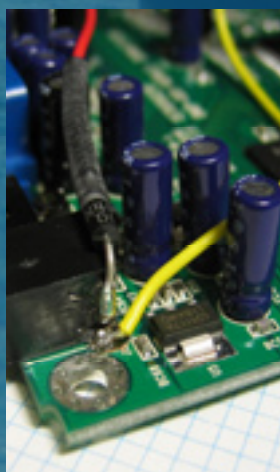


CQ-TV

Issue 233 May 2011



**NEW! FM ATV RECEIVER
ACTIVITY DAY
CAMERA CHOICE
3D TV - IN ACTION!
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MODIFYING THE EMPREX BMP-001
DATV IN NEW ZEALAND
FRARS OPEN DAY**

ISSN 1466-6790



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Caption Contest

Here are some of the entries for last issues picture (shown below):

"I look up to him, but down to him"
With apologies to the two Ronnie's.
John Cronk, GW3MEO.

"No the floor noise can;t be that high"
Harold G8BPU

"Well we 'ad a green screen, loike, but
it only come up to abaht 'ere - so we put
the yellor one aht instead"
de Terry Maton, G4GHU

"OK guys, the audio subcarrier oscillator
is broken so we will need to resort to
using sign language like this...."
Jason Haywood G7KPM

...and the winner is John GW3MEO
Congratulations, a caption generator
will be on its way shortly.

This months photo is below, comments
please to: editor@batc.org.uk



Contents

3D in Action.....	22
Advertising Rates.....	4
An Alternative 6MHz Audio Sub-carrier	14
A Quick and Dirty LNB Mod.....	21
A Trip to Holland.....	12
ATV Activity Day	34
ATV in Argentina.....	13
Bands: going, going, gone !.....	13
Camera Choice: Broadcast or Industrial?.....	10
Caption Contest.....	2
Chairmans Column	6
Circuit Notebook 107	7
Committee Contacts.....	4
Contents	3
Contest News	31
Deadlines.....	4
Digital ATV (DATV) in New Zealand.....	16
Editors Preamble.....	5
FRARS Science & Engineering Open Day	19
Help Wanted.....	15
Internet help	32
Letters to the Editor	30
MKII 24cms FM ATV Receiver	25
Project Vivat! Update.....	28
Pye built MCR 20 as supplied to BBC Wales	35
Recording the past for the future	20
The BATC Shop.....	36
Turning back the pages.....	37
TVA 159	29

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Advertising Rates

Size	Mono	Colour
Quarter page	£45	£75
Half page	£90	£125
Full page	£150	£200

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If you would like to advertise in CQ-TV, then please contact our advertising manager: Trevor Brown, 14 Stairfoot Close, Adel, Leeds, LS16 8JR, England. Telephone: +44 (0) 1132 670115.

Email: adman@batc.org.uk

Deadlines

CQ-TV is published quarterly in February, May, August and November each year. The deadlines for each issue are as follows: -

February	-	please submit by	December	31st
May	-	please submit by	March	31st
August	-	please submit by	June	30th
November	-	please submit by	September	30th

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

Editors Preamble

Welcome to CQ-TV 233 the May issue (not the February issue), we decided to miss out the February issue because there was simply not enough content to put a full magazine together. I hope the wait was worth it.

I have been working on the backend software for the clubs website. We are moving towards a fully automated online system for renewing subscriptions and paying for membership, I am hoping to have this all fully up and running by the next issue.

As a first step towards this, members are now able to login and view/edit their own details held on the club database, just browse to:

<https://www.batc.org.uk/members/>

The system uses the same username and password as the streamer site, so if you have a login on www.batc.tv it will work here as well. If you don't have a login, simply click on the word "Register" in the left hand menu, a new page will

appear asking you for some details so that we can confirm your identity and membership status. The most important fields are your email address, name and membership number, if the name and membership number do not match what we hold on record you will not be issued with a login.

Once you have completed the form, click the "Send" button at the bottom and an email will be sent to the address you entered. You MUST read this email and click on the link it contains to confirm your email address. This is an anti-spam measure and is an important part of the registration process, so please bear with us. If you do not receive the email within an hour, then please check your anti-spam quarantine folder as it may have ended up in there.

It also helps if, before you complete the form, you add the domain "batc.org.uk" and/or the email address "info@batc.org.uk" to your "safe senders list" or "whitelist" in your email client. Once you have confirmed your email address

by clicking on the link, you will receive another email confirming your login details. The system will generate a random password, please use this to login and change your password to something more memorable, please make sure the password you choose is secure to protect your personal data.

For your peace of mind, the system itself is very secure, both physically and virtually! You will have noticed that the interface uses SSL (https) so all your data is fully encrypted between our server and your browser. Your password is stored encrypted as well, this means the system is more secure as no-one (not even us) can view your password, however if you forget your password the only way out is to have the system reset your password with a new, random one. You can do this from the link on the login page.

So please take the time to login and check/update your personal details. Any questions, don't hesitate to drop me an email.

73 de Chris G1FEF



We have produced a DVD containing electronic versions of CQ-TV and the CQ-TV articles index. Also included are electronic versions of our three most recent handbooks, 'Slow Scan Television Explained', 'Amateur Television Handbook' and 'An Introduction to Amateur Television' as well as the Lighting eBook.

The archive contains all past issues of CQ-TV and is updated 4 times a year, to include the current issue of CQ-TV.

The DVD is playable in a PC and the data files will 'auto-run' when the DVD is inserted.

The video section was prepared by Brian Kelly and contains videos from Bletchley Park 1999, one from Shuttleworth 2002 and one from 2004. The DVD is available to members for just £5 inc. postage to the UK and EEC. Note that these videos have been made with the H.264 codec and so you will need suitable software to view them.

http://www.batc.org.uk/club_stuff/pubs.html

Note: This DVD is supplied on +R media only.

Chairmans Column

Sorry to disappoint the streamer viewers by not streaming the RSGB AGM this year. The RSGB and BATC have worked together over the last couple of years to webstream the Society's AGM via live video. We again offered the facility this year, but the RSGB has considered its position and has reluctantly taken the decision that this year it would not be prudent to go ahead with live streaming. We have accepted the Society's position on this but hope to be able to offer the Society the facility again in 2012.

One event that We did stream was the Flight Refueling Amateur Radio Society contribution to science week organised by John Bales. These events are popular and we need more of them. The mobile streaming kit is still available should anyone want to borrow it to stream an event. The event will need advanced approval by the club committee, but it is unlikely we would refuse an event.

On the inside rear cover is a picture of a home brew 24 cms ATV RX that uses a pre aligned module for the front end and is complete with a digital frequency readout developed by Grant ZL1WTT, we are supporting this constructional project with a bare bones kit of front end module, both PCB's, a pre programmed micro processor and digital display. The kits were imported from New Zealand and attracted a duty payment, so at this point we have left you to source the capacitors, resistors and semiconductors yourself from a local source. If the kits prove popular then we may be able to arrange for full kits to be stocked by the club.

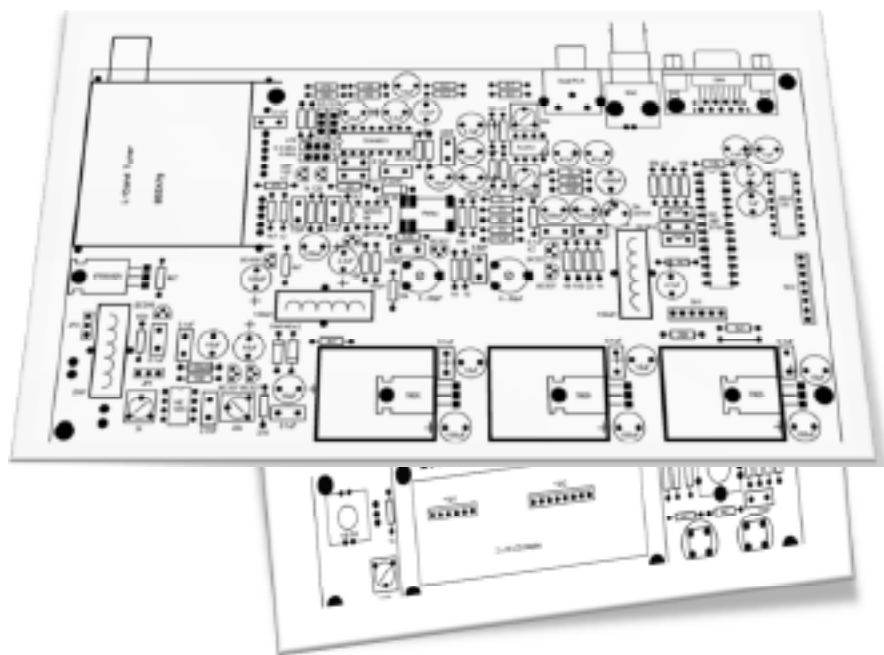
The kit is part of revamp by the club of what used to be members services and will now become The BATC Shop.

We are also producing a new look BATC badge, with a more modern look than the older diamond badges which were not selling too well. We are actively looking for new products to add to the store and it will eventually be available online at <http://www.batc.org.uk/shop> it just takes time to revise and integrate the software for this task.

In the interim period pleasem contact me to purchase the RX kits and the badges.

Trevor Brown
BATC Chairperson

Basic kit for the 24CMs Receiver:
Set of pre drilled and tinned PCB's, Pre programmed Micro Controller,
Digital display, Front end module



£99 including UK postage. Overseas please add £5

New style BATC camera shaped pin badge



**£2.99 Including UK postage.
Overseas please add £1**

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Visit: <http://www.batc.org.uk> for details

Circuit Notebook 107

by John Lawrence GW3JGA

Modifying the EMPREX Digital Media Box BMP-001

The EMPREX BMP-001, shown in Fig.1, is a cracking little box. It will accept either an SD card or a memory stick containing your videos, pictures, test cards etc and output (through phono connectors) composite video, L&R sound. A VGA output is also provided

The internal clock/calendar can be set, as can the video brightness, contrast, hue etc by using a remote control (supplied). NTSC or PAL operation can also be selected.

My interest was to use the Box as a source of test cards and captions independent of a PC and to power it from 12V. To test it out, I downloaded some test cards from Google, (enter 'test cards') and copied them to an SD card. I plugged this into the Emprex and connected its plug-top power supply.



Figure 1

Initial Testing

The video output was connected to a normal colour monitor. The parameters for the SD card were set up using the on-screen menu. The results were fine (1V p-p) providing the output was not terminated. But, when terminated in 75R it dropped to 0.6V p-p. This indicated a low output voltage and an output impedance of around 35R.

The BMP-001 requires a 5V supply of 500mA and this is normally provided by a switch-mode plug-top power

supply. But, for portable operation from 12/13.8V a 5V regulator would be required.

Modifications

To overcome these two shortcomings, I decided to replace the video output stages with two video op-amps and to install the required voltage regulator. In fact, I fitted two regulators, a 5V one for the existing circuits and a 9V one to feed the proposed video amplifiers. The 5V regulator would have to dissipate a lot of heat. $13.8V - 5V = 8.8V \times 0.5A$

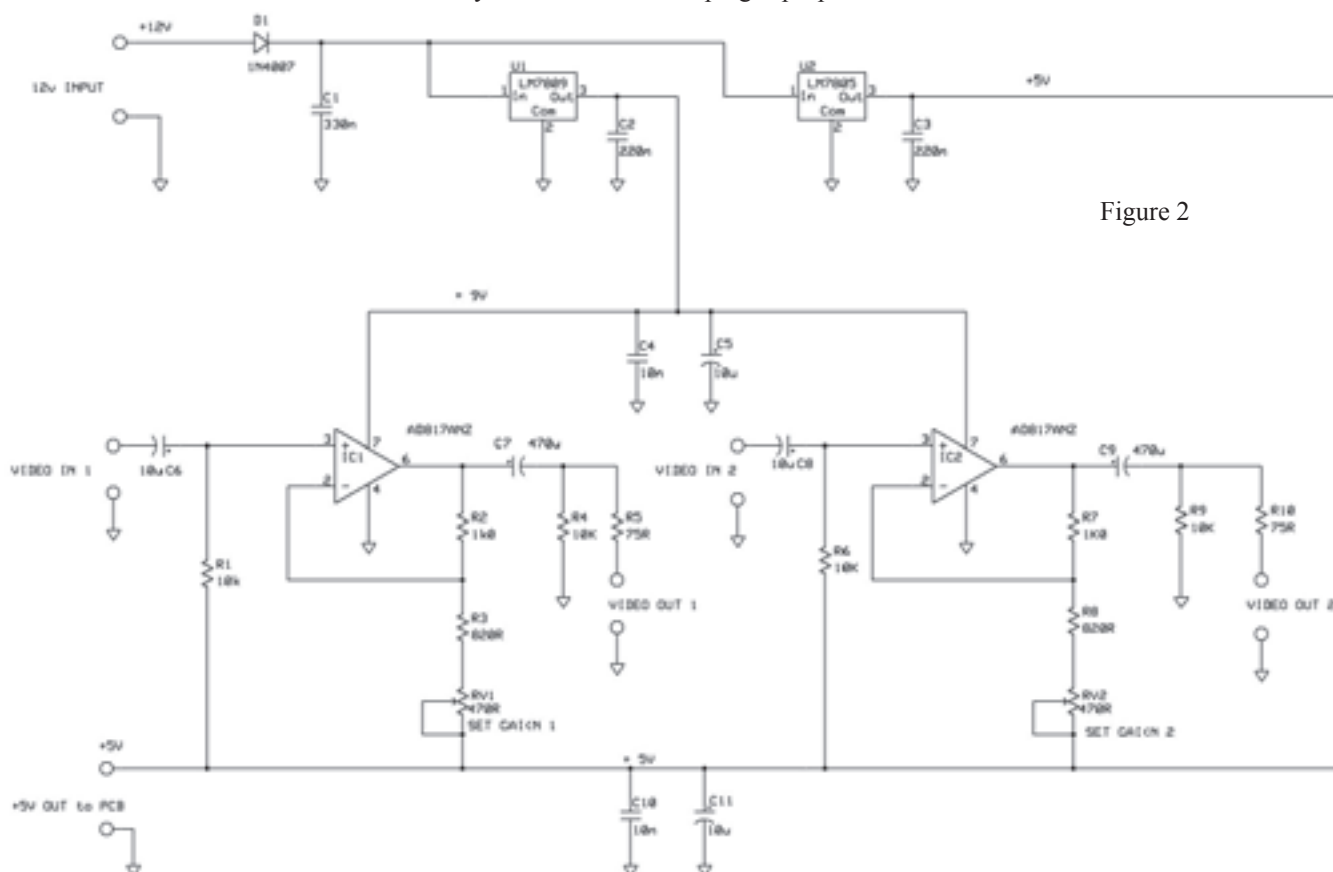


Figure 2

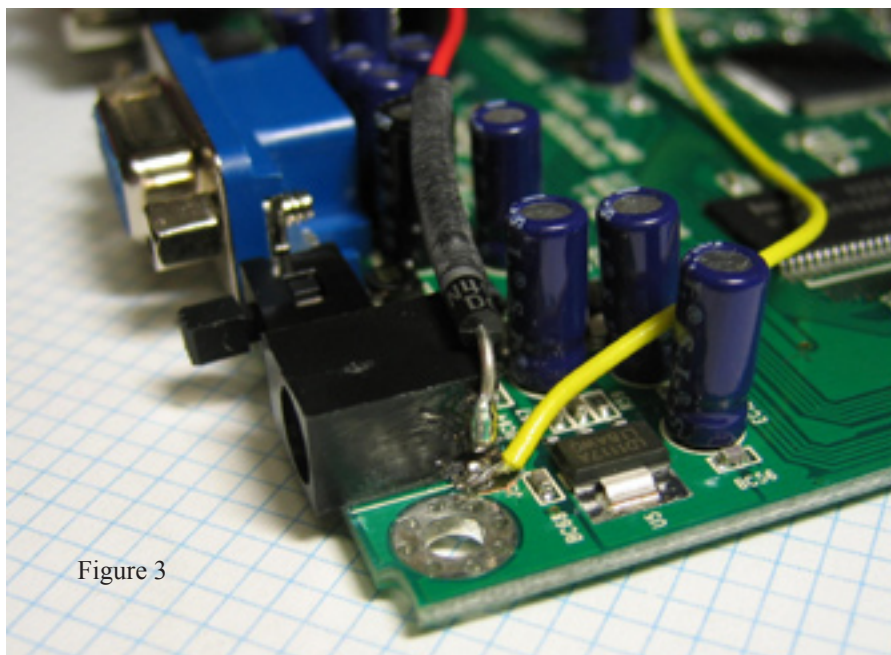


Figure 3

= 4.4Watts The Emprex box is plastic so a suitable aluminium heat sink would be needed. The one from my junk box was thermally larger than required but it fitted comfortably on top of the Emprex box. I fitted the two regulators on the underside of the heatsink, as shown in Fig.4 and wired them as shown in the circuit diagram, Fig.2.

I cut the live tag coming out of the power connector from the PC board, as shown in Fig.3 and wired this through D1 to the regulators. I took the 5V output from the regulator and connected it to the 5V input to the PC board. Using a variable power supply, I applied 12V to the input power connector and checked that the output voltages of +9V and +5 were correct. I find it prudent to use a variable power supply and monitor the 5V output whilst gradually increasing the input to 12V. If there is a problem then you can stop in time!

Dual video op-amp

I used two AD817AN video op-amps. I prefer EL2020 op-amps but these are no longer available. I laid out the circuit on Veroboard as shown in Fig.5 ('x' is a cut in the track, a 'blob' is a soldered joint). The components were loaded as shown in Fig.6. I connected the Veroboard panel according to the circuit and fitted it inside the box, as shown in Fig.7, taking care not to foul any of the existing components.

I cut the link between the 'video' output

socket and the PC board, also the 'Y' output socket from the PC board. I connected both inputs on the Veroboard to the video output on the PCB. This would feed video to both op-amps. I then connected the two video outputs from the Veroboard to the 'video' and 'Y' sockets respectively. This would provide a 'video' output from both the 'video' and the 'Y' sockets.

Final Testing

Using my 'test card' SD card, I powered up the box from 12V/13.8V. I connected a monitor, terminated in 75R, to each output in turn and adjusted the relevant RV1 or RV2 to provide a 1V p-p output. The rear of the completed Emprex box is shown in Fig.8.

