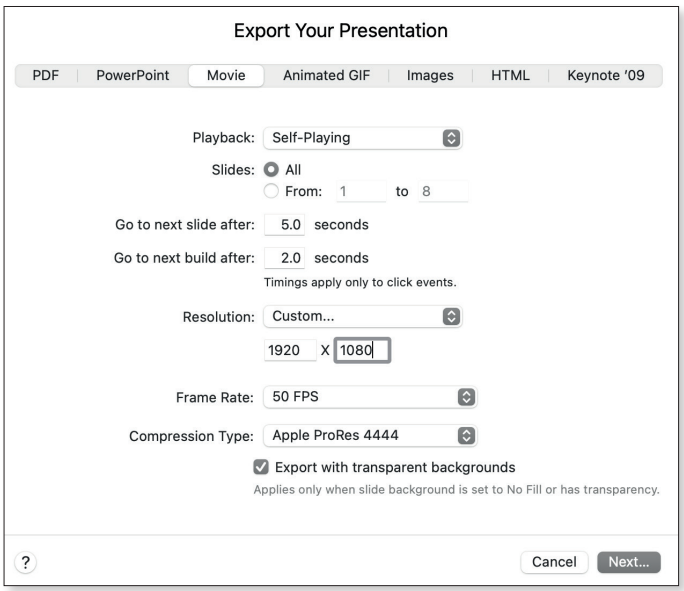


Figure 13 Exporting an animated transparency from Keynote

After this you can import the movie into PiDeck via the web interface and configure the ATEM upstream keyer and PiDeck as your key source as per the ATEM handbook and then create your ATEM macro and Bitfocus Companion "button" to call the ATEM MACRO you've created.

If you've not got a Mac there are numerous programmes that can help you create transparencies, Adobe Photoshop for instance. It is unfortunate the Microsoft's PowerPoint does not directly support the creation of transparencies, but there are numerous work-rounds suggested on the web. Personally, this is just one reason why I make my presentations with Apple's Keynote; it provides an easy and free way of creating transparencies for your media.

Creating ATEM MACROS

There are two methods of creating a Blackmagic ATEM macro. The first method is just to start the ATEM's MACRO recorder and perform the series of key-steps and create your MACRO. The disadvantage of this method is that if you make a mistake, you must start all over again. It is also important to ensure your start-up state when you begin recording the MACRO is set in stone, so I find using the HTML with Microsoft's free "Visual Studio Code" is the best way of creating a MACRO.

If you're unfamiliar with ATEM MACROS, there are plenty of resources on YouTube that explain how this is done. It really is very simple; within a few hours you'll be creating impressive MACROS and editing the XML like you were creating a page for a web site… Oh, hang on…

Here is the XML used for the GB3JV ATEM MACROS

```
<?xml version="1.0" encoding="UTF-8"?>
<Profile majorVersion="1" minorVersion="5"
product="ATEM Mini Pro">
  <MacroPool>
    <Macro index="0" name="Strm"
description="Strm">
      <Op id="MediaPlayerSourceStillIndex"
mediaPlayer="0" index="15"/>
      <Op id="PreviewInput"
mixEffectBlockIndex="0" input="Camera1"/>
      <Op id="AutoTransition"
mixEffectBlockIndex="0"/>
      <Op id="DownstreamKeyAuto" keyIndex="0"/>
      <Op id="MacroSleep" frames="150"/>
      <Op id="DownstreamKeyAuto" keyIndex="0"/>
    </Macro>
    <Macro index="1" name="70cm"
description="70cm">
      <Op id="MediaPlayerSourceStillIndex"
mediaPlayer="0" index="13"/>
      <Op id="PreviewInput"
mixEffectBlockIndex="0" input="Camera2"/>
      <Op id="AutoTransition"
mixEffectBlockIndex="0"/>
      <Op id="DownstreamKeyAuto" keyIndex="0"/>
      <Op id="MacroSleep" frames="150"/>
      <Op id="DownstreamKeyAuto" keyIndex="0"/>
    </Macro>
    <Macro index="2" name="23cm"
description="23cm">
      <Op id="MediaPlayerSourceStillIndex"
mediaPlayer="0" index="14"/>
      <Op id="PreviewInput"
mixEffectBlockIndex="0" input="Camera3"/>
      <Op id="AutoTransition"
mixEffectBlockIndex="0"/>
      <Op id="DownstreamKeyAuto" keyIndex="0"/>
      <Op id="MacroSleep" frames="150"/>
      <Op id="DownstreamKeyAuto" keyIndex="0"/>
    </Macro>
    <Macro index="3" name="Ident"
description="Ident">
      <Op id="MediaPlayerSourceStillIndex"
mediaPlayer="0" index="17"/>
      <Op id="DownstreamKeyAuto" keyIndex="0"/>
      <Op id="MacroSleep" frames="150"/>
      <Op id="DownstreamKeyAuto" keyIndex="0"/>
    </Macro>
    <Macro index="4" name="Bars" description="">
      <Op id="PreviewInput"
mixEffectBlockIndex="0" input="ColorBars"/>
      <Op id="AutoTransition"
mixEffectBlockIndex="0"/>
    </Macro>
    <Macro index="5" name="MP1" description="">
      <Op id="PreviewInput"
mixEffectBlockIndex="0" input="MediaPlayer1"/>
      <Op id="AutoTransition"
mixEffectBlockIndex="0"/>
    </Macro>
    <Macro index="18" name="K" description="K">
      <Op id="MediaPlayerSourceStillIndex"
mediaPlayer="0" index="18"/>
      <Op id="PreviewInput"
mixEffectBlockIndex="0" input="Camera4"/>
      <Op id="AutoTransition"
mixEffectBlockIndex="0"/>
      <Op id="DownstreamKeyAuto" keyIndex="0"/>
      <Op id="MacroSleep" frames="150"/>
      <Op id="DownstreamKeyAuto" keyIndex="0"/>
    </Macro>
  </MacroPool>
  <MacroControl loop="False"/>
</Profile>
```

▶ *Figure 14 The ATEM Macros used in GB3JV*

I can recommend this YouTube video for an introduction to ATEM MACROS *https://youtu.be/WrWDecjTV4w*

Programming the ATEM Streamer to work with the BATC web site

The ATEM Mini Pro (and above) comes pre-configured with numerous streaming destinations such as YouTube, Facebook, and the like. Adding the BATC streamer is just a matter of adding a new destination server to the HTML. Below is an example of the HTML that I created to deliver content to the BATC streaming page (ATEM Mini Pro and above).

The Stream Key can be added in the ATEM "Software Control" App which is installed as part of setting up your new ATEM. You will also notice the option in the xml to add a recording destination. The same codec is used for both the recorder and the streamer, so you can continuously record to a USB-C disk drive if you want to maintain a permanent record of the repeater output. If you're feeling flush enough to go for the Mini Pro ISO, this can simultaneously record to a separate file for every input. This feature is designed for post-production editing.

```
<?xml version="1.0" encoding="UTF-8"?>
<Profile majorVersion="1" minorVersion="5"
product="ATEM Mini Pro">
  <Output>
    <LiveStream serviceName="BATC" url="rtmp://
rtmp.batc.org.uk/live" key="g8ytz-cskfzr "
lowLatency="False">
      <Credentials username="" password=""/>
      <bitrate low="1000000" high="2000000"/>
      <audioBitrate low="128000" high="256000"/>
    </LiveStream>
    <Record filename="Untitled"
recordInAllCameras="False"/>
  </Output>
</Profile>
```

▶ *Figure 15 Blackmagic ATEM Mini Pro Streaming Configuration for the BATC Streamer*

Conclusion

I believe that by incorporating Bitfocus Companion into your repeater controller offers many more possibilities than simple HDMI input switching, whether you decide to integrate using OBS or buy a commercial switcher such as the Blackmagic ATEM Mini Pro the creative possibilities are just about endless, you have all the tools to do some fantastic integrations with external entities, perhaps even other repeater sites to create a network of TV repeaters.

One feature that I have in mind is to use the Bitfocus Companion integration with Home Assistant, this will allow an iPhone or Alexa notification when an input becomes active, so you know when to tune in.

Other future possibilities exist to grab the program headers from input signals and create custom in-vision tickers to welcome users and together with a log state when that user last accessed the repeater, who was the last user etc.

Enjoy

With thanks to:

- Guy Plunkett for his suggestion to use Bitfocus Companion and the URL library on the "Ryde" receiver
- Dave Crump for his work adding the webhook capability to the BATC Repeater controller

BATC attending HAMRADIO 2022

We have not yet confirmed if we will have a stand but we planning to support the proposed DATV conference on Friday afternoon with presentations on the latest developments on Portsdown and Ryde systems.

We look forward to meeting many of our European members and if you would like to help organise the event please get in touch.

