Contents

Committee Contacts

BATC Chairman Trevor Brown G8CJS

Club affairs, Video tape library, Technical queries, especially relating to handbook projects. 14 Stairfoot Close, Adel, Leeds, LS16 8JR. Tel: 01132 670115. E-mail: trevor.brown@betwixt.dircon.co.uk

BATC General Secretary Paul Marshall G8MJW

General club correspondence and business. Library queries relating to the borrowing or donation of written material. Fern House, Church Road, Harby, Notts., NG23 7ED. Tel: 01522 703348. Email 101573.2170@compuserve.com

BATC Hon. Treasurer Brian Summers G8CQS

Enquiries regarding club finances, Donations, and constitutional enquiries. 11 Harefield Road, Uxbridge, Middx, UB8 1PH. Tel: 01895 810144, Mobile 0850 014892

CQTV Magazine Editor Trevor Brown

Anything for publication in CQ-TV, Articles, Review items, Advertisements, Letters to the editor, and other material except as below.

Photographs for the CQ-TV covers:- - Patrick White, Swyncombe, 8 Kingswood Court, Maidenhead, Berkshire, SL6 1DD, England

TV on the Air:- Graham Hankins G8EMX, 11 Cottesbrook Road, Acocks Green, Birmingham, B27 6LE. Tel: 0121 707 4337

Satellite TV News:- Paul Holland G3TZO, Chatterton, Chapel Lane, Threapwood, Nr. Malpas, Cheshire, SY14 7AX. Tel: 01948 770429, Email: 101705.137@compuserve.com

CQ-TV Advertising Manager: Dave Hemingway, Ivanhoe, Glen Road, Hindhead, Surrey, GU26 6QE. Tel: 01428 604645

CQTV Awards:- Bob Webb G8VBA, 78 Station Road, Rolleston on Dove, Burton on Trent, Staffs., DE13 9AB. Tel: 01283 814582

Exhibitions

Rally 96:- Mike Wooding G6IQM, 5 Ware Orchard, Barby, Nr. Rugby, CV33 8UF. Tel: 01788 890365, Fax: 01788 891883, Mobile: 0860 857434 Email: vhf-comm@g6iqm.demon.co.uk

CAT 96:- General arrangements and information about talks to clubs, demonstrations, lectures, etc. Paul Marshall G8MJW - Details above.

Club Sales

Members Services:- PCB's, components, camera tubes, accessories, etc. (NOT PUBLICATIONS). Peter Delaney G8KZG, 6 East View Close, Wargrave, Berkshire, RG10 8BJ. Tel: 0118 940 3121

Publications:- Handbooks, Back copies CQTV, and anything related to the supply of BATC publications. Ian Pawson G8IQU, 14 Lilac Avenue, Leicester, LE5 1FN.   Tel: 0116   276   9425.   E-mail: ipawson@cix.compulink.co.uk

Membership

Anything to do with membership, including new applications, queries about new and existing membership, non-receipt of CQ-TV, subscriptions, membership records, data protection act. Dave Lawton G0ANO, 'Grenehurst', Pinewood Road, High Wycombe, Bucks., HP12 4DD. Tel: 01494 528899

Club Liaison:- And anything of a political nature, co-ordination of ATV repeater licences. Graham Shirville G3VZV, The Hill Farm, Potsgrove, Milton Keynes, Bucks., MK17 9HF. Tel: 01525 290343. Email g3vzv@amsat.org

Contests:- Richard Guttridge G4YTV, Ivy House, Rise Road, Skirlaugh, Hull, HU11 5BH. Tel: 01964 562498

BATC BBS Sysop:- Brian Kelly GW6BWX, 12 Cotswold Way, Risca, Gwent, NP1 6QT. Tel: 01633 614376, BBS: 01633 614765. Email:brian.kelly@betwixt.dircon.co.uk

Repeater Liaison:- General enquiries and repeater affiliation. Graham Hankins G8EMX, 11 Cottesbrook Road, Acocks Green, Birmingham, B27 6LE. Tel: 0121 707 4337

Editorial

In CQTV 174 the S.C.A.R.T. ATV group reported the problems of repeater licences. The system of ATV repeater applications being veted by Graham Shirville to ensure a smooth passage through various RSGB committees has broken down. The problem was discussed at committee and it was agreed that I should write to the RSGB president on behalf of the club. This I did in March and am sad to report that other than a post card from Lambda House I have not had a reply and it is now June. The Kent ATV group have also taken the Step of writing to the RSGB president. I have not reproduced their letter. but the problems are on similar lines.

On a brighter front I have just seen a copy of the ATV programme broadcast on HTV. Bob and Brian made two amiable subjects and although some sending up of what we do was inevitable, they both managed to put a across the positive side of ATV.

Copy for CQTV has been at a record high and some has inevitable not made it into this issue apologies in advance if yours is among it. I have tried to edit it for interest balance and include one or two more pictures, That I hope brighten it up a little. New is golden oldie bit of past works that are no longer in print , for new members who will not have seen these older circuits. Let me know if you like it or have a favourit that you would like to see included.. 96 pages is all that the printer can manage to staple together but we are working on him.

The Editorial team is coming together and I hope we are all coming out of overload and into a more creative roll, and that this is reflected in the magazine. The Electronic communication is bearing fruit, and E mail is arriving, as yet we have not had an complete article via the Information Super Highway so there is still a first for someone. The down side was a file from the draughtsman went astray on the Highway and had to be redrawn, His Electronic is reproducing a little pale. but hopefully that will be fixed before we get to the printers. In this issue we have covered the PIC micro as a special topic with an explanation and a programmer and an article that uses on in anger. If you are interested in this subject can I point you at Nigel C Gardners book which comes with an assembler and Simulator, I have also found a bargain source in AC Farnell's of Leeds who have some at £5.89 as opposed to the usual £19. If you can find a way around there minimum order of £10 for non account customers, If not drop me a cheque and some P&P and I will see if I can get you a copy.

Last but not least can I thank everyone who sent me info and even Magazine's on PIC's and Stamps, I have not replied individually but all the help has been welcome, and has helped in compiling this and subsequent issues.

(trevor.brown@betwixt.dircon.co.uk)

Test Card Generator PCB's

GB3UD Amateur Television Group offer test card generator PCB's for sale

The board has been produced professionally for the group and is of very high quality, through hole plated holes and double sided eurocard size.

The PCB contains the colour circuit and a 1KHz tone oscillator, it uses easy to obtain 74LKS type IC devices.

The board is priced at **£18.00** + **£1.50** p&p and is available from:-

Trevor Burndred G0KBI, 53 Everest Road, Whitehall, Kidsgrove, Stoke-on-Trent, ST7 4DY Tel: 01782 782886

From the Membership Secretary.

I received a letter in the middle of April from Holland (it had a Dutch stamp on it) with a partial postmark of "Gravenha". Unfortunately the letter was not sealed when it arrived and the original contents missing.

If anyone has sent me a letter to which I have not replied and it could be yours please let me know.

Post and News
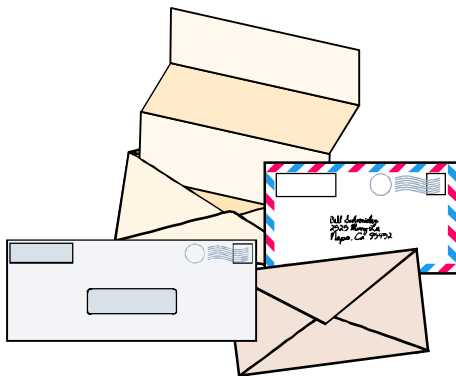
Please send all correspondence for **Post and News** to the CQTV Editor. Trevor Brown. 14 Stairfoot Close, Adel, Leeds, LS16 8JR England. Tel 0113 2670115. E-mail trevor@betwixt.dircon.co.uk

27 April, 1996 Dear Trevor

If you are wearing your editor's hat here are few notes on CQTV 174. I like the new covers. Congratulations to Patrick.

Chrominance Equaliser/Booster CQ-TV 174

Yes these low cost delay lines really do work for video. I have measured their performance and used them in broadcast grade designs. Up to l00nS they are almost flat to 5.5MHz. The 200nS parts roll off a little but can be readily equalised. At 300nS the delay per section is 30nS and the inherent bandwidth is marginal. Some manufacturer's parts are better than others. The Newport parts are not as good as some others but are readily available. I would counsel caution even at 200nS.

The delay lines should be terminated in l00R. Hence the 100R resistor terminating the output of the delays should actually be 110R since it is in parallel with the 1K feeding the virtual earth of op-amp 2. The feedback resistors of EL2020 op-amps should be 820R or 1K. For reasons that are too complex to explain here the bandwidth of this type of amplifier varies with the feedback resistor. With a 470R feedback resistor there will be a very large and nasty gain peak at about 50MHz and possibly oscillation. There are many other suitable video op-amps. The EL2020 is a first generation

part and not really recommended for new designs. The Elantec EL2044 series would be ideal for this project. The 2044 is a single, 2244 dual and 2444 quad. All reasonably priced too and not fussy about feedback resistor value. There are also many suitable parts from Comlinear, Analog Devices and Harris.

Note that pins 6 and 7 of the EL2020 are shown transposed in CQ-TV 174. ie pin7 is Vcc and pin 6 is the output.

3CMs North Sea activity weekend.

Bob Platts G8OZP and Has Dekker PE1ECO have arranged another set of North Sea 3CMs ATV tests for the weekend of the 17th and 18th of August 1996. Hans will be on the coast of central Holland. The exacted location in not known at the time of going to press. Bob will be on a small piece of private ground at the end of South Marine Drive, Bridlington on the Yorkshire coast. Any 3CMs stations wishing to join in are welcome to do so either from the front at Bridlington or from a coastal location of your choice. It is hopped to enhance our Knowledge of the sea surface propagation effect that was noted during last years tests. The more stations at different locations, the better. Talk back will be on 144.750 horizontal polarisation.

Bob can be contacted at...

220 Rolleston Road, Burton upon Trent, STAFFS, DE13 0AY, 01283 531443

Video Titler (CQTV 173)

Somebody asked in CQTV 174 about where to get chips for this project. The Xicor X9C103 is easy. Farnell (and probably many others) stock this. The NMJ2244 took some detective work. Do not confuse with the Elantec EL2244 mentioned above. It is made by the New Japan Radio Corporation and distributed in the UK by Young-ECC Electronics. 01628 810727. I am not sure if they would be happy about accepting small orders from amateur users. For those who do not know the EL4581 it is a superior version of the well known LM1881 sync separator. The latter could be used in this design. I can program many of the Philips microcontrollers but unfortunately not the 87C055.I like the look of this design. With a little bit of work (47u output coupling capacitor for video??) it would be useful even in a near broadcast environment. Regards Jeffrey Borin 25 Abberbury Road, Iffley, Oxford, OX4 4ET

Phone: 01865 777534 Fax: 01865 749540

Peter Delaney also did some research on the subject and came up with some R.S components order numbers :-

EL4581	R.S. 112-434	X9C103	R.S. 299-480
NM 93C46	R.S. 658 -788	MAX 202	R.S.299-913
LTC 485	R.S. 659-905		MAX699 Is not listed even by Maxim the

MAX 705 RS 284-292 is as far as I can tell pin compatible.

See also the E mail Section Steve Mitchell is on the trail of NMJ 2244 but alas no one has found a source of 87C055 programmed or otherwise

(EDITOR)

Dear Trevor

Thank you for your kind permission allowing me to reproduce selected articles from the CQ-TV magazine on my Internet Home Page.

http://www.nwnet.co.uk/dexter/ (doesn't work with all browsers) or http://www.nwnet.co.uk/dexter/sstv2.html

My home page is devoted to Slow Scan Television and related information. I am trying to provide new information or links to existing resources and sites, whilst trying not to duplicate data already available elsewhere . I shall attempt to update my home page on a monthly basis, if I have sufficient new material, with this in mind, if anyone wishes to submit material for inclusion on the page or has found links to new pages related to SSTV then I will try to include them.

I noted with interest M Puncer GOBLV, comments, in CQ-TV I74, regarding the lack of articles related to SSTV, but I feel I must jump to your defence, after all you can only publish information or articles you receive. The problem obviously lays with us Slow Scanner's, I think we're probably, all a bit Slow at putting pen to paper (too busy composing our next work of art).

The latest 'news on the block' is that, John Lagner, developer of the Pasokon SSTV system, has finished testing the Beta version of Pasokon 3 and it is now on sale in the USA for around $39.00. I believe he will "mail shot" all existing owners in the near future, but he can be contacted on email for those who need further information.

I have read on http://www.ultranet.com/~sstv/computer.html#pktv the following description of the new versions functions and capabilities:

- Supports over 30 SSTV modes including Robot, Martin, Scottie, AVT, Wraase, and New high resolution (640 x 480) ("P" modes P3, P5 &

P7).The screen operates on a 800x600 format with the image being 640 x 480 x 16 million colours

- VIS code decoding -- Receive mode is set automatically.

- Automatic fine tuning -- Compensates for signals off frequency.

- Real-time display of images -- See pictures as they are received not later.

- Built-in paint program -- Very quick and easy to add text and graphics.

- Read and write wide variety of file types BNP, $$Z, IPG, PCX, PNG, TGA, TIF.

- Compatible with all VGA cards -- automatically chooses best graphics mode available. On-line help.

- Built-in test pattern generation and image processing.

- Print directly to most popular printers.

- User-defined menu items -- "open" system approach allows seamless integration with frame grabbers, printers, paint programs and other applications.

Minimum Computer System Requirements

- IBM PC with '386 CPU, '486 or higher recommended.

- Colour VGA display. Any VGA card will work but one capable of 800 x 600 resolution with at least 32k colour is recornmended for best results.

- 4 Megabytes of memory, 8 Megabytes recommended for best results.

- One free standard (lSA) expansion slot is needed. Available from: -

- Absolute Value Systems, 115 Stedman St,. W Chelmsford, MA 0 1824-1823

There is a certain continental station informing British SSTvers that they must only use frequencies above 14.234Mhz etc., for transmitting, whilst that 14.230 is reserved for German speaking stations. Please ignore this, until we receive official confirmation. I for one believe this is an attempt by one station to cut down his own QRM and reserve himself a frequency. Have you heard of this, or have any comments, am I wrong ? I hope this goes some way towards allaying M Puncer' s G0BLV concerns about the lack of SSTV information. I reiterate, if we Slow Scanners don't come out of the closet and start writing our own articles, the rest of the Amateur world will continue to ignore us. I hope this sparks off some comment or even debate, I

look forward to reading others views, my email address is robin@dexter.nwnet.co.uk

73's Robin Dexter 15 Whitethorn Avenue Burnage Manchester Ml9 1EU

Dear Trevor, I wonder if there may be a CQTV reader who has successfully obtained a useable output from the Burst locked oscillator in issue 150 (also 154 and 155).I don't dispute that the BLO itself works, but as far as I can see it only works as long as one does not want to actually take an output from it! It will tolerate an oscilloscope x10 probe hung on the output (which is how I know that it does lock to an incoming signal) ,but any attempt to drive a lower impedance output causes problems . The probe switched to xl just unlocks the BLO . Any other load stops the oscillator altogether. I have tried other FETs of course, and I have tried an emitter follower - both instead of , and in addition to , the FET . I have also tried the output stages of the subcarrier DA in CQTV 122 added on the FET, without success. I wish to use the circuit as a subcarrier source, but to do so I will need to be able to clean it up. There is a noticeable line by line twitter on the output, and a set-up during the burst gating period . However I can't clean it up if I can't feed anything!

A.Jaques G3PTD 88 Sandy Lane Stretford Manchester M32 9BX

Dear Tony, Trevor Brown passed your letter about the problems you are having with the TDA 3950 burst-locked oscillator circuit, as it has appeared in several of the articles that I have written in CQ-TV, even though I am not the person who developed the circuit originally. To set the record straight, it first appeared in Circuit Notebook No. 41 (CQ-TV 129), and is attributed to David Ellis-Jones GWBPBX. Nevertheless, I have used the circuit (slight1y modified) at least a dozen times, and although I have had some problems, they have not been associated with the output buffering! The main problem, covered in the article in CQ-TV 155, was that the original circuit showed the pin 5 triggering feed to be `line drive' , whereas in order to gate the incoming burst, it should be ` line blanking' ; also, the pulses must be uninterrupted through the field period in order to preserve the PAL squarewave sequence.

I have rechecked the circuit diagram in CQ-TV l55, and can find no errors; the circuit should work. It takes some juggling with the settings of the APC pot and the frequency trimmer for optimum lock-up performance, and I have found that the `SC LOCKED' LED is a useful guide. I have had no trouble with `scoping (without a probe) at the output of the 2n3819 source follower, although I have found that the waveform is not very sinusoidal.