Model No. BMP-001

Support picture format
Support video format
Support audio format
Support memory cards
Remote control
Interface
Output format
TV type
Power supply
Dimension

JPEG, BMP, GIF
Standard MPEG1/2, Xvid
MP3, WMA
SD, MMC, XD, MS, MS-Pro
Remote control
USB2.0 interface
RCA, Y Cb/Pb Cr/Pr, VGA
NTSC/ PAL
DC5V/1.5A
136.4 x 100.2 x 41.5mm

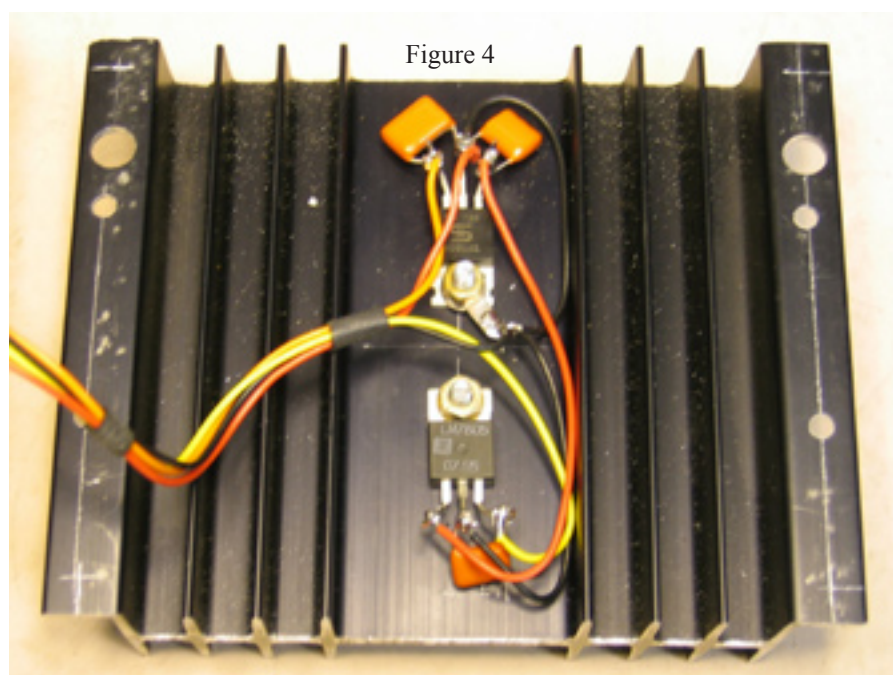


Figure 4

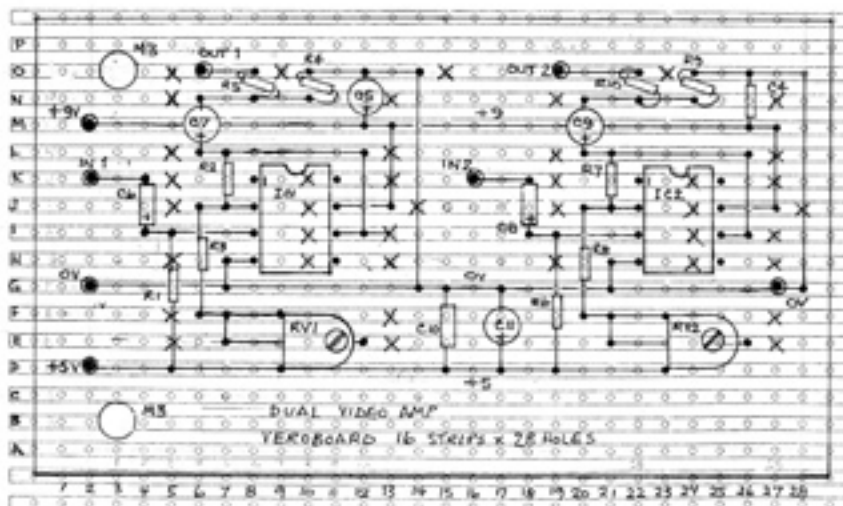


Figure 5

Thanks

My thanks to David, GW8PBX for his helpful advice on the project.

The Emprex BMP-001 is available new from Amazon at £23.99 www.amazon.co.uk/emprex or 'refurbished' from the Emprex eBay shop www.ebay.co.uk/emprex at £12.99 inc. postage. My refurbished unit looks immaculate and works extremely well.

Note: These modifications will result any warranty becoming void.

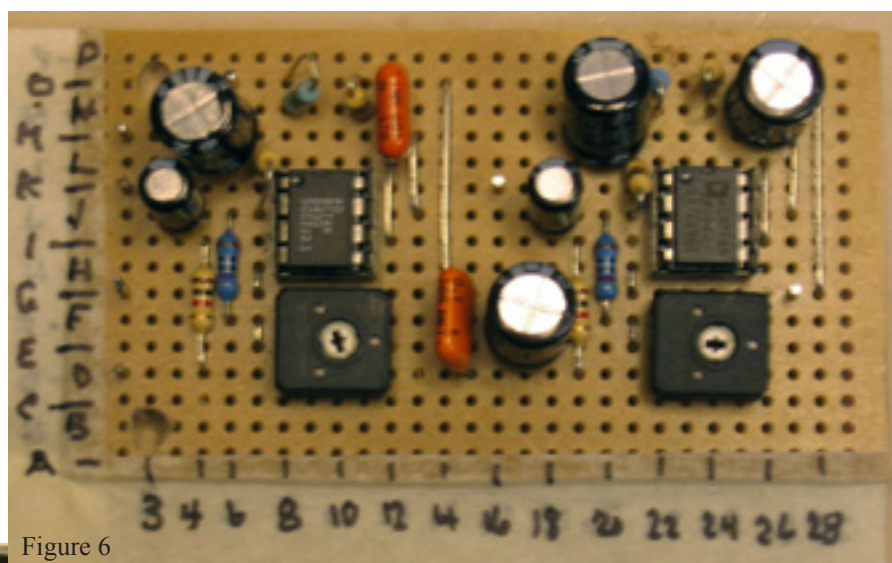


Figure 6

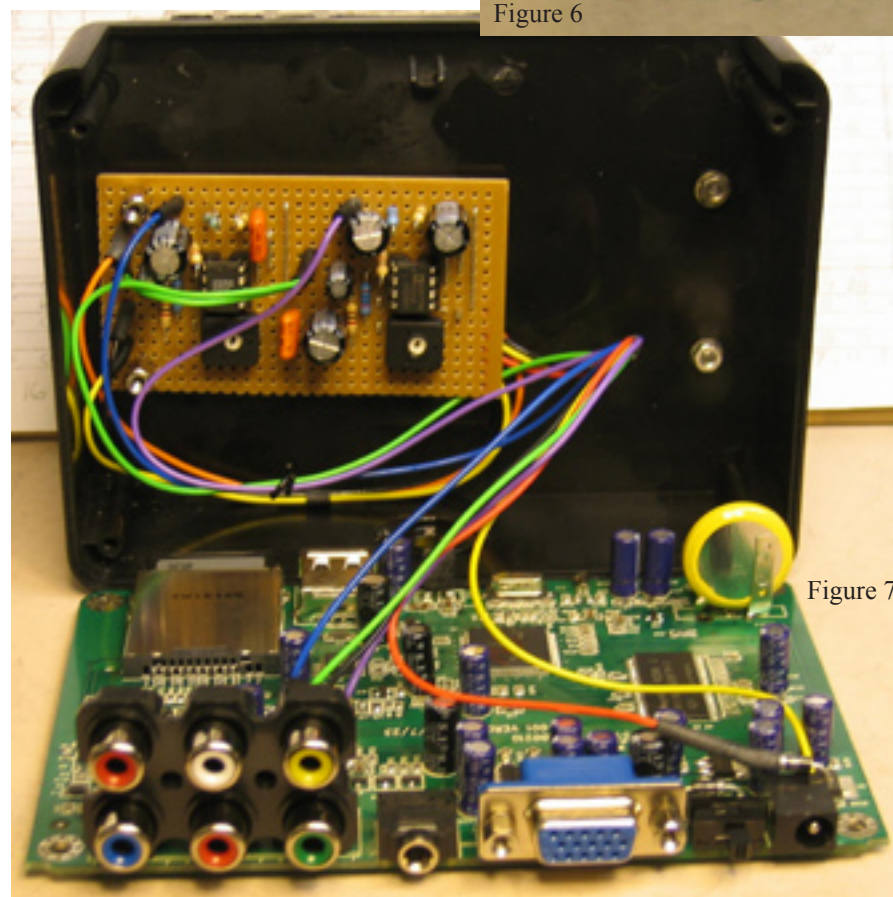


Figure 7

Figures

Fig. 1. Emprex BMP-001

Fig. 2. Modified Circuit Diagram

Fig. 3. Input Power Connector

Fig. 4. Heat-sink Wiring

Fig. 5. Veroboard Drawing

Fig. 6. Veroboard Panel

Fig. 7. Veroboard fitted in Box

Fig. 8. Rear view of Modified Emprex

Camera Choice: Broadcast or Industrial?

by Brian Summers

This issue I am taking a look at the Sony DXC-M3P camera. It is a sub broadcast camera aimed at the industrial and educational market. It is a “one piece” camera, light in weight and it sits comfortably on the shoulder. A multicore cable connects it to the companion VTR or to the PSU/CCU. It is a full stand alone camera so with the local battery box it could be used for radio working.

The Sony DXC-M3P

It uses 18mm. Saticon tubes and it has good sensitivity for a tube camera, and a low signal to noise ratio of 55dB. It works well in good room lighting and is not too noisy even with 9dB of gain switched in. There is also a good resolution of 650 lines in the picture

centre. The camera has a cue light on the viewfinder (switchable) and in the viewfinder eyepiece. An intercom is provided when used with the CCU. A microphone can be connected to the camera’s XLR socket for use with the VTR or routed through to the CCU.

The lens

The lens is one of the areas where economies have been made. The one on the review camera is made by Tamron, a nice clean lens but let down by the slow zoom servo and minimum focus distance of 1 metre. This is mitigated by a macro control on the lens body. There is no range extender. It has a standard “B4” mount for 18mm. tubes, but the “Hi-rose” connector to the camera body is smaller and has fewer pins than its broadcast brethren. The zoom range is 9 to 126mm again not as wide as you might wish for. A remote zoom demand control, type LO24ZS is available to mount on the pan bar for tripod use.

Website:

www.tvcameramuseum.org

E-mail:

secretary@batc.org.uk

In use

The DXC-M3 was not sold to the broadcast market, so a lot of the cameras had an easy life in industry or education. The review camera is “like new” hardly a mark on it. As it is a tube camera, it was quickly superseded by CCD cameras and I think that many of them spent a long time in cupboards, awaiting disposal. The usual caveats apply when buying one. You need to see it work and make sure you have all the needed parts. If you can get a service manual that would be a good idea, Sony manuals are exceptionally difficult to copy and the one for the DXC-M3 is no exception.



The camera

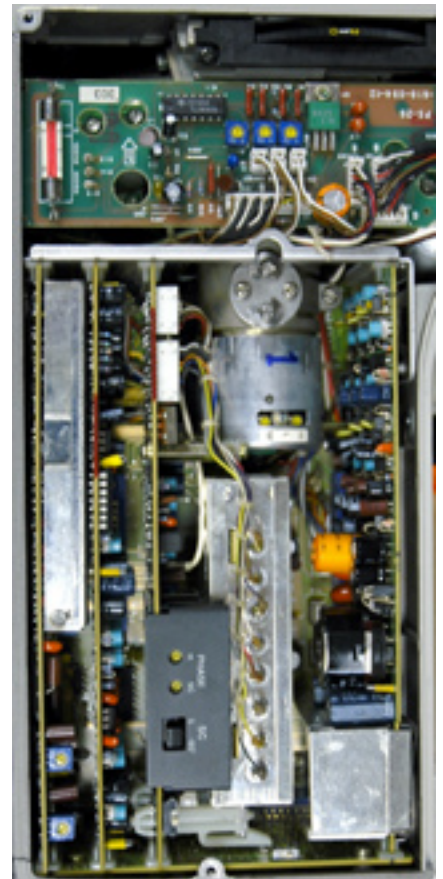
The DXC-M3 is a late model tube camera. Subsequent models started to use the CCD sensor. It has a useful range of features, like its broadcast brothers:

- Auto, Black, White, centering, and Iris.
- The viewfinder has a character display of camera status and rudimentary captioning ability for use with the associated VTR.
- A 14 pin camera cable connector goes to the portable u-matic VTR or to the CCU/PSU and supplies power in this mode.
- There are the usual controls, filter wheel, gain switch (0-9-18dB), colour bars/standby.
- The camera can be genlocked and phased with controls on the camera side.
- It has proper BNCs for output and genlock input and a 2 pin connector for external 12 volts at 16 watts.

Accessories

The flexibility of the camera is extended by a range of accessories.

- Large Viewfinder, DXF-40CE
- Battery adaptor, DC-7 for BP-60 battery
- AC Power adaptor, CMA-7CE
- CCU-M3P
- LC-M3 flight case
- Tripod adaptor (shoe), VCT-M3



Maintenance

This is another camera that is the best part of a quarter century old, but it is made by Sony and if it has been cared for it should be all right for some time to come. Most of the circuitry is on 4 horizontal plug in cards. The red object in the bottom right corner is an hour meter. The circuitry has the usual Sony complexity, but it is mainly analogue with OP amps and looks fairly fixable. The review camera has not gone wrong yet! (touch wood).

!!! Your Club Needs You !!!

If you do something, anything, related to ATV please drop your editor an email so it can appear in CQ-TV, if you can write an article about your latest project even better, you may even get paid !!

editor@batc.org.uk

A Trip to Holland

by Brian Summers G8GQS

I had planned a visit to some friends and by a cunning feat of timing I aligned it with the 35th. Dutch National Radio Fleamarket. Now there are reports elsewhere as to how big this radio rally is, they do not exaggerate, this is a BIG event! I joined the entry queue and paid my €7 to get in. There was a vast array of stalls over two floors, new, old, vintage, army it was all there, except perhaps for computers which were mostly absent.

The website for the event is www.radiovlooiemarkt.nl and there is a section in english with a floor plan, maps etc. English is widely spoken, I just spoke normally and was easily understood, possibly better than at home! I took the car and went via Euro Tunnel and drove up through France and Belgium on the motorways. It is an easy drive and easy to find being a major exhibition centre called "Autotron" on the A59 near Rosmalen.

It took me over two hours just to do a quick walk round followed by a more careful look at the stalls. There were a few stalls dealing with video, cameras and ATV. A lot of stalls had "green" army kit from all over Europe, I have never seen so many 19 sets in one place! One stall had a spectacular Tesla coil demonstration; the stallholder was drawing sparks a foot long from the top of the coil. He had a good crowd of spectators.

I also visited the Philips Historical Products Museum in Eindhoven see: - www.philipsmuseum eindhoven.nl This is modestly tucked away in a corner of an industrial estate and I spent an enjoyable couple of hours looking around. It features the whole range of Philips products, radio, TV, tape recorders, Hi-Fi & record players, Industrial & medical, a couple of transmitters and vintage microphones. There was a good selection of domestic video cameras on display along with a mid 1960s PC-60 colour camera and a pair of working LDk2s (possibly a LDH1 & LDH10) colour cameras.

Would I go again? Yes I would, I like a good rally, but it was a jolly expensive outing, Tunnel, hotel, fuel. It was only feasible if pleasure is combined with business. It might be much cheaper if part of an organised (club) trip.



ATV in Argentina

by Tony Capocetti, LU7DTS
and Marcelo Morasca, LU9ES

Back in 2008 several ham radio operators started talking about the possibility of introducing ATV, which was new in Argentina at that time. Current regulations in this country do not have many options for working ATV. This can only be done on 23 cm and higher frequency bands. UHF frequencies are not allowed to be used in Argentina.

There are several groups working hard toward ATV operation and repeater construction. These groups are at Campana, Saladillo and Tres Arroyos cities, all in the province of Buenos Aires, Argentina. By using Echolink, in particular the conference Argradio, we were able to contact other ATV operators around the world who help us in getting started this fascinating mode

The Campana experience

Campana team members are: Marcelo, LU9ES; Tony, LU7DTS and Beto, LU9DH. Since the beginning we realized that an ATV repeater was a must for us if we were to make amateur television QSOs, therefore the effort was aimed to install a 1.2 GHz repeater. The repeater was finally put

in operation on 5th of February 2010. At the beginning the effort was aimed to get transmitters and receivers capable to send and receive composite video in 1.2 GHz band. We found equipment like Comtech or similar video surveillance systems are ideal for the job. We needed help with aerials, colour bar generator, DTMF control, sync detector switching. Antonio, IK1HGI was, without doubt a tremendous help to us due to his invaluable ATV experience. He was and still is our counselor in helping us with aerials, circuits for colour bar generator, sync detector, not only for the repeater but also for ATV operator's station.

Future plans include an installation of a 10 GHz transmitter using the same input/output as the 1.2 GHz ATV repeater.

The details

If you are interested in details and pictures of our ATV repeater system, visit our site:

<http://www.atva.com.ar/repetidoras/campana.htm>

ATVA stands for Argentina Television Amateur, an association dedicated to ATV, which is still in the organization stage.

Worldwide access to Campana ATV repeater.

We have realized that we need to increase the numbers of ATV stations if we want more QSOs. In the meanwhile we have developed a World Wide access system to allow any authorised ham radio operator to access our ATV repeater with audio and image through Internet, using the Skype program. A DTMF control system was established to PTT the repeater and make contact with local ATV operators. An explanation on how the repeater can be accessed please visit http://www.atva.com.ar/streaming_en.htm We would like to thank BATC for streaming our repeater images with an excellent quality. A block diagram on how the Internet system works can be found on this site: http://www.atva.com.ar/skype_repe.htm

We found Internet a good way to let ATV operators around the world contact us. Only one operator at a time can access via Skype, his QSO partner must be local working ATV via RF, with his or her transmitter and receiver. We hope other ATV groups will follow the way we have set up this system, and look forward in seeing other ATV'ERS through our repeater.

Bands: Under Pressure!