G1MFG silent key

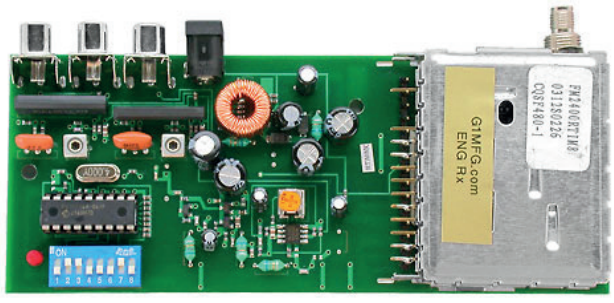
The RSGB have announced that following a very short illness Giles Read G1MFG has become silent key on 18 March 2022.

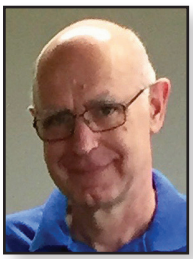
As well as technical editor for RadCom, Giles is well known to many in the ATV community.

Approximately 20 years ago Giles lived near Southampton and was an active member of the Solent Amateur Television Group and helped run the GB3AT television repeater but his real contribution to the ATV community was when he started to resell the Comtech ATV modules.

These modules were cost effective FM Tx and Rx modules for 23 and 13cms and helped a lot of ATV operators get started on 23cms FM ATV and a large number are still in use today. Giles, through his website *g1mfg.com* offered help and support to enable people to "get on the air" and sold a number of associated products which he designed such as front panel controllers and antennas.

Our thoughts are with his partner, Heather, & with his family and friends.



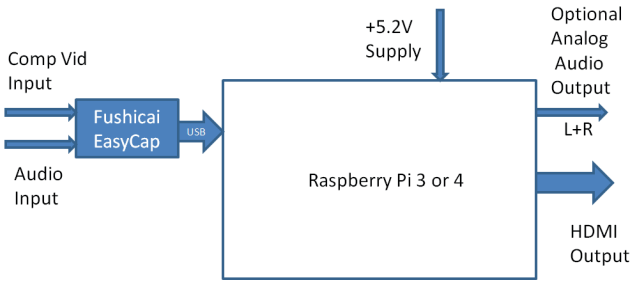


Composite Video to HDMI Converter

Dave Crump G8GKQ

The new BATC ATV repeater controller (described elsewhere in this CQ-TV and on the Wiki *https://wiki.batc.org.uk/Repeater_Controller*) is designed to be used with HDMI sources and switches. However, some sources (such as FM ATV receivers) only output composite video and need to be connected to the repeater video switch.

Using the BATC-supplied Fushicai USBTV007 EasyCap, it is possible to capture the composite video (and audio) on a Raspberry Pi and provide an HDMI output.



Hardware

The video is captured using the Fushicai EasyCap on the yellow phono composite video input. Audio from the white and red phonos is also captured. A Raspberry Pi 3 or Raspberry Pi 4 can be used; both work well in this application.

HDMI video is available on the HDMI output (the primary one on the Raspberry Pi 4). The parameters of the HDMI video (720p or 1080p for example) are negotiated with the connected HDMI switching or display device by EDID.

Audio is by default included on the HDMI signal, but can be switched to the analogue 3.5mm jack if required.

It is important to have a low impedance 5.2v power supply to the Raspberry Pi and a good quality USB lead between the EasyCap and the Raspberry Pi (not the one supplied with the EasyCap). This is because the EasyCap needs a good 5v supply to prevent streaking appearing on the captured video.

Only the Fushicai EasyCap is fully compatible. It is realised that these are difficult to obtain, but most repeater groups must have members with spares as more and more stations convert to digital equipment.

Software

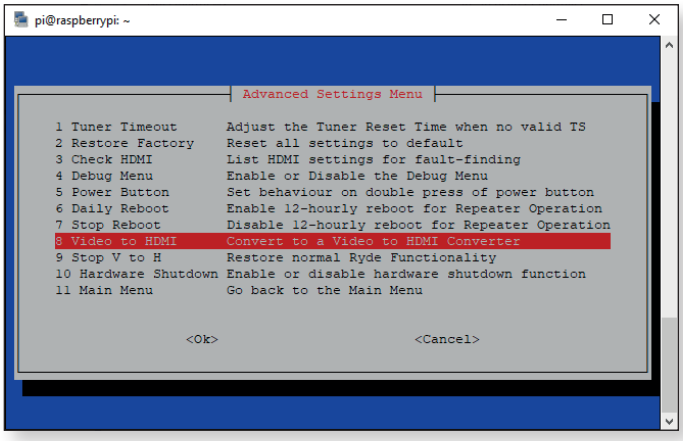
Rather than start yet another BATC software project, the software has been added to the standard Ryde receiver software build. The Ryde build has the required VLC player included, and also autostart-on-boot. Only an additional 100 lines of code were required to add this facility (which is NOT part of Ryde). Note that although the Ryde project requires a Raspberry Pi 4, this facility will run on a Raspberry Pi 3 or 4.

Build and Configuration

Put the hardware together as shown in the block diagram above and connect an HDMI display. After loading the basic Raspberry Pi Buster Legacy Lite OS on the SD card and enabling SSH, boot up the Raspberry Pi; you should be able to see the Raspberry Pi's IP address on the HDMI screen.

Log in to the Raspberry Pi and cut and paste the three lines from the Ryde GitHub page into the command line. Let the Raspberry Pi do a standard Ryde Build. At the end of the build the Pi should reboot and you will get the Ryde's "Source not Loaded" caption on the HDMI screen.

Log in by ssh again and type "stop" (no quotes) and press enter. Then type "menu" and you will get the Ryde SSH Console Menu. To enable the converter go to "8 Settings" and then select "8 Video to HDMI". Go back to the main menu, select "12 Shutdown" and then "3 Exit to Linux".



If you now enter "ryde-build/rx.sh" the converter should start. If you have a video input, you should see the video on the HDMI display.

The default is to display a 4:3 image correctly proportioned within a 16:9 frame. Also a caption reading "Analogue Input" is displayed at the top left corner. These settings, along with the audio output destination can be changed by hand editing the configuration file (/home/pi/ryde-build/cv_config.txt) and then restarting the display (by pressing ctrl-c and then up-arrow, enter):

/home/pi/ryde-build/cv_config.txt - pi@192.168.2.214 - Editor - WinSCP

Encoding

```
# Config file for HDMI to Comp Video Converter

# Audio output: hdmi, jack or usb
audio=hdmi

# Format: 4:3 or 16:9
format=4:3

# Ident Caption
# Must not include hyphens (-)
caption=Analogue Input
```

The settings are self-explanatory. Once you have the settings as you wish, reboot to check that the converter starts properly. Note that Ryde functionality is no longer easily available on this build once you have changed its use.

Thanks to Rob M0DTS for the initial code that was used to start this project.

Portsdown Exhibited at The National Museum of Computing

The Raspberry Pi Computer was launched on 29 February 2012. To celebrate the 10th anniversary of the launch, an exhibition was opened at the National Museum of Computing. As part of the opening ceremony, an exhibition of Raspberry Pi applications was staged, including the Portsdown DATV transceiver.

Thanks to Phil M0PIT for exhibiting his Portsdown system and manning the stand throughout the day.

▶ *Phil, M0PIT with his well-made Portsdown system. Photo credit Lucy Hattersley*

▶ *Phil's Portsdown Demonstration. Photo credit Lucy Hattersley*

The Portsdown Newsletter

Dave Crump, G8GKQ

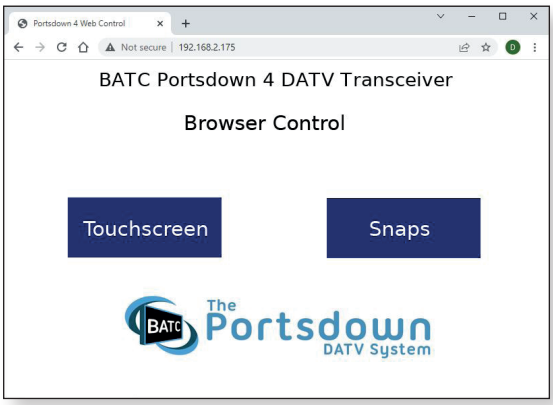
Fewer Portsdown changes to report this time, as a lot of effort has been expended on the BATC repeater controller. That said, an update to the Portsdown 4 released in mid-March introduced the following new features:

- Web access to the Portsdown touchscreen
- Support for the DFRobot five-inch touchscreen
- Support for Colin G4EML's Langstone V2 using the LimeSDR Mini (or Pluto).

Web Access

Thanks to Phil M0DNY, I have been able to enable access to the Portsdown touchscreen from a browser on the same LAN as your Portsdown. This is not intended for full internet access – the security is not adequate.

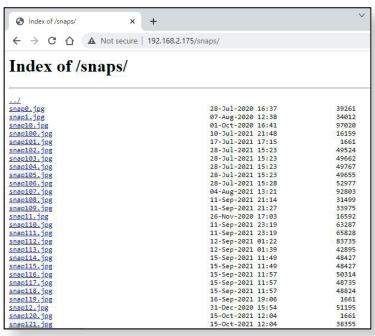
To get started, check the IP address of your Portsdown (Menu 2, Info) and simply type the IP address into your browser. You should see the page below.