I am a Technician at West Herts College where we run a Degree Course in Television Production. I have built and installed 5 colour correctors in the editing suites there all based upon the principles outlined in my series 'Colour Correction' and all using the TDA 3950 circuit. In addition, I have used the circuit in a B-Y decoder for one of the Studio cameras for chroma key; also a number of colour correctors have been built for myself and friends. So you see, the thing DOES work.

I can only think that you have a problem with any of the following:-

- Circuit layout

- TDA 3950 itself

- ZN3819 (Correctly oriented?)

- The Crystal or coupling capacitors.

I'm sure that you will say that you have thought of all these things, but I can't see why your scope should load the oscillator from the output side of the source-follower. In fact, on the design that I currently use, I have reduced the gate biasing resistor from 10M to 1M without problems !

The circuit works better if the incoming burst has passed through an ACC circuit; if the burst amplitude varies, the oscillator phase changes. A simple circuit I have developed uses a TTL Schmitt trigger to achieve constant burst amplitude. I enclose a sketch for your info. Also I find the best way around the problem of poor waveform output is to amplify, slice and then rectifier the signal. In fact I do this by converting to TTL, and then using monostables for phasing adjustment. This also gets around the fact that the level of the signal drops during the blanking period, even though it is being picked off directly from the crystal.

I hope that you'll persevere with the circuit; it is the simplest B.L.0. that I've come across. It would help if you could get someone else (loca1) to cast an eye over your layout, as I have found that a fresh eye can sometimes solve simple problems that you are too close to, to see yourself Sorry that I can't offer any instant answers, but at least two other members of the BATC have made this circuit work - myself and GW3PBX
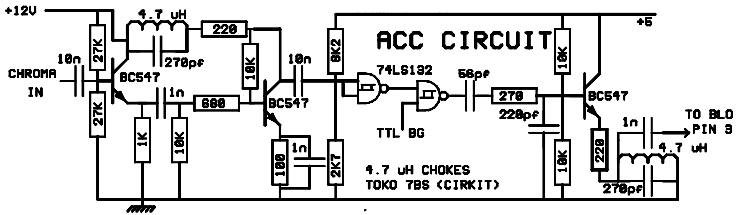
John Goode 58 Linden Cres, St Albans, Herts, AL1 5DD

Stolen Video tapes

Dear Trevor,

I have been requested by Detective Chief Inspector Anderson to help in any way possible to recover the missing U-Matic tapes purchased at the BATC Rally at the Sports Connexion, Coventry on Sunday April 28th.

I shall not go into any more detail than has already been disclosed by the media, specifically BBC TV News. The content of these tapes may, or may not, contain information contrary to the security of the United Kingdom and its defence forces.

I have been advised that all expenses and costs incurred during the purchase of such tapes will be reimbursed.

If you have any of these tapes then please contact me at the address, phone or fax numbers shown in my sig file. A rather hackneyed phrase I agree, but if desired all anonymity will be respected. If requested I shall act as an intermediary between the Police, Security Agencies and yourselves. The important thing is that these tapes are returned to their rightful place, from which they were stolen.

I shall not correspond further via this medium, but only by personal telephone calls.

Michael J Wooding vhf-comm@g6iqm.demon.co.uk

KM Publications, 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF, UK Tel: (0)1788 890365 Fax: (0)1788 891883

<div align="right">

The President,
Radio Society of Great Britain
Lambda House

</div>

Cranborne Road
Potters Bar
EN6 3JE

31st March 1996

Dear Sir,

Re:The processing of licences (NOV's) for 23cm ATV Repeaters

At a meeting of the National Committee of the British Amateur Television Club held last weekend, it was unanimously agreed that I should write directly to you to bring to your attention the major problem that exists regarding the above process and to request your personal intervention to ensure that the service that the RSGB provides is beyond criticism.

The BATC has been affiliated to the RSGB for most of it's existence and this is the first time that I, or my predecessors have had to write to the RSGB in such a way.

I am attaching a detailed description of the situation that exists today, as seen from the "customers" point of view and would ask that, as monopoly supplier of amateur radio liaison with the RA and of "NOV" issuing, action be taken by the RSGB to stop the time wasting that is taking place at the moment. This is, or seems to be, due to a total lack of intercommunication between, and little interest from the RSGB Committees involved.

One ATV repeater group has been advised by a member of the RA HQ staff that they would be happy to consider using an organisation other than the RSGB to provide ATV repeater liaison if this would provide a better service for the users. The BATC would be reluctant to take on this role but must be seen to be doing it's best for it's membership of over 2000 committed specialists.

Thank you in advance for your attention and help in resolving this matter promptly.

Yours faithfully

T. Brown - Chairman BATC

23cms ATV repeaters have been in operation since the early 1980's

The specification for these units was drawn up at that time and although a revised draft was circulated for discussion last year, existing units are still licensed to the requirements of the original document.

The band plan for ATV repeaters was set up at the same time and is, today, also basically unaltered.

Up to the end of 1994 a total of some 20 ATV repeater licenses were issued. Some of these took only 3 months to license from when the group submitted their full proposal to the RSGB.

The procedure has always for the groups to submit their proposals to the RSGB RMG. The RMG have, up to now, used G3VZV Graham Shirville, a member of RMG since 1985(approx), as vetting manager for these ATV applications.

Between March and September 1994 the following applications were received by the RMG.

GB3AT Southampton (new) - GB3VX Sussex (new) - GB3KT East Kent (new)

GB3VR Worthing (change of frequency) - GB3AF Newcastle (change of frequency)

The applications were sent to the RA in the usual way but were returned to RSGB HQ at the end of 1994 with a letter stating that the CAA/NATS objected to the applications and would not be in a position to discuss the problem for "some time".

The RSGB finally arranged a meeting with NATS last summer (June 1995) and it was agreed that a new spec would be circulated for agreement and a method would be proposed by the RSGB to NATS by which it could be demonstrated that a proposed ATV repeater would not cause QRM to the radar system.

After that meeting a press release was issued by the RSGB saying that everything would be sorted out but a little more time was needed(sic).

Since then the RSGB has not issued any information to any of the groups responsible for the projects listed above.

These applications are now over twenty months old.

There is NO new repeater specification being discussed

The RSGB has not yet approached NATS to seek agreement to a new system to prove non - interference

GB3AT is, according to reports, now back in the system but this has been achieved only after much badgering by the group concerned and without a review/update of the close down data and without a satisfactory analysis of the possible QRM to a radar at Pease Pottage

There is a backlog of new additional applications waiting to go in.

The RSGB committees responsible for co-ordination of these matters, LAC, Mwave and RMG have never met or discussed the matter jointly so that real action could be taken and the customers satisfied.

The RSGB is giving the appearance of totally ignoring the needs of an active section of it's membership.

Graham Shirville has become so frustrated at the lack of progress that he has offered his written resignation to the Chairman of the RMG twice in the last three months. He has yet to have received any response to these offers!

EMAIL

some of the mail sent to trevor.brown@betwixt.dircon.co.uk

With regard to the latest CQTV mag and the request for a supply of NMJ2244 IC's. I currently have 100 of these on order (8 pin DIL package) and will advise of cost and availability when they arrive in the UK. Some will be available if required.

 Steve Mitchell G3JMJ

The recent letters about E-mail and the Internet in CQ-TV makes me wonder if your readers know about the Mail Alias Service run by Amsat If you log on to www.amsat.org/amsat/listserv/remailer.html all will be revealed. As you will see you don't need to be a member of Amsat. All amateurs on the Internet drop this service operator a line and get on the list then we don't need to worry about long addresses, only the other persons callsign. Thanks for all your work on the magazine. Best wishes John Knight jmk@cable.co.uk

Trevor, today received my first CQ-TV magazine from BATC as a new member. I thank your organisation for accepting me and will be looking forward to the magazines as they come out. I did not however notice my membership number anywhere and wonder if you may be able to email me

the details for when/if I order things from BATC member services? Once again thank you. Just a bit about Local ATV here in Melbourne Australia.

Firstly, I have only just managed to put together a 70cm transmitting system but have been in receive mode for several years. I did however manage to transmit 10GHz ATV down my passageway several years ago but unfortunately the GUNN module died and I have not yet managed to rebuild, the system. Consisted of a home-brew Modulator/Power supply into a Microwave Door opener module for the TX, and a modified 12GHz LNB and a NEC 1022 Sat receiver for the RX. Although only 15m in distance, with no antenna connected either side, pictures where perfect. I plan to investigate both 10 GHz WBFM and ATV in the near future between several friends here locally

As to the Melbourne ATV side, our local repeater on "Mount Dandenong" consists of a 444.250 uplink and a 579.250 downlink. The 579 MHz is a left over from the old days when VK amateurs where entitled to the 50cm band, now solely used for Broadcast Television although stays of execution have been granted to ATV repeaters only, until required by the broadcast service. Recent efforts by the die hard ATV people here point towards having a 1.2 GHz FM uplink. The 444.250 uplink may also stay and both uplinks will operate on a first come first served basis??? Those involved are excited by this and have told me that 1.2 GHz is an excellent band in which to operate. However, due to the nature and position of Mt. Dandenong, the repeater's (VK3RTV) antennae are orientated to give about 180 dg from north through west to south pattern. As I am due south of the repeater location and around 30 - 40 Km's away I only get into and receive it marginally, so I tend to play around with out simplex channel 426.250 more with closer locals. None the less, it is all fun and a great learning curve from "narrow band" modes.73 till next time. Any chance on a bit more information on the 10GHz diode modulator, item number 55 and the 10GHz head unit, item number 56 and any other associated info? Thanks Mark x25net vk3jma@vk3blw.#mel.vic.aus.oc

 Internet: vk3jma@ozemail.com.au fidonet :

CAT'96

Conference on Amateur Television '96

Post House Hotel

Crick

(Nr Rugby)

Aug 31st/ Sept 1st 1996

BRITISH AMATEUR TELEVISION CLUB

- CLOSE TO M1

- AMPLE CAR PARK

- ACCOMMODATION - BOOK DIRECTLY WITH THE POST HOUSE ON 01788 822101, STATING 'BATC'

- LATE BAR

- SNACKS AND DRINKS AVAILABLE ALL DAY AT REASONABLE PRICES

- EVENING DINNER ON 31st Aug.

- FULL CONFERENCE AND DEMOS ON 1st Sept.

How to Get There:

BY CAR: The POST HOUSE HOTEL is in the centre of the country, located about 300 yards East of exit 18 of the M1 motorway. Motorists should leave the motorway at J18 and take the A428 signposted to Crick and Northampton. The POST HOUSE HOTEL is to be found at the end of its own slip road on the left hand side. It could not be much closer to the M1 unless it was a service station!

BY RAIL: The nearest mainline and Inter-City station is 'Rugby Midland', which is actually in Rugby itself. A Taxi rank is available.

BY BOAT: The Oxford and Grand Union canals pass close to Rugby and Crick. Numerous wharves and moorings are available.

BY AIR: The nearest major terminal is Birmingham International Airport. It is around 30 miles from the venue.

Rally 96

by Mike Wooding G6IQM

Once again it is all over and the dust has now settled on Rally 96 - although there is still a little storm raging over certain happenings in the car boot sale!

The Rally was thankfully again a financial success, with early estimates indicating a net profit for the club of around £900, which will be useful for financing CAT 96 at Rugby. It was much more difficult this year persuading traders to come to the rally, it appears that they are getting fewer and fewer, certainly radio-related traders anyway, the others come and go somewhat like the wind. Apart from the difficulties however, I managed to just about fill the hall again, disguising the empty tables by allowing the traders to 'expand', and as the photos show (somewhere in this issue!) it all came together quite well.

The Rally itself started for me around 3pm on the previous Saturday, when I arrived on site complete with all the paraphernalia for the show and, of course, the VHF Comm. stuff as well. Unfortunately, due to a badminton competition taking place in the hall, I could not get access until after 6pm, so it was off to meet John and Elaine Elliot in their caravan just up the road for tea and cakes - many thanks both for an entertaining afternoon. After demolishing all the cake I left for the hall around 6pm but still could not get it, but was persuaded by Dave G6FEO to accompany him to the Bull and Butcher for a pint or two of the wonderful Irish bitter they sell - it didn't take too much arm twisting!

Finally, around 6.45 we got into the hall and it is now I must thank the large, by previous years standing at least, team of volunteers who turned up to help set the tables, etc., out. In fact, by around 8pm all was finished in that respect and the team duly departed, leaving me to finalise things and set up the VHF Comm. stand and Chris Smith to lay out the cables for the traders' electricity supplies. By 10.30 all was completed for the night and I went home.

Sunday morning the alarm, somewhat rudely I thought at the time, went off at 6am and I was on the road to the hall at 6.30. This year I actually beat the traders to the site, but only by about 10 minutes, come 7.15 and the place was becoming a hive of activity - the Rally had taken on a life of its own and was now unstoppable, and generally unalterable too. All the months of planning (?) were swept away as traders, stewards, helpers, boot sale people, etc., all did their own thing! - still the outcome looked OK.

The only real hiccup was having to move some of the already established boot fair traders from one location to the correct one - sorry Clive, I shall be prepared for that one next year! Ten o'clock arrived and the doors were opened! and after the initial rush there was a steady flow of visitors until around 3pm. Brisk business took place on the stalls and for much of the day the Club stand was two or three people deep, many parting with the folding stuff for books, PCB's and whatever. Outside the hall, Steve Mitchell, Ashley Booth, et al were doing whatever it is that they do with the OB and Link vehicles and the boot fair was doing brisk business - thankfully yet again the weather was excellent for the entire day.

By 5pm most of the visitors had left, the boot fair was nowhere to be seen and by 6 the hall was clear of traders and most of the tables cleared away. 7pm saw me back on my way home - it was all over again for another year, apart from balancing the books and liaising with the powers-that-be over the U-matic tape affair!

All-in-all Rally 96 was very successful. I would like to thanks all the volunteers who helped over the weekend, without you it would be an almost impossible task. I would also like to thank the Coventry Amateur Radio Society for providing and running the talk-in station and for their members' help during the day. Finally, I would like to thank you for supporting your Club and coming to the Rally.

Oh - one further thing. See you next year at Rally 97, The Sports Connexion, Coventry, Sunday April 27th

There are more rally pictures on page 78

**PYE Squared**

by Dicky Howett

A history of the ubiquitous image orthicon television camera, the PYE Mark III.

Frankly, the Pye Mk III 3 inch image orthicon camera was just a fraction too clever for its own good. For starters, it did things no other broadcast television camera could. At it's introduction in 1951 the camera proved to be technologically way ahead of the competition. For example, the camera could be totally remote controlled. An engineer sitting in the gallery or o.b. van could swing the lens turret, change the iris and pull the focus, all with the aid of knobs, wheels and push buttons. Also, with dedicated attachments, the camera could be made to tilt 30^0 above, and 40^0 below horizontal as well as pan 280^0. About the only task the camera couldn't perform was make the tea and change its own valves. Remember, this was still the era of valve driven electronics. A time when your average industrial computer had so many electron tubes it could have fitted comfortably the length of Coronation Street itself. In fact up at Granada a Valve Tale was told of how a television cameraman cooked his breakfast using solely the furnace like heat radiating from a large camera control unit. (Actually, this apocryphal story ran throughout tv, each studio substituting its own engineer, in turn varying the amounts of bacon and eggs!).

Meanwhile back at Pye, the idea of a fully automatic TV camera found little favour with British broadcasters. It was assumed-perhaps correctly-that too many things could go wrong. Also, understandably, cameramen were a little wary of any sort of job-destroying technology. However, the Pye Mk III camera soon overcame this prejudice (the jobs of cameramen were safe, at least for the next 25 years) and eventually the camera became very popular.