As some of you may know I have been concerned of late that the 2.3GHz/13cm band, despite UK government use, will come under pressure for sale. This and other bands are listed for action in the coming years in the headline at:

http://www.culture.gov.uk/news/news_stories/8008.aspx

and the detail at

http://www.culture.gov.uk/images/publications/Spectrum_Release.pdf

The 2.3GHz band is in great commercial demand worldwide so its a trend that isn't going to go away. The band is also a key one for the ATV community, its relatively large bandwidths and its valuable repeater infrastructure. Thus I suggest you read carefully and carry on with the spectrum friendly DATV trend - that may be vital if the band starts shrinking around us. BATC and RSGB are considering their position

Meanwhile GB2RS has the news that Ofcom has formally requested

a temporary chunk of 70cms for the Olympics venues around London, Weymouth and South Essex from May until September 2012. Around those venues, activity in the band including the section area where DATV experiments occur is likely to be restricted. BATC participates in the RSGB Spectrum Forum which is handling this and watching for further Ofcom developments

Regards
Murray G6JYB, RSGB

An Alternative 6MHz Audio Sub-carrier

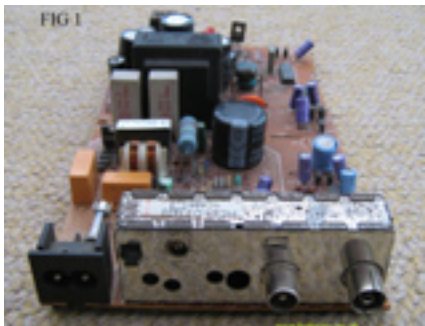
by Brian V Davies GW4KAZ

For a number of years, I have built ATV transmitters for 23 & 3 cms, however I have always had problems in building the 6 MHz sound subcarrier circuits. This article conveys my thoughts and the utilization of my ideas, and is written in this vein.

“Eureka” Moment

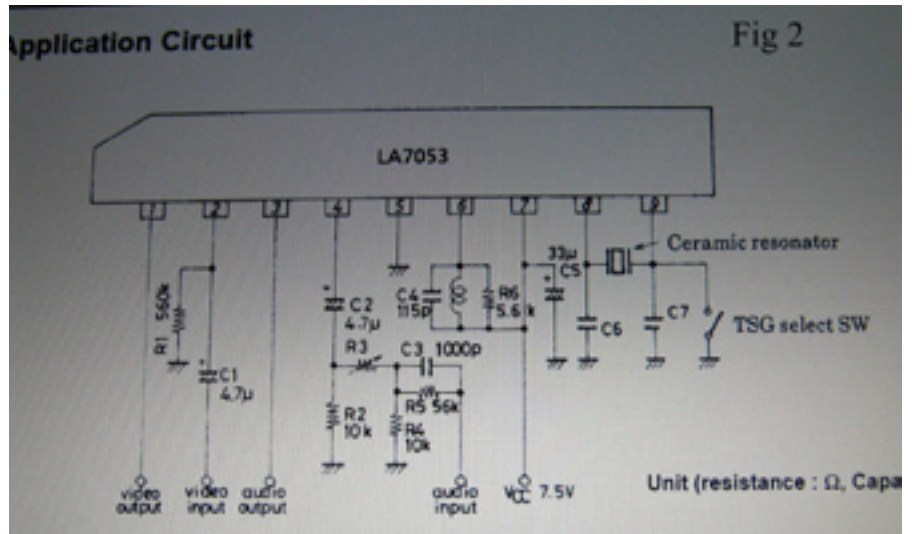
In search of a suitable solution to this problem I had a “Eureka” moment and thought that the sound subcarrier systems which were used in UHF modulators in VCRs, satellite receivers, etc might be suitable. I decided to look at the possibility of utilising these modulators.

In my workshop I had some faulty Pace analogue satellite receivers. I noted that there were two types of UHF modulator units used. Fig. 1 shows one type that I refer to in this article.



Having removed the units from the receiver PCB, I removed the outer casing to gain access to the circuit within. The units employed an IC as a video and sound modulator. I was not interested in the video side, so concentrated on the sound circuit.

First what was required was to find the IC's identification number, I had to remove the IC in one unit to find the number as the IC was an in-line configuration, so care was required in removing this IC and replacing it back onto the board. This was an LA7053. Fig. 2 shows a typical circuit diagram taken from the data sheet. I will concentrate on this IC.



(I have also used a CXA1433M); this IC has an onboard UHF oscillator, which simply needs to be disabled by removal of the oscillator components).

The LA7053 IC

The modulator unit has 2 sections, one contains the subcarrier circuit, the other the through antenna system. This second part can be removed, a simple job done by means of a junior hacksaw and cutting carefully along the internal screen on the antenna side of the unit, then cleaning along the edge of the PCB so that there are no shorts circuits on the PCB edge. (Fig. 3)



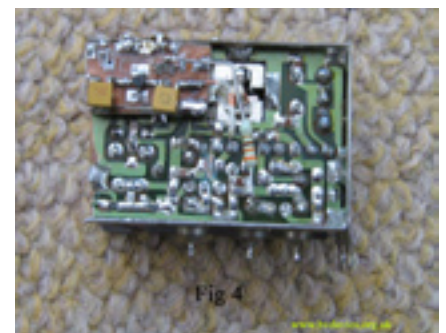
The LA7053 is an interesting and simple IC, as it has an onboard video test signal, plus some video processing. However, I have not taken advantage of these facilities at this time. Other's ICs are similar and with careful identification of the input and output circuits from the data sheets, I am sure they can also be utilised.

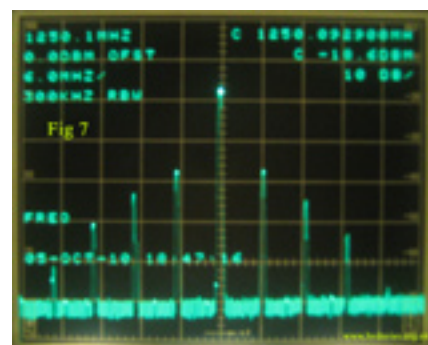
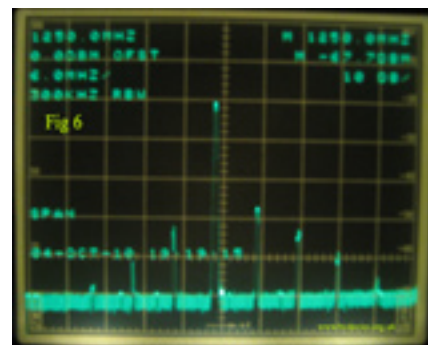
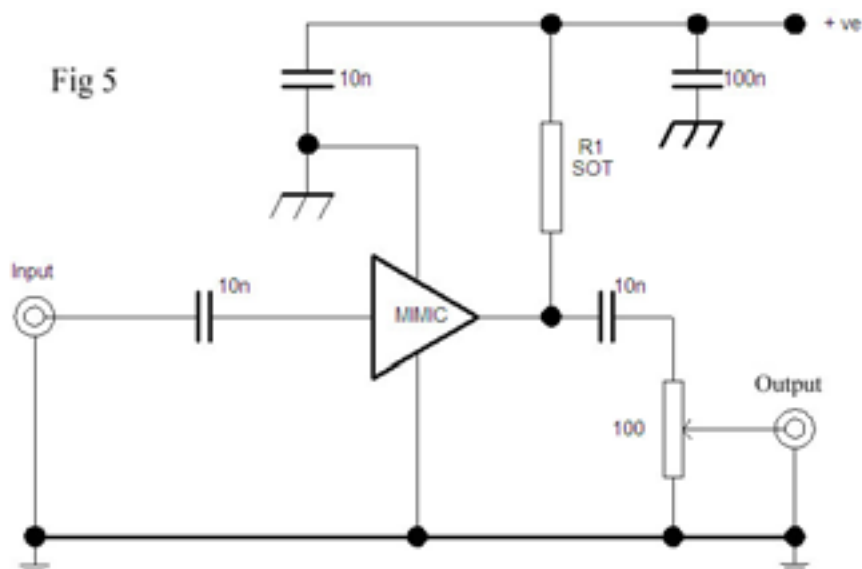
The audio input (pin 4) and output (pin 3) on the IC can be identified, also the supply +ve (pin 7) and 0V (pin 5) on the PCB (Fig. 2).

Usually the sound subcarrier is mixed with the video on the output stages; therefore disconnection of this video circuit is required by removal of components to isolate this circuit.

Sub-carrier Amplifier

I found that the 6 MHz sound subcarrier output (pin 3) from the IC did not have enough drive to modulate the transmitter to the required level of -18 dbc. To amplify this signal, I decided to use a MMIC, which was a simple answer to the problem. I inserted a 100ohm variable resistor in series with the output of the MMIC so that the amplitude of the subcarrier could be adjusted to the required level. Different MMICs require suitable supply current; in my case I used a surplus MMIC from an old blue cap LNB marked as an a08 or an MSA0886. I just cut the PCB of the blue-cap LNB around the MMIC added 10nF capacitors as input and output connections, plus a suitable dropper resistor to the required value. (Fig. 4 & 5)





Suitable circuit designs can be found in RSGB's RadCom February 1998 and in the latest RSGB Radiocommunications Handbook. Fig. 6 shows the output from the IC before amplification.

Please experiment with these ideas. As far as I am concerned, they were a simple answer to a problem. Good Luck!
www.bvdavies.org.uk

Microphone Amplifier

I found that direct connection of the mic to the IC was not sufficient to drive the 6 MHz sub-carrier to the required levels. To rectify this I built an audio amplifier utilising a 741 IC, this gave the audio gain required together with the facility to vary the audio levels as required. Suitable circuits were published in CQTV 194, Circuit Notebook by John GW3JGA.

The result of the completed project is shown on my spectrum analyser (Fig. 7), with excellent results and audio quality. Fig. 8 shows the completed 100mW 23 cms TX.



Help Wanted

I have recently acquired a Bosch TV-zoom lens. It is essentially a CCTV lens but looks quite good quality, it's certainly nicely made. My problem is that some kind soul has cut off the plug! There is the usual 4-pin auto iris plug, and what would be a 12-pin remote control for zoom and focus. The remote leads are multi-coloured, which might help. Can anyone help please with details of the remote control unit for this lens, or the connections etc?

LENS DETAILS:
Model LTC 3293/50.
12 - 240mm f1.6.
1/2" C-mount.

Any help would be most gratefully received.

Peter Lindsley G3UDV
01263 838335
cbmpublishing@aol.com



Digital ATV (DATV) in New Zealand

by Doug Ingham ZL2TAR

INTRODUCTION

Several members have asked for information on how our club went about selecting suitable transmission parameters, and what type of DATV equipment we use. Hopefully, the following notes will be of interest.

THE WELLINGTON VHF GROUP

First, let me introduce our local Amateur Radio club, The Wellington VHF Group Incorporated.

The club was formed over forty years ago, with the aim of popularising the VHF (and higher) bands. Prior to the club's formation individual, and informal groups of, New Zealand Amateurs had been experimenting with television for more than 20 years.

An analogue television repeater, having 70 cm input and output, was constructed in 1979. With the narrowing of the 70 cm band, the repeater output frequency moved to TV channel 39 (614 to 622 MHz), long before the start of commercial UHF broadcasts. Another change of repeater output frequency is expected in a few years time, but we intend keeping some of the repeater inputs on 70 cm.

Why 70 cm? In a word: topography.

Wellington, the capital city of New Zealand, features a sheltered harbour having some flat land, surrounded by hills of, up to, 450 metres (1500 feet) height. There are considerable propagation losses between some locations in Wellington and our ATV repeater on a 410 metre (1350 feet) hill, known locally as Belmont. Our self-supporting tower is a bit smaller than the guyed-mast at the Belmont UK transmitting site!

Propagation losses, over obstructed paths, increase with increasing frequency, hence our desire to use the lowest available input and output frequencies.

THE WELLINGTON DATV TEAM

The club is very fortunate in having members with a wide range of talents: professional broadcast engineers involved in the design, commissioning and operation of the Digital Satellite and Digital Terrestrial Freeview™ (New Zealand) transmission system; domestic video and audio equipment test engineers for Consumer Institute; Video, Audio, Data, RF and software experts; project managers, and an import/export agent.

VIDEO AND AUDIO QUALITY TESTS

Early in the DATV project we became aware that the MPEG-2 encoder was the "weak link", dominating the achievable video quality. Domestic DVD and HDD recorder test results, published by Consumer Institute, highlighted the variable quality of Standard Definition MPEG-2 encoders, between different makes of recorder, at a given bit rate (usually 9 Mbits/s in the XP mode; 4.5 Mbits/s at SP, and correspondingly lower bit rates in the LP and EP modes).

Obviously, we needed to "stress test" a wide range of reasonably-priced MPEG-2 encoders. Unfortunately, we couldn't afford a Rohde & Schwarz DVQ Digital Video Quality Analyser, which gives consistent quantitative results, so we set about organising a viewing panel.

First, we "sensitised" the members of the viewing panel to the video compression artefacts produced by MPEG-2 encoders operating at too low a bit rate, when fed with "critical video", such as provided by the Rohde & Schwarz test DVD. We then presented the panel with the same video, in random order, encoded at rates of between 2 Mbits/s and 9 Mbits/s, and asked them to write down their opinion score on the standard ITU quality scale.

On analysing of the results, the overall winners were judged to be encoders based on the Fujitsu MB86391 ASIC. The encoding artefacts were rated as being just perceptible, at a coding rate of

4.0 Mbits/s, except during the fade-to-black at the end of the Rohde & Schwarz "Forest Scene" segment. Incidentally, all the other encoders tested were rated as being worse than the Fujitsu ASIC, during the same fade-to-black.

Audio tests, using similar test methodology, resulted in the selection of: Stereo sampled at 32 kHz and encoded to give an output bit rate of 128 kbits/s.

The Fujitsu MB86391 MPEG-2 encoder ASIC is used in both the AGAF and the SR-Systems DATV modules.

DVB-S TRANSMISSION TESTS

It became apparent that, on the basis of equipment complexity, and hence cost, Simplex digital TV, and the digital up-link to the repeater, would need to use the DVB-S (S for Satellite) mode. The DVB-S mode is designed to be rugged when receiving weak signals. However, DVB-S is not as rugged as the DVB-T mode, in the presence of multipath, otherwise known as ghosting in the analogue TV world.

DVB-T is immune to multipath of the same amplitude, and any phase, as the direct signal, when delayed by any amount of, up to, tens of microseconds, the precise delay limit being determined by the number of transmitted carriers (2K IFFT mode versus 8K IFFT mode) and a parameter called the "Guard Interval". However, there is no free lunch, since multipath "noises up" DVB-T reception and reduces the effective Carrier to Noise ratio by a small amount.

In contrast to DVB-T, DVB-S is quite sensitive to multipath having small amplitude (say -10 dB, when the main signal is weak) and much smaller delays, relative to the direct signal. At a DVB-S Symbol Rate of 2950 kSym/s (see later) the Symbol Duration is 0.34 μ s. For example, multipath of 0.34 μ s delay, or more, has maximum impact on reception bit-error rate. As with DVB-T, multipath "noises up" DVB-S reception and reduces the effective Carrier to Noise ratio.

Multipath of 0.34 μ s delay can be simulated in the laboratory by using a delay line of 67.8 metres of ordinary coax (velocity factor of 2/3). The phase of the multipath (for example at 432 MHz) can be varied through 360 degrees by varying the actual length of the delay line through 463 mm.

Multipath of lower amplitude, and lesser delay, produces less reduction in the effective Carrier to Noise ratio. Longer multipath delay than 0.34 μ s produces little change from the Carrier to Noise ratio degradation at 0.34 μ s.

The club considered that Amateurs using a DVB-S up-link to the repeater would be intelligent enough to use directional transmitting antennas to minimise multipath. Usefully, the “quality” bar graph, displayed by the repeater’s DVB-S receiver, can be used to optimise the direction of the user’s transmit antenna, to minimise the effect of the multipath.

The central half of the DVB-S spectrum is transmitted with a flat amplitude. Therefore, the amplitude and delay of the multipath can be determined by Fourier analysis of any amplitude ripples in the, otherwise, flat portion of the received spectrum. However, this technique only becomes useful when the multipath delay is equal to about two, or more, Symbol periods.

FORWARD ERROR CORRECTION (FEC)

The last remaining DVB-S parameter needing selection was a suitable FEC. Five FECs are permitted by the DVB-S specification; the choice of FEC involves a compromise between ruggedness of reception and occupied bandwidth of the transmission.

The Forward Error Encoder, in the transmitter, inspects the Transport Stream and performs mathematical calculations to spread the information over a larger number of bits, hence increasing the transmitted bit rate for a given input bit rate. The Forward Error Corrector in the receiver reverses these calculations, allowing it to detect and correct bit errors, hence reducing the received Bit Error Rate, for a given Carrier-to-Noise ratio.

For example, an FEC of $\frac{1}{2}$ doubles the number of bits fed to the modulator, hence doubling the bandwidth of the transmission, but results in good, error-resistant, reception. At the other extreme, an FEC of $\frac{7}{8}$ increases the number of bits fed to the modulator by one seventh, adding a seventh to the bandwidth, but reception is much less error-resistant than with an FEC of $\frac{1}{2}$.

The middle FEC of $\frac{3}{4}$ increases the number of bits fed to the modulator by a third, adding a third to the bandwidth, and gives an intermediate value of error-resistance.

On balance, it was decided that an FEC of $\frac{3}{4}$ gave an acceptable compromise between transmitted RF bandwidth and reception error-resistance.

NEW ZEALAND BAND PLANS

The New Zealand bandplans are published by the New Zealand Association of Radio Transmitters (NZART), the local equivalent of the RSGB. The ATV band segments are integer multiples of 8 MHz wide: 8 MHz on 70 cm, 16 MHz on 23 cm and 12 cm, and wider on the higher bands. This permits integer numbers of 8 MHz-wide Analogue VSB TV transmissions, or 16 MHz-wide Analogue FM TV transmissions.

The DATV team decided that a DVB-S transmission having a bandwidth equal to a simple fraction of 8 MHz would have many benefits. The MPEG-2 encoder bit-rate viewing tests, and choice of FEC, showed that a high quality DVB-S transmission could be fitted within a 4 MHz RF bandwidth. In particular:

MPEG-2 encoder output	4078 kbits/s
Reed/Solomon	188/204
FEC	$\frac{3}{4}$
Symbol Rate	2950 kSym/s
Occupied bandwidth	3982 kHz

The ATV segment on 70 cm is shared with other modes; the ATV segments on the higher bands are not shared with other modes. Many years ago, the 70 cm carrier frequencies of Analogue TV: Vision, FM Sound and NICAM, were carefully chosen to minimise interference between the various modes.

During extensive testing, it was found that a 4 MHz wide DVB-S transmission, located at the bottom of the 70 cm band, would also minimise any conflict with Amateur Satellite (435 to 438 MHz) and with FM voice repeater inputs and outputs.

DVB-T TRANSMISSION TESTS

Similar factors were considered during the choice of transmission parameters for the output of the repeater. In this case, the large number of DVB-T receivers owned by the public was considered to be an important factor, allowing them easy access to the reception of DATV.

Unfortunately, a 2K IFFT mode DVB-T modulator is more complex (and expensive) than a DVB-S modulator, and, in turn, an 8K IFFT mode DVB-T modulator is more expensive than a 2K IFFT mode DVB-T modulator.