Portsdown 4 Web Control "Home Page"

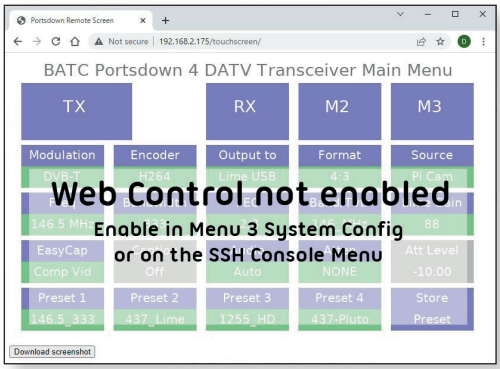
If you click the "Snaps" button, you will see a list of the screenshots (snaps) that you have captured using your Portsdown:

These can be downloaded directly.



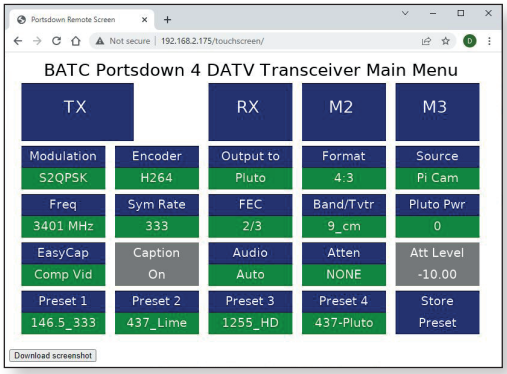
Portsdown 4 Snaps index

Click the back button (on your browser) and then the "Touchscreen" button. You will get the screen below.



Portsdown 4 Web Control "Not Enabled"

By default, web control of your Portsdown is not enabled. To enable it, on the touchscreen select Menu 3, System Config, and then touch "Web Control Disabled" to toggle it to "Web Control Enabled". Your browser should immediately display the System Config Menu and you can click your way back to Menu 1.



Portsdown 4 Web Control

Web Control Limitations

Web Control is not a total substitute for the touchscreen and has some limitations:

- The touchscreen must be connected to the Raspberry Pi – it does not work without the touchscreen
- It only shows static or slowly refreshing text, so you can't use it to view received images or streams, or the Pi Cam images
- It only refreshes once per second, so although your clicks will be acted on almost instantly, the effect on the screen can take up to a second to show. So be patient
- Web control is only available for the core Portsdown application. So you cannot use it for Langstone, BandViewer, SigGen etc

- However, it is useful for dish alignment (using the received MER display), basic settings and transmit/receive switching. The functionality may be extended in due course

A useful tool – but do remember that if you enable it you give full Portsdown control to anyone on the same LAN; probably your whole family.

Support for the DFRobot five-inch touchscreen

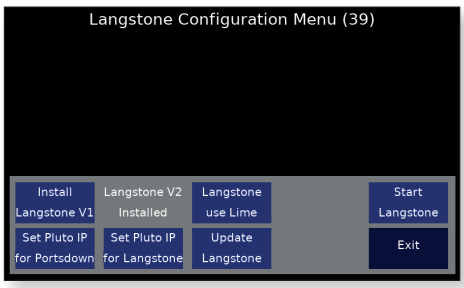
The DFRobot DFR0550 touchscreen has the same screen pixel count as the Raspberry Pi official seven-inch screen and uses the same DSI connector. It does work without software modification, but occasionally misses touches. The latest update corrects that issue, but the correct screen type (five-inch or seven-inch) must be selected on Menu 3, System Config.

The DFRobot 5 inch Touchscreen

The only problem with the five-inch screen is that on, initial build, the Portsdown touch map is rotated by 180 degrees. This can be corrected by navigating to Menu 3, System Config, Invert Touchscreen. If you can't work out where to press, the steps are listed on the Wiki; simply search on DFRobot. After the reboot, you should again go to Menu 3, System Config and select the five-inch screen to get a reliable response to touches.

Langstone V2 including LimeSDR

The Langstone integration has been redesigned to use either Langstone V1, or Langstone V2.



The new Langstone Configuration Menu

Langstone V2 offers the option of LimeSDR or Pluto.

All the controls are available on the Langstone Configuration Menu:

Note that:

- You must be connected to the internet to install the Langstone software, or to switch between Langstone V1 and Langstone V2 (or back again)
- If you have set a non-standard (Langstone) Pluto IP address for Langstone V1, you will need to set it again if you switch to Langstone V2 (and vice-versa). You would also need to reset it after a Langstone software update
- Once Langstone V2 is loaded, you can switch between Lime and Pluto easily from the Langstone Config Menu without an internet connection
- Langstone V2 is still under development, so please report any bugs that you find to Colin G4EML and remember that he is a volunteer as well.

If you use a LimeSDR USB, it MUST be connected to one of the USB3 ports on the Raspberry Pi 4. It will not work in the USB2 ports.

Minor Changes

Up until the most recent update, Portsdown DATV transmissions using the Pluto could not transmit the correct callsign in the Service ID if the call included a "/" (as in G8GKQ/P). Thanks to a work-around suggested by Stephane F4DVK, this has been corrected.

The recommended operating system for new builds is now the Raspios Buster Legacy Lite, which should be supported by the Raspberry Pi foundation until June 2024.

LimeSDR Mini

Lime Microsystems have announced that the LimeSDR Mini V1 has now been discontinued as they are unable to source the Intel FPGA used in it (due to the global chip shortage). They will replace it with the LimeSDR Mini V2 which uses a different FPGA which is more easily available. The new LimeSDR V2 should be a drop-in replacement for the LimeSDR V1 and I am hopeful that it should work well with the Portsdown.

This is good news as it means that LimeSDRs will once again be available for DATV use. I hope to test one of the early samples and will provide updates on the BATC Forum when I have more information.

Portsdown 2020

Finally, just to mention that the Portsdown 2020 is still supported and I hope to give it some attention in the next few months.

BBC MCR21 Outside Broadcast van update

Brian Summers G8GQS

In this short report I will explain our progress and look to the future. Our first public show was last year at the Goodwood Revival, a three-day event. MCR21 looked good from the outside, resplendent in its original colours and bright chrome work. However the inside was, in the true television production way, a mock up. The original mixers were present but not powered up and the monitor stack was showing pre-prepared videos on the camera monitors and transmission. All as it might have been at the time.

We have lots of plans for this summer, MCR21 will be at the Amberley Chalk pits Museum in July, The Camberley Car Show, also at an RTS event, and best of all MCR21 has been chosen to be one of the BBC's "100 objects" see:- *https://www.bbc.co.uk/historyofthebbc/bbc-100/100-objects/*

Since then we have made a lot of progress building and installing the structure and the supporting technical services. A big step forward was obtaining one of the Pye Mk6 cameras that were originally installed. When this was collected from the National Media Museum's store at Wroughton, a happy discovery was made, not only was it the correct type of camera, but it WAS one of the original four that were supplied with the van. This camera, 21-4, is now being tided-up by one of our volunteers.

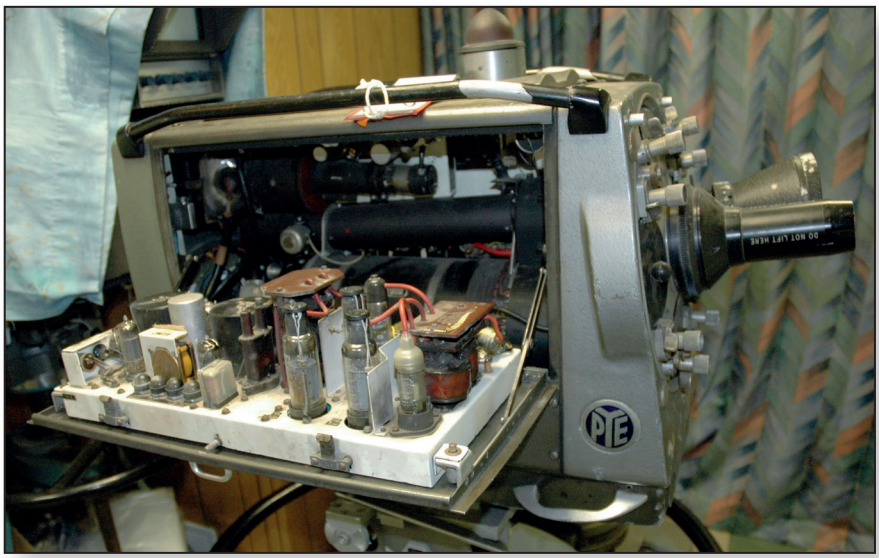
Over the next few weeks we will start installing the original cables and replacement on as needed. Many co-ax cables and multicore cables need to go in. As a last generation monochrome unit there is a surprising amount of complexity and hence wire. Much soldering to be done.