Essentially, the Pye Mk III was a compact 3 inch image orthicon four lens monochrome television camera developed with a large eye on the export market. There were two basic models: the 2028 which ran 405 lines and the 2014 which ran 525 and 625 line standards. A further, switchable version (the 2014E) could cope with an extra standard of 819 lines for French and Belgium television.
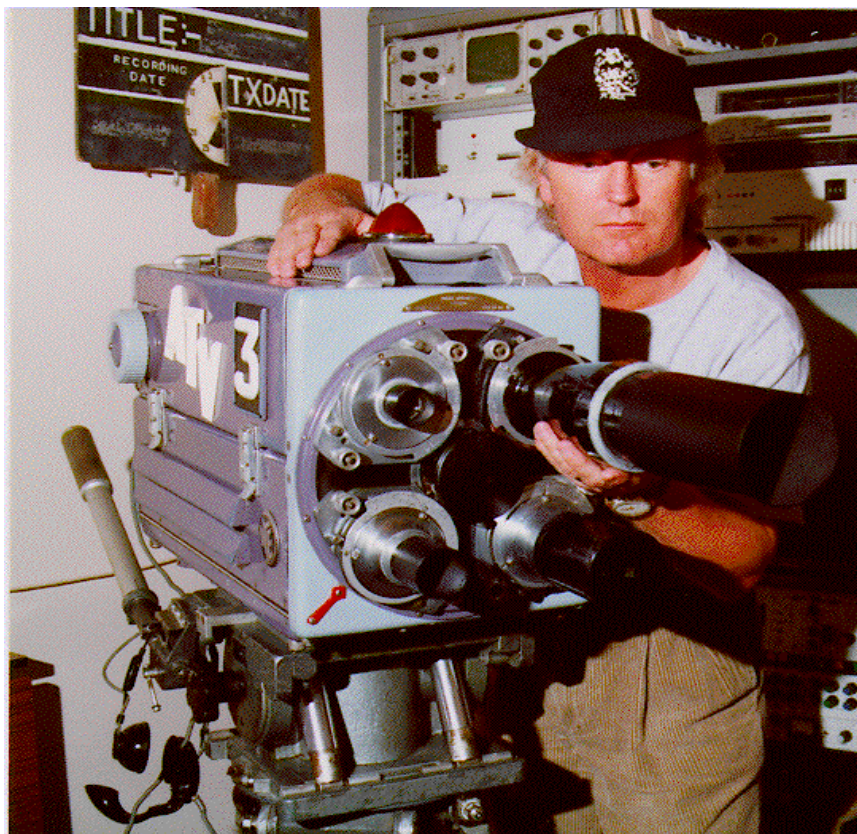
Dicky Howett with his ex-ATV PYE MkIII

At the front end of the camera, the turret and lenses had some interesting and unique features. The (11 inch) turret itself was constructed with a peripheral ball race to withstand the strain imposed by the largest lens. Lens changing was accomplished by a motor drive in the turret controlled by a selector switch at the rear of the camera. When set in motion the turret rotated until the selected lens was in position. The turret then locked in place automatically. (The 'taking' lens was looking from the front bottom left. This was indicated helpfully by a bold red arrow). The time it took to change from one lens to one adjacent was 1.5 seconds. To a lens opposite, the time was 2.5 seconds (This speed could seem glacially slow to some cameramen used to manual turrets, swung in half the time). Nevertheless, a motorised turret was a useful laboursaving device, especially on outside

broadcasts where the weight of a 40 inch telephoto lens on a manual turret could easily break a wrist.

The lens mounting plates for the Pye Mk III were unique to the camera. These plates were quite heavy (approx. l.5kg even with the lens barrel removed) and they were attached to the turret by locating pins and secured by large knurled nuts. The lenses (Watson or Dallmeyer in Britain) were manufactured with a special aperture barrel which connected by cogged teeth to a central cogged motorised iris wheel. The iris on all four lenses could then, as mentioned, be controlled from the gallery, or on override, by the cameraman himself. Also, the lens mount had a built-in resistor that through metal sensors, automatically came into circuit. Because the focus

The serious end of a PYE MkIII

control was entirely servo operated, the image orthicon tube could be positioned correctly in relation to any particular lens. In other words, the picture tube was automatically racked back or forth to maintain focus, compensating for the change in focal length after each turret change.

Image focusing was performed by large hand-operated wheels situated at either side of the camera, with a switch selecting left or right or 'Remote'. As the focusing was electrical the picture tube (and the focus) would remain locked irrespective of the camera angle of tilt. (Cameras with manual focusing -especially the weighty Marconi Mk III--meant that the cameraman had to hang on to his controls otherwise the I.0. tube could rush headlong, due to gravity, resulting in a nasty and possibly costly 'clunk').

The Pye Mk III had a fixed 5 inch viewfinder which together with the servo unit could be swung upwards and outwards away from the camera for ease of maintenance. Flying leads could be attached to allow adjustments to be

performed whilst the camera was running. The camera had an all up weight of 48kg which for its size was somewhat heavy. In fact, as the author can attest, the Pye Mk III is quite a little weight to lug around.

Heavy weight or not, the camera was a success in Europe, the Middle East (Iraq), the Far East (Thailand) and particularly the USA (ABC TV for one) where it was marketed by an outfit called General Precision Laboratory Inc who re-badged the camera with an identical 'PYE' decal shape with the letters GPL'.

Returning to 1951, the BBC commissioned from Pye an o.b. unit equipped with three Mk III cameras and this unit first went into action on November 14th, covering a London snooker tournament at Leicester Square Hall. The Television Newsreel of the time described the camera with typical BBC understatement as being 'of new design' it's a step to doing away with the cameraman altogether ..in reality this will only happen if the camera space is too restricted to allow for a cameraman to 'fit'

Reassuring stuff, especially for obese cameramen. The commentary went on to add, 'it (the camera) will give a picture much the same as all other outside broadcast cameras now in use'.

In fact the Pye Mk III would have produced somewhat better pictures. However, it matched well with the Marconi Mk I (and 1B) camera, then in BBC o.b. use.

The original casing of the Pye Mk III (two tone blue) had nothing much in the way of ventilation. There was just a single internal fan to keep the components at a stable temperature. Later versions of the camera-casing had various sloping external vents and a so-called 'export' type had a double fan arrangement. (You can spot the double-fan types of Pye Mk III camera because they have oblong 'tin sheds' on the top). Also on the original models, the 'Artiste' cue lamps were just a couple of small red lights situated on both sides of the turret at the top. Later came varieties of top-mounted cue light which were actually familiar car brake lights of the time (wedge or dome shape) from Lucas. (Why invent it if you can buy if off the shelf at Halford's
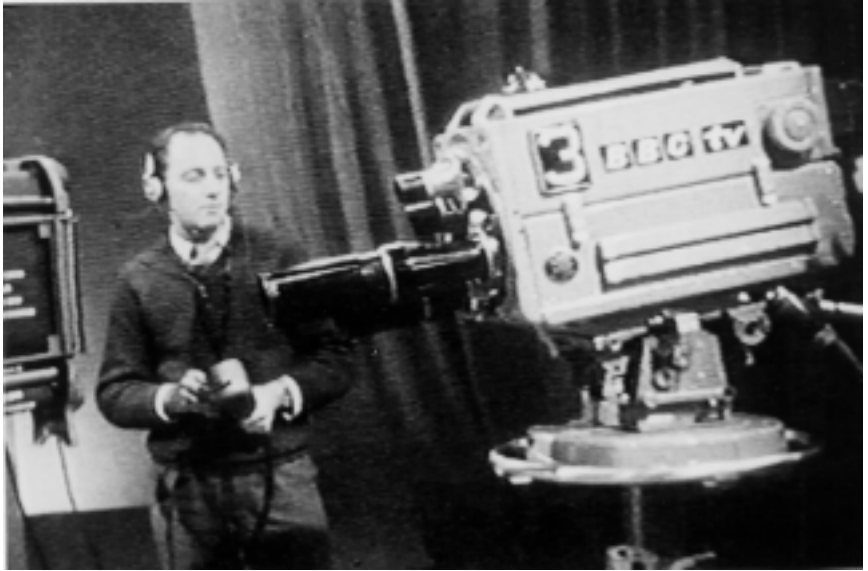
BBC Bristol, an off-screen shot

The BBC equipped two regions with Pye Mk III's for outside broadcast use and also for a certain amount of 'roll in' studio work. Scotland had MCR (Mobile Control Room) 11 and the West of England had MCR 12, each with three Pye cameras. (When the Scottish o.b. unit came down to augment the 1953 Coronation outside broadcast camera force, one of their vans, situated at Hyde Park displayed proudly the BBC Scottish Region 'Flag' just to keep up morale).

No BBC London studio was ever equipped with Pye Mk III's. The reason for this was technical prejudice. The BBC in the early nineteen fifties was not at all keen on 3 inch image orthicon tubes for 'serious' studio work, preferring Photicons, Pesticons or the more 'photographic' CPS Emitrons. Image orthicon pickup tubes were tolerated at the BBC only for their high sensitivity and consequent valuable use in low-light o.b. situations. The exact opposite was true for Commercial Television. It started transmitting using only image orthicons! When ATV began in 1955 it was run exclusively on Pye Mk III'S. Pyes were installed at ATV's Wood Green Empire, The Hackney Empire, Highbury Studios and the Foley Street Master Control presentation studio. ATV's o.b. fleet was all Pye and there are many photographs showing Pye Mk III cameras in action, some installed at the London Palladium for that popular Sunday night variety show.

Granada TV equipped it's fleet of 'Travelling Eyes' with Pyes and when 'Studio 4 in Manchester opened for local programming, Pye III 'S were wheeled in. (The Beatles first TV appearance (1962) in Studio 4 was captured by Granada's Pye cameras). Then there was the Chelsea Palace in London from whence came

'Chelsea at Nine' and 'The Army Game', again using Pye Mk III cameras.

 (Continuing the subject of technical prejudice it must be noted that a 3 inch image orthicon sourced picture had a tendency to look 'embossed', or white edged. This factor probably helped at the receiving end, given the generally poor picture reproduction quality of some home receivers. ITV studio pictures thus tended to have a grainy, bright, 'dynamic' appearance over the arguably softer non-image orthicon BBC pictures).

ITN, Scottish tv, ABC tv and Anglia tv all used Pyes. (Anglia's little give away booklet from 1959 'Anglia TelevisionThe Creation of a Station' features many pictures of Pye Mk III'S on the job as it were). It's a tribute to the good robust design and longevity of the equipment that most of Commercial TV's Pye cameras were still running (all on 405 lines) right up to the advent (in 1969) of all-channel colour TV.

The Pye Mk III camera was withdrawn from sale in 1960 after an estimated world wide sale of 250 units. So where are these Pye Mk III cameras now? Do any survive? The answer is yes, and in some quantity. Several BATC members own Pye III's, and museums here and around the world have examples of the camera in their collections. These days, not surprising considering the amount bought, most of the old preserved Pyes are ex ATV (in some cases still sporting those distinctive ivory coloured car number plate letters- a style called Bluemels Pyramoid 11).

By the start of colour TV in Britain, ATV still had the lion's share of operational Pye Mk III cameras. In 1970 it (reasonably cheaply) disposed of the cameras to all comers. Legend has it that during a sale, from ATV's Elstree o.b. base, a BATC member bought five Pye Mk III's (plus an o.b. van and for good measure an Ampex VR 1000 2 inch Quad video machine.

Recently, (in serendipity mode) the present writer met an ex ATV engineer who confessed to being at that very same 1970 sale. He was on the lookout for souvenirs, and he also acquired some Pye kit, but this time for free. He told me that during the sale he wandered over to a skip and discovered boxes and boxes of Pye Mk III camera lenses, a few of which were of the rare 40 inch 'folded' variety, all heaped up, ready for scrapping. Fortunately, the ATV engineer had the good sense to 'liberate' some of the lenses and keep

them secure in his garage where they remain to this very day. But that, as they say folks, is another story!

A PYE MkIII on the job at Southend Carnival 1956

Some Amateur Television related Internet addresses.

VHF Communications http://www.eolas.co.uk/ag/vhfcomm.htm
Radio Society of Great Britain (RSGB) http://www.rsgb.org/rsgb
British Amateur Radio Teledata Group (BARTG)
http://www.cs.nott.ac.uk:80/~ibx/BARTG/
The PROPOSALS MANAGER of the RSGB's REPEATER
MANAGEMENT GROUP
http://ourworld.compuserve.com/homepages/DALZIEL
Index of over 700 radio and TV http://www.mbnet.mb.ca/~rraimb
Amateur Radio Slow Scan Television http://www.ultranet.com/~sstv/
The Amateur Television Network of Southern California
http://www.ladas.com/ATN
UK Slow Scan TV site http://www.nwnet.co.uk/dexter/

GB3XT Kits & Bits. (Advert)

Using Gunnmod2 with High Power Diodes

by Bob Platts G8OZP

I have been asked on several occasions on how to use my Gunnmod 2 ATV TX kit with higher power diodes. The standard unit will power diodes up to 30mW above this power level, modification is required.
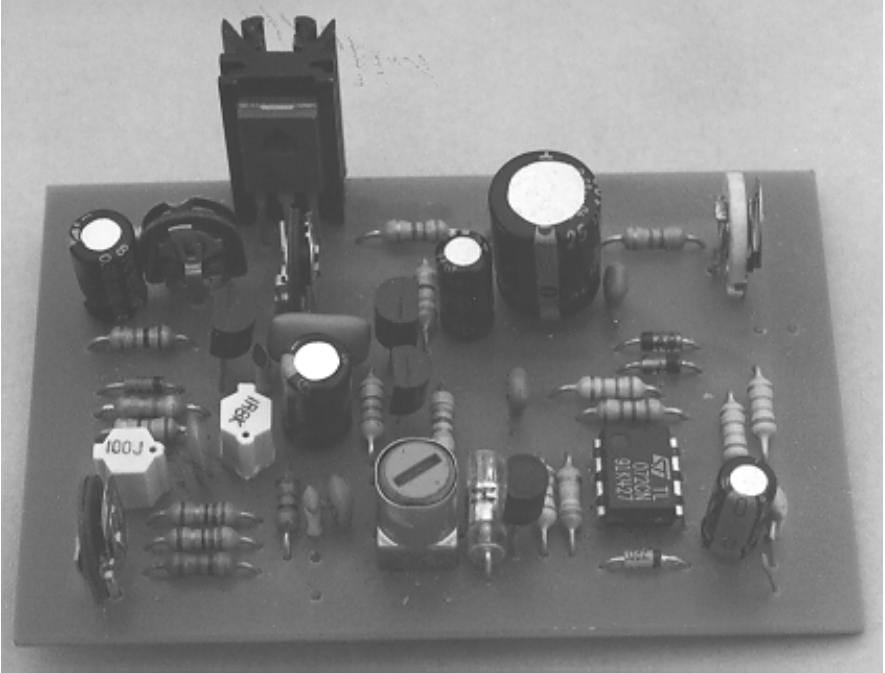
100mW and 300mW diodes require the addition of an emitter follower stage to provide the extra current, the base of the transistor connecting directly to the Gunnmod 2 output. 100mW diodes can consume 500 - 1000mA, 300mW diodes can consume 1000 - 1700mA. The emitter follower transistor must be able to handle the current and have a high enough Ft. Medium power HF RF power transistors are ideal. the 2SC1969 being well suited. The Ic max. is 6A and max. dissipation is 20W. The package is TO220 which make it easy to mount and fit to a heatsink.

High power Gunn diodes can produce up to 10 Watts of heat. This must be removed by means of heat sinking the diode. Diode cavities designed for low power diodes are unable to dissipate this amount of heat.
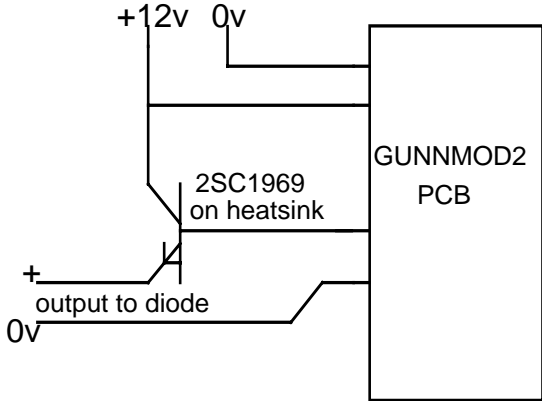
It is the anode (+) end of the diode that gets hot. There are a couple of solutions. A new oscillator could be made from a length of copper wave guide. Several designs have been published in microwave handbooks etc. The diode must be reverse mounted with the anode to the copper wave guide. A heat sink could then be attached to this. Make sure the diode mounting hole is a good fit for good heat transfer. Alternatively an existing lower power cavity could be adapted. In most cases the diode is located in a mounting screw fitted into the body. This is removed, possibly drilled out to a larger size, and replaced with a new mount made from copper rod to which a heat sink is then attached. In both cases the anode of the diode will be connected to the cavity body. This means that the cavity will need to be electrically isolated from the rest of the system. Use nylon nuts and bolts and a plastic membrane on the mounting flange. The positive supply can then safely be connected to the case and the negative to the diode post. High power diodes may require a slightly different operating voltage to the 7V normally used on low power devices. In the past, I have known of high power diodes of opposite polarity. Check with the manufacturers or suppliers just in case.