The DVB-T transmission standard permits 120 different combinations of parameters. The number of combinations reduces somewhat when some initial choices are made:

Our bandplan, and local broadcast TV, features 8 MHz-wide channels.

Selecting the 8K IFFT mode, as used by our broadcasters, together with a Guard Interval of 1/16, results in resistance to multipath of, up to, 56 μ s delay.

Choosing a compromise FEC of $\frac{3}{4}$, the same as for the DVB-S uplink, leaves only one remaining parameter to choose, the modulation constellation.

Constellation	Available Payload Bit-Rate	Bit-Error-Resistance	Possible number of 4 Mbits/s streams
4QAM (QPSK)	8.782 Mbits/s	Excellent	2
16QAM	17.564 Mbits/s	Very good	4
64QAM	26.346 Mbits/s	Good	6

Once again, we were faced with selecting between a range of options featuring, at one extreme, a small payload and excellent bit-error-resistance (4QAM) and, at the other extreme, a large payload and good bit-error-resistance (64QAM). Most broadcasters, transmitting high power from high sites, choose 64QAM.

On balance, we chose the 16QAM compromise, since we contemplated having, up to, four up-link receivers: 70 cm analogue, 23 cm analogue, 70 cm DVB-S and 23 cm DVB-S.

Typically, broadcasters are able to spend a lot more money on MPEG-2, or MPEG-4, encoders, producing much lower bit rates per programme stream, than we can. Hence, a larger number of programme streams can be included in broadcast transmissions than are listed in the above table.

SR-SYSTEMS

Eventually, our club purchased DATV modules from SR-Systems of Germany.

We found that these modules had a good user interface, and that the modules could be user-programmed for the full range of DVB transmission parameters, using a simple lap-top computer. The only apparent restriction was with the lower cost DVB-T Mini modulator,

which only featured the 2K IFFT transmission mode. We ended up buying the more expensive DVB-T modulator, for its additional 8K IFFT capability.

The SR-Systems MPEG-2 encoder also features the Fujitsu MB86391 ASIC, mentioned above. The DVB-S modulator had good spectrum shaping, with the out-of-band sidebands being, typically, 50 dB below the wanted transmission. The DVB-T modulator out-of-band sidebands were close to the theoretical levels, which are inherently lower in the 8K IFFT mode than in the 2K IFFT mode.

In early 2010, in order to facilitate the development of local DATV, the club imported many SR-Systems modules.

The set of modules, for converting the repeater, included:

Two MPEG-2 encoders, to be fed from the audio and video outputs of the analogue receivers,
One DVB-S tuner, its digital output to be fed direct to the 4-input multiplexer,
One 4-input multiplexer, and
One 8K IFFT DVB-T modulator.

Several sets of modules were also pre-ordered by members, each set consisting of a MPEG-2 encoder and DVB-S modulator, some on 70 cm and some on 23 cm.

HOME-GROWN MODULES

Several home-grown modules have been constructed for the repeater:

Receive up-converter from 432 MHz to 962 MHz,
Receive Low Noise preamp with bandpass filter for 23 cm,
Transport Stream switches, to substitute locally-generated Transport Streams when any of the four repeater inputs are not carrying traffic.

An EPROM-based psuedo Transport Stream generator is being developed.

Most of the home-grown modules of the analogue repeater are being re-used for DATV:

Analogue receivers
IF linearity pre-corrector
IF to UHF up-converter
UHF power amplifier

A simple Transport Stream Analyser, and a Transport Stream to LVDS adapter, have also been constructed.

REFERENCES

<http://www.vhf.org.nz>
<http://www.nzart.org.nz>
<http://www.sr-systems.de>
<http://en.wikipedia.org/wiki/DVB-S>
<http://en.wikipedia.org/wiki/DVB-T>

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FRARS Science & Engineering Open Day

by John Bales G0HAT

Flight Refuelling ARS Science and Engineering open day 2011

Over each of the past few years Flight Refuelling Amateur Radio Society, located in the grounds of Cobhams Sports club at Merley between Poole and Christchurch in Dorset, has opened the doors to the public for a day in March to celebrate Science & Engineering week. With this year's theme as "communication" the well equipped clubhouse proved the ideal place to showcase many aspects of amateur radio with a range of experiments on display.



TV coverage of the experiments with the pictures streamed across the world also provided a great opportunity to promote amateur radio in the UK and to demonstrate the potential of the BATC streamer in sharing amateur activity worldwide.

To provide this coverage, a team of BATC members from the nearby Bournemouth Radio Society set up its "mission control" in a small workshop area at the clubhouse where the internet connection point is situated and from where sound and video sources could be fed to a computer loaded with software to provide a data stream to feed the internet.



Video sources were one wireless camera and one wired camera, radio mics to provide sound coverage and wireless talkback from mission control to the camera operators and interviewer via headphones. This arrangement allowed coverage of demonstrations both inside the clubroom and outdoors.

The BATC streamer kit, mounted in a flight case and prewired, contains the vision mixer, small picture monitors and the A-D converter for the video. Additional equipment within the flight case including a high spec computer, which was not used on this occasion, due to lack of space to deploy a flat screen monitor and keyboard needed to operate it.



Sound was controlled on a separate small audio mixer.

Video and audio DAs were used to allow sound and vision to be split to feed both the streaming application and an on-site DVD recorder.

Demonstrations of experiments set up for the open day included the ever popular high voltage tesla coil with its 30 cm long arcs of sparks and accompanying loud crackling sound, presented by Chuck M0MDK.

In the VHF shack, Clive G7SVI waited patiently as the time for each satellite

pass approached, whilst watching a satellite tracking programme running on his computer, listening on his VHF/UHF receiver and adjusting the controls which aimed the azimuth and elevation of the yagis mounted on the clubhouse roof. The VHF shack is tiny, allowing room for only a handful of visitors plus the cameraman providing the streaming pictures during a pass.



Across the passage and only slightly larger is the HF shack. No specific demos were laid on this year but the HF bands were constantly monitored for activity taking advantage of feeds from the large range of wire and beam antennas situated in the clubhouse grounds.

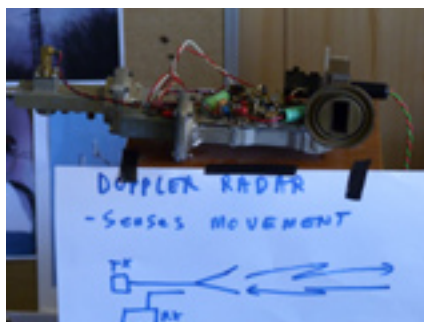


A demonstration of passing rf signals through the ground tested our coverage of the event as we were able to first show pictures of equipment in the clubhouse sending modulated rf to two ground spikes planted in the soil outside, then make our way out into the field to show live pictures and hear the sound from of a portable receiver picking up the transmission via two further probes pushed into the ground.

Back in the clubhouse and amongst the most visually impressive demonstrations was that of a Baird televisior with its spinning disc and built by John M1BAI displaying its tiny 32 line vertically

scanned monochrome picture. TV has moved on a bit since then!

By the time you read this there should be a recording of the day's coverage of the event available on the BATC website in the archive section. This includes interviews with some of the special guests who were there on the day and video of all the numerous demonstrations that took place - too many to mention in this report.



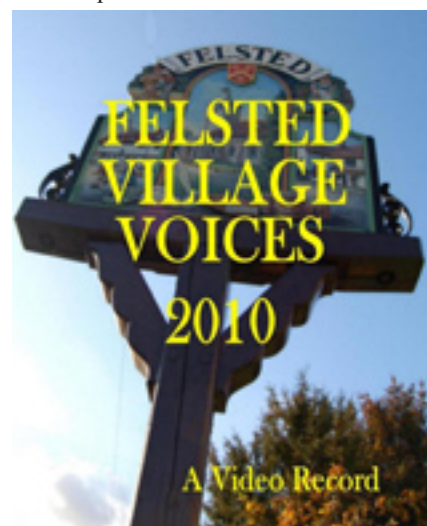
Recording the past for the future

Dicky Howett makes a video

A scheme to 'capture' my village on video matured recently when copies of Felsted Village Voices hit the local stands. Easy really. I persuaded several (and mostly at random) citizens of the village where I live to speak their minds, but only for a couple of minutes. Well, not exactly 'their minds'. I was more interested in what they were doing at the precise moment that I interviewed them. So the postman was on his round, the local handy man was being a bit, er handy with a paint brush and the W.I were sewing a brand new tapestry (local

views) in the church vestry. Previously during 2010 I had filmed the opening of the village's new multi use games area (referred to unfortunately by the acronym MUGA). This filming was a special service to the parish Council who wanted to 'prove' to the MUGA's sponsors how felicitous the money had been spent. Of course, cash is still required for the project and so I proposed a fund-raising Village Video, incorporating the footage shot of the opening of the MUGA (by lone Atlantic rower Charlie Pitcher, who lives in the village). Adding too, pre-recorded bits of the village panto as well as sylvan

scenes of the surrounding countryside and the pre-mentioned yokels. All in all a 55-minute package of exactly the correct length, (or so I've been told). To film, I used my trusty Sony BVW 300AP Betacam with the 'old fashioned' 4:3 ratio picture format. Editing was done linearly, ie shot- by- shot assembled onto DVD- no computer involved at all. All done with timing and the 'eye', which I used to do at the BBC back in the pre-colour ages with comag negative b/w 16mm film no less. My video is now selling at £6 each in a presentation case. A duplication house handled all the copy work which ensured a trouble free replay, most important considering the past 'compatibility' of the DVD system. No complaints so far.....



A Quick and Dirty LNB Mod

by Michael Edwards G8CPF

Having taken early retirement, and moved to Minehead, I was naturally keen to reinstate my ATV gear and provide a little more activity on the "local" repeaters.

"Nice flat takeoff, should be easy" I thought! Miles of sea to the NorthEast towards 'ZZ only the Mendips at 40miles between me and 'UT "should be able to watch one whilst working through the other"!!

DREAM ON !!

So far, I can only JUST detect 'ZZ at P1 from my home QTH with my best antenna @ 30ft, H103 coax, ultra low noise preamp, and TWO interdigital filters!! It's amazing just how effective Msr Fresnel can be at 23cms, if you are right down at sea level.

So, I had to think of some possible alternative. Maybe I could try 'XG, (Severnside's 10GHz repeater on Dundry, just South of Bristol). I had taken the opportunity to "tweak" some rather old LNBs on the "firm's" analysers before leaving. None of them are particularly "low noise", and none of the I.F.s produced are at all convenient for feeding into an existing ATV receiver. Still, worth a try.

I have a 1m offset dish, so, it was off down to the harbour one windless morning to try my luck. After two hours of "pointing & tuning" there was no sign of anything from 'XG, BUT the Cheltenham beacon GB3CCX was quite strong on a narrow band Rx, at about 90m! Some hope yet then for 'XG at about half that distance.

So it's all down to the filtering. Fine, IF you can keep your downconverted signal within that narrow filtered bandwidth. Not too easy when your first L.O.(the DRO in the LNB) is so sensitive to temperature and supply voltage variations. Quite recently there has been published a very clever way of obtaining a stable "2nd LO" in an

LNB by injecting an additional stable signal which intermodulates with those already present in a standard LNB. This principle involves "drift cancellation", and made me wonder what would happen if I enabled BOTH L.O.s, to run at the same time, in a Universal LNB.

Initially, without any "tweaking" they would run at 9.75GHz and 10.6GHz, producing a strong difference signal at 850MHz. Now, if you take the "normal" I.F.s produced from say a 10.065GHz received signal mixed with the 9.75 & 10.65GHz L.O.s ($10.065 - 9.75 = 315$) & ($10.065 - 10.6 = 535$) and ADD them to 850MHz you get ($315 + 850 = 1165$) & ($535 + 850 = 1385$).

One can immediately see that 1385MHz is not too far from our 23cm band, and that a bit of judicious "tweaking" would very easily bring it within the band and hence to the centre frequency of a nice interdigital filter (which, incidentally, becomes somewhat necessary in order to keep all the other mixing products out of the Rx).

It is wise, if possible, to "tweak" only one DRO, so that you still have a reference. I chose to "tweak" my 10.6GHz DRO, but you may find it more convenient to move the other one. In order to get 10.065GHz onto 1249MHz my high DRO had to end up on 10.532GHz thus producing a 782MHz "2nd LO" which mixes with the IF produced by 10.065 – 10.532 = 467MHz

One added advantage of using this technique is that your "Repeater input" signal can also be brought "within the band" At least within range of a Comtech Rx.....($10.315 - 9.75 = 565$ + 782 = 1347MHz).

There remains, however, the question of stability. LNB DROs are normally quite stable enough for wideband FM TV, so one would not expect stability to be markedly worse by mixing two of them. Maybe twice as bad, HOWEVER, so far my experience has been that stability is markedly BETTER. I am not quite sure why this should be, but, could it be

that because both DROs are in the same environment their drift characteristics are essentially very similar, so the difference frequency that they produce remains constant?

So. How easy is it to do? As easy as falling off a log(periodic)!

You don't need a 22kHz generator, just identify the two power feed lines to the DROs, and solder them together. I was very lucky, as both lines run very close together in the particular model I have (Microelectronics Technology Inc AP8-T2).

(see photo on inside back cover, marked with a blue circle)

The "tweaking" is best done using a Spectrum Analyser, but if you don't have access to one of those, any general coverage Rx up to 1300Mhz will do, it just involves a bit more of that tedious maths stuff, to work out where you expect things to be.

A signal source, of known frequency, anywhere within the 10GHz band, can be a very useful tool at this point.

The large puck is the 9.75GHz DRO, & the smaller one is at 10.6GHz.

If you find that your chosen DRO will not pull quite far enough, you have the option to, either, physically reposition the puck slightly, or, "tweak" the other DRO appropriately, in order to achieve the desired I.F. (this would, of course, destroy your "calculation reference").

If, however, you have kept good records of the process, you should be able to return the chosen DRO to its' original frequency, and try the other one for "pullability".

It would be interesting to know what effect the modification has upon the LNB's Noise Figure. Perhaps someone with the appropriate kit, and knowhow, would care to try it and see.

Good luck

3D in Action

by Mike Cox

Since the last piece in CQ-TV231, a lot has happened to the 3D system.

The first decision was to make the camera head a “camcorder”, so that it can be used in “iso-cam” mode, and record to mini-DV tape. For new readers, it may be appropriate to remind them of the specification of this 3D TV system. The Left and Right images are produced by two Sony cameras giving PAL outputs on 625 lines. The two signals are synchronised, and then switched so that Field 1 [Lines 22 - 312] comes from the Left camera, and Field 2 [Lines 334 - 625] from the Right camera.

The CCU, or perhaps better, called 3D base station, is fitted to the bottom tray of the tripod dolly. A Sony DV [GR-D900E] recorder is Velcroed onto the lid of the base station.



The monitoring facilities in the base station were controlled by a set of direct switching push buttons on the panel, but these are now replaced by CMOS switches, and remotely controlled from the side of the viewfinder. The switches select Left, Right, Left - Right and composite signals. Thus all the functions can be checked on the viewfinder. The view finder is a 7" wide

screen LCD display, and in back of the case is a burnt-in waveform indicator [COX 2494] to indicate peak level of the camera outputs, thus enabling exposure setting using the manual controls on the two cameras.

To avoid undue screen clutter, the waveform display can be turned off

The original replay kit, based on losing one field in two to the display gave a dimmer display with an amount of flicker. As we have thrown away some vertical resolution anyway, the Field Store has been built which takes Field 1 and stores it to play out again during the second half of the frame. It does a



leaving just the action area graticule.

The Sony DV recorder has its own battery, while a 12 volt 5 AH lead-acid battery powers the rest of the channel. These last are cheap and readily available, and because they are on a platform weight is not a consideration. The channel can therefore run for over an hour with battery power. A simple battery state indicator is fitted at the camera head.

As I already had another Sony DV recorder [GR-D300E], the play unit can be decoupled from the acquisition side.

similar thing for Field 2. [Fig. 4]

Thus the projectors are effectively displaying 288 active lines every field, so there is no more flicker than displaying a normal 2D picture. Also, because of the Kell factor, only about 75% of the interlaced 576 lines is available, whereas all the 288 lines are available as a progressive display.