While we are fortunate to have a fair amount of original equipment there are still lots on the wants list: *http://mcr21.org.uk/get-involved/wish-list/* One difficult item is the Pulse and Bar generator by Gresham Lyons. It was a dual standard 405-625 line valve unit. These were commercially available and used by the BBC and the GPO amongst others. The hope is there is one in a loft somewhere.

I could write a lot more but this is not getting the soldering done…

Useful links:-

www.mcr21.org.uk
https://www.facebook.com/groups/mcr21
https://www.youtube.com/channel/UCmB–mGL3Qbs-NHWpJPbtKw
https://mailchi.mp/d0da1391cb0c/mcr21-newsletter-6128496?e=3cb8f3a8ae

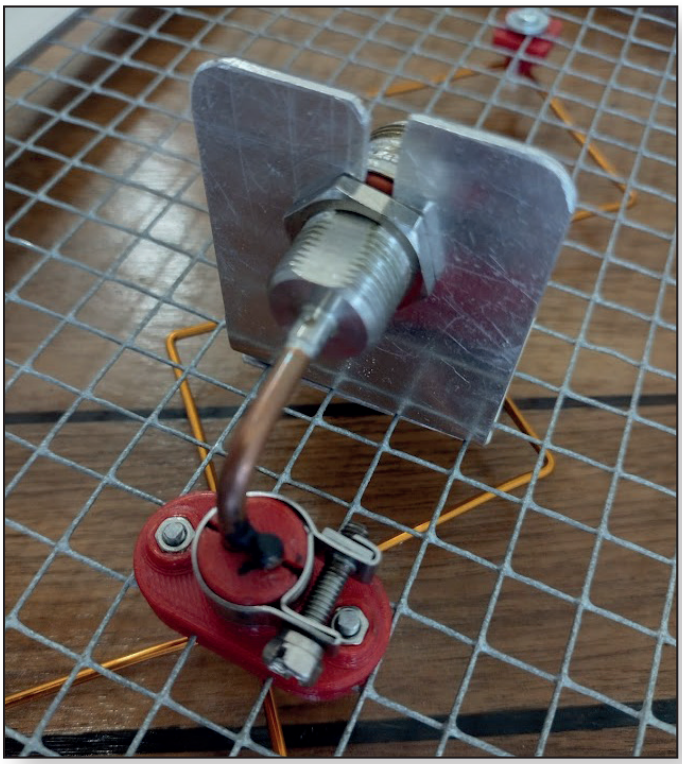


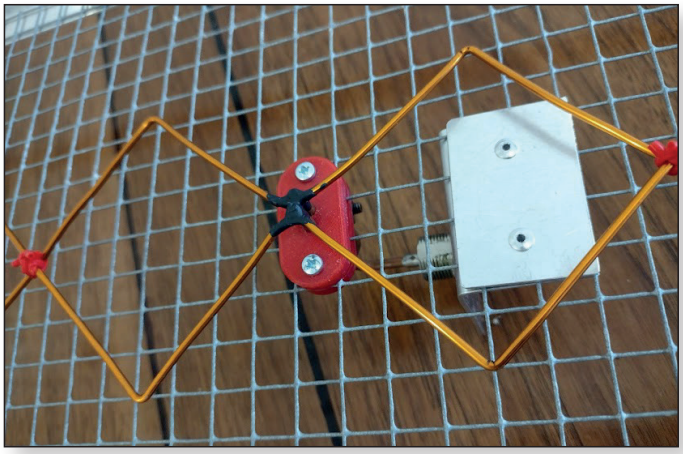
A flat-plate antenna for 24cms

Gareth G4XAT

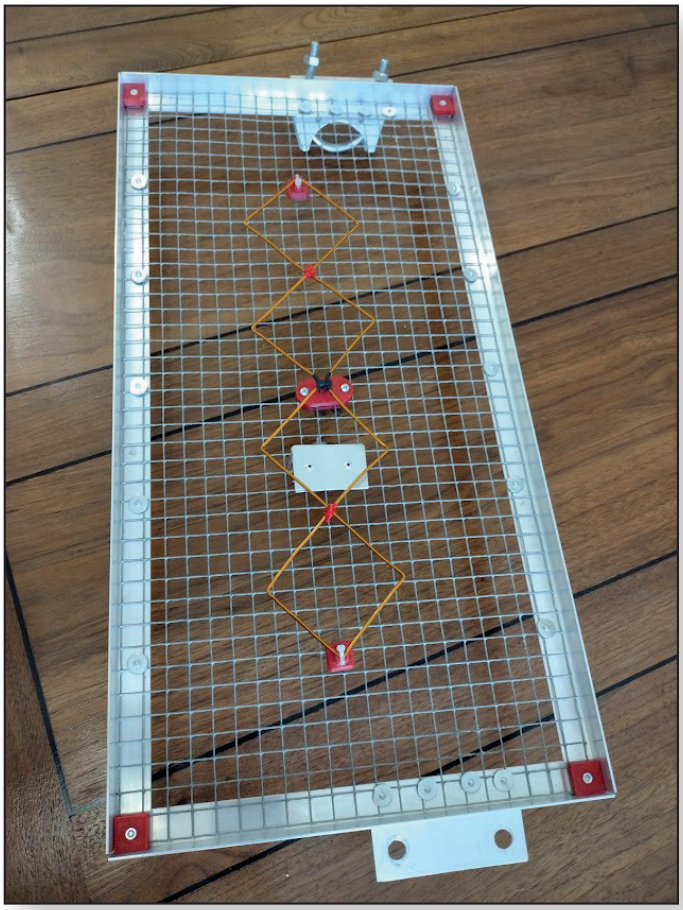
More than 25 years ago I built a triple bi-quad for 24cms, based, if I recall, on a CQTV article by John, G8MNY. I called it a 'builders special' (no, not a huge fry-up) as I re-purposed some surplus metalwork from a nearby skip for the main antenna frame. It was never actually used until recently when I compared it with a 21 element 24cms yagi that I had built. It was better than the yagi, although through my access to modern test gear (a Nano VNA) it showed its match was less than satisfactory.

On reading the interesting article about dish illumination by Chris van den Berg PA3CRX (CQ-TV 273) which included information about bi-quads, it spurred me on to build another unit, but to 'tighter specs' than the original. My build progressed as I planned, helped by a 3-D printed former for the wire loops and this website for dimensions. *https://buildyourownantenna.blogspot.com/2014/07/double-biquad-antenna-calculator.html* However, all was not well when it was tested. A forum post quickly resolved the issue *https://forum.batc.org.uk/viewtopic.php?f=2&t=7644* and very quickly I had a functioning solution.



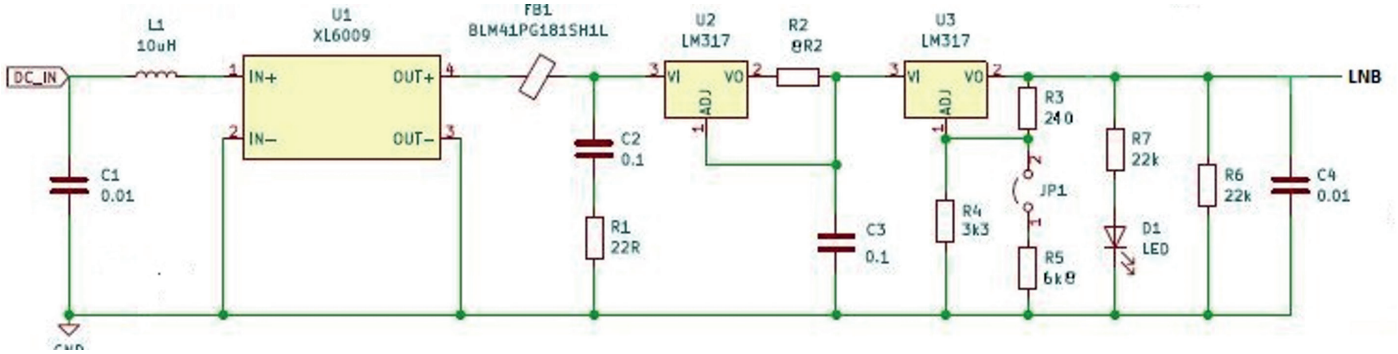


There then followed some CAD and 3-D printing to make a tidy little Pawsey stub balun that allowed fine-tuning. A short N-Type to rigid coax was used for the feed, from a 'job-lot' purchase from eBay. The end result is compact, broadband and has very useful gain. The -3dB bandwidth was measured very approximately by swinging it in the shack and watching the received signal – it was about 60 degrees. Gain is predicted to be 10dBd, a useful boost.