Beyond TTL EPROM Programmer PCB's & PC Compatible Software Now Available £15 Inc Pp Trevor Brown 14 Stairfoot Close, Adel, Leeds LS1 6 8JR Tel 0113 2670115

Remote Power Supplies

by Eric Edwards GW8LJJ

The most interesting TV pictures always come from cameras sited in the most unusual positions. When you find an ideal location you can be assured that mains is never conveniently placed. This novel circuit shows how to supply the power requirements of a small camera via the video cable that carries the camera signal. Fig 1 shows the interconnection, Figure 2 shows a typical camera power supply.
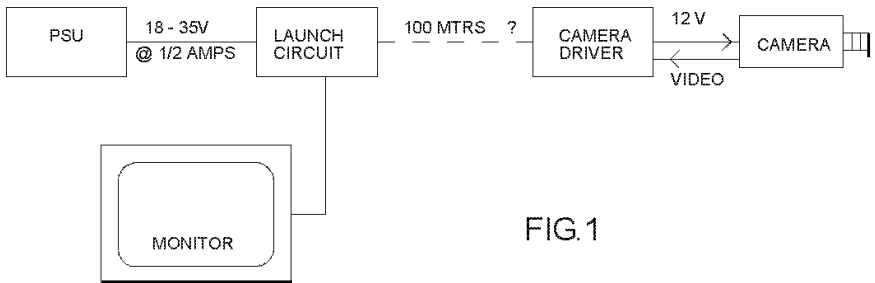
FIG.1

The circuit is in two parts figure 3 shows the launch circuit which is sited at the monitor end and impresses the DC power onto the cable and extracts the video signal which can be used to drive a monitor. Fig 4 shows the camera end which extracts the DC and supplies it to the camera and also takes the video from the camera and puts that on the same cable. Its all down to AC coupling the video and DC coupling the power supplies. The components
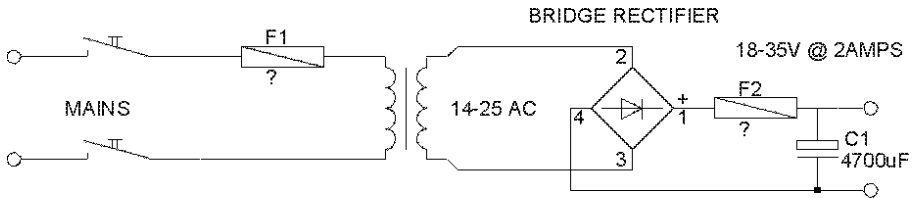
FIG.2

are all out of the junk box but L1 does need to be good for 2 amps i.e. wound from a reasonable wire gauge. Next time you are on the repeater how about showing a true aerial view.

MONITOR

C2
1000uF

INPUT DC
MIN 18V
(SEE TEXT)

DARLINGTON
TIP121 OR
TIP132   T1

5WATT
2R7
R1
5W

2AMP
(SEE TEXT)
100uH
L1

R2
3K3

C5
470uF

C3
470uF
25-40V
DEPENDING
UPON INPUT DC

C4
100N

OUTPUT

TO CAMERA CIRCUIT

0 V   LAUNCH CIRCUIT   0 V

FIG.3

FROM LAUNCH CIRCUIT

C10
220uF

CAMERA VIDEO

35-40V

T2
TIP121 OR
TIP132

5 WATT
R5
3R3
5W

12V TO CAMERA
U1

1   7812   3
IN   GND   OUT
2

R3
1K2

C8
330uF

C9

470uF

C7

100N

C6

100N

0 V   CAMERA DRIVER   0 V

FIG.4

Anchor Surplus Ltd. (Advert)

NE592 vs EL2020 Video Op-Amp Group Test

by Ian F Bennett G6TVJ

The NE592 video operational amplifier has been around now for a number of years and is most commonly found in older satellite receivers. The NE592 can also be found in many amateur TV designs. I have spent some time with amateur equipment using these devices and in some cases I have found shortcomings with the NE592 which gave it a somewhat poor reputation compared to more modern ICs, in my mind anyway.

A more modern device is the EL2020 video operational amplifier manufactured by Elantec, it belongs to a family of high performance video devices and is available from Maplins. I have used these devices very successfully perhaps at the expense of the poor old NE592. Against this background I decided to test these two devices back to back with some interesting results.

To test these devices I built up a simple video amplifier using a single 12V supply rail (most popular with amateur designs) and AC coupled 75R input and output impedance's. I fed the amplifiers with various test signals via a constant impedance attenuator to determine gain, frequency response, and linearity. The units were built up on plain copper clad board used as a ground plain for stability, strip board is not really suitable if reasonable performance is to be realised. The results where displayed on an oscilloscope and not a picture monitor, never judge a video signal on a picture monitor as half a dozen tellies will do half a dozen different things when presented with a distorted video signal!

NE592 Circuit

Fig 3 shows a circuit using a NE592 used as a non-inverting amplifier. One advantage with a NE592 is that it provides an inverted output on another pin. A potential divider sets the bias voltage on the input pins and intern the output pins. Something to note is that the voltage on the output pins is different from that on the input unlike most op-amps at low offsets, this is not a problem due to the AC coupling but it does have a performance implication.

FIG 3
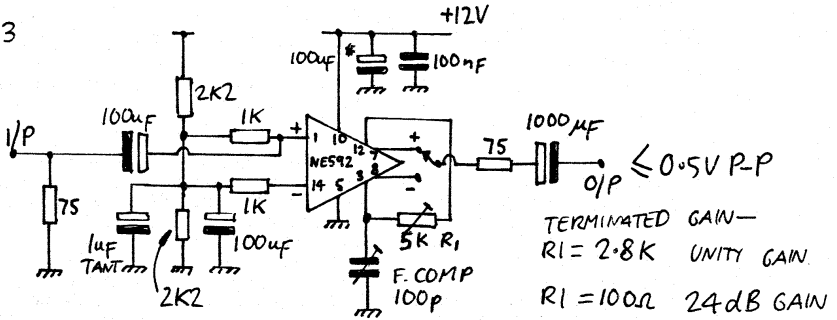
The gain is set by a single resistor between pins 3 and 12, this makes varying the gain rather awkward as one side of it cannot be earthed. I have found that soldering a 5K pot across the top of the IC works well, the lead lengths and stray reactance must be kept to a minimum. A frequency compensating capacitor can be added between pin 3 and ground, its value depending on the gain setting, although I actually found it wasn't really necessary and the manufacturer does claim frequency comp is not required. The coupling and decoupling electrolytics are chosen to give good video low frequency performance, their values shouldn't be reduced. At 75R a 1000uf is really a good value to use if rolling and pulling pictures are to be avoided particularly if several bits of equipment are "daisy chained" together.

EL2020 circuits

FIG 1
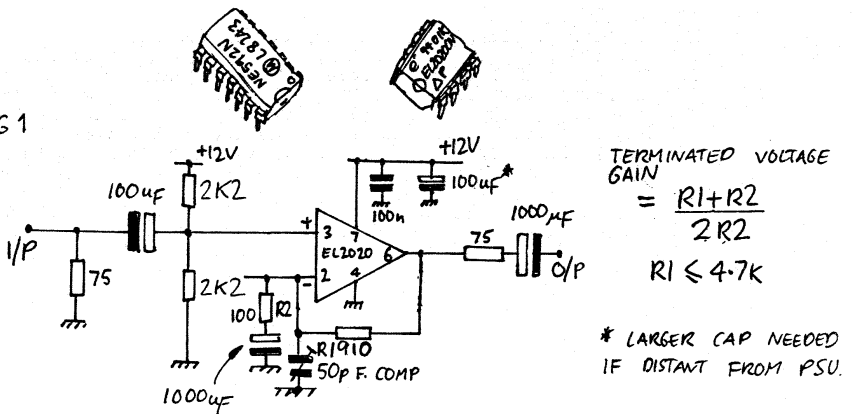
Fig 1 Shows an EL2020 video op-amp configured as a non-inverting amplifier producing a terminated gain of 14dB. EL2020s are much similar to more ordinary op-amps such as the 741 than the NE592 is.

The 2020 can be virtually wired up in the same way as the 741 except the resistor values are much lower due to the low impedances associated with video circuitry. The gain is set by a conventional feedback network and the output potential is similar to the non-inverting input for low DC offsets. Frequency compensation can be added between the inverting input and ground. As with the NE592 the values of the coupling and decoupling capacitors should not be skimped on.
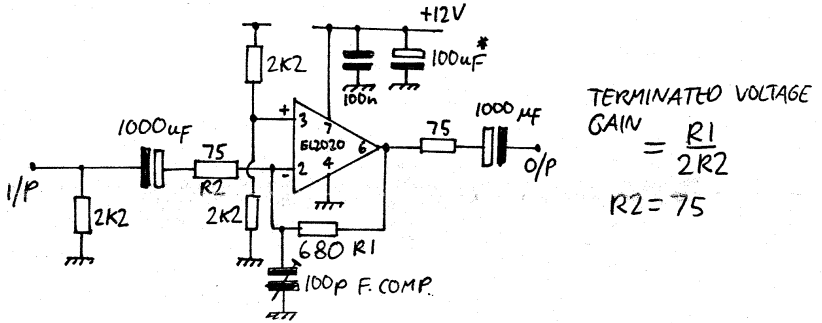
Fig 2 shows an EL2020 wired as an inverting amplifier producing a terminated gain of 14dB. It is basically similar to the non-inverting configuration except that the input video is fed to the inverting input on the op-amp partially via the feedback network. The impedance of the source feeding the amplifier forms part of the feedback network so care must be exercised to maintain this at 75R otherwise the gain will be affected.

Performance compared.

Gain:

According to the manufacturers data a NE592 can manage up to 5OdB, I settled for about 30dB which is all that should be required for amateur applications. The EL2020 is somewhat beaten at a voltage gain of 10 (the maximum quoted by the manufacturer but higher gains might be possible at reduced bandwidth) this is translated into a terminated video gain of 14dB less than half that of the NE592.

Frequency Response:

This is the area where I expected the NE592 to do badly but it actually works well. Its pulse and bar response and Chrominance response is as good as the EL2020. Frequency comp can be applied to both chips as shown in the diagrams to sharpen up the response by a few % and also compensate for

circuit losses elsewhere such as cables and other video stages. The value of compensating capacitor for the NE592 does increase with gain but the actual loss remains more constant with gain.

Linearity:

Now this is when a problem comes to light with the NE592, its output stage appears not capable of delivering a 2V pp signal into 150 R that is a 1V pp video signal terminated in 75R. I found the maximum undistorted amplitude possible was about 0.4v pp into 75R before the onset of distortion which manifests itself as sync crushing at high average picture levels. No such problems exist with the EL2020 which will actually drive two terminated loads with 1V pp. It may be possible to increase the supply voltages or play around with the biasing to improve things with the NE592. I would be interested to hear from anyone experiencing similar problems with this device.

Low Frequency Response

This is not strictly a test of the ICs but of the rest of the circuitry. All of the circuits shown are reasonable at LF and do not produce any appreciable distortion of the field sync. It is advisable not to reduce the values of electrolytics, a nice big fat 1000uf is needed to properly couple 75R video, together I think we can work to banish rolling pictures from amateur TV forever!

Conclusion

At the end of the day the EL2020 wins, it does not have the gain of the NE592 but it is a broadcast quality device with an output capable of driving terminated cables. The NE592 does work well provided its output swing is kept below about half a volt, also at about a £1 it is much cheaper than the EL2020 which costs about £5. There are many more complicated circuits using both these ICs, they can be operated on split supplies and cascaded together but hopefully these examples fully tested by me should be of use.

Digital Digest - Even More About MPEG 2

by Paul Holland G3TZO

In CQTV 174 I reproduced text available on the World Wide Web originally written by Chad Fogg (E-mail: cfogg@chromatic.com) which provided a useful introduction to MPEG 2. The following slightly edited text, again written by Chad Fogg, provides additional information on how MPEG 2 has been implemented for satellite DTH broadcasting in the US. As before, although the US Direct TV and US Satellite Broadcasting's (USSB) Digital Satellite System (DSS) is linked to the current NTSC analogue standard, it is possible to translate the information here to work out how DSS broadcasting will be implemented for European standards.

1. Composite vs. component

MPEG video signals are exclusively component YCbCr (CCIR Rec. 601). This permits programming to remain component over the entire signal path (from camera all the way to the TV monitor). The video signals encoded onto Laser Discs are in fact a variant of the composite analogue NTSC (or PAL for Europe) format, and as such, are subject to the host of traditional composite artefacts such as twitter and dot-crawl.

2. Artefacts

There are two completely different classes of compressed digital video artefacts namely bitstream error artefacts and coding artefacts.

Bitstream error artefacts most often result when the modulated signal received by the dish becomes too weak or jumbled. These artefacts manifest themselves as; picture freezes, black or strangely coloured blocks scattered across the picture, and total audio loss. You can easily simulate bit error conditions by gradually obstructing the dish until the signal strength falls to the noise threshold, beyond which the video and audio signals will completely disappear. Decoders will handle bit errors differently.

Coding artefacts stem from sub-optimal encoders. These artefacts are easily characterised by ringing along edges of objects and blockiness in flat areas. Unlike the bit error artefacts above, all decoder boxes regardless of location or signal strength, will render the same artefacts in the same picture locations at the same time (remember the deterministic nature of MPEG video decoders!). Theoretically, these artefacts would never exist in an

"optimal" encoder. However, encoders 100% free from all forms of artefacts are probably asymptotic.

Currently, the most prevalent coding artefact in DSS occurs during rapid lighting changes (scene fades). This is a result of sub-optimal encoder intelligence, not MPEG, and will be corrected with time. Cost is a major factor behind slow upgrades. Like most high-end MPEG-2 broadcast encoders, each Compression Labs Inc (CLI) Magnitude encoder at Castle Rock (one per video program) costs around $100,000. NB. Castle Rock is the US DBS uplink site for their DIREC TV service. The encoder chips which perform the intensive compression operations may be partially programmable, preventing a complete replacement of hardware at each upgrade, but some limitations may be inherent to the hardware.

When adapted in a sub-optimal way (as it often is on DSS), MPEG has a visual effect much like a multidimensional low-pass filter (in fact, the MPEG process can be mathematically expressed as a filter). Full motion may very well be present to several orders of approximation. Just how many orders of accuracy depends on bit-rate and how good the encoder is at applying the bits. As the bit-rate increases, the "approximation" signal should converge to the original video sequence.

3. Deriving channel count

The Digital Satellite System (DSS) spectrum utilised by DIREC TV is comprised of 32 transponders, each with an average of 6 programs. Not all 32 transponders are devoted to video programming. There are other data types like the 28-channel Music Choice service. The useable bandwidth of the high powered Ku band spans a frequency range of around 450 MHz. It is a North American convention to space each transponder every 27 MHz, which in analogue terms corresponds to only one television channel. This yields a total of 16 transponders (450 MHz/27 Hz/transponder = 16).

When broadcast from space, the Ku band microwave signals are coherent enough for the same frequency space to be occupied twice - each at opposite polarities. The separation between polarities is not infinite, but sufficiently high enough (~30 dB). Hence the transponder count is doubled to 32.

A spacing of 27 MHz may seem somewhat liberal when considering that cable television and terrestrial television channels are spaced much more narrowly: every 6 MHz. However, to keep power levels low, analogue video satellite signals trade off bandwidth for power through the simple method of wide band FM modulation. This scheme makes it possible for, say, a 15 dB

carrier to convey a narrow baseband signal with a carrier-to-noise ratio (CNR) of more than 45.0 dB.

One DSS data carrier is modulated on every 27 MHz transponder channel at a rate of approximately 20 million symbols/sec. The 4-QPSK modulation scheme maps 2 bits per symbol, yielding 40 Mbit/sec per carrier. The CNR needed in practice to achieve nearly bit error-free decoding is a little less than 10 dB. A higher margin, +2dB for instance, is desirable to offset rain fade. Out of the total 40 Mbit/sec, only 30 Mbit/sec is actual useable payload data. The remainder 10 Mbit/sec is made up of various channel coding overheads such as Reed-Soloman error correction bytes and Viterbi convolution. The lower-powered 120 Watt transponders have a payload rate of only 23 Mbit/sec.

High overheads are common place in modulated digital mediums. Compact Disc itself has a "channel rate" more than twice as high as the effective 1.5 Mbit/sec payload rate set aside for the audio bitstream (2 channels * 44,100 Hz sample rate * 16 bits/sample = ~1.4 Mbit/s). The Reed-Soloman error correction bytes add 0.5 Mbit/sec, and the outermost EFM modulation layer adds another 1.5 Mbit/sec. The overall affect of these overheads, assuming the engineering was sound to begin with, actually translates to a larger and more robust payload than would otherwise have been possible.

4. Number of satellites

The number of satellites needed to provide DSS is purely an implementation issue. The power requirements for a 32 transponder high-powered Ku-band DBS service are too great for the solar panels of a single conventional space craft. So multiple satellites are deployed to divide the problem into more manageable chunks. International Agreements (UN, ITU-T, et al) prescribe limits to;

- signal strength (240 Watts/transponder, or more accurately a limit to the signal strength per square metre)

- frequency division multiplexing (transponder spacing of 27 MHz including 3 MHz of guardbands, etc.)