The basic principle of the project has been to re-cycle as much as possible, and so the start was a TTR PAL to YPbPr decoder that was lying around. This in turn feeds the “NOAH” unit described in CQ-TV 214/215 as an Aspect Ratio

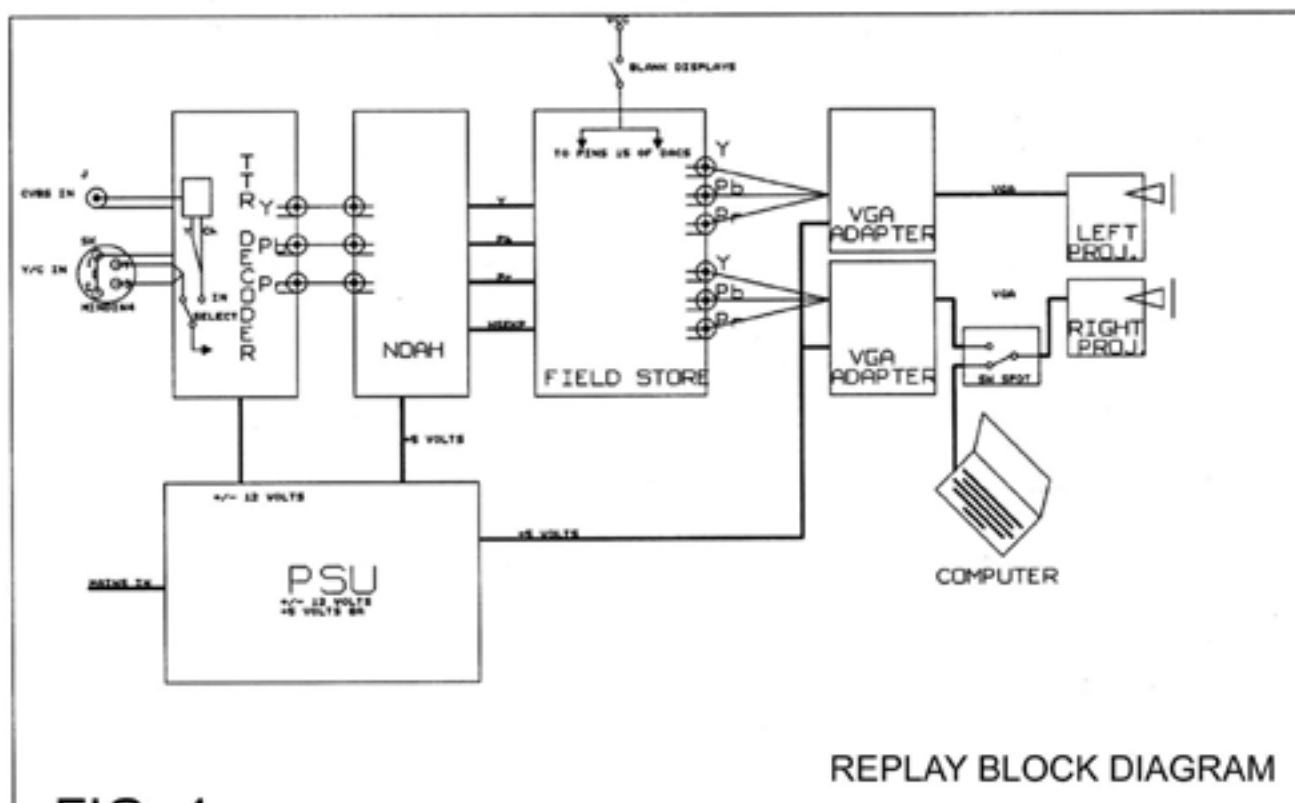


FIG. 4

Converter. For this application, the ADCs and the housekeeping [clock generation etc] are used. The old SDI card was removed, leaving the digital YCbCr outputs available to feed the Store Card via the 10 pin connectors that fed the card. This card carries the address counters for the SRAMs, and 6 4Mb SRAMs [AS6C4008]

Each store cell consists of a 74HC574 latch and the SRAM in parallel. An 8 bit video signal is applied to the latch, and the output taken from the latch paralleled with the SRAM I/O pins. The latch output enable [/OE] is taken low for the first field, and its output goes on, while the SRAM Write/Read pin [WE] is also low, and the latch output is written into the SRAM. [Fig. 5]

During blanking, the Chip Enable [/CE] pin is high, providing a clean blanking interval for subsequent processing. A resistor pack is fitted at the output to pull down the outputs during blanking, except for O4, which is pulled up to +5 volts. This makes the output 10h during blanking. This grouping of 74HC574 and AS6C4008 is repeated 6 times for Left and Right, Y, Cb and Cr. The interconnects between the NOAH board and store card are in 10 way ribbon

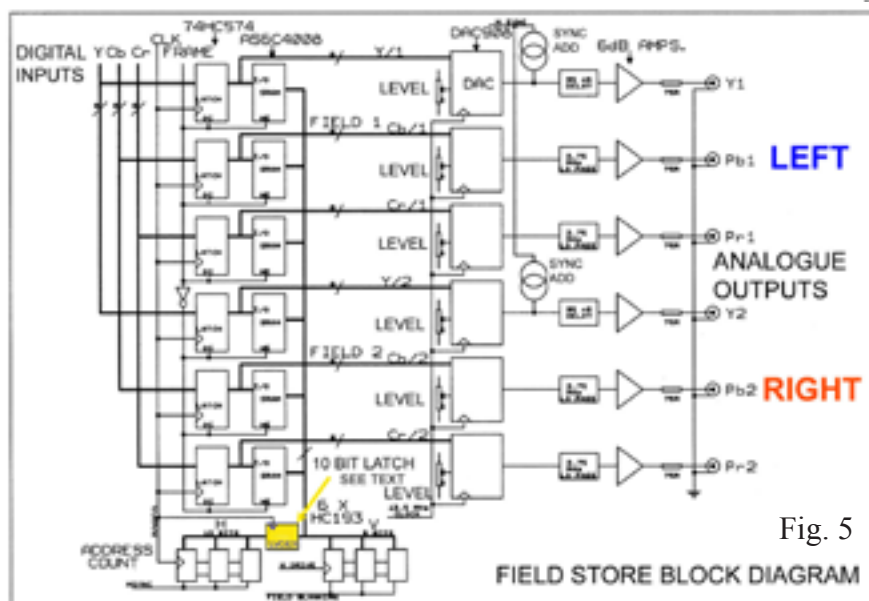


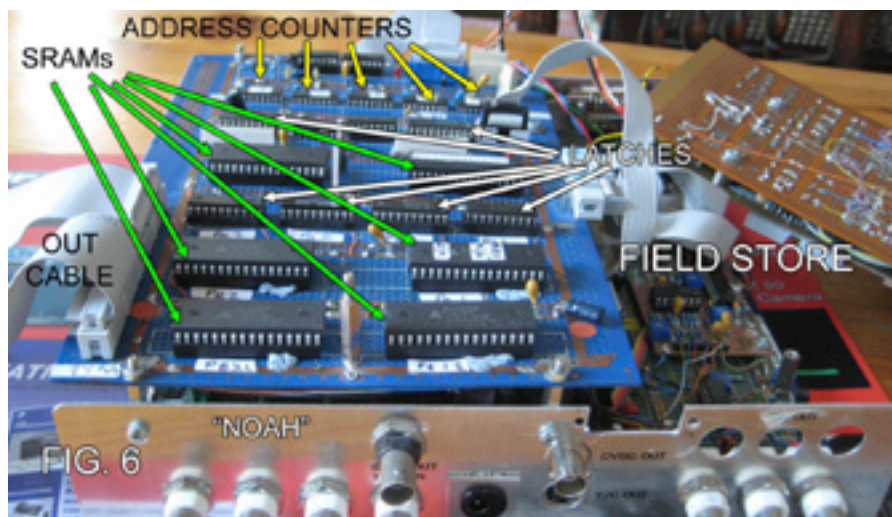
Fig. 5

cable with IDC connectors. [Fig. 6]

When it came to test time, there was an artefact that showed up suggesting some skew in the horizontal address counter system. The counter uses 74HC193 “synchronous” counters, with provision for connecting these in a string to get the number of address bits needed. What the data books do not tell you is that although these counters are synchronous to their own outputs, one counter has a noticeable skew compared to the next along the row. Luckily the Capacious Drawers [qv] came up with a 74LV821, which is a 10-bit latch, in many ways similar to a 74HC574, but wider. This

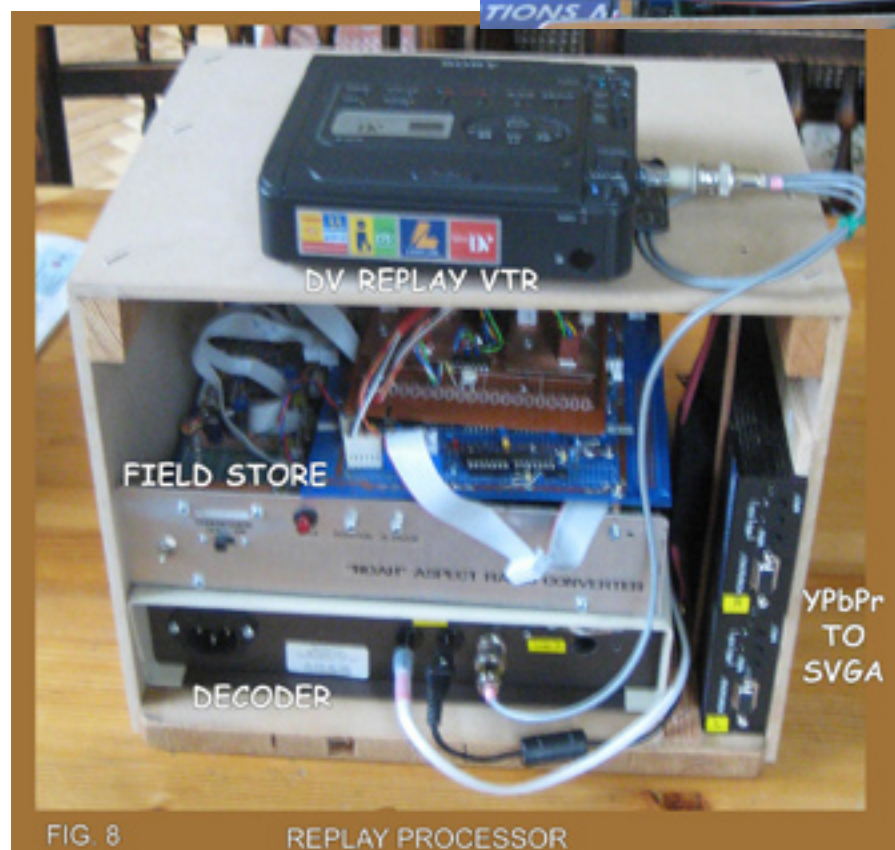
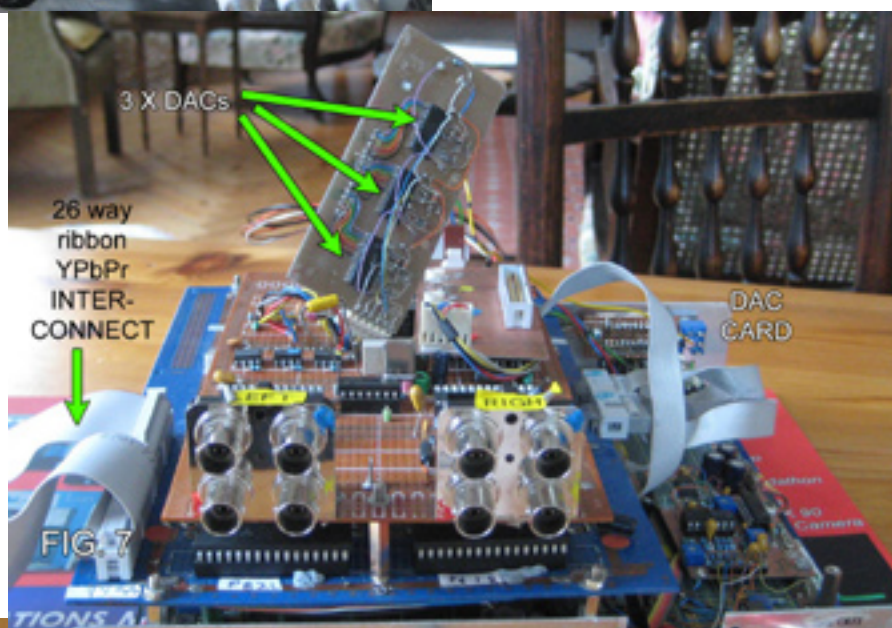
was inserted into the horizontal system, and the artefacts disappeared.

When it came to connecting to the DAC cards, a 26-way ribbon cable is used, and all the Y, Cb and Cr ways go into the one connector, with only 2 common ground ways. As the cable is relatively short, it works. There are two DAC cards for Left and Right, each carrying 3 DAC908 surface mount DACs. On each card are level controls, to set the current output of each DAC. [Fig. 7] They will source around 20 mA, thus driving 0.7 volt into 75 ohms, from a 75-ohm source resistor. Hence a double terminated filter can be fitted easily, and



two 2.75 MHz Gaussian filters are fitted to the Pb and Pr outputs, and a 95 nS corresponding delay section in the Y output. A dual current adder adds 300 mV of sync to the Y channels at this point.

Originally the intention was to fit two PAL coders so that the projectors could be fed. In the C.D., I had some Sony PAL encoder chips type CXA1229P. To prove one seldom learns from experience, I had several years ago built a simple coder using this chip, and could not make it work successfully. I then put a CXA1229P into one of those proto-boards, with high capacity between busbars etc, and it worked. So



when it came to the DAC card, I fitted two of these coder chips. One worked OK, the other was very unreliable. So I abandoned this idea, and bought two upscaling YPbPr to SVGA converters, and drove the projectors via the VGA port.

The replay kit is mounted in an MDF crate, which requires mains power in, and video, either from the camera via a cable, or from the Sony GR-D300 mini-DV player, which is Velcroed onto the crate lid. Two VGA cables then feed the projectors. [Fig. 8]

To extend the use of the projector

assembly, a 2 way VGA switch allows one of the projectors to be used for presentations [see Fig. 4]. To avoid having to switch off the other projector, with consequent delays, a global cut to black facility has been added. This operates by taking pin 15 of each of the DACs high, which cuts off the DAC.

So we have a working system, which will provide valuable experience of what you can do, and perhaps more important, what you cannot do in a 3D TV environment. As proof of the concept, a successful talk and demonstration was given recently to the Farnham Rotary Club.

The next project may be to take the output from a 3D Blu-Ray player, and process it to drive the projectors.

If you are minded to try this design and want either DAC908 or AS6C4008 chips, try Farnell or RS.

MKII 24cms FM ATV Receiver

by grant ZL1WTT

Background:

In the past it was not hard to find a FM TV receiver, in the form of a satellite receiver. These days these older analog units are coming harder to find and if you did come across one they often needed to be modified. So I decided to come up with a design to work with the narrower form of FM TV modulation that is used for ATV. With the success of the older MKI design, it was time to move on with the improvements of technology.

Digital ATV is a lot of fun to experiment with as Ralph (ZL1TBG) and myself have found out over the last five years. But the down side to DATV is the set up cost that comes with this equipment. Whilst the analog technology has done the opposite and has come right down in cost. This why the Auckland ATV repeater will continue to provide ongoing access for those who wish to use their current analog equipment.

Introduction:

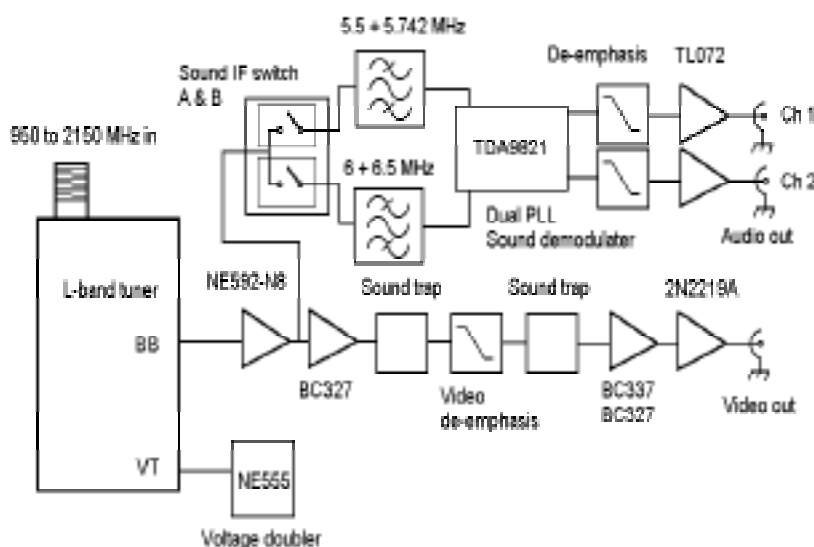
With the newer generation Comtech L-band tuner modules there is a lot more I can do in ATV receiver design. This idea come from a discussion with John (ZL1JD) in regards to the low cost modulator project. The thinking was that one would complement the other and provide a way to view your own signal. So far this receiver has out performed any other receiver I currently own and it's a big improvement over the older MK1 design.

Features:

- 1/ Wide turning 800 to 2200 MHz
- 2/ Wide and narrow IF settings
- 3/ Variable low threshold demodulator
- 4/ Dual switchable IF sound demodulator, 5.5 + 5.742 MHz and 6 + 6.5 MHz
- 5/ Local oscillator off sets for different bands
- 6/ +/- video output

- 7/ 22kHz LNB drive (if required)
- 8/ Wide video bandwidth DC to 5.2 MHz (without threshold)
- 9/ 12 volts DC powered
- 10/ Designed for ATV applications (setup for 18 MHz bandwidth)
- 11/ Can driven via RS-232 for remote use (ATV repeater sites)with a software change)
- 12/ Rotary encoder driven from front panel via the LCD display

IC2 The incoming base-band signal is DC coupled into pin 1 of the NE592-N8. This is where the gain is controlled via TR3 (MPF102 JFET) across pins 2 and 7. Where by the bias is set from the Micro in form of PWM output. Pins 4 and 5 are the deferential outputs, this feed RL1 for the positive and negative video modulation. The common pin is the pick off point for dual sound demodulator.



RX Circuit description:

The L-band tuner takes the incoming RF and mixes it down to an IF of 480 MHz, with two IF filters that are switchable one is wide (27 MHz) and the other is narrow (18 MHz). This tuner arranged around a Mitel PLL chip the SP5055. This PLL is driven with an I2C serial interface that is controlled via a PIC 16F876A Micro-controller. The FM demodulator runs at the IF frequency and uses PLL as the demodulator. In the loop filter of this PLL the time constant can be increased by varying the low threshold pot. The AGC line is connected to the A to D input of the Micro and is converted in software to a signal readout on the LCD display.

IC1 Is a NE555 timer oscillating at 22kHz, this drives two transistors in a Totem pole configuration. This feeds D1 and D2 these Diodes set out as a voltage doubler this part of the circuit provides the turning volts.

TR4 (BC327) is a DC level converter stage, followed the first sound trap. Next is the PAL video de-emphasis network, the output side feeds on to the second sound trap. TR5 and TR6 (BC327 & BC337) are a standard feedback pair. The video is fed into the base of TR5 which then drives TR6 the signal then comes off the collector of TR6 providing the video output drive. TR7 is nothing more then a buffer stage in the form of an emitter follower, to drive the into the 75 ohm video output.

IC3 is the TDA9821 dual PLL sound demodulator. This takes the outgoing signal from the relay from the NE592 stage. TR11 and TR12 (2xMPF102 JFETs) are configured as switches to switch between the two sound IF frequencies (A & B). Where A is $5.5 + 5.742$ MHz and B is $6 + 6.5$ MHz. Through a set of four ceramic filters which then feeds the two inputs of IC3 pins 1 and 15. The audio gain has been set by the use of the two 1.2k resistors and the two 2.2 uF caps. The audio

output pins 7 and 8 are connected to the 50uS sound de-emphasis networks. If only using the 6 and 6.5 MHz sub-carriers you can link out the switching FET's.

IC4 is a TL072 op-amp used as a dual channel line amp. The pins 2 and 6 are the two inputs. The audio gain is set by VR3 and VR4. The output pins 1 and 7 are coupled to the outputs which then provide the two audio output channels.

IC5 is the PIC 16F876A Micro-controller that drives all parts of this receiver plus 2 x 16 LCD display, reads the push buttons and the rotary encoder from the display PCB. I have written the software and layed out menu in the same structure that Kith (ZL1BQE) did for the MKII ATV modulator. As for the documentation I will do at a later date and put it out as a PDF manual, as I have done for MKII ATV modulator.

IC6 the MAX232 RS-232 level converter. I have added this component to provide remote access to software settings, this could be from a PC or a repeater controller. For example changing receive frequency or even displaying the signal level. This IC can be left out if just using the rotary encoder from the display board. To use this receiver in remote mode requires a software change.