Another use for the BATC Noise Figure Power supply board

Dave Robinson G4FRE

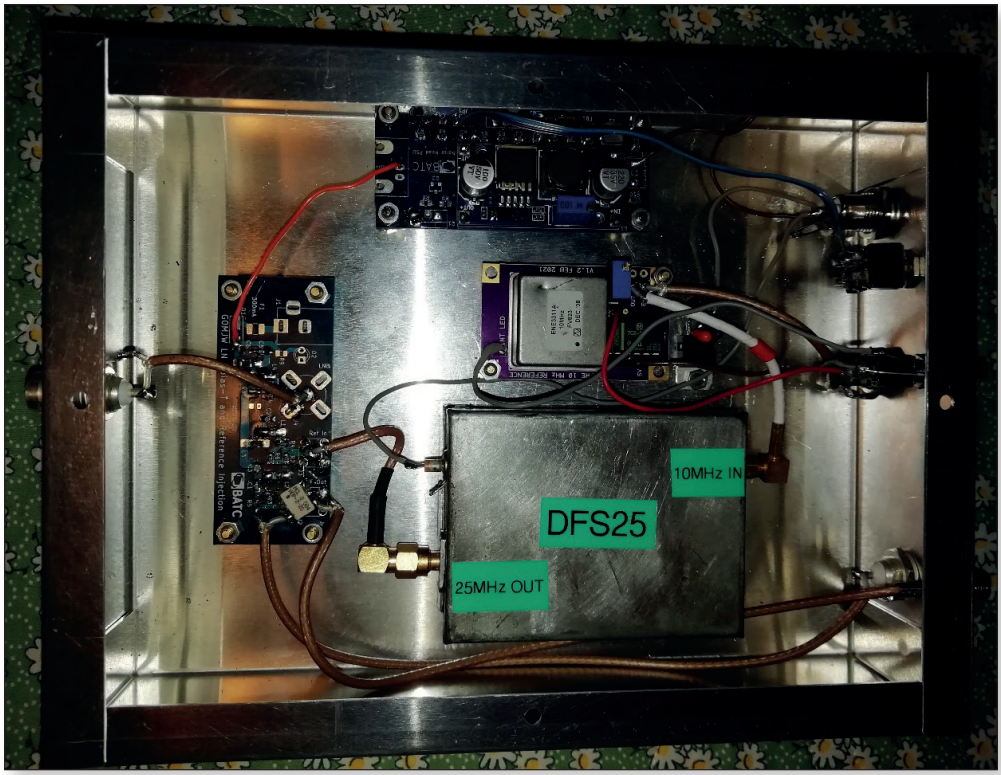


To allow me to operate portable this summer on QO100 I needed a power supply module that would allow me to generate the two different LNB voltages from a 12V supply. A DC to DC converter would be needed followed by an adjustable regulator set to give the required switchable 15.5V and 18.5V at under 150 mA

I started devising a circuit, then realised the circuit was going to end up being very much like that of the NF PSU circuit described in CQTV 274 page 21. This would also mean I could use my spare NF PSU board obtained from the BATC shop. The modified circuit is shown as follows:-

JP1 is replaced with a DPDT switch, the other pole is used to switch a red and green LED to indicate whether 15.5V or 18.5V output voltage is being generated. The circuitry around Q1 and Q2 was removed as it was not required in this application. The PCB was populated with these components (after doing the required track modifications) and the voltages checked. They were close enough to the calculated values. I also checked the current limiting function (set by R2) by connecting a 10 ohm resistor across the output.

The PSU PCB was mounted in a metal box along with a duplexer ("LNB Bias T and reference injection" PCB from BATC shop), a G4HUP DFS25 (to generate the 25MHz LNB reference from the 10MHz Rubidium input) a high stability 10MHz crystal oscillator (for when I forget the Rubidium standard) and a minicircuits ADP2-20 splitter (mounted on the diplexer board) to allow the minituner and the RSP1A SDR to listen to QO100 at the same time



Exploring new technologies and approaches for DATV Repeaters

Michel, HB9DUG

The HB9TV Team who manages, operates and develops the HB9TV Network (www.hb9tv.ch) has started thinking about a new generation of repeaters for its network.

The current network is mainly based on DVB-S modules from SR-Systems, which have been working well in our 4 repeaters for over 10 years. Unfortunately, the hardware is no longer available and spare parts are becoming difficult to source.

In addition, the modules used only support the DVB-S standard with a minimum Symbol Rate (SR) of 1 Ms/s with MPEG2 video encoding, thus closing repeater access to stations using the DVB-S2 standard with SRs lower than 1Ms/s with H.264, H.265 video codec and AAC or AC3 audio codec in their DATV transmitter.

Finally, it should be mentioned that during the migration of our FM relays to DVB-S technology, in order to allow the coexistence of access with FM or DVB-S TXs, the repeater at the center of the network was equipped with FAGOR IFL6000 (transponder) and IFA600 (amplifier) modules designed for processing Analogue and Digital TV.

In view of the above, it seemed interesting to investigate in the technology of a linear transponder for our future repeaters. A prototype was made with an ADALM-PLUTO module from Analog Devices.

By carefully reading the documentation for the AD936x RF Agile Transceiver used in this module, you can see that a RF RX to RF TX loop-back function is available. The loop-back happens in the ADI provided HDL core. The transmitter will transmit anything that the receiver receives. The entire RF chain is active (Sample rates, RF bandwidth and FIR settings will all effect the transmission).

We will use this function to create our linear transponder prototype. To make programming the AD936x of the Pluto easier, Analog Devices provides pyadi-iio, the Pluto's Python API.

Before you can use the API, you need to install the libiio and libad9361-iio libraries and after pyadi-iio.

The installation of these libraries is OS dependent. For non-geeks like me, PySDR:A Guide to SDR and DSP using Python (https://pysdr.org/index.html) will give you a starting point.

The very basic python program below configures the Pluto in "linear transponder" mode with the following parameters:

Pluto connected via Ethernet interface at 172.22.22.150

- Sample rate at 8.192 Ms/s
- Rx Lo at 437 MHz with a bandwidth at 2 MHz
- AGC automatic in 'slow attack'
- Tx Lo at 1280 MHz with a bandwidth at 2 MHz
- Tx hardware gain at -10 dB

Python program

```
#
# version 1.0 2021-12-20, HB9DUG Michel
#
# proto transponder DATV
# input = 437 MHz
# output = 1280 MHz
# rf bandwidth = 2 MHz

import adi

# setup interface
sdr = adi.Pluto('ip:172.22.22.150')
sdr.sample_rate = 8.192e6

# Configure RX channel
sdr.rx_enabled_channels = [0]
sdr.rx_lo = 437000000
sdr.rx_rf_bandwidth = 2000000

# configure TX channel
sdr.tx_enabled_channels = [0]
sdr.tx_lo = 1280000000
sdr.tx_rf_bandwidth = 2000000
sdr.tx_cyclic_buffer = True

# Mute TX on power up
sdr.tx_hardwaregain_chan0 = -60

# Use RF loop back mode
sdr.loopback = 2

# AGC
sdr.gain_control_mode = 'slow_attack'

# TX on (-60 to 0 dB)
sdr.tx_hardwaregain_chan0 = -10

while True:
print(' ')
stop = input('Return to Exit')
sdr.tx_hardwaregain_chan0 = -60
break
```

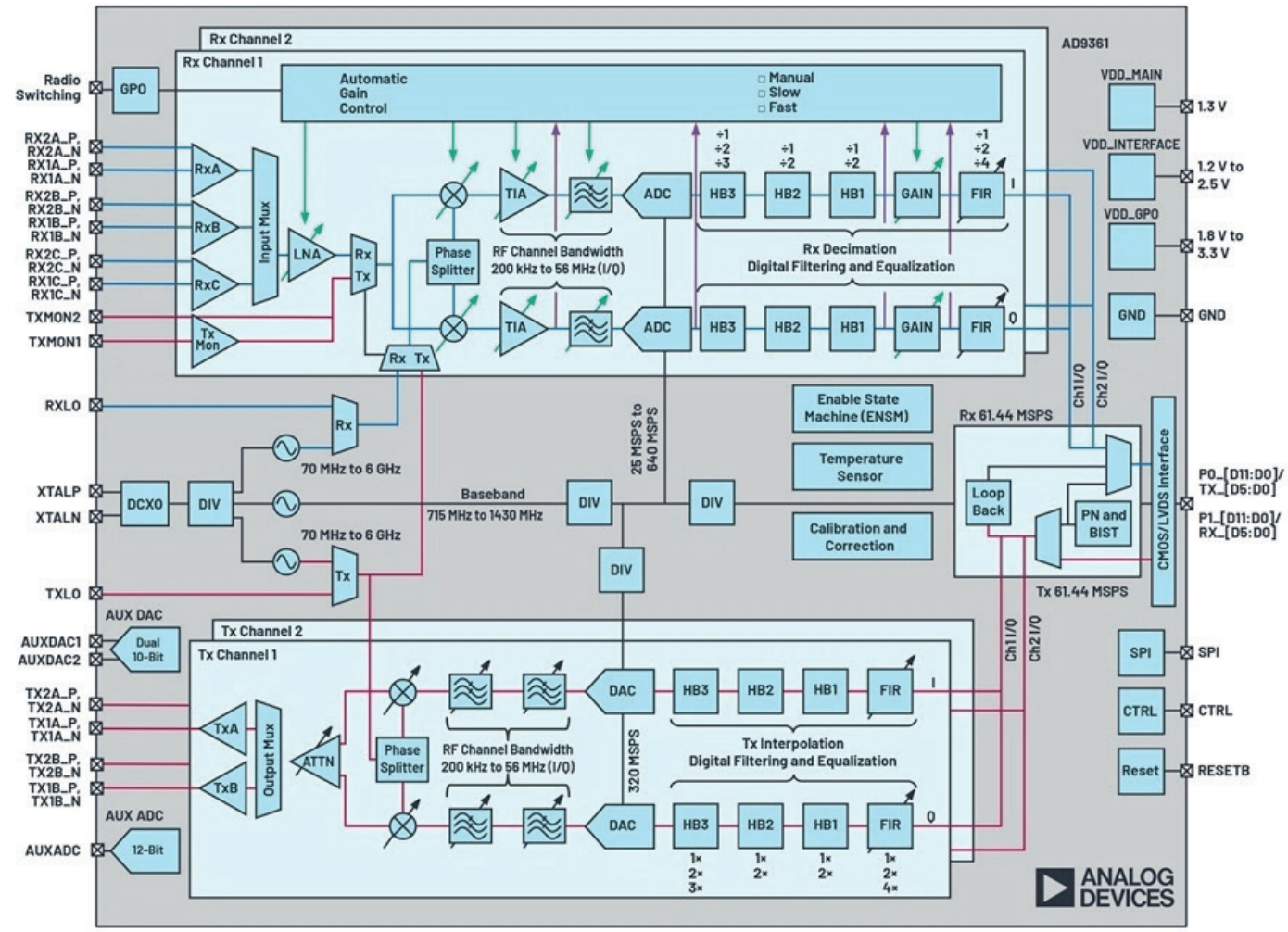
This simple prototype has been tested with success on the bench and in real conditions in the Lake Geneva area with DVB-S, DVB-S2 and DVB-T transmissions.