- and spatial division multiplexing (spacing of 9 degrees between orbital slots) of the license holders along the geosationary orbital belt (a.k.a. "Clarke Belt").

It would therefore be more accurate to say: "There is a potential of 32 transponders, each with X Mbit/sec of channel capacity, per ORBITAL SLOT." Currently, DSS is already in possession and use of all 32

transponders at the 101.0 Deg W high-powered Ku-band (BSS) orbital slot. 8 of the 32 transponders still remain at the lower 120 Watt level prior to the activation of the 3rd satellite, so there is still more potential for raising the overall channel count by some 33% (whilst keeping the same average bit-rate per program).

5. DSS and standards

DSS makes use of several standards, but is not fully compliant with the European Digital Video Broadcasting (DVB) satellite convention. DSS was designed before the ratification of DVB. However, DSS should be compliant with the most difficult interoperability aspect of DVB: video and audio representation. In fact, the video and audio bitstreams are unaffected by the transport layer protocol. An MPEG-2 video bitstream transported over DSS packets will demultiplex identically to a bitstream transported by DVB means. DVB specifies conformance at several levels including;

channel coding (e.g. symbolic rate, QPSK modulation, Reed-Soloman forward error correction, Viterbi convolution for outer error correction, packet interleaving) transport layer (MPEG-2 Systems Transport bitstreams)and elementary stream layers (MPEG-2 Video, MPEG-1 Audio)

DSS elements are nearly identical to DVB. Subtle differences exist such as packet length (DSS packets are 147 bytes long whereas MPEG-2 Transport streams packets are 188 bytes long), but the more expensive implementation items are the same (modulation, error correction).

The DVB document also defines cable (64 QAM) and terrestrial broadcasting (QAM/OFDM) conventions. In the near future, box manufactures will market set-tops capable of decoding both DSS and DVB signals. The differences are small enough such that only political (e.g. licensing) issues could prevent this.
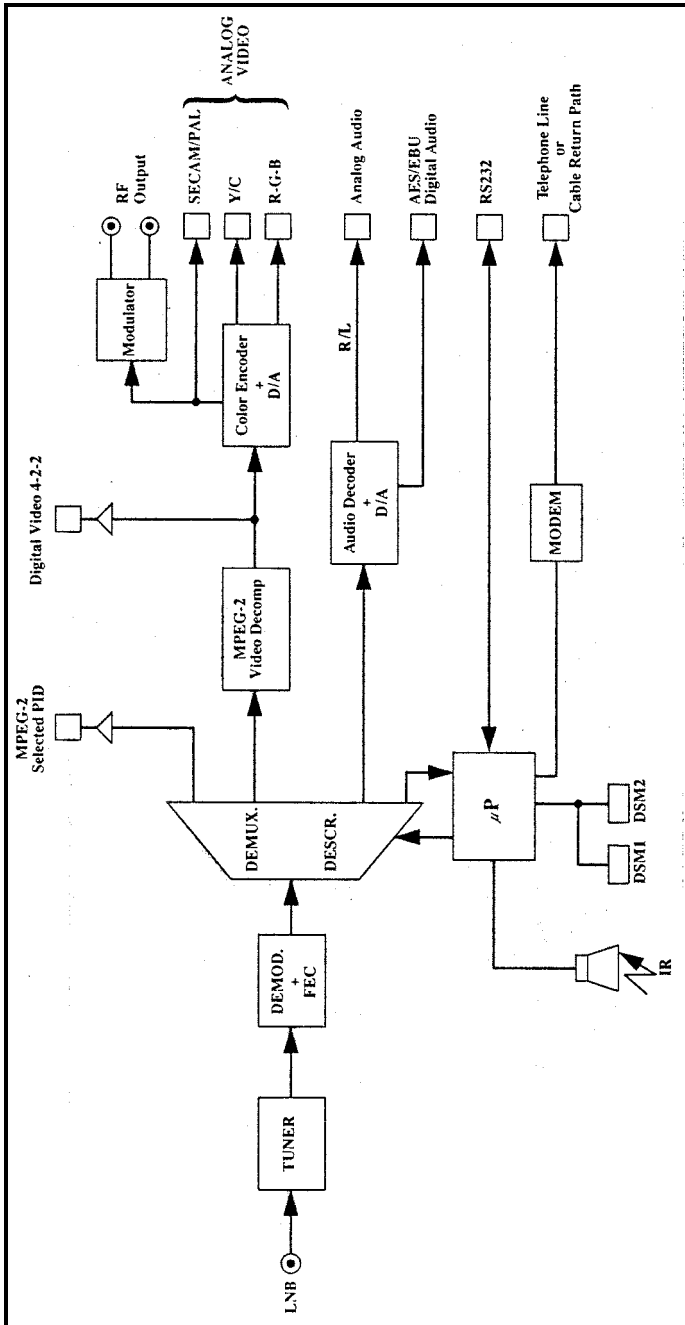
6. Bitstream breakdown

Each packet consists of various data fields.

Inner error correction	17.0 bytes
Header length	3.0 bytes
Payload	127.0 bytes

_____

Data Packet length	**147.0 bytes**
Outer error correction (6/7 viterbi)	24.5 bytes

===

Total:	**~171.5 bytes**

This equates to (~ 1372 bits or ~ 686 QPSK symbols/sec)
Expressed from a hierarchical perspective:

Layer	Rate
analogue waveform	band limited to 24 MHz
Symbol stream	20 Million 4-QPSK symbols/sec
Bitstream	40 Mbit/sec (2 bit/symbol * 20 MHz)
Packet stream	34 Mbit/sec (after convolutional code)
Payload stream	30 Mbit/sec (after packet header and FEC)

Each data packet is 147 bytes. A byte is made up of 8 bits. The first two bytes in the data packet contain the Service Channel Identification (SCID) and Flags. The SCID is a 12 bit number, 0 to 4095, that identifies the data channel to which the packet belongs. Each Flag is 4 bits long. The Flag controls whether the packet is encrypted, and if so, which key decodes it. The third byte of information is a 4-bit Packet Type indicator and a 4-bit Continuity Counter.

The Packet Type identifies the packet's data types. When combined with the SCID, the Packet Type determines how the packet should be used. The Continuity Counter increments once for each Packet Type and SCID. The next 127 bytes of information consist of the payload data which is the actual useable information sent from the program provider.

7. Macrovision chip

Macrovision is built into the Philips SAA 7188 chip, as documented in the 1994 Philips "Desktop Video Data Handbook." (see the diagram on page 18) This chip performs the PAL/NTSC modulation in the RCA receiver boxes. It

is the function of the NTSC modulator to convert the digital component signal output by the MPEG video decoder to the standard component Y/C and composite NTSC baseband signals accepted by TVs and VCRs.

Macrovision can be turned off or on at the whim of the encoder uplink facility. Conditional access information is embedded within the transport bitstream to control this and other DSS receiver box features.

8. DigiCipher II vs. MPEG-2

The DigiCipher II (DC2) compression system was developed by the US Company General Instrument in parallel to MPEG-2 (circa 1992-1993). Although DC2 syntax is mildly superior to MPEG-2 bitstreams that do not employ B frames, the benefit is mostly for decoders with lower memory usage. DigiCipher II video decoders need only 1 Mbyte of memory compared to the 2 Mbytes needed by MPEG-2 Main Profile @ Main Level (MP@ML) decoders.

However, MPEG-2 bitstreams with B frames (which is usually the case) provide moderately better picture quality than DC-2 bitstreams which are renderable in only 1 Mbyte of memory. Besides memory arguments, B frames are chided for the delay they introduce in encoders. The delay is brought about by the fact that future reference frames must be sent in advance of the coded B frames. However, this is of little consequence in systems which employ a large lookahead (1/4 sec). B frames have additional coding benefits. For example, they help reduce mismatch propagation (drift).

9. Measuring bit-rate

It is possible to measure the respective audio and video bit-rates for programming by monitoring the strobe rate of the data input bus of the MPEG video and audio decoder chips. With this information, it is possible to hook up a "bitmeter".

10. Components of a DSS decoder system

To illustrate the makeup of the DSS System, a block diagram of the video Signal path is provided on page 18. Note: this diagram is generic enough to apply to many other set top box designs.

In Retrospect

CQTV 174 page 16 13cms Tx. D1 is shown the wrong way round and on page 17 the frequencies in brackets are 1.255 GHz and 2.335 GHz not MHz as stated.

CQTV 174 pages 38-39 SPG R20 is a 10 ohm resistor in series with C55. C60 is 100nF and is in series with C34 and the NE567 pin 3. C34 is 100nF as per parts list, and L12 and C59 82mH and 1n2 in parallel, fit from the C60/C34 junction to ground. A full A4 corrected circuit diagram will be supplied from Members Services with all PCB orders.

CQ-TV 174. There is a minor error on the PCB for the SPG. The wider track under the board to C60 (to the pin nearest the edge connector) should be carefully cut. The now isolated pin should be wired to the pin alongside, on the other track joining C59 and L11, to C34. The circuit diagram sent with the board is correct.

It is easiest if DL1 is soldered down before C23 and C24 are fitted. Bend the DL1 can tags and solder them to the groundplane, first clearing a little of the green solder resist.

Some people have enquired about the capacitors used. The following were used on the prototypes:- All polarised capacitors are tantalum beads, as is C45 (+ towards edge connector). All capacitors up to 1n2 in value are ceramic plates. C54, C57, C58 are polyester layer. C16, C25, C30, C34, C35 are monolithic ceramic (Monores cap). The 0.01μF, 0.1μF are miniature polyester. Maplin Electronics stock all of these, with pin spacing to suit the board, although other types or suppliers can be used, of course.

Varicap diodes type BB409, BB109, MV209 have all been tried in this circuit. The specified diode is about 5.1pF at 25V and 29pF at 3V. It is not critical, as in this network L11 is adjustable. BB609, BB809 or MV2108 should work just as well, the last mentioned being a Maplin stock item.

To check the phase of the line indent signal, the end of R66 furthest from the edge connector makes a convenient point to monitor the incoming signal. The output is of course available at the edge connector.

A 12v to 24v DC Transformer

by John Cronk GW3MEO

Most of my equipment is built to work with 12 Volt DC for portable operation, but my latest project requires a few more volts for some varicap tuning diodes. I decided to make up this simple module as I expect it will have other future applications.
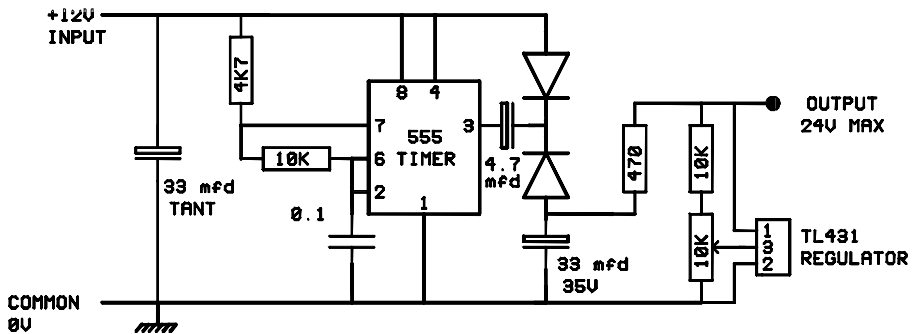
The ubiquitous 555 timer chip generates a square wave that is added to the supply voltage. If the load and the supply is steady the regulator may not be needed, and can be omitted. The TL431 is an inexpensive shunt regulator that can pass up to 100mA for use up to 30 volts (available from Farnell's)

Construction was via a small home etched PCB. All the capacitors used were tantalum blobs, and the variable resistor was a small wire ended cermet type. The resistors were mounted vertically so the final PCB was only 25 by 60mm.

Circuit Notebook #58

by John Lawrence GW3JGA

Remote up-dating of the News Page at GB3TM

These notes may be of interest to those who use the Teletron I^2C boards in their ATV system, in particular where these boards are used to control an ATV Repeater. First a bit of background.

The GB3TM repeater is located at a remote exposed site near Amlwch on the North East corner of the Isle of Anglesey, off the North Wales coast. The repeater came on air in July 1994 and has operated continuously since then. The receiver is a modified professional satellite unit with pre-amp. The transmitter is a Worthing 1 watt unit followed by a Mitsubishi block amplifier and the aerial is a home built dual Alford slot with the TX & RX sections in the same tube.

The logic control at GB3TM is a copy of that used at GB3ET and contains the BATC I^2C CPU board and the I^2C VDU board. The software programme for GB3ET was originally written by Chris Smith G1FEF. The CPU & VDU boards generate a sequence of 8 pages consisting of 6 captions/test cards, one of which contains a time and date display from an on-board real-time clock and 2 news pages which can be up-dated remotely.

Additional boards in the system are, a Maplin PAL coder to code the RGB information from the VDU board, a video detector and video switch to select either internal video or the received video, an audio switcher to similarly switch the internal and received audio and finally a keyboard decoder, which we will look at in more detail later.

The captions for GB3TM were designed by David Ellis Jones GW8PBX and as these have to be in Teletext format they were developed on a BBC B micro which uses a Teletext chip for all screen text and graphics. The insertion of the GB3TM captions into the existing repeater software was done by Graham Denton G8VAT and this version is currently in use.

Keyboard Decoder

The purpose of the keyboard decoder is to accept a frequency-shift keyed audio tone, which is transmitted over the audio channel and to demodulate the audio into ASCII serial data and then convert this into parallel format

for controlling the I^2C system CPU. The keyboard decoder is a self contained circuit on a small p.c. board.

In the early days at GB3ET, our Commander, Trevor Brown, devised a manual system (see CQ-TV No.158 p.79-82) using a keyboard feeding a UART (Universal Asynchronous Receiver & Transmitter) and an FSK (frequency shift keyed) tone generator, to transmit text over the audio channel from a home station to the repeater. A corresponding FSK tone decoder and UART at the repeater fed parallel data into the CPU card. I tried this method initially at GB3TM and although it worked well, it was necessary to view the return signal while typing, and for me, with only two finger proficiency, this was a slow process.

As the I^2C boards in the repeater use Teletext characters it seemed sensible to use a BBC micro as a transmitting keyboard with the possibility of preparing pages in advance. I persuaded my junior op, Geoffrey, who was a whiz kid on the BBC in his school days, to escape from family life for an hour or two and write some software for the BBC.

We now have software for the BBC B, unashamedly called "BESTYET" which will allow a number of news page to be prepared on screen and stored ready for transmission to the repeater. The pages are transmitted using the serial port linked, in the software, to the cassette port. This then transmits an FSK audio tone signal of 2400 Hz and 1200 Hz, suitable for feeding into the audio input of the transmitter. BBC Bs can usually be found at bargain prices - but must be complete with a working DFS chip and a compatible disc drive.

The circuit of the Keyboard Decoder, as used at GB3TM is shown in Fig.1. The audio signal input is taken to IC2 the tone decoder. RV1 is set to provide reliable FSK decoding of the incoming signal. The logic output from IC2 is taken to part of IC1 to provide the option of inverting the logic if required. Polarity is selected by a link plug. A further part of IC1 allows the direct input of keyboard serial logic for testing purposes. The keyboard input is linked to ground when not in use. The serial data is then taken to pin 20 of IC5, the UART.

A clock oscillator IC4 provides a clock signal for IC5 at x16 the baud rate being used, The BBC Micro is set to 300baud by the "BESTYET" programme, so the clock oscillator is set to 16x300 = 4800Hz.

The UART, IC5, with the clock oscillator and the serial data input provides the serial to parallel conversion and the parallel output is available at the data output connector. A strobe pulse is provided to inform the CPU that

valid data is present. IC3a provides a small delay to link the data register DR and DRR lines and IC3b provides a suitable strobe pulse of selectable polarity. All ICs are available from Farnell Components, Leeds.

"BESTYET"

'BESTYET' is a programme for the BBC 'B' to allow the composing and editing of pages of text for subsequent transmission to systems using the BATC I^{2}C Teletron Boards.

Up to 5 pages of text may be saved for subsequent transmission. Graphics are not available in this version.

THIS PROGRAMME WILL NOT RUN ON A P.C.

The audio output from the BBC cassette port (pin 1 live, pin 3 earth) is connected to the audio input of the home ATV transmitter. The cassette port is configured by the programme to run at 300 baud.

A copy of "BESTYET" may be obtained by sending a 5 ¼ inch formatted disc, either 40 or 80 track (including sufficient return postage), to the address below.

A printed circuit board for the Keyboard Decoder is also available (£6.00 including postage).