REG1, 2 and 3 are the on board regulators REG1 is 9 volts supplying the video and sound stages. REG2 and 3 are 5 volt regulators two drives the analog parts of the circuit where by three does the same for the digital side. The PCB layout has two ground planes one each part of this circuit. The digital ground is connected to analog ground via L3 100uH choke, there by reducing any unwanted noise between each part of the circuit.

TR10 (IFR9540N) this P-channel MOSFET switchers on and off the LNB volts. This N-channel device is bias in depletion mode, there for you need take the gate negative to turn off this is done via TR9 (BC548).

Performance and testing:

I have tested the receive performance down to -96 dBm this without any preamp. At this level with threshold I

Signal to noise measurements were:

-96 dBm P2 set to 18MHz bandwidth with low threshold	S/N 12dB
-85 dBm P5 set to 18MHz bandwidth with low threshold	S/N 23dB
-82 dBm P5 set to 18MHz bandwidth without threshold	S/N 26dB
-79 dBm P5 set to 27MHz bandwidth without threshold	S/N 29dB

managed to resolve a P2 picture in the noise.

As you can tell using threshold will only provide an extra 3dB signal to noise performance. By doing this it will effect the output waveform at the higher video frequencies. To give some Idea how this compares to AM modulation an home aerial installer aims for a signal level of -54 dBm (55 dBuV) as a reference for the same P5 picture.

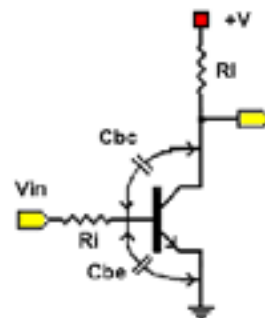
I have tested different bandwidth and compared the results on a video waveform monitor. There is definitely a difference in video quality over a range deviation settings. At 27 MHz the high end frequency components such as at the transition points were well defined. At 14 MHz the best way to describe the picture would be say it was VHS quality, it had the same look to it. Rounded off edges and general softer look to waveform. This is why we have come up a compromise of 18 MHz, to balance up quality against bandwidth. This area of signal to noise vs deviation is another subject in it's self, possibly for something a later date. The video bandwidth is DC to 5.2 MHz only limited by the sound trap at 6.25 MHz. DC response is ok but could be better, due to C18 and R34 in the circuit.

The operating AGC range is from -30 down to the noise floor about -108 dBm. I have added a table in software to display readings in dBm as well as in a bar graft format.

Audio bandwidth tested from 20 Hz to just above 20 kHz with a small amount of phase shift at the top end. The frequency response on the lower sub-carriers frequencies the roll off is about 15 kHz. The bandwidth of the two sets of filters are somewhat different and this was reflected in these results I got.

Other design problems:

The Miller effect and how it applies to signal transistors such as the BC327 and BC337. How do you work around these limitations hence my dilemma. The way I did this was to drive these transistors



in low impedance configuration. Even so to get DC to 7 MHz flat response was somewhat pushing these device to their limits.

Decoupling or isolating between video stages was another problem area. This took me a bit of time to work out the best way to do this. 0.1 uF capacitor on DC supply simply was not good enough. I found by adding a 10uH choke in the supply line between each stage started to make difference. So I ended up by using the 10uH choke with two capacitors one was 0.1uF and the other was 100uF this did the job.

Setting up:

There is very little to here, adjust VR1 with a frequency counter and set to 22kHz. Set VR2 to output of one volt peak to peak to set the 22kHz injection level. Check C11 and C13 with an Oscilloscope and adjust to minimise the sound sub-curriers levels from video output.

Construction

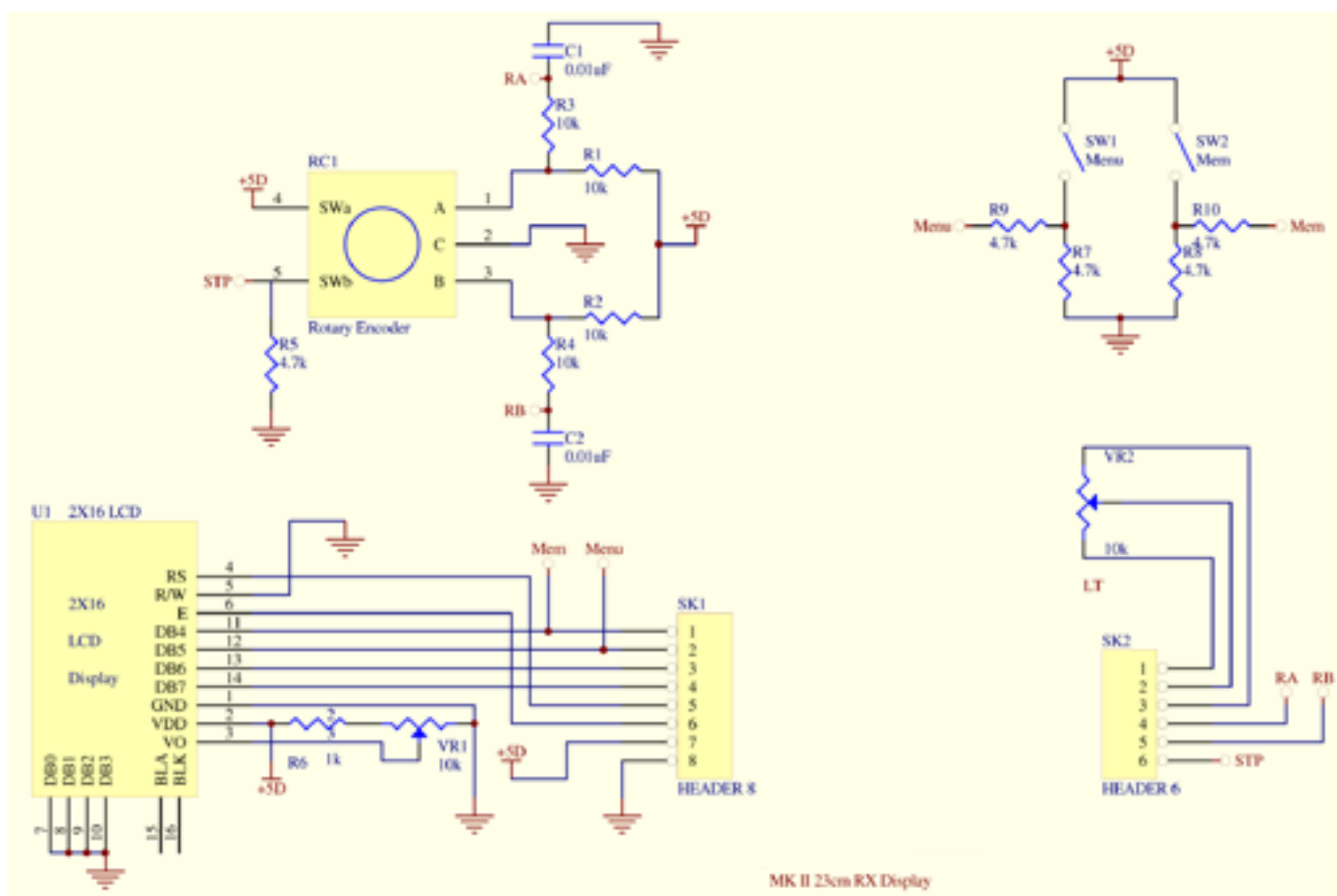
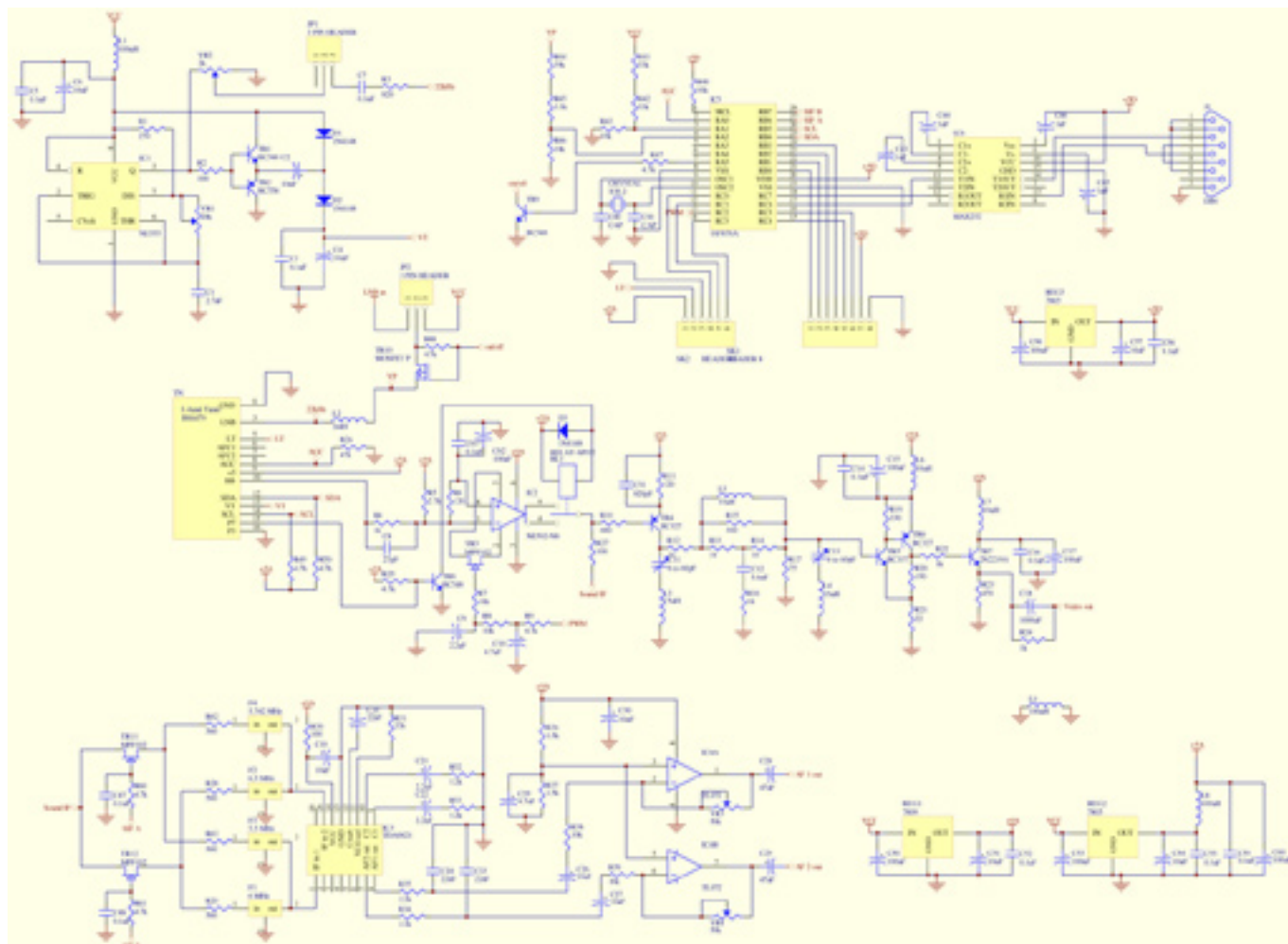
We are supporting this constructional project with a bare bones kit consisting of the front end module, both PCB's, a pre programmed micro processor and a digital display.

These are available for £99 including UK postage, overseas please add £5

Cheques, drawn on a UK bank only, made payable to "BATC"

From 14 Stairfoot Close, Adel, Leeds, LS16 8JR

E-mail: chairperson@batc.org.uk



Project Vivat! Update

by Paul Marshall

Where did 2010 go? Setting out at the start of the year it always seems as though there's plenty of time for everything to be done and keep everybody happy. Project Vivat has undoubtedly progressed in the past year, but on the vehicle front at least, not as fast as I would have liked. As ever, the 'old enemy' - time - has taken its toll, but I'm very optimistic that 2011 will see some real strides in the vehicle department. My part-time academic work concludes (all being well!) in March, and that will free up huge swathes of time (and energy); well, maybe . . .

Although the vehicle has only progressed in terms of bits and bobs in the past few months, it is under cover and safe from the ravages of the weather. This really is most important and it is comforting to know that the snow is not piled up on top of it, that the rain is not trying its hardest to penetrate every nook and cranny, and that the rot has been slowed to a snail's pace. First up for next year is to finally get the under-body shot blasted. Until this is done, there's little incentive to clean/tidy/repair/make-good anything else as it makes such a mess. That will have to wait until the spring now – for the better weather and the freeing up of my time.

It's better news on the electronics and internal mechanics front. Two BD851 monitors are now complete and reliably giving good pictures, albeit on 625 lines. Both of these came back from Australia several years ago, and as TV down under opened in 625 lines, the monitors were made for that standard. The plan is to use these two as the main TX and PV monitors, but I haven't tried them on 405 lines yet. I have two others of the type which could – given the time and parts – be restored to a reasonable standard (both have good tubes), but one needs new scan coils and the other a new LOPT. Two into one remains the best and easiest option, but it's not ideal. The design of these monitors dates from around 1952 and they were designed and made for the Marconi Co. by Kolster

Brandes, the TV firm of Footscray in Kent. I don't have the circuit diagrams, but so far I've managed to fettle them by working from first principles and accusing any suspect capacitor. Sometime in the 1960s, several of these monitors had their magnetically focussed CRTs (with ion traps) replaced with electrostatically focused 'equivalents'. One of the restored ones still has its magnetically focussed tube, but the other is electrostatic. Both CRTs are in good order, but it's no surprise that the magnetically focussed one is quite a bit better.

Another step forward has been the mechanical/cosmetic refurbishment of two out of the three Marconi MkII/III camera control consoles. These also came back from Australia and must be the last three of the kind anywhere in the world – unless anybody knows any different! These have now been tidied mechanically and sprayed up using specially mixed paint. They already look the part, even if the electronics to go in them still needs to be 'processed'. Two down, one to go, but the third one is missing its desk top plate – that my well have to be fabricated as it's highly unlikely that one will turn up now.

On the supporting documentation front some very interesting booklets from the mid 1950s have turned up on eBay (thanks to Dave Hill for spotting them). One is a lovely colour brochure about Marconi Outside Broadcast trucks and has pictures in it that I've never seen before. They depict the huge range of OB trucks which the company made and exported throughout the 1950s, winding up in far-away places having to endure climates and conditions which we can only imagine. Our domestic ones had

a cosseted life indeed compared to those sent to places such as Venezuela and Canada. I especially like the 1950s style of the front cover drawing of the brochure (pictured). The confidence of the company at that time, reflected in the the overall feel of it, shines through on every page. Our 'target' for Project Vivat (the BBC version) is also well represented in the booklet and I've chosen two views to share with readers. One is a carefully done composite photograph/drawing of a cut-away view of the vehicle and the other is one of the BBC trucks in the yard at Marconi's in Chelmsford. Those were the days, when we actually MADE things in the UK, especially for EXPORT.

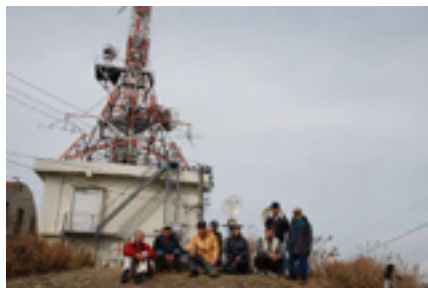
Hopefully, with the easing pressures on my time after spring 2011, Project Vivat will leap forward a little more than it has in the last few months. The 'big plan' is to have a major blitz on the vehicle (inside and out) once it comes back from the shot blasters. It will be a bit of a 'work camp', but people have already volunteered and it should be fun!



**Drop me an email, let me know
what you're doing with ATV.
It's good to talk:
editor@batc.org.uk**

DATV activities in Japan

JJ1RUF, Sato Hideyuki, pointed the TV-AMATEUR team onto successful DATV long range tests using the AGAF boards developed at the Wuppertal University DATV lab. JL1BLF, Mr. Sumi, and JH1GED, Mr. Otaki, made a two way DATV contact over 341 km distance on the 3 cm band and a one way contact on the 6 cm band. This success was achieved on 10th of August 2010 between two mountain tops, one being at 2236 m ASL. A short "evidence" video is found online at www.youtube.com/watch?v=C9ptvLnatQA. NASA happy about successful SpaceX-



mission

US space agency NASA appreciated the successful start of a privately developed rocket carrier system called "Falcon 9" on 8th of December 2010 as a "great achievement". NASA manager Alan Lindenmoyer said "Thanks for the premature christmas present" after the capsule's several earth orbits and a water landing in the pacific ocean around 800 km away from the coast of Mexico.

Elon Musk, founder of "SpaceX" enterprise, should feel very happy after only three successful starts of six "Falcon9" rocket tests overall. According to a contract from 2008 "SpaceX" is bound to perform 12 supply missions to the ISS for NASA after the end of all Space Shuttle flights.

ISS in 3D

The very best Blu-ray-3D documentation ever in view of many 3D fans is now obtainable in USA and GB: "Space Station 3D" by IMAX has a lenticular 3D cover and is region-code-free! The

technical remarks on the back cover are pointing to the need of "High Speed" HDMI cable for 3D playback, but normal blu-ray players are able to use the 2D track included. One of the scenes in and around the ISS filmed with IMAX 3D cameras in a breathtaking quality is an amateur radio contact with US students! A little amusing is the spacewalk of two astronauts being dubbed with noisy tool sounds.



Avoiding 3D headache

1. 3D camera adjustment

Horizontal positioning of left/right video frames is one of several working tools with 3D shooting (for the new profession "stereographers"). This will determine the position of objects in front or behind the 3D screen and the virtual window. At cutting points that should not vary too much for spectators, and the main action has to use the "ghosting-

free" space just before or behind the screen in order to avoid uncomfortable conflicts between accomodation and convergence of both eyes.

2. inverted 3D

Question: "Is it possible to connect an HDTV receiver via HDMI to my 3D-ready DLP beamer Acer H5360 getting a decent 3D picture from "side-by-side" 3D transmissions? What about 3D Blu-rays or a playstation console?"

This is not an easy task - the Acer beamer needs a 120 Hz-3D signal at it's HDMI 1.3c connector, best way is to use the output of a current Nvidia graphics card in a Windows 7 computer. That will also help the main processors to decode 3D blu-rays (running in an internal blu-ray drive) with CUDA technology, and the Nvidia 3DVision infrared transmitter connected to a USB port can easily synchronize the 3DVision shutter glasses.