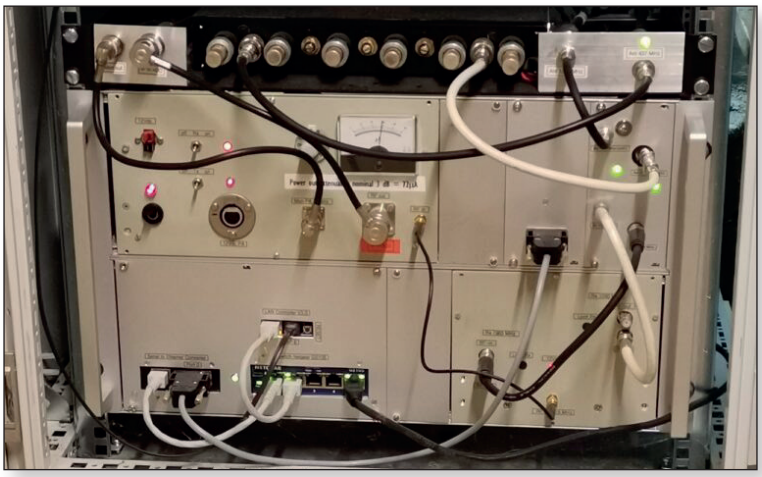
Its use is not only limited to a DATV transponder. It can also be useful as an up and down converter in front of a DVB-S/S2, DVB-T tuner or a spectrum analyzer.

We are sure that this demonstrator will foster interest in these new technologies and approaches for our DATV repeaters. Please share your experiences with us and the ATV community.

References:

- PySDR: A Guide to SDR and DSP using Python
  https://pysdr.org/
- Analog Devices Hardware Python Interfaces
  https://analogdevicesinc.github.io/pyadi-iio/
- AD9363 RF Agile Transceiver
  https://www.analog.com/media/en/technical-documentation/data-sheets/AD9363.pdf

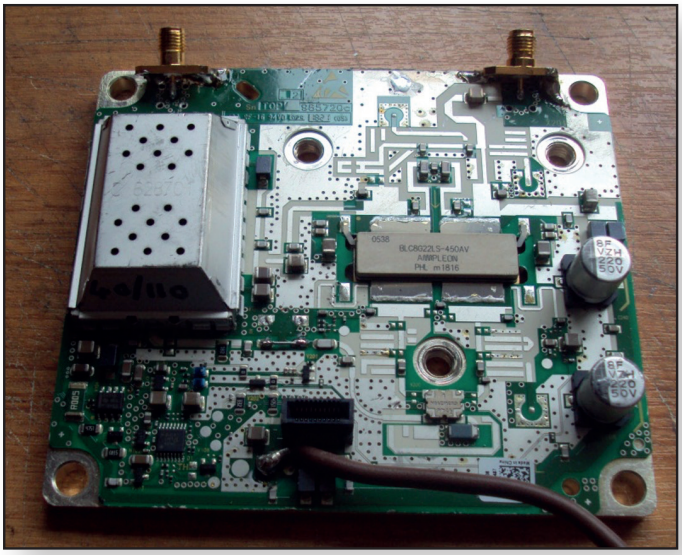




HB9TV powered by arald

Modifications to Nokia single transistor pallet for 2.4GHz

Jim Smith G7NTG

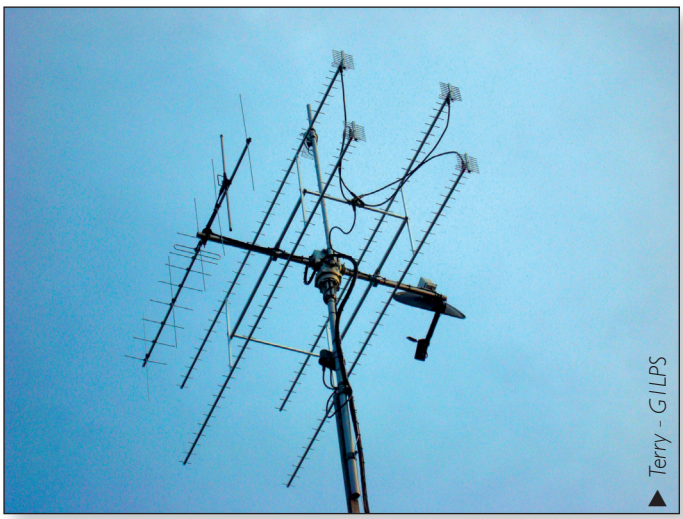


There are a few of these pallets available on Ebay from bisonelectronics-sp2iyr at a reasonable price, and, although they are intended for 2.1 GHz, they work fine at 13cms with 100W or more possible at 2.32GHz.

As they stand , these pallets average around 30 watts max output at 2.4GHz but with simple modifications they can be improved to give 70 – 90 watts.

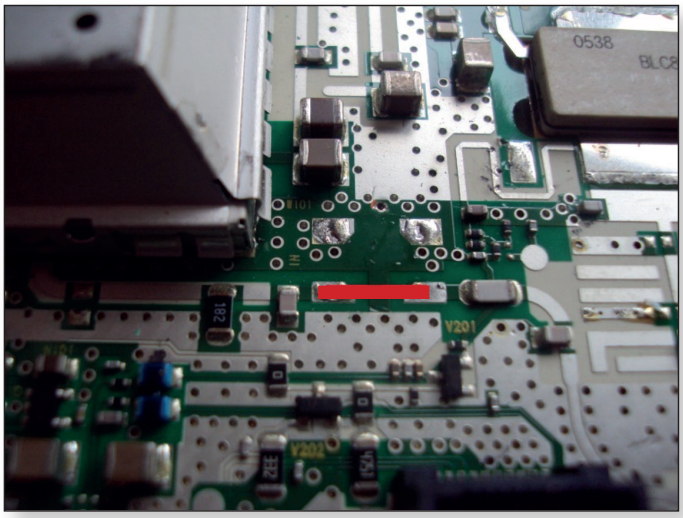
First heat them on a hotplate and remove the input and output connectors and also the interstage filter or circulator (not sure which it is but the output is improved by removal and bypassing).

If you don't have a hotplate then mount them in a vice on a piece of copper so that they don't move and heat them from underneath with a blowlamp and the items can be lifted off carefully with tweezers or pliers. Don't knock the PCB during the process or everything will come off!

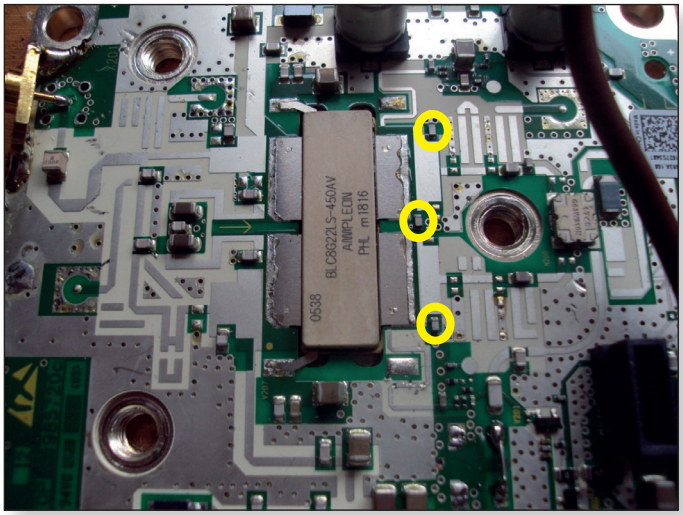


▲ *Terry - G1LPS*

The input and output connectors can be replaced with SMA sockets soldered at an angle with a big, hot soldering iron. My soldering iron is a Weller 200 watt temp controlled. The in and out pads of the removed filter are linked with a short length of wire such as a component wire offcut shown in red.