John Lawrence, 40 Aberconway Road, Prestatyn, Clwyd, LL19 9HL. 01745 853255

FIG. 1.
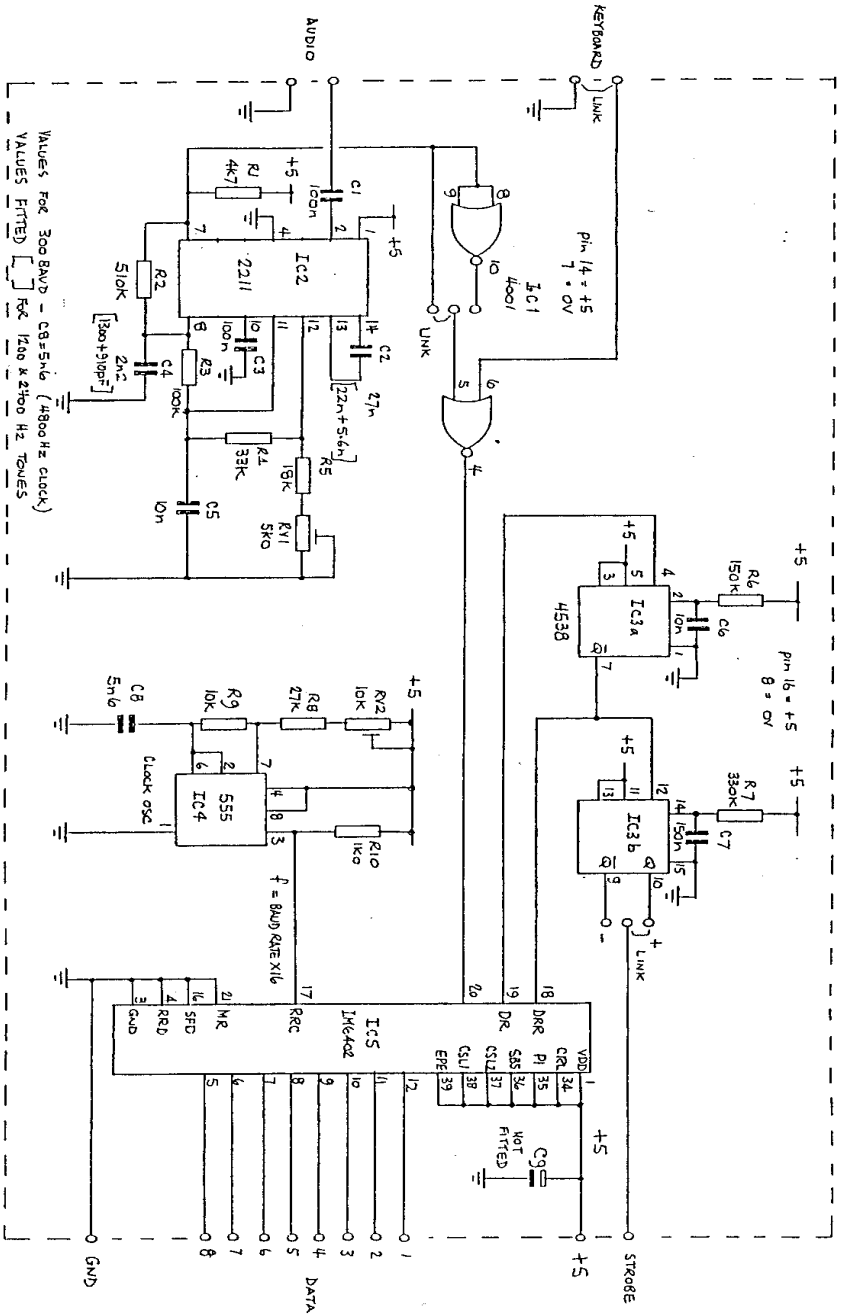
Satellite TV News

by Paul Holland G3TZO

In this edition of Satellite TV News I have refrained from listing details of new digital services as with the current dearth of suitable reception equipment there seems little point. At least until equipment does appear fairly readily in the UK market I will concentrate reports on the progress of Digital TV introduction with specific reference to applicable hardware, software, and systems components.

Launch News

AMOS 1

The Israeli AMOS 1 satellite was successfully launched on 16th May aboard an Ariane 44L rocket. Manufacturers Israeli Aircraft Industries confirmed that at least initially AMOS 1 will reside at 4.0 Deg W. Further AMOS launches, if they occur, will probably use 1.5 E and 39.0 Deg. Due to be operational by July, AMOS 1 carries seven wideband (72Mhz) transponders, each capable of carrying two analogue and two digital TV services. Amos 1 has two primary spot beams, one on the Middle East and one on Central Europe. It is likely that the Israeli services currently on Intelsat 702 at 1.0 Deg W will relocate to AMOS 1 following successful in orbit testing.

TURKSAT 1C

Turksat 1C due to launch in June aboard an Ariane 44 LP rocket will replace Turksat 1B. Turksat 1B will then be re-located to 31.0 Deg E and be used for non TV telecommunications traffic. Turkish channels currently on Eutelsat satellites such as ATV, TGRT etc. may re-locate here.

SIRIUS 2

Due for launch in late 1997 this satellite will provide a much extended coverage area than Sirius 1 and Tele X which it will replace at 5.0 Deg E. Most of England and Wales are in the beam centre which provides an EIRP of 50 dBW. Scotland and Ireland are in the 48.0 dBW contour. The satellite will have 16 transponders and be used for DTH, Cable Headend, SNG and Business TV delivery.

THOR 2A

Hughes Space & Communications will build THOR 2A for Telenor Satellite Services based on their HS376 platform. Due for launch in early 1997 aboard a McDonnell Douglas Delta- 2 rocket from Cape Canaveral Thor 2A will carry 15 transponders and will replace the current Thor 1 satellite at 0.8 Deg W.

ASTRA

Astra operator SES have signed an agreement with Arianespace to launch 6 more Astra satellites between 1997 and 2000. As reported previously SES have orbital slots at 24.2, 26.2, 28.2, 31.4, 35.5, 37.5, 41.2 and 43.2 degrees East in addition to the 19.2 degrees East position.

Launch Programme (European TV Satellites)

Date	Satellite	Launcher	Position
June 12	Intelsat 709	Ariane 44P	18.0 W
June	Turksat 1C	Ariane 44LP	42.0 E
June	Arabsat 2A	"	19.0 E
July	Telecom 2D	Ariane 44L	TBA
August	Hot Bird 2	Atlas IIA	13.0 E

Intelsat News

With the transfer of traffic from Intelsat 702 to Intelsat 707 at 1.0 Deg W complete Intelsat 702 is now relocating to 177.0 Deg E where it in turn will displace Intelsat 703. Intelsat 703 will then move to 57.0 Deg E where it will then take over from Intelsat 510.

Eutelsat News

Hot Bird 2 will launch in August on board an Atlas Centaur rocket from Cape Canaveral. The satellite will carry 20 DBS transponders, however to date only two are allocated to analogue services. One confirmed analogue feed will be RTP International currently on Eutelsat IIF2 at 10.0 Deg E. The majority of the digital capacity has been booked for the Italian Telepiu/RAI broadcasters which have 9 transponders booked.

Eutelsat have contracted Matra Marconi to build the Hot Bird 5 satellite. Hot Bird 5 will carry 22 high power transponders and will launch in Spring 1998. Hot Bird 3 launches in Qtr 1 1997 and Hot Bird 4 in the Autumn of 1997.

One interesting feature of Hot Bird 5 will be its ability to multiplex incoming digital feeds and relay them as a "bouquet" similar to those currently being provided by Canal Plus & Nethold. The advantage in principle is that independent channels/service providers need not pay terrestrial carriage feeds to a central point for multiplexing prior to uplinking. The disadvantage currently is the high power consumption of on board multiplexing. This technology offers the potential however for satellite operators such as Eutelsat or Astra to create their own "bouquets" or packages of channels from grouping independent programme providers.

The end of the road for the following Eutelsat I satellites was announced by Eutelsat recently; Eutelsat IF1 36.0 Deg E (August 1998), Eutelsat IF4 25.5 Deg E (October 1997) and Eutelsat IF5 21.5 Deg E (December 1998).

From The Post Bag

I. Waters, G3KKD, writes from Cambridge to enquire if any members are currently working towards Amateur Digital TV. As he says " it seems that a combination of MPEG 1/2 with digital carrier modulation coupled to the propagation characteristics of 70cm could lead to some very exciting results. Also as the potential for interference between a digital TV signal and other carriers is greatly reduced, ATV could co-exist with other modes at the top of the 70cm band even if the top 2 Mhz are taken away". If any members are actively considering/undertaking experimentation in this area please let G3KKD and myself know.

A short note from Roger Bunney reports on the growing interest of Satellite TV in New Zealand. Roger included an extract from a VK/ZL Journal for January which reflects the increase in satellite capacity and programming in the Asia Pacific Region. Thanks Roger for the mention of CQTV in What Satellite's "Satellite Search" column.

New Channels

JRT TV - A new Jugoslav channel called JRT TV is promised to launch on 1st July from a Eutelsat II satellite. No further details are available except JRT TV will broadcasting initially for 8 hrs daily.

DW-TV2 - Deutsche Welle plan a second channel concentrating on more languages than the current service on Hot Bird 1.

Transponder News

Panamsat 4 68.8 Deg E

A new Indian channel called "Home TV" has been observed testing on Tp 6C, 3.835 Ghz (V). The channel uses the African beam but is receivable in Europe on a 3.0 m antenna.

Astra's 1A, 1B, 1C, 1D, 1E, 1F 19.2 Deg E

TV1000, TV3 Sweden and TV3 Denmark will close here on 1st August with TV3 Norge having closed on 15th June. Three of these vacant transponders will be used by B-Sky-B and G-Sky-B for the launch of new services in the Autumn. The fourth vacant transponder looks set to used for another German shopping channel.

The Dutch channels RTL-4, RTL-5, Veronica and SBS 6 are to drop their analogue distribution in favour of digital feeds with the Nethold Digital Multiplex on Astra 1E. The first to leave is likely to be SBS 6 in September.

The Dutch World Service and NOS broadcasters are launching "Zomer TV" on Astra 1D Tp 53 for 4 hours per day starting at 19.00 hrs. On the air for June through to the end of August the service is designed for Dutch holiday makers.

Eutelsat II F3 16.0 Deg E

Libyan TV has now taken over 11.080 Ghz (H) in clear PAL and operates from 15.00 to 22.00 hrs daily.

Coverage of the former Yugoslavian War Crimes Tribunal is being carried on 11.638 Ghz (H)

A new Christian Channel, Sat 7, will broadcast in Arabic for the Middle East from 31st May on 11.575 Ghz (V). The service will be on air from 10.30 to 1230 daily.

An additional feed of the Dutch "Zomer TV" carried on Astra Tp 53 is to be found here on 11.080 Ghz (H)

TVSat 2 0.6 Deg W

ZTV & TV6 have joined to become 3+. The new channel is carried on 11.977 Ghz (LHC) in D2Mac

Intelsat 707 1.0 Deg W

NRK 1 has now partially encrypted in Eurocrypt M. Full encryption will commence on 31st August.

Intelsat K 21.5 Deg W

Maxat has taken additional capacity here on Tp V4 to increase capacity on its dedicated transatlantic route served by their Broookmans Park teleport (see Intelsat 601 also).

Intelsat 601 27.5 Deg W

UK cable only channel Home Video Channel (HVC) will be carried digitally from June 1st using bit rate capacity on Tp 69. It is likely that the Adult Channel will use the same capacity when HVC closes at 12.0pm .

Maxat has taken additional capacity here on Tp's 72/72, 73/43 and 43/73 to increase capacity on its dedicated transatlantic route served by their Broookmans Park teleport.

Intelsat 603 34.5 Deg W

Moslem TV (MTA) have moved here from Eutelsat IIF3 and can be found on 11.010 Ghz (V).

Orion F1 37.5 Deg W

NTL are distributing the Weather Network on a digital feed via this satellite for UK cable networks.

Panamsat 3R 43.0 Deg W

The Chinese CCTV 4 channel is now to be found on Tp 16 4.180 Ghz (V)

Satellite TV On The Internet

For those interested there are a number of interesting WWW pages relating to Satellite TV. As a starter try ;

Intelsat : http://www.intelsat.int:8080/

Eutelsat: http:/www.eutelsat.org

Panamsat: http://www.panamsat.com/

US space launches: http://www.dot.gov./dotinfo/faa/cst/bulletin/manifest.txt

And a little more obscure - try the Russian Satellite Home page at http://www.sat-net.com/russ. To view these pages you need to download KO18 cyrillic fonts from a Russian Language WEB site first !!

Satellite Software

Following my visit to the Swedish Microwave stand at the Cable & Satellite show recently I have had the opportunity to try out some new software. The programme written by SMW provides link budget calculations for both

single and interestingly dual feed systems. An interesting feature is the ability to vary link parameters whilst observing the simulated effect on an inset graphic of colour bars. Due to lack of space I am unable to provide more details here but members wanting a copy of this Shareware can obtain one by sending a formatted 3.5" High Density disc to me together with postage and appropriate packing for return of the disc.

Conclusion

That's all for this edition of Satellite TV News. Due to pressure on space in CQTV some material has been held over for next time. As usual please do write in with any comments, questions or information you may have relating to Satellite TV.

BATC on the Internet

The Internet URL (address) is ...

http://ourworld.compuserve.com/homepages/ipawson/

You may gather from the address, the pages are being edited by our very own Publications Officer, Ian Pawson.

It is experimental at the moment, we have information on publications, sales items, who to contact, general information about the Club and latest news.

Ian would be pleased to hear any comments about the pages, you can E-mail him via a link from the BATC's homepage.

A Brief Introduction to PIC Microcontrollers

by Brian Kelly, GW6BWX

Arizona Microchip Inc. introduced their range of PIC 16C series chips to meet a demand for low cost, self-contained microcontrollers. They rapidly became one of the most popular controllers on the market, their success stemming from their high performance to cost ratio. The baby of the family, the 16C54 costs little more than a few TTL ICs yet can run at a staggering one million instructions per second. Being fabricated in CMOS their current consumption is also extremely low, in some of my projects the chip has consumed less than 5mA and in one case I managed to eliminate the on/off switch altogether by putting the chip in "sleep" mode which reduced its demand to just 600pA (0.6uA!).

PIC chips come in five basic families, each of these has its own special function as well as a common core set of instructions. Each family is subdivided into several variants, their most obvious difference being the amount of internal program memory and the number of input/output pins each has. All chips have a four-bit port and at least one eight-bit port, more of the latter are available on the larger devices. Some of the port pins have more than one function and can be programmed to perform different tasks by the code running inside the chip. For example the four-bit port on the 16C71 can be used for digital communication or can be configured as four independent voltage inputs to the on-board analogue to digital converter (ADC).

The special functions of each family are:

- 16C5x   12 to 20 I/O pins and one counter input,

- 16C6x   as 16C5x but also has timers, PWM output and event counting inputs,

- 16C7x   as 16C5x but has 4 to 8 analogue inputs,

- 16C84   as 16C5x but program and data memory is electrically erasable and reprogrammable.

- 17C4x   up to 33 I/O pins, three timers, three capture registers, two PWM outputs and a USART.

Package sizes vary according to the number of I/O pins, the simpler chips have 18 pins but this increases to 40 pins in the case of the 17C42. The

16C84 is reprogrammed by simply writing over its old memory contents but the other types are either OTP (one time programmable) or have windowed packages which allow them to be erased in ultra-violet light. The UV erasable types are rather expensive though their cost is justified if the chip is being used to try out software in its development stages. I have erased and reprogrammed several chips over 100 times which has saved me a small fortune and kept development time to a minimum.

The reason for the blinding speed of these devices is their RISC like instruction set and "Harvard" architecture. Most microprocessors and microcontrollers have a single block of memory which is partitioned into fixed content areas (ROM) and alterable areas (RAM). In a Harvard architecture they exist as two independent blocks, each having its own address and data bus. In a RISC processor each opcode breaks down into an instruction, source and destination field. This saves time in two ways, firstly there is no need to decode the byte (and possible fetch subsequent bytes) to determine what to do and secondly the source and destination memory can be accessed at the same time as the next instruction is being fetched from the program memory. The penalty for using RISC is that because each opcode contains so much information it has to be wider than the customary 8 bits. The PIC processor family use widths of 12, 14 or 16 bits, of course all bits are available in parallel and they only occupy a single program memory address. To show how efficient this coding method is, the 8-channel AV switcher program is just 393 instructions long, try doing that with a Pentium!

The RISC, Reduced Instruction Set Controller, is just that, the 16C54 has only 33 instructions. The extra features on the larger chips push their compliment slightly higher. With such a small number of instructions to remember, writing programs for these devices is very easy. The manufacturer distributes a free assembler package and a PC based execution simulator which actually runs the program without any PIC chip being present. For debugging a new program this is incredibly useful as most of the "bugs" can be ironed out before committing anything to silicon.