The second (cheaper) option "DLP-Link" shutter glasses is also supported by a special white flash signal from the DLP chip, but this way the left/right switching in the shutter glasses is not necessarily in sync with the 3D video - purely by chance. You have to determine for yourself by closing one eye or the other, if the projected 3D picture is inverted (head ache danger, distant objects seem to be nearer than close ones). Then the left/right assignment has to be switched in the beamer menu.



3. 3D-TV ghosting

“In my LCD-3D-TV set severe ghosting (visible echoes like reflected analog TV pictures caused by wrong antenna pointing) is lower after some working time. The warming-up of LCD crystals is speeding them up = less ghosting!”

3D plasma TV sets have a faster display processing (about 1,5 ms, LCD between 5 and 10 ms). 3D-DLP chips are even faster and do not show any ghosting effects!

4. 2D-3D conversion

A new “cheating” method is the simulated 3D conversion of normal (HD) video content, not only at the 3D cinema (i.e. “Clash of the Titans” and “Piranha”) and in some 3D-TV sets, but now also on a satellite TV channel called “Brava 3D” on Astra 23 degr. east showing operas and music concerts. A typical mark for this “fake 3D” are double lines (seen only without 3D glasses!) running apart from the lower



edge of the screen upwards, while in a real 3D shot these double lines would run in parallel continuously. This 3D cheating is damaging the whole 3D development worldwide more than other hurdles like 3D glasses and 3D-blurays

exclusively bundled with one device manufacturer.

Translations:
Klaus, DL4KCK
AGAF e.V.

Letters to the Editor

Re. CQ-TV 232, page 15: “Choosing a new 3D TV” (Mike Sanders, G8LES)

Hello,

May I add some remarks on Mike’s view of 3D TV? First, to prefer Plasma over LCD is right, but there is an even better choice for 3D home theaters: A cheap 3D-ready DLP beamer with 720p HD definition! More and more 3D fans are reporting their excitement about the really ghosting-free 3D cinema look on a 2m wide white screen (no special silver plating needed!). The DMD engine is switching very fast with 120 Hz frame rate giving a bright picture with a new UHD lamp, and light-weighted LCD shutter glasses are switching with 60 Hz per eye.

There are two wireless control systems: “DLP-Link” using a white flash signal from the beamer optics put in between the video frames, “Infra-Red” control like with most 3D TV sets but similarly restricted to only one manufacturer like Nvidia (3D-Vision, rechargeable).

DLP-Link has a disadvantage to be 50 percent wrong in L/R eye allocation (with crazy looking 3D content a “3D invert” function in the beamer menu may help), while IR control contains a stable L/R linkup. Light loss through the glasses is remarkable, but real home cinema viewers are used to dimmed environment. By the way, “clip-on shutter glasses” have to be produced still (I don’t know any), there are newer full 3D glasses with special design and minimum weight on the nose tip in the making.

Until now the “3D-ready” beamers (Acer, Optoma, Viewtek) can only take 120Hz sequential 3D video content, so a high-end home theater computer with built in Blu-ray drive is needed, but a speedy internet connection can also add huge 3D video banks like “Youtube 3D” (version “parallel”) in 1080p quality to the home entertainment. PC based 3D TV reception was described in CQ-TV 231, page 33, and CQ-TV 232, page 32.

Recently a cheap “boxed” solution was marketed by “Optoma”, the “3D XL Converter” is taking HDMI 1.4 signals from a stand-alone 3D Blu-ray player (3D format “frame packaging”) or a HDTV receiver (“side-by-side”) and putting out 720p 120 Hz 3D video for any 3D-ready beamer! That signal needs “high speed” HDMI cable if length is more than 5 m!

3D content is rising day by day, counting 3D Blu-ray editions and BSkyB 3D programmes with several soccer games every week, but beware of false 3D claims: more and more PC software pretends to convert 2D to 3D video (like some 3D TV sets), and even some cinema block busters and satellite TV programmes are using such faking tools. Don’t take the risk of severe headache...

Klaus, DL4KCK

Contest News

IARU International Contest: A disappointing level of UK activity for the IARU International Contest. Here are the final results:

Section 1

	Call	70 cm	23 cm	13 cm	6 cm	3 cm	Total
1	PA1PAS/A	1694	4362	11250		2085	19391
2	F9ZG/P	5189	6874	4070		1470	17603
3	ON4DPP/P		4962	12510			17472
4	F3YX	4342	5984	935		560	11821
5	PA3DZA	169	2672	6680		2225	11746
6	F6ANO	3096	4170	2030		2030	11326
7	PA9DX	787	3592	6630			11009
8	F6GNJ/P	2921	4702	1575			9198
9	PE1EZU	570	3472	4490	400	235	9167
10	PA3DLJ	714	3050	4580		725	9069
11	PE1EBX	249	2082	4665		2055	9051
12	PE1OFO	681	2142	4455		1760	9038
13	PA1AS	1042	2438	4315		635	8430
14	PE2TV	496	1144	3650		1170	6460
15	PA0AVN	748	1972	3535			6255
16	PE1OMB	5	1918	3875			5798
17	PA3CWS	181	1712	3260	555		5708
18	F6IQG	2461	3108				5569
19	PE1RXX			5515			5515
20	PA1RK	783	1608	2125	355	495	5366
21	PE9MJ	730	1306	2360		400	4796
22	PE1OLR	267	1226	3070			4563
23	PE1JMZ	1254	1182	2020			4456
24	S5/IV3WSJ		556	2571		1320	4447
25	F6BGR	2083	2178				4261
26	PE1RXX	351	2696			1180	4227
27	F6ESU	2301	1452				3753
28	PE1BQE		1180	2245	280		3705
29	PE1HIS	229	976	2240			3445
30	F1DUJ	1606	1656				3262
31	F6CIU	938	2196				3134
32	PE1NKT	81	669	1400	565	380	3095
33	PE1GQE			2780	150		2930
34	F8KOP/P	1649	1116				2765
35	G4TNX/P		878	1700		100	2678
36	S52DS		528	1320		660	2508
37	PD2HJE	426	442	1140		480	2488
38	M0DTS/P		976	1320			2296
39	PE1AXM		1894	120			2014
40	S52RU		556	1320			1876
41	PA3CRX		260	650	775		1685
42	F1ARY	993	600				1593
43	F6BGZ	554	748				1302
44	PA7HV			1230			1230
45	PA0ZR	382	458				840
46	PA0GJV	23	186	465			674
47	PE1RLF	50	70	350			470
48	F1TDG	192					192
49	PD5RST	90	90				180
50	PD0AV	112		28			140
51	PE1SDE		80				80
52	F1BCT	50					50

70 cm Activity

I am heartened by the amount of 70cm activity on the continent during ATV Contests. I am not sure why we in the UK have almost ceased to use the band. It's not that difficult to build a narrow band (2 MHz) 70cm transmitter, and there are plenty of solid state amplifiers that are linear enough for use with low bandwidth contest-style pictures. The longer distances that can be achieved on 70cm might convince a few more people that there's enough activity to make it worth coming on the air!

Repeater Contests

I heard from Roger G4OCO that he called CQ on GB3NQ during the December Repeater Contest, but heard no other activity. However, he did manage 3 contacts in the March Repeater contest, and looks set to be the winner unless I get any other entries!

Apology

My apologies that I was not able to provide Contest News for CQ-TV 222. Having just moved from the USA to Abu Dhabi in the UAE, and started a new job, life has been a bit hectic!

I can be contacted through e-mail (contests@batc.org.uk), or through my BFPO address:

Wg Cdr D G Crump, Defence Section,
British Embassy Abu Dhabi, BFPO
5413, London.

**See the BATC stand at
the Dunstable Downs
Radio Club Bootsale
on May 22nd
or watch us on
<http://www.batc.tv>
under "Live Events"**

Section 2

	Call	70 cm	23 cm	13 cm	6 cm	3 cm	Total
1	PE1IWT	303	366			145	814
2	F1TDG		192				192

Congratulations to John and the Humberside Group operating G4TNX/P – also to Rob M0DTS – creditable scores!

Contest Calendar

1200 UTC 11 June 2011	1200 UTC 12 June 2011	BATC Summer Fun Contest
1800 UTC 10 September 2011	1200 UTC 11 September 2011	International ATV Contest
1200 UTC 10 December 2011	1200 UTC 11 December 2011	BATC Repeater Contest
1200 UTC 24 March 2012	1200 UTC 25 March 2012	BATC Repeater Contest

Internet help

The internet is proving to be a treasure trove of help and information for all sorts of hobbies and Television is certainly one of them, hardly a day goes by before I get pointed at some helpful free software, or a TV news item, or just some plain old interesting TV archive item. I thought it might make an interesting page for CQ-TV or even a section of the forum which might be helpful for long links and paper only CQ-TV subscribers, for the cyber subscribers the links are only a click away

Archive interest

<http://www.youtube.com/watch?v=0f1GDQDB0Ss&feature=related>

VERA was one of the first Video recorders (Vision Electronic Recording Apparatus) developed in 1952 by the BBC under project manager Dr Peter Axonnot , it was limited to 15 minutes of recording time per reel (B/W 405 line) not the most practical of systems as the high head to tape speed required for video recording was achieved from a fixed head and spools moving at a very fast rate.

The problem of high tape speed was eventually solved in Redwood City by a team that included Charles Ginsberg and Ray Dolby working for Ampex . The solution they came up with was the rotating video head their machine was first demonstrated in April 1956.

<http://www.vtoldboys.com/>

Perhaps the best site to visit if you are interested in Video recording, the technology and its implementation at the BBC

Free software for stills

<http://www.faststone.org>

Very useful software for viewing still pictures (not all my pictures move) it copes with a of different formats including RAW

<http://www.gimp.org/downloads>
Gimp 2.6 again a free package for PC's that has often been likened to photoshop

<http://ufraw.sourceforge.net/Install.html>

useful plug in for Gimp that allows it to work with RAW images

Free software for Moving Pictures

<http://www.vlcmediaplayer.org/>

One of the best all round video players VLC plays absolutely anything. It supports an enormous number of multimedia formats, without the need for downloading additional codecs. It really does have the ability to play any type of Audio/Video file you throw at it.

<http://www.rivavx.com/?encoder>

Transcode your existing video files to the advanced Flash Video (FLV) format then you can upload them to www.batc.tv film archive Also comes with the free Riva FLV Player.

Free software for Audio

<http://www.darkwood.demon.co.uk/PC/meter.html>

These audio level meter programs allow the optimum setting of input levels for various sound recording functions, particularly for video editing. When capturing video and sound from different sources accurate level setting helps maintain a consistency of volume across various clips, and therefore eases the sound mixing. It does not indicate playback output levels, this meter indicates only what is fed into the wave input channel. To monitor playback output levels feed the wave output back into the wave input, either externally with a cable or by using the Windows Mixer if you have this option. Usually Vista and Windows 7 do not. For accurate work you would need to calibrate it. As an aid to calibration here is a Calibration Tone Wave File you can download*. This is a 400Hz tone recorded at a level of 4dB below Full Scale Digital. Playback this file and set up the meter so this reads '6' or +8dB on the scale, or just at the start of the red.

Forums

<http://www.edaboard.com>

Want to learn electronics and need a point to start ? Need help in your electronic relate homework? Need a seminar topic ? All questions can be answered here including software usage and installations and reviews. Also Linux solutions and EDA tools

<http://www.videohelp.com>

This site will help you to make your own DVD, Blu-ray, AVI, MKV, MP4 etc that can be played on your standalone DVD Player, Blu-ray Player, Media Centre or portable device from video sources like DVD, Video, TV, DV, AVCHD or downloaded movie clips like AVI, MKV, MP4, WMV, Flash, etc.

A forum for general technical help and discussion: www.edaboard.com

Another forum specifically for video topics: www.videohelp.com

Miscellaneous

<http://www.cutepdf.com/products/cutepdf/writer.asp>

Portable Document Format (PDF) is the de facto standard for the secure and reliable distribution and exchange of electronic documents and forms around the world. CutePDF Writer (formerly CutePDF Printer) is the free version of commercial PDF creation software. CutePDF Writer installs itself as a "printer subsystem". This enables virtually any Windows applications (must be able to print) to create professional quality PDF documents - with just a push of a button!

An alternative to cutepdf but with a few more features is Bullzip PDF printer at www.bullzip.com, the site also has a useful utility for copying file names to the clipboard, something lacking in Windows.

<http://www.coreftp.com/>

This free, secure FTP client gives you a fast, easy, reliable way to update and maintain your website via FTP. It also provides a secure method (via SSL, TLS, or SFTP) to upload / download files to and from FTP servers. Check out the list of features and you'll find almost every feature you need, all in a free ftp program.

<http://www.mailbigfile.com/free/>

File too big to email this site might just be the answer, you upload the file to the site, enter the email address of where it needs to go and they will be sent a download link

<http://www.alldatasheet.com/>

Alldatasheet.com is the biggest online electronic component datasheets search engine.

<http://www.atv-projects.com>

Our very own Brian Kelly's site full of ATV projects that have featured in either the Severnside TV Group's newsletter "P5" or The British Amateur TV Club (BATC) magazine "CQ-TV".

<http://www.alldatasheet.com>

Worlds biggest database of component information:

<http://www.tvcameramuseum.org>

The Virtual Museum of the Broadcast Television Camera. A site listing technical details and images of vintage broadcast television cameras from UK, Europe and the USA.

The Quantel Digital Factbook

http://www.quantel.com/repository/files/library_DigitalFactBook_20th.pdf

A really useful anthology of technical terms with explanations relating to the digital TV world. It is a PDF with 206 pages. It includes two digital tutorials and a white paper on "Stereoscopic 3D Post" as well as 172 pages defining digital TV terms. Well worth downloading. The URL is :

Technology on the move again, how this for the world smallest VT You could have one per camera and built in screen to check recordings

<http://www.atomos.com/>

This is ideal for anyone who thinks their ATV antenna needs to be higher

http://www.liveleak.com/e/07b_1284580365

If anyone has any links they would like to share, please send them in for the next issue: editor@batc.org.uk

For Sale / Wanted
BATC members can place an advert
in CQ-TV and on the website
FREE OF CHARGE

ATV Activity Day

by Ian Waters G3KKD

I thought that CQ-TV 232 was an excellent read. I can add something to the piece about network day on the back cover: For the ATV network day, 22 August 2010, the Cambridgeshire repeater group (CRG), which runs GB3PV, operated a portable 70cm DATV station. The site chosen was at Brinkley, 10 miles east of Cambridge (JO 02 ED) at a height of 370 ft asl. The group used the CRG's mobile shack, a large transit type van fitted with a 60 ft pneumatic mast, benches, power supplies, etc, affectionately known as Flossie. They used the callsign G6PYE, which commemorates their Pye heritage. The weather was excellent and the team had the equipment rigged and operational by 1100.



The equipment used was:

Two stacked 21 element 70cm yagis, with a total gain of 19dBd plus a receiving low noise preamplifier on the 60 ft mast. A camcorder feeding a

QPSK coder modulator giving a 2Ms/s, 7/8 FEC, 70MHz IF. A 70MHz to 436MHz up converter feeding a class A driver and a class AB power amplifier, capable of 250W. The preamplifier, with a gain of 20 dB and a NF of 0.9 dB fed a 70 cm to 23 cm up converter and a spectrum analyser. The up converter fed a conventional STB and a monitor.

Unfortunately, just before the event, a partial failer occurred in the TX driver amplifier reducing the output to 90 W. However, this did not cause problems with the contacts made, as the ERP was still about 5.5 kW. Talkback was by 144.750 MHz FM using a transceiver feeding a yagi on a crank up trailer mast towed by Flossie. The log shows that an excellent two way video contact was first made with Mike G8ASI (IO91SR) near Hemel Hempstead over a rather unobstructed 48 mile path.



Video was then received from Paul G6MNJ also near Hemel Hempstead. It is not clear if he received pictures from PYE, if so perhaps he can advise?



Finally, there was a two way video contact with Noel G8GTZ (IO91SR) near Basingstoke over an 87 mile fairly unobstructed path.

It was most unfortunate that three of the four stations, that had announced an intention to be on air, and who should have been worked easily, failed to be present. An attempt was made to work G3PYB/P on Meryton Low. He was a very difficult copy on 2 m, but some sporadic weak digits were seen on the spectrum analyser, presumably due to aircraft reflections.

Contact was made with G7LWT on Winter Hill using D-Star, but he had problems and did not get on to 70 cm until after we had to strike camp. In conclusion, it was a successful exercise, but it would have been much better with more activity available.



Pye built MCR 20 as supplied to BBC Wales

by Phil Hallinan

I read with great interest the article on "Project Vivat", and in particular the reference to the MCR 23 series of Pye built scanners which were equipped with the Pye Mk VI camera channel. I was employed by the BBC Wales as an OB base maintenance engineer at this time and had a great deal of contact with the unit when it was not on the road.

The camera channel is of great interest as it was a hybrid valve/transistor design. It followed the usual design of a camera head, a power supply unit, a CCU, and an operational control panel. This was a common layout with its contemporary cameras, the Marconi Mk IV, and the EMI 203.

All three channels employed the BICC Mk IVb camera cable. This provided 3 video coaxes, 3 screened quads and approximately 16 other single conductors. The Pye Mk VI power supply unit was very forward looking and aimed to maximise efficiency by employing a "Primary Regulator". This was a circuit that optimised power use by altering the firing of the mains cycle according to requirements as fed back by subsequent regulators. It was done by firing SCR's to adjust the 50Hz duty cycle into the mains transformer.

As far as I can remember, other features were the use of germanium transistors such as the OC29 as the series regulator on a 200v supply line. These delicate flowers had to be protected against overloads and again SCR's were used as crowbars across the transistors. These were fired by pulse transformers in series with the output load when in trouble.

The video chain in the CCU was all transistor apart from the gamma correction stage which used an E55L valve selected for its very high slope.

The general build quality was excellent and used plug-in metal chassis that were finished in white glossy powder coat.

The canner was supplied without manuals for the Pye camera. All we had were a set of blueprints and an audio tape that featured an interview between a BBC London engineer and the Pye project manager. These tapes were assiduously listened to by Jim, Mervyn, Meiron, Andrew and myself. We were the poor guys that had to repair the beasts!

Other memorable features of the van were the Pye 2788 14" picture monitors paired with the BBC MN6/501 waveform monitors. These fitted side

by side into a 19" rack.

The vision mixer was a BBC design 8 channel input. Access to the plug in modules was from behind the vision engineers seating. Vision amplifiers were a BBC design and featured a locating pin that if pushed in slightly off vertical resulted in touching a mains pin in the back connector. this resulted in a mains trip out - great!

One of the most unreliable units were the WG61 SPG's. These must have been Fergusons only venture into broadcast electronics. They were dual 405/625 capable but the changeover between the two standards was not on a switch and required the changeover of a number of plug in cards. To add to this the cards were not accessed from the front but from the side, requiring the removal of both units from the rack.