Three capacitors are then removed (ringed in yellow).



Power is connected as shown in the first picture.

The pallet can then be bolted down to a LARGE heatsink and tested

Typical output 80W (sat) for 200mW input at 16 amps , 28 volts

P1dB is about 50-60 watts at around 28dB gain and 9 amps at 28 volts.

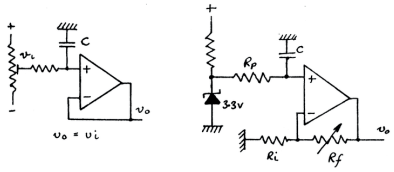
Turning Back the Pages

A dip into the archives of CQ-TV, looking at the issue of 47½ years ago

Peter Delaney - G8KZG

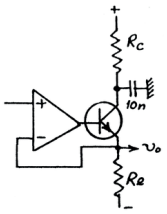
CQ-TV 86

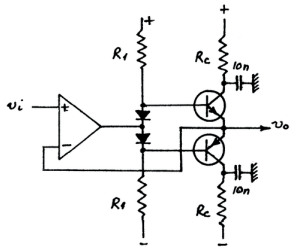
Although Arthur Critchley had completed his set of articles on logic circuits, his integrated circuits tutorials continued in CQTV 86, which appeared in May 1974, with more on operational amplifiers ('op-amps'). As with the logic circuits, it was not necessary to know the details of what was inside, just that it was a high-gain amplifier with inverting and non-inverting inputs. They could be configured to perform a variety of functions by applying the appropriate feedback from the output to the (usually inverting) input.



The first example was a voltage source. In the version on the left, the feedback arrangement ensured unity gain. The voltage selected by the variable resistor at the non-inverting (+) input would appear at the output, but with minimal loading on the resistor chain. The alternative voltage source on the right worked by having a reference voltage set by the zener diode at the non-inverting input - a 3.3 volt device being chosen as its temperature coefficient was virtually zero. This gave a very stable output voltage, the value of which being set by the fraction of it that was fed back to the inverting input (-) of the op-amp.

An op-amp, however, only had a very limited output current capability. That could be increased by adding an emitter follower transistor stage, but the transistor's base-emitter voltage drop would affect the voltage seen at the output. By including the transistor within the op-amp feedback loop, the problem was minimised (by the gain factor of the op-amp). A resistor was added at the transistor's collector to limit the current to a safe level.





However, this did not cope with output signals with a relatively large voltage swing, or if it crossed the 0V point, for which a complementary pair of transistors was needed.

The feedback was again taken from the output point, and all of the emitter current flowed through the load - such as a set of television scan coils.

Arthur also used this part of the series to explain the (now standard) use of op-amps as inverting or non-inverting amplifiers, and how to obtain the frequency response (within the limits of the particular device) required.

Grant Dixon followed up his article about the slow scan standard frequencies in the previous issue with a pattern generator. The first problem was that the timings to be derived from the sync pulse 1200 Hz signal were different in Britain and the USA (it being desirable to scan at a rate related to the mains supply frequency of 50Hz and 60 Hz respectively).

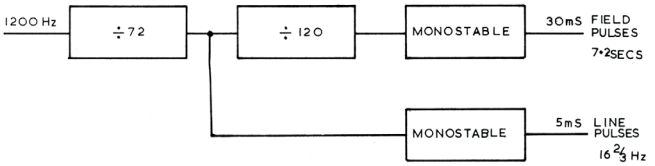


FIG. 3 BRITISH STANDARDS

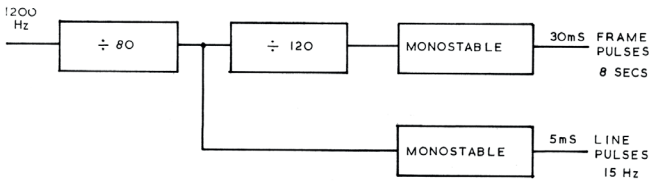


FIG. 4. U.S.A. STANDARDS

By gating together the standard frequencies, an all black screen or an all white screen, with sync pulses, could be produced.

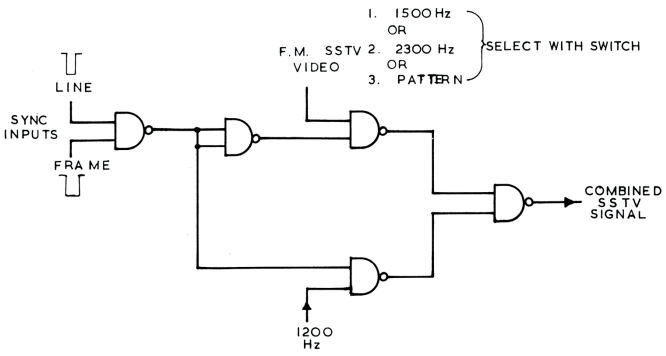


FIG.5. CIRCUIT TO GIVE MIXED SYNC & VIDEO. (ALL GATES ¼ 7400)

Arthur Critchley had suggested a method to choose between the British or American standards "at the flick of a switch" (SSTV being a mode transmitted on the short wave bands, so trans-Atlantic exchanges were not unusual). The 7490 counter (top left) could be set to divide by 9 or by 10, and when followed by the divide by 8 stage, gave either an overall ratio of 72 or 80, as needed.

The series of counters along the bottom of the diagram counted out 120 lines to produce the frame signal.

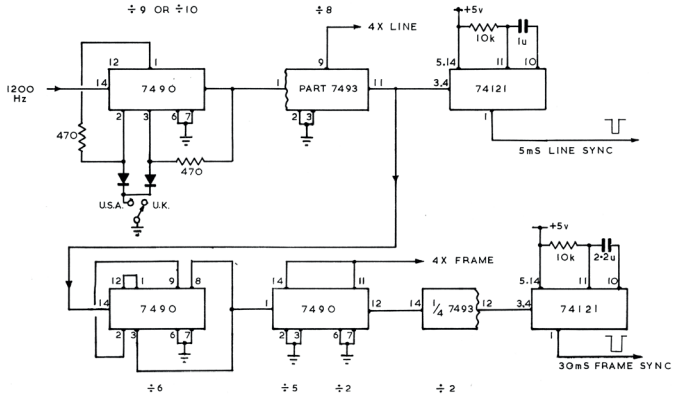


FIG. 6. CIRCUIT TO GIVE LINE & FRAME PULSES WITH CHOICE OF STANDARD.

By using the 4 x line and 4 x frame signals, and their inverted forms, they could be gating to produce a chequerboard pattern (selected at A in the diagram), with spare logic gates producing alternative patterns at B and C (these Grant described as 'not so interesting'!). The logic then selected either the 2300 Hz or 1500 Hz tone as appropriate for the white and black sections, with the output having the sync signal added as in fig 5.

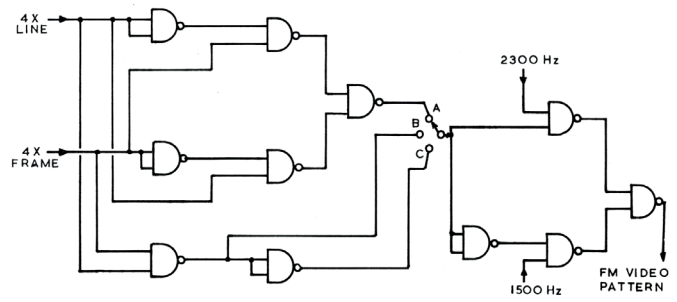
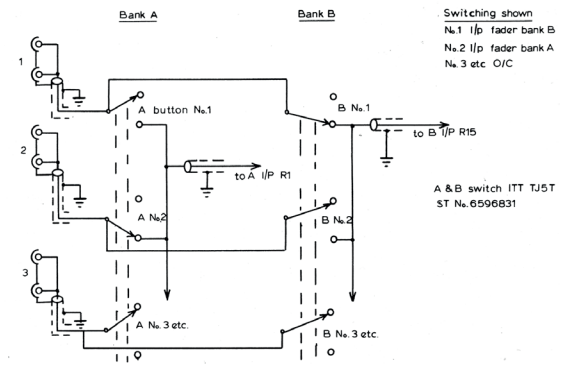
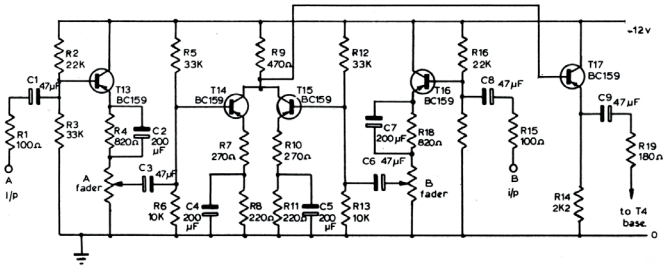