All PIC chips have internal clock generators which can utilise quartz crystals, ceramic resonators or even a simple resistor/capacitor combination. They can be reset externally or by a built in power detector which starts the chip after its supply has been turned on and a short "settling time" has elapsed. They also have a "watchdog" option which if enabled will force a reset after a short time if the watchdog register has not been cleared by the program, this gives a degree of safeguard against stalling if the program crashes. All types except the 16C5x have an "interrupt on port B change"

function which will allow the chip to be put into sleep mode yet still wake up if the logic state on its pins is changed. In sleep mode the chips draw negligible current, even the clock oscillator is stopped to reduce consumption. A mine of information on these devices is available on the World Wide Web at address "http://www.mchip.com" which is Arizona Microchips home page. The chips themselves are available from Maplin, Farnell and numerous other outlets. Costs vary but they start at around £4 for one-off quantities and drop to under £2 for bulk orders.

MICROCHIP BBS 0171 490 8881 (N,8,1) for support on P.I.C controllers

Outside Rally 96 - see the article on page 18

A PIC Programmer

by Mr R Grodzik

(reproduced by permission of Electronics Today International)

The microchip PIC has opened up a new era in micro-electronics. Conventional microprocessor technology utilising such processors as the 6502, Z80, 8080, 6800 etc. required the provision of external ROM and RAM and support peripherals. Associated with each processor was a formidable instruction set, detailing the operation of each opcode, in some cases covering several pages. The PIC has on-board ROM/EPROM, IO and timers. Its reduced instruction set comprises 32 instructions which surprisingly allow any logic algorithm to be created with a minimum of effort.

The smallest of the PIC family, the PIC 16C54, is an 18 pin 0.3" DIL i.c. and could easily be mistaken for a standard TTL i.c. package. But that it is not. It is a very powerful 12 bit processor capable of clock speeds to 20MHz, providing an execution time of 200 nanoseconds/instruction (400nS for conditional branch instructions). If that is not enough, a dozen bit addressable I/O port lines are provided. These can supply enough current to light a heavy LED.

Internal ROM/EPROM memory capacity is 512 words (12 bit) with an additional 32 bytes of RAM registers serving as general purpose 'file' working registers and as scratch pads. In common with microprocessors, a flag register keeps track of results of operations and a watchdog timer will reset a program if a 'crash' is imminent. Finally, the current consumption of the OIC is a couple of milliamps, a matter of nanoamps in sleep mode, ideal for battery operation.

Project Development

Development tools for embedded controllers can be very sophisticated and in the case of I.C.E. (in circuit emulators) can cost several thousand pounds. However, there is a simpler and cheaper way. Here's how. The PIC16C54JW ceramic packaged PIG contains EPROM and a quartz window which allows erasure of the EPROM contents by exposure to UV light just like conventional EPROMS. This device is very robust and the cycle can be repeated several hundred times.

Once a definitive version of the software has been developed, the code can then be programmed into an O.T.P (one time programmable) and much cheaper PIC. So how is the program developed? It's impossible to use conventional techniques such as an EPROM emulator. The answer is to use the MPSIM simulator which runs on any PC. Single stepping of the program in the simulator allows the user to examine register contents at each instruction; external logic changes on the I/O pins can be simulated in single-step and run mode. Here are a few examples of the commands available to the MPSIM simulator:

```
SE RB0 RB:0 ;change logic level on input pin.
DKI 1,RA3,T ;pressing ALT + F1 keys will toggle the
 ;RA3 pin in RUN mode
SC 1 ; set clock cycle time to 1 microsecond
 ; i.e. 4MHz clock
B4 ; 'break' stop at address 4
RS ; reset to start of program
ZT ; zero the elapsed time counter
 ; delays can be accurately measured.
$5 ; enter single step mode
E ; execute program
F2 ; modify program counters contents
```

When the software has been successfully simulated, the next step is to burn the PIC. Use the EPROM version for program development since it is very rare the first attempt of the software will produce 100% operational and functional confidence.

The PIC programmer described here programs the PIC in a fraction of a second. Connect the PCs serial port to the programmer and send the object code using any PC terminal emulator which has a hardware CTS/RTS handshake capability. The MPALC assembler provided free on the user disc (together with the MPSIM simulator) produces object code which the programmer will recognise. Use the following assembler directives (File PASM.BAT)

MPALC %1.ASM /f picice/t 8/p 16C54

This will generate an object file (FILENAME.OBJ) consisting of 1024 bytes. These bytes are arranged as Least Significant Bit (XXH) and Most Significant Bit (0XH) thus forming 512 12 bit words which is the capacity of the PIC16C54. Part of a typical hexdump is shown below:

```
0000: 00 00 00 09 40 0C 2C 00 20 0C 2D 00 25 07 55 00
0010: 07 0A 05 04 08 0C 2B 00 29 09 6A 00 03 04 2A 03
0020: 25 06 EA 05 23 09 EB 02 0E 0A FF 0C 8A 01 26 00
0030: 45 05 23 09 45 04 EC 01 07 0A 40 0C 2C 00 ED 02
0040: 07 0A 05 08 03 0A 20 0C 29 00 E9 02 25 0A 04 00
0050: 00 08 30 0C 29 00 E9 02 2B 0A 04 00 00 08 02 0C
```

```
0060: 05 00 00 OE 06 00 FF 0C 26 00 45 04 05 05 65 05
0070: 0C 08 FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F
0080: FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F
0090: FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F
00A0: FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F FF 0F
```

Note that the most significant nibble of the most significant byte is always 0 ie. 0XXXH = one 12 bit word, and that the INTEL HEX format is not used. To invoke the assembler, type PASM TRY 'ENTER', 'TRY.ASM' being the ASCII text source code of the program to be assembled. The MPASM cross assembler will not produce romable object code.

Programming

The EPROM version of the PIC (16GS4JW/P) can be configured for any clock oscillator - RC or crystal, whereas the OTP device has to be selected when purchasing for a particular clock source. PICS with the suffix 'A' are now available allowing the configuration of the 'clock' fuse to take place at the programming stage.

Apply power to the programmer and invoke the PC's terminal emulator ensuring that the CTS/RTS handshake facility has been engaged.

Selection of PIC programming fuse is by entering a number or letter on the keyboard followed by 'ENTER'. Note not to select P 'PROTECT' initially, since this will lock the PIC and render it unprogrammable.

```
SELECTION FUSE   FUNCTION   PIG TYPE        CLOCK

0         FDH    BURN XT    UV ERASABLE     100HZ 4MHz XTAL
1         FFH    BURN RC    UV ERASABLE     DC-100KHz
2         FEH    BURN HS    UV ERASABLE     4 - 20MHz
3         FOH    BURN LP    UV ERASABLE     32KHZ-200KHz XTAL
A or a    FFH    BURN OTP   ALL OTP DEVICES
P or p    F7H    PROTECT    ALL DEVICES
W or w    FBH    WDT        DISABLE WATCHDOG TIMER
```

It can be seen that the UV erasable PIC (JW/P) can be configured for any oscillator (RC or Crystal), whereas the OTP (one-time programmable) PIC device has to be selected for a particular frequency source. All PICS can have their ROM contents protected by selecting option P/p AT THE COMPLETION OF PROGRAMMING. Note that for all selections, the watchdog timer is enabled. To disable select W/w.
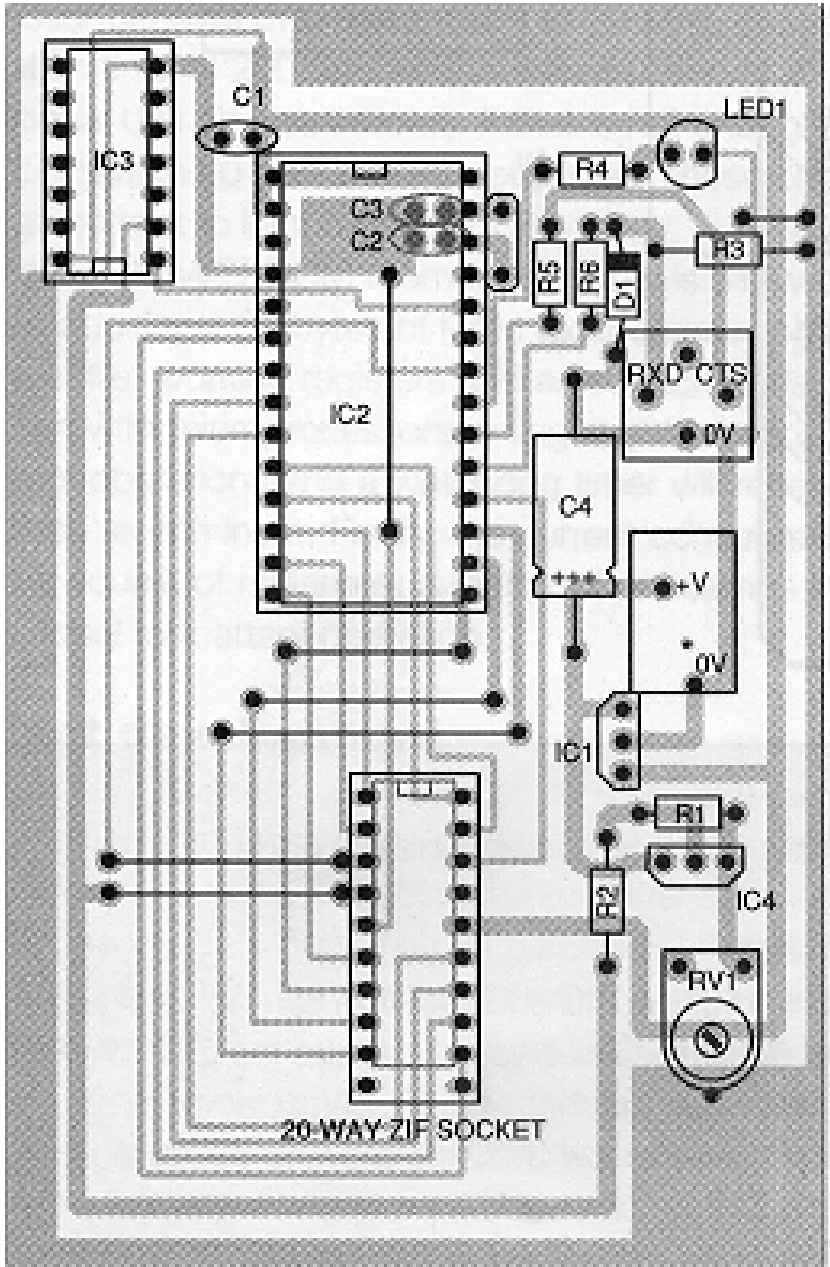
Once the configuration fuse has been selected, download the object file to the programmer. Ensure that the file size is 1024 (400H) bytes. (Rename OBJ)

A pre-programmed PIC (type PIC16GSS) is available from the author.
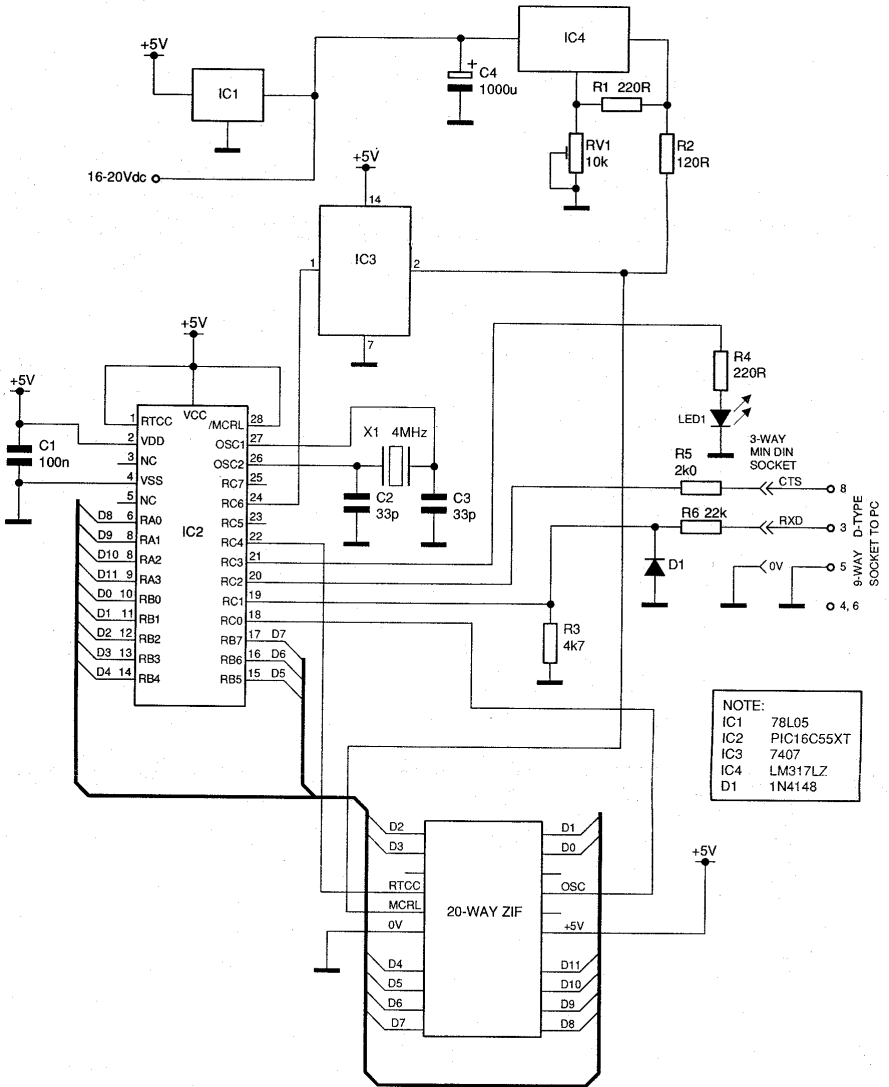
Mr R Grodzik (MICROS) 53 Chelmsford Rd, Bradford, BD3 8QN £30 inc. pp.

Includes free disc containing DOS printable PCB file, Program examples, MPALC, MPASM

PCB overlay

An 8 Channel Audio & Video Selector

Design by Brian Kelly, GW6BWX. Prototypes by Carol Webb.

The design described here is for a compact, low cost signal router that can feed any of eight audio inputs and eight video inputs to two independent pairs of outputs. It also includes a DTMF tone generator and an automatic antenna selector function. All the functions are controlled from a pair of keypads, the function keypad decides which mode is to be used and the numeric keypad allows digit or channel selection. Antenna selection is made by pressing the "AS" function key or by grounding a pin on the PCB. By connecting this pin to your transmitter it is possible to automatically select your preferred antenna every time you start a transmission. The antenna number is programmed by fitting links or a small switch on the smallest PCB.

Instructions for use:

The powered up condition is with channel 1 audio and video being sent to both A and B outputs and the keypad in DTMF mode.

DTMF mode can be selected at any time by pressing the "TO" (tone) key. Once in this mode, the numeric keypad acts as though it were a telephone dialler and produces the appropriate tone pairs while the digit is pressed. The "AS" (antenna select) key can also be pressed at any time and will cause a sequence of four tone pairs to be sent. The sequence is *0x# where "x" is the number selected on the small (95-0003C) PCB. The operating mode is unaffected by the "AS" key. The "Auto" pin is intended to interface to the transmitter "PTT" line, pulling the pin to a logic zero level also activates the "AS" function but instead of sending tones immediately, it waits 750mS to allow enough time for a repeater to access. Note that when tones are generated they will be sent to channel A and channel B simultaneously.

The signal selecting modes for channel A and B are completely independent, changing the routing on one will leave the other alone. Three modes can be selected, audio only, video only and both together. For example, pressing the "channel A both" (B1) key followed by digit 5 would route audio and video input 5 to channel A outputs. Pressing "channel A audio" (A1) followed by digit 3 would leave the video on channel 5 but switch to audio from channel 3. Channel B works in exactly the same way. Once a mode is set, the channels can be changed by selecting another digit on the numeric keypad.

The only exception to this pattern happens in self-test mode, more about that later.

Construction:

All five boards can be cut from one standard 160x100mm PCB. The two 95-0003D boards are mounted upright from the main board. This method minimises the video and audio track lengths, reducing the crosstalk between them. The function key PCB is the same height as the numeric keypad to make front panel mounting easy. The small board houses the antenna enable and selection links, as these probably don't require frequent adjustment they can be mounted on the rear panel.

Note:

This unit was originally designed to work with the GB3ZZ repeater which uses the tone sequence:

*0 <antenna number> #

to select the antenna at the repeater which gives best reception of a station using this unit.