Often a change of standards was needed between sports items on a Saturday afternoon between BBC1 and BBC2. God help you if the gens did not work after a changeover.

Happy days

Phil Hallinan

Former BBC Wales OB maintenance engineer (1962 - 5)

**Remember, we will pay you for constructional articles published in CQ-TV.
Send in your latest project for publication and earn some money!**

At the BATC Convention



Welcome to the BATC convention, before our first speaker can we just run a quick camera check



Sorry if you are trying to genlock to me I need to speed up the Nipkow disc



No I think the problem is my camera, I have two of these camera's and the other one is fully populated but unfortunately at home



Would someone like to explain to our viewer there might be a short delay before we start streaming

The BATC Shop

Publications

An Introduction To Amateur Television (225gm)

The definitive handbook full of detailed information on how to set up your ATV station, plus lots of video and RF construction projects. The BATC handbook features construction articles on video units, 24cm and 3cm ATV, a Digital Frame Store, and much more.

The Best of CQ-TV (150gm)

A compilation of the best construction articles from CQ-TV's 133 to 146

CQ-TV Back Issues:

The following issues are still available. Please circle those required: 185,186,187, 188,189,190,191,192,193,194,195,196,197,198,199,200,201,202,203,204,205,206, 207,208,209,210,211,212,213,214,215,216,217,218,219,220,221,222,223,224, 226, 226, 227,228,229

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All items appearing in Members Services from previous editions, can still be ordered (subject to availability). Please see page four for contact details. Several items are still on sale, so please check for the latest pricing before sending a cheque.

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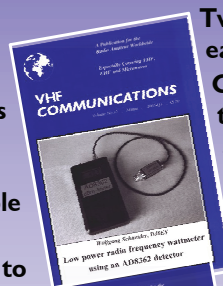
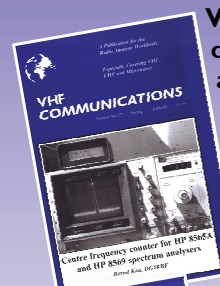
The web site has sample articles and a full index from 1969 to the present that can be searched to find articles.

All back issues are available, most are just £1 plus postage.

Two compilation CDs are available for £10 each plus postage.

CD-1 on measuring techniques contains 21 articles published in VHF Communications magazine from 1988 - 2005.

CD-2 on Transmitters, Receivers, Amplifiers and Ancillaries contains 32 articles published in VHF Communications magazine from 2000 - 2005.



K M Publications, 63 Ringwood Road, Luton, Beds, LU2 7BG, UK. Tel/Fax: +44 (0) 1582 581051, email: andy@vhfcomm.co.uk

Turning back the pages

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

by Peter Delaney

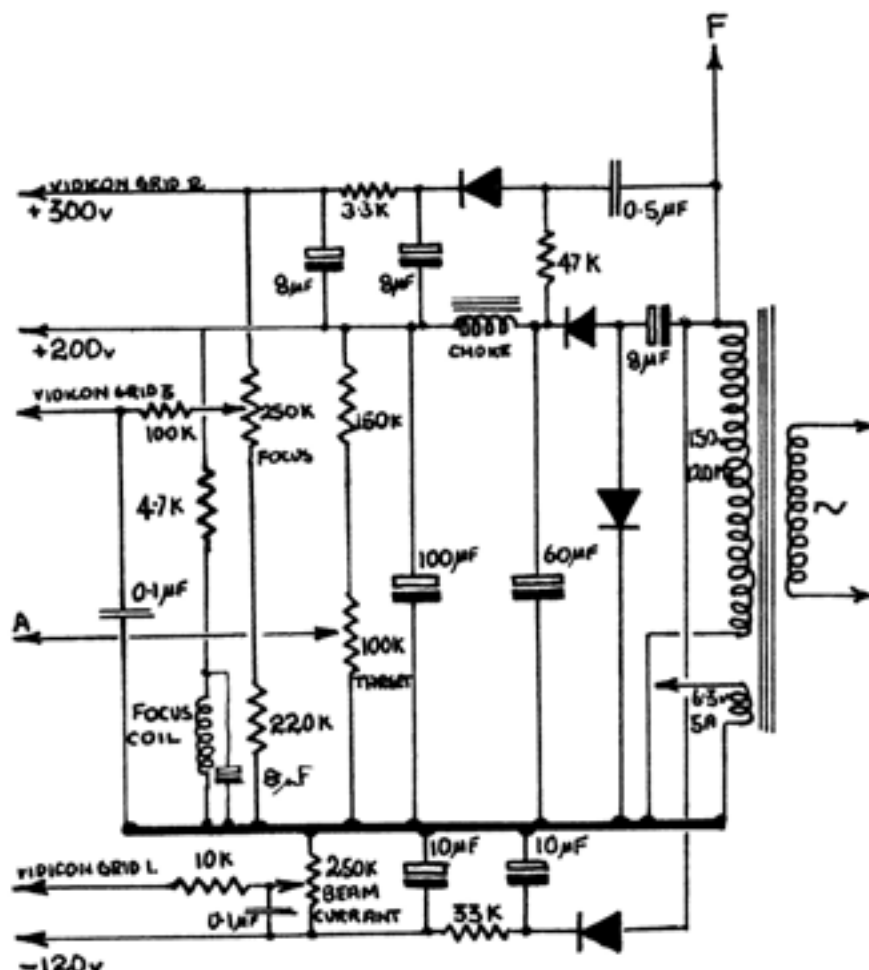
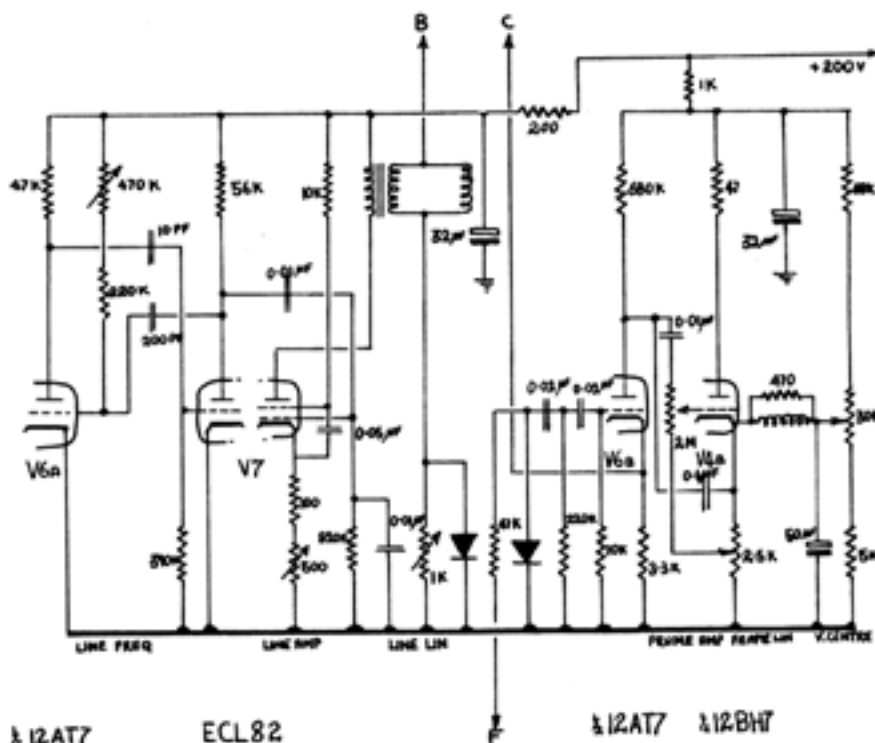
CQ-TV 47

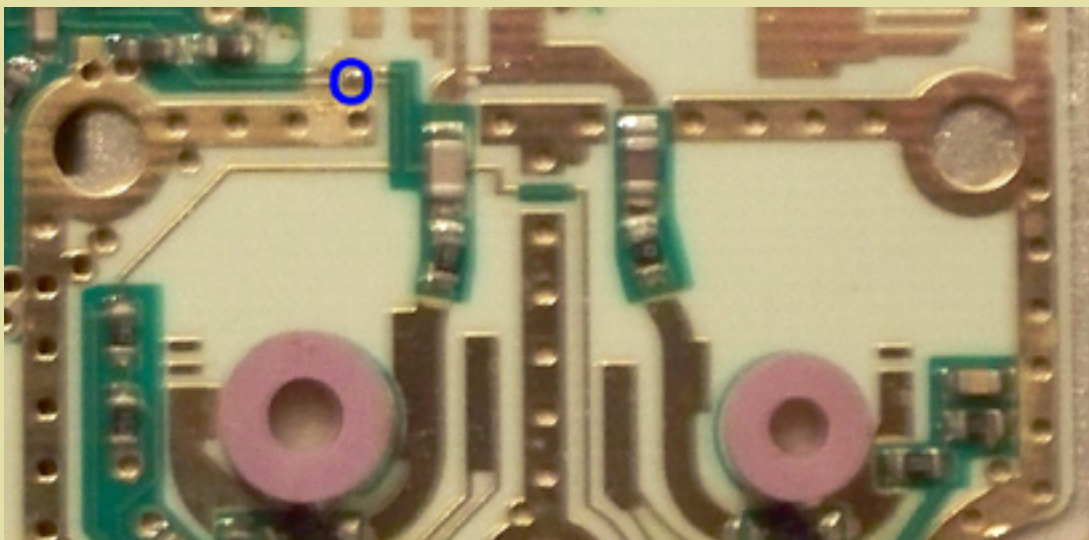
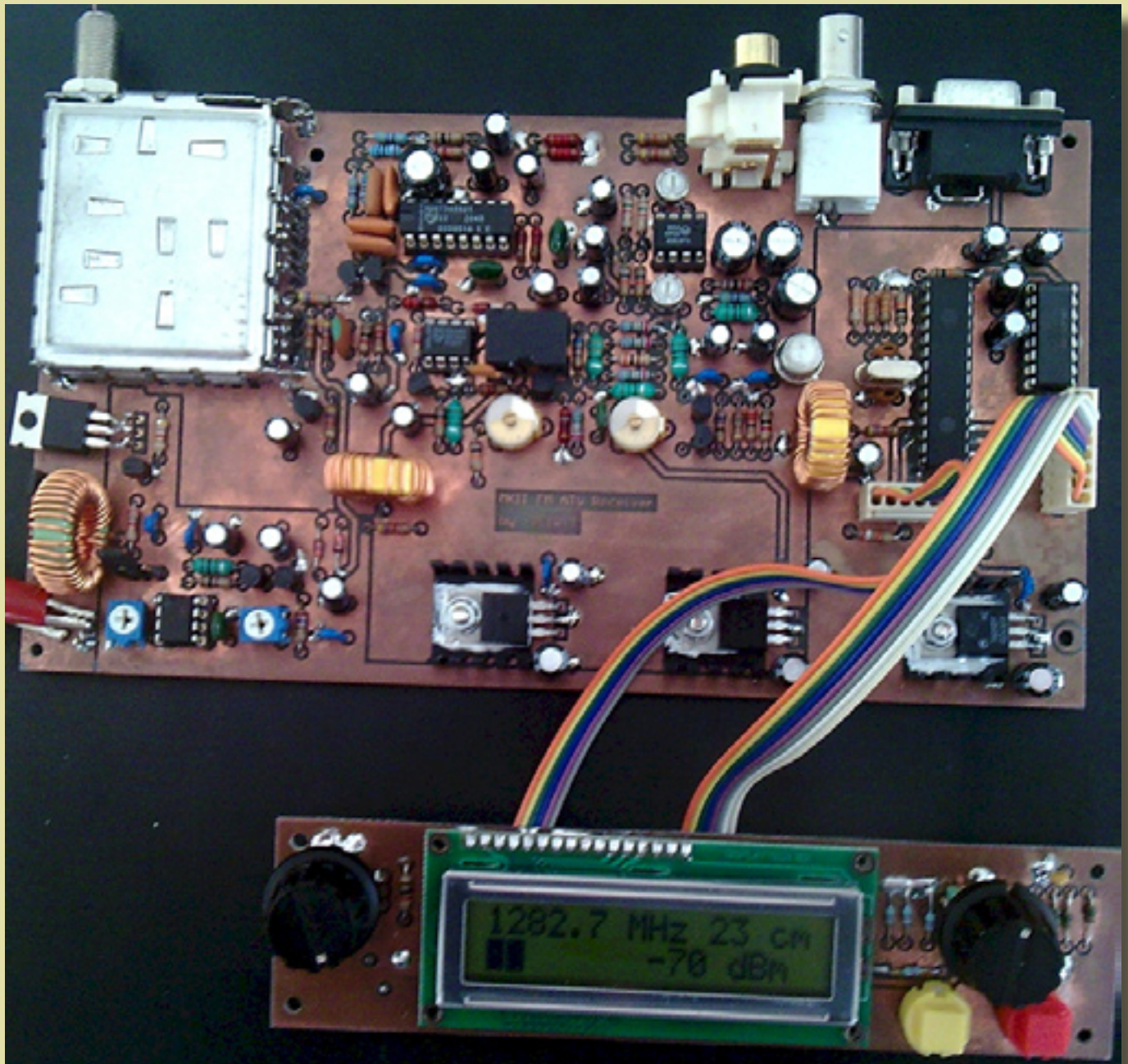
The issuing of CQTV had slipped to the extent that issue 47 came out in mid 1962 - hence the change to '48 years ago' in the heading.

The editorial advises that the Sixth Amateur Television Convention 'will take place on Saturday 8th September in the Conway Hall, Red Lion Square, Holborn London WC1'. It was hoped that a really representative selection of amateur TV gear would be shown in 'working action'. Admission prices were 3/6d all day or 2/- after 2pm for members, or 5/- all day and 2/6d after 2pm to non-members.

Edition 47 of CQTV carried two major articles - one a complete self contained vidicon camera 'ideal for the beginner or for the amateur needing a small camera channel without external pulse and control equipment.' The other article was a complete pulse generator - the first time a complete unit had been described in a single edition of the magazine.

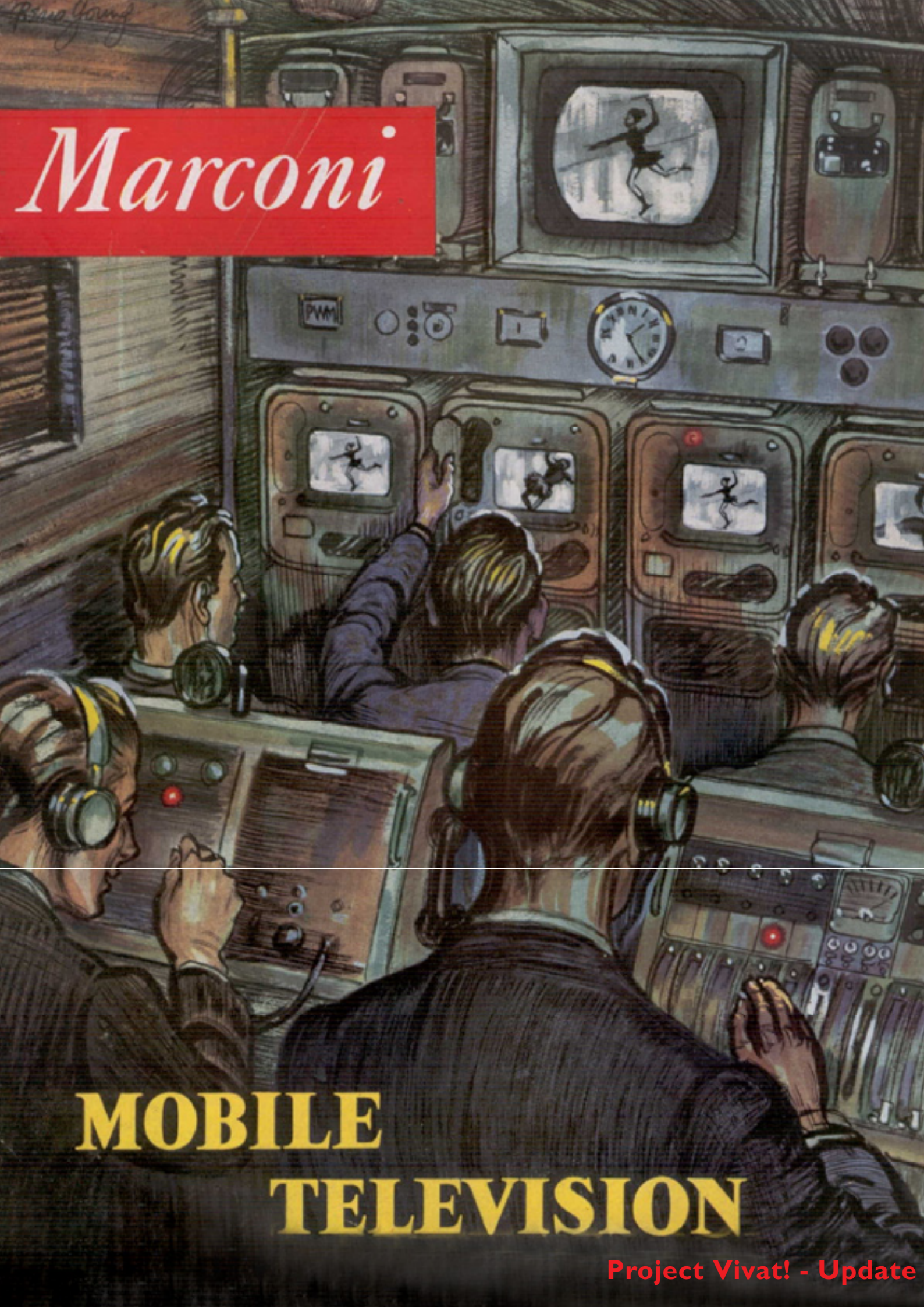
The "Seven Valve Camera" had been designed by D. Goodyear of St Albans, and was a random interlace unit with a free running the line oscillator, and the field drive synchronised to the ac mains supply. The output was designed to feed a domestic television receiver (in band 1). Although designed for 405 line positive modulation, it was said that with relatively simple modifications it could run on 525 or 625 lines, or with negative modulation. The video amplifier chain was formed of V1, V2, V3 and V4A, with V5 as the rf oscillator and modulator. The line scan circuit comprised V6a and V7, with V6b and V4b providing the frame scan. The power supplies included a voltage doubler for the HT supply and a voltage tripler for the vidicon G2 supply - both multipliers formed using solid state diodes. The focus coil was of





Quick and dirty
LNB MOD

Page 21



James Young

Marconi

**MOBILE
TELEVISION**

Project Vivat! - Update