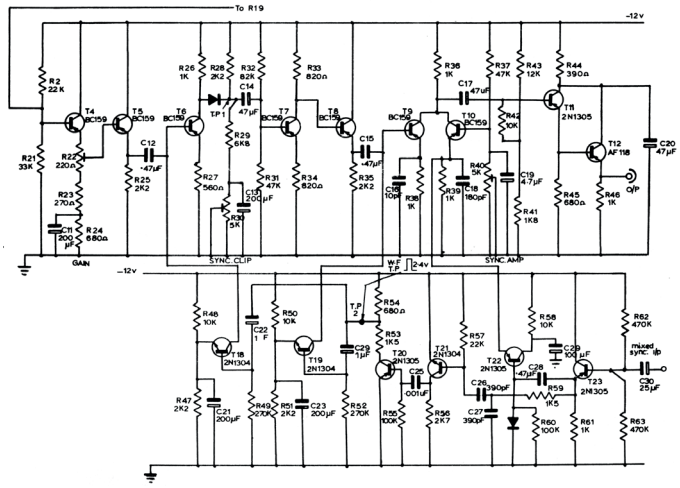
FIG. 7. CIRCUIT TO GIVE CHEQUERBOARD PATTERN ETC. (ALL GATES 1/4 7400)

For use with fast scan television, Harold Skegg described a vision mixer. This used the A / B bank principle, in which any of the inputs (just 3 being shown on the diagram) could be selected to either bank A or to bank B, or neither. The output from the switch banks were then sent to the mixer circuit itself at R1 and R15 respectively.



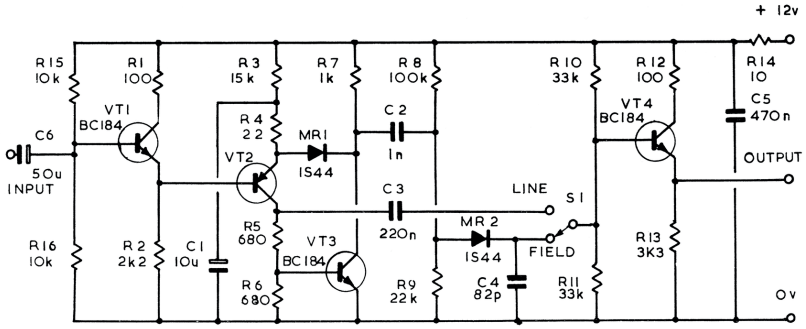


Each input was matched by an emitter follower stage to the fader resistor - Harold recommending special faders made by Penny and Giles for professional use. From the fader, each channel had a unity gain amplifier, there being a common collector resistor for the two banks where the signals combined, to a common emitter output stage.

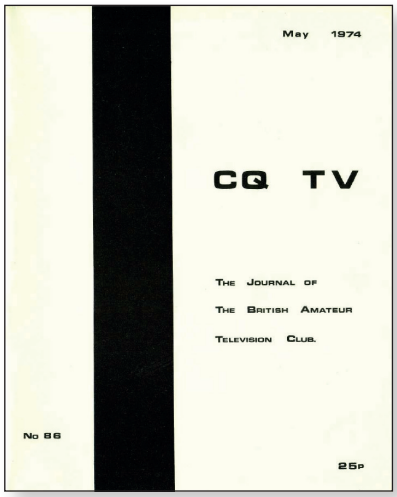


The rest of the circuit comprised a processing amplifier. The mixed video signal first passed to T4, where the gain was set, and then to an emitter follower, to create a low impedance point. This enabled a clamping pulse to be fed in at this point, which grounded the video signal and so removed the sync pulses that had passed through the faders. The lower part of the circuit took in mixed sync pulses (right) and produced the clamping pulses, as well as allowing clean sync pulses of the correct amplitude to be then added at T10, followed by an output amplifier to deliver the standard 1V signal across 75 Ω.

A rather simpler, but nevertheless useful, circuit appeared in the Circuit Notebook column. This was designed to extract the timing information from a composite video signal, either at line or field rate, to trigger an oscilloscope so that a stable display could be obtained of the waveform.



News from members included several who were experimenting with the slow scan mode, using a design for a monitor that G3RHI had included in a separate booklet published by the Club. There was also a report on the activities of the Gwent TV Group, in South Wales. The local terrain made communication between the stations difficult, as the best signal paths were north-south, and even with stations 700 feet above sea level, they could not make exchanges into the neighbouring valleys. Construction of pulse generators, cameras and video processing amplifiers was under way by some of the members of the group using circuits from – you've guessed it! – CQTV of course!



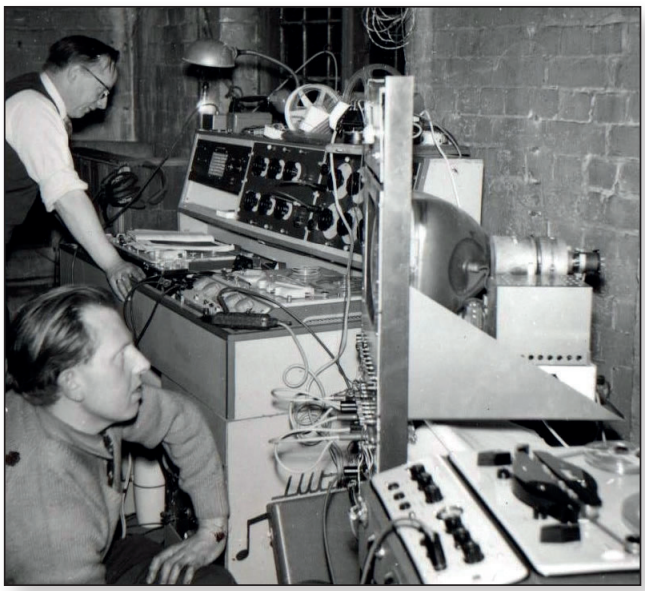
▶ *The cover of CQ-TV 86... things have come a long way since 1974!*

In memoriam

It is with sadness I have to report the deaths of past committee members.

Alan Pratt Died on the 26 November 2021. He was the BATC treasurer from 1970 to 1979 and was part of the Lincolnshire ATV group along with Alan Watson, Joe Rose and Brian Summers. All served on the BATC committee.

Committee member Clive Reynolds represented the BATC at Alan's funeral which was held at St. Johns church, Brigg.



▶ *Alan Watson, foreground, and Alan Pratt to the rear during a production of Opera at the Brigg Corn Exchange – 1959-62.*

John Everest Tanner died on the 3 November after a short illness. John served on the BATC committee from 1958 to 1964, first as Editor and then as Secretary. John's television call sign was G3NDT/T.

▶ *John Everest Tanner, G3NDT/T and Dave Mann (with camera) G3OUO/T. Photo credit RADARC*

John had an apprenticeship with Marconi before he joined the BBC and was heavily involved with the colour experimental team. He then founded Link Electronics, latterly of Andover, with David Mann. John was very well known in the professional TV world and many of members of the BATC may recognise him.

The British Amateur Television Club

Out and About

Rallies and events with a BATC stand: (subject to change)

24 April Norbreck Rally, Blackpool – BATC Stand

22 May Dunstable Downs – BATC Stand

19 June Harwell Microwave Round Table – Possible BATC Stand

24 – 25 June Friedrichshafen – BATC Lectures

26 June Newbury – Possible BATC Stand

17 July McMichael (Reading) - Possible BATC Stand

7 August – BATC CAT 22 at Coventry

14 August Flight Refuelling Hamfest Wimborne – Possible BATC Stand

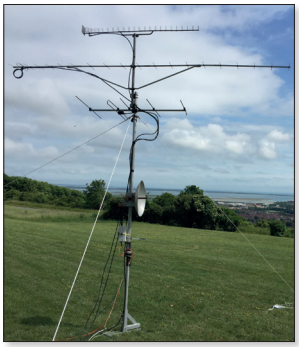
14/15 October Lincoln Hamfest – Possible BATC Stand

3 December Midland Microwave Round Table – BATC Stand

The most up to date status can be found on this RSGB web page: *https://rsgb.org/main/news/rallies/*

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

Activity Weekends & Contests



2022 Activity Days:

9th & 10th April 2022	*70cms + 23cms*
14th & 15th May 2022	*2m & down + 23cms*
11th & 12th June 2022	*IARU Region 1 ATV Contest*
9th & 10th July 2022	*23cms & up*
13th & 14th August 2022	*70cms + 23cms*
10th & 11th Sept 2022	*2m & down + 23cms*
8th & 9th October 2022	*23cms & up*
12th & 13th Nov 2022	*70cms + 23cms*
10th & 11th December	*2m & down + 23cms*

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