Fit all the resistors first, then the capacitors and diodes. Keep all the wire clippings as they can be used to mount the upright PCBs later. Note that all vertically mounted diodes have their cathode (banded) end facing away from the board. Next, fit the links, remaining components and finally the ICs. The PIC16C54 must be programmed before soldering it in place, an unprogrammed device will not work.. The binary object file is available on BetWiXt BBS if you want to program the device yourself. To mount the upright boards, first solder the wire clippings to them, then fold the wires flat against the component side of the board and away from the components. Try to keep the wires parallel, it makes it easier to "plug" them into the row of holes on the main board. The drill holes in the board can be 0.5 or 0.8mm except for the veropin holes which should be 1mm diameter. The PCB mounting holes are 3mm. Keep all the board interconnecting wires as short as possible, some carry pulse waveforms which could pick up on the signal wiring if they come too close to each other. The audio and video signal wires should either be screened or tightly twisted with their ground wires, again this is to reduce crosstalk. The smallest PCB is laid out so that either a DIL switch or pins and jumper links can be mounted. Three of the links are used to select the antenna number when in antenna select mode and the fourth is used to enable this function when the "Auto" pin is pulled low. Note that the "AS" key works whether this link is fitted or not.

Link options

Ant	S1	S2	S3
0	no	no	no
1	yes	no	no
2	no	yes	no
3	yes	yes	no
4	no	no	yes
5	yes	no	yes

Fit S4 to enable operation of the "Auto" pin.

Testing:

Before applying power, check for shorts on the board. This design runs from a **FIVE** volt supply, connecting it to 12V will kill it for certain. The current drawn is very small, in the region of 70mA so connect a 5V regulator in line with the supply if you intend to use a 12v power source. For the prototypes I used a 7805 regulator on a 2cm square copper sheet and even after running for two days it was barely warm to touch. When you are happy about the current consumption, measure the voltage between each of the outputs and ground, it should be less than 0.5V. If all is well connect a monitor to the audio and video outputs and put the unit into self-test mode by pressing the "chan A both" and "TO" buttons simultaneously. You should hear an alternating high and low pitch beep at about 1 second intervals. Now connect some audio and video sources to the inputs. While in self test mode, the inputs are selected in sequence so you should see the pictures and their sounds one after another. Channel A and B selections are staggered so you can confirm their independent operation. To exit self test mode, either switch the power off and on again or press the "chan B both" and "AS" keys together until a rapid beeping is heard. You can release the keys as soon as the beeps start and after a few seconds the unit will revert to its freshly powered up state.

Parts list:

source - M = Maplin Electronics, F = Farnell Electronic Components)

R1-8,32,33,36,37	12	75R	M75R	M
R9-16,20-35	22	1K	M1K	M
R17	1	10K	M10K	M
R18,19	2	10K x 4 SIL	219-186	F
R38	1	4K7	M4K7	M
C1,2	2	39pF	WX51F	M
C3-7,9.11A,11B	8	0.1uF	RA49D	M
C8,10	2	10uF	WW68Y	M
D1	1	BZY88C4V7	QH06G	M
D2-8	7	1N914	QL71N	M
X1	1	3.58 MHz	DJ31J	M
U1	1	NME0505S	AH18U	M
IC1	1	PIC16C54XT	PIC16C54XTP	F
IC2	1	CD4028	CD4028BCN	F
IC3	1	PCD3311C	PCD3311CP	F
IC4	1	TL072	RA68Y	M
IC5	1	EL2232	UR10L	M
IC6A,6B,7A,7B	4	74HCT4351	PCF74HCT4351P	F
Digit keypad	1		JM09K	M
SW1-8	8	click switch	FF87U	M

You can use front panel mounted switches instead of SW1-8 if preferred, in which case you will not need the FF87U switches and the alternative types can be wire linked together. For selecting the antenna number you need either a DIL switch (Farnell 285-950) or pins and links (Farnell pins 312-241, links 312-307). If you expect to change settings often you could wire the PCB to a front panel switch instead. IC1 must be the "XT" version of the chip and must be programmed before fitting it to the board. You will also need about 1 metre of tinned copper wire to make links on the PCB and about 1 metre of insulated wire to connect the keypads to the main board.

How it works:

Microcontroller IC1 has a 4-bit port (RA) and an 8-bit port (RB). RA is used to select which part of the circuit is being addressed and RB is used to transfer data to and from it. As there are more addressable devices than available RA pins, the selection is sent from IC1 as a 3 bit binary number and is then decoded by IC2 to activate one of eight possible control lines. The keypad and switches are all part of a 3 column by 8 row matrix. Three

of the address lines are connected to the columns and by sequentially selecting them and checking for a signal on the rows it is possible for IC1 to detect whether any key was pressed. The firmware inside IC1's ROM then decided what course of action to take. If the key was in the function key part of the matrix it sets that function as the current mode. If the key was on the numeric keypad it sends the number out to either the tone generator or one of the input selectors depending on what the mode is. IC1 also monitors the voltage on the auto pin, normally this is about 5V but if it goes lower than about 2V and internal timer is started which creates a 750mS delay, the antenna selection codes are then sent over the audio channel. The tone generator (IC3) and IC1 share the same clock signal to reduce the component count. Inputs selected via IC6 and IC7 are passed to output buffers, each can drive two terminated loads of 75R for the video output and 1K for the sound output.

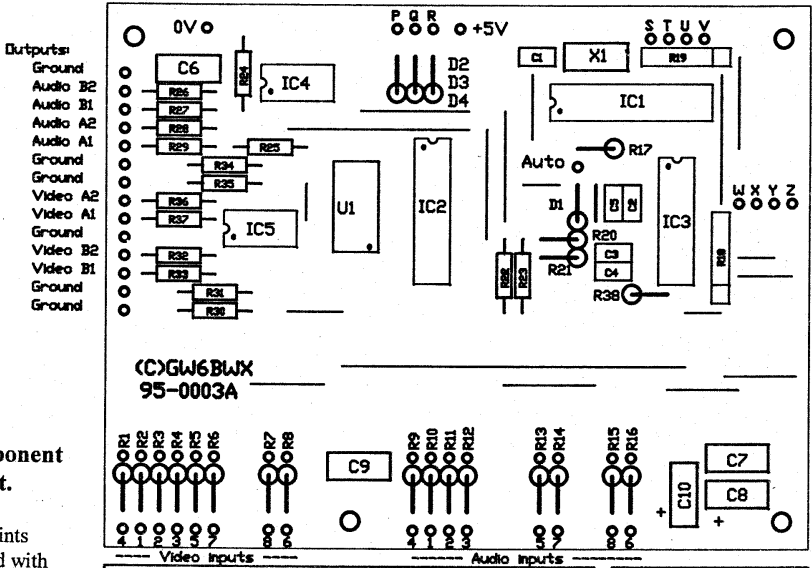## Interfacing to the "Auto" pin:

Low side PTT control   High side PTT control   Supply switching
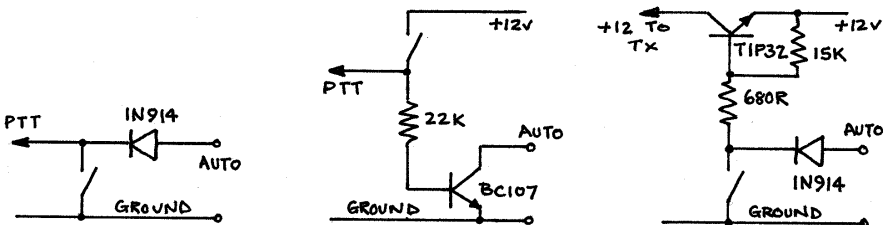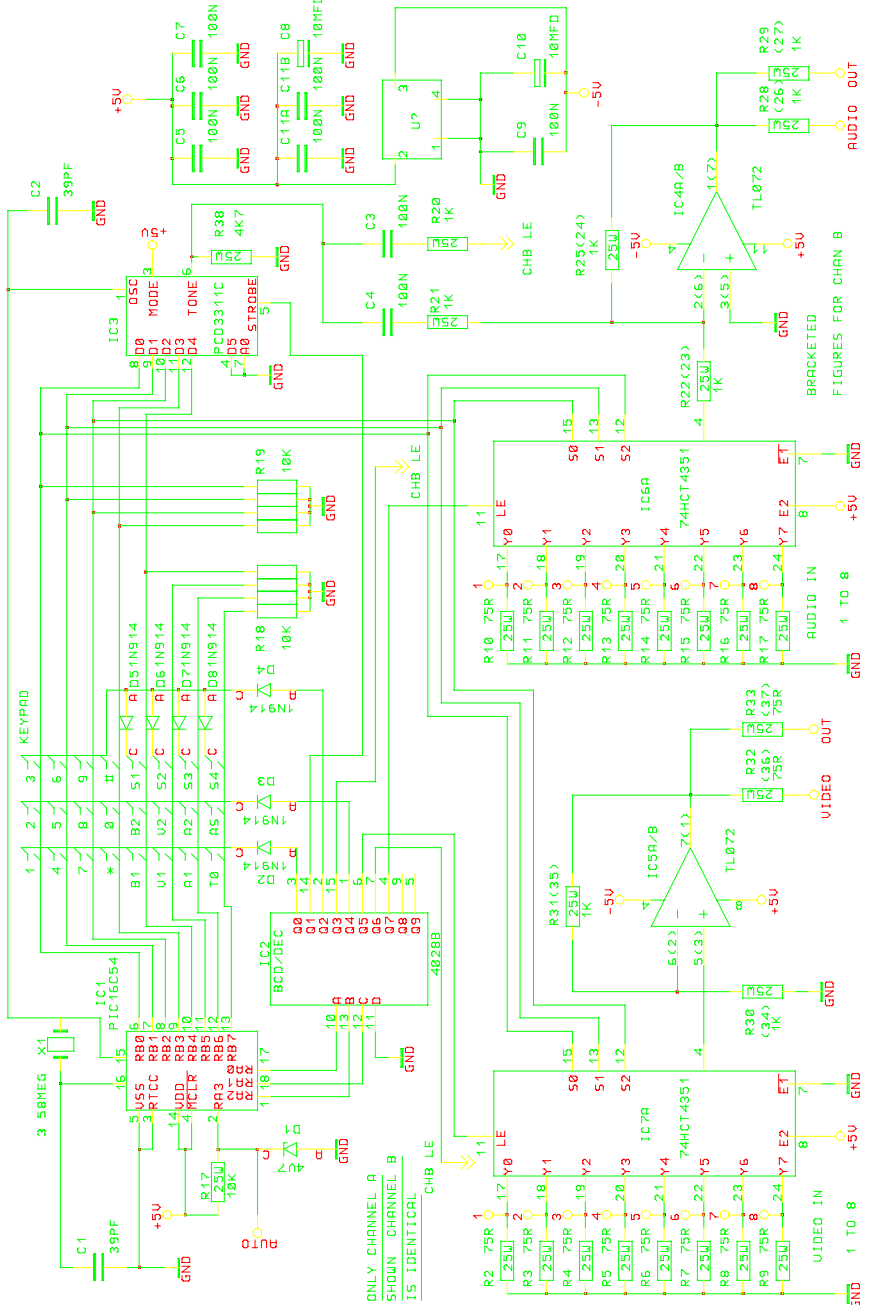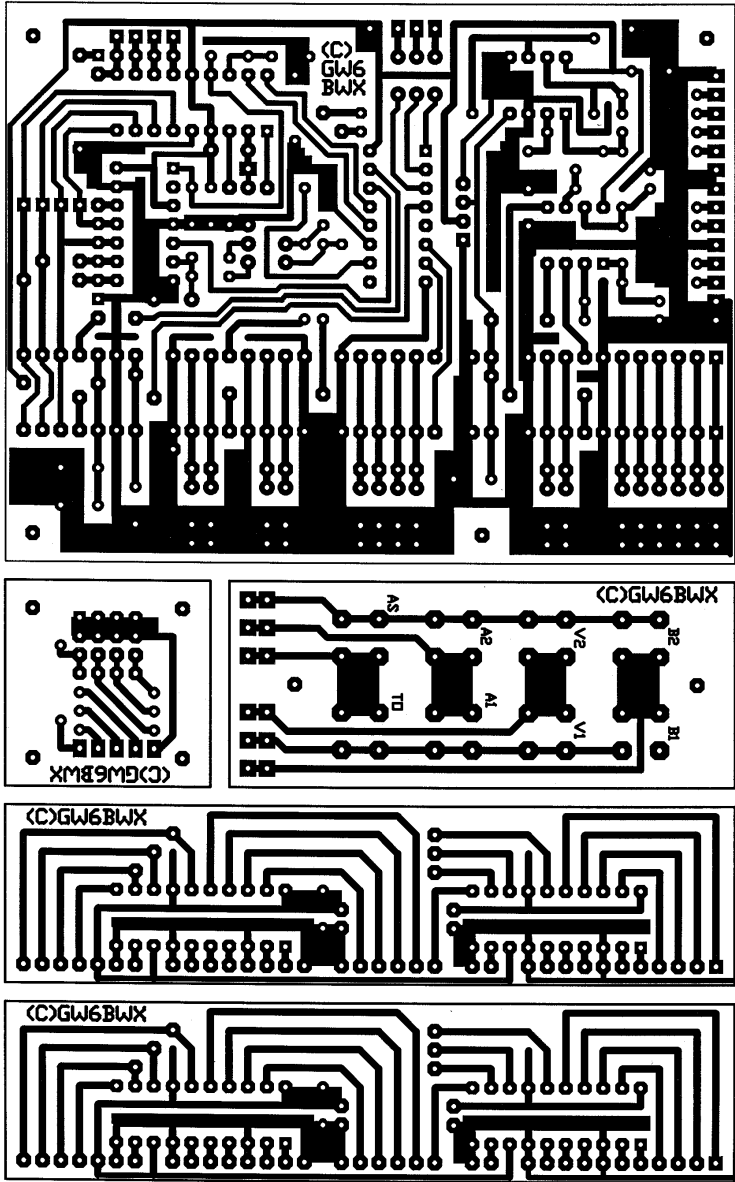
PCB track layout (copper side). Box outlines are to help when cutting individual boards from the panel, they are not part of the track layout.

PCB Component layout.

The points labelled with letters are wired together, eg. all points marked "T" are joined.

Connections to the numeric keypad are: (from left to right)

1. No conection
2. Q
3. P
4. R
5. Z
6. Y
7. X
8. W

Outputs:
Ground
Audio B2
Audio B1
Audio A2
Audio A1
Ground
Ground
Video A2
Video A1
Ground
Video B2
Video B1
Ground
Ground
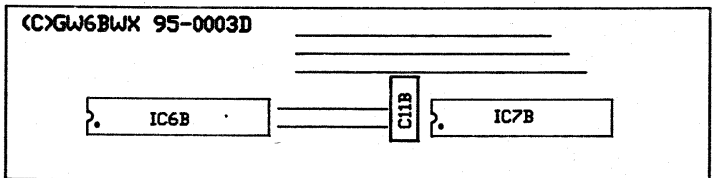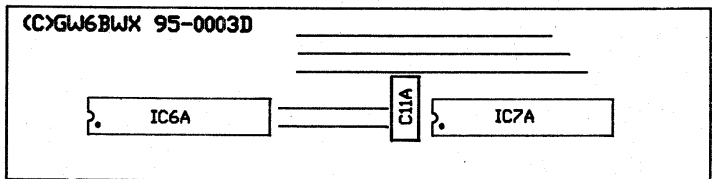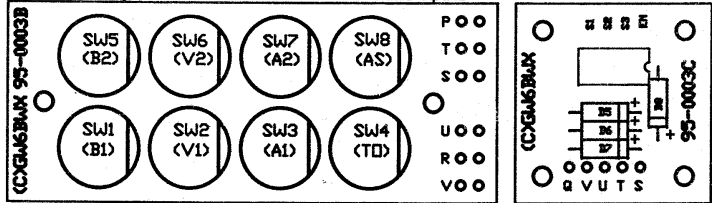
The pin marked "Auto" is intended to be connected in such a way that it is joined to ground either directly or via a resistor of 1K or less at the start of your transmission. Under no circumstances connect it to a voltage source above 5 volts or a negative voltage.

The North to South Wales Demo of Live Fast Scan Amateur TV

by John Lawrence GW3JGA

North Wales' farmers are well used to seeing modern technology in the form of wind farms, but one farmer near Llithfaen on the Lleyn Peninsular was unprepared for what he saw on Saturday, 30th March, 1996 when five complete portable ATV stations, equipped for 24cms and 3cms set up in his country lane.

This was the North Wales end of an ATV demonstration put on especially for the 'Raw Charm' TV camera unit located with Bob Robson - GW8AGI and Brian Kelly - GW6BWX on the Preseli Mountains (NGR SN 074 322) S.E. of Cardigan in South Wales. The recording of the portable ATV demonstration is to be shown on HTV Wales later in the year as part of the Marconi celebrations.

The North Wales contingent comprised, veteran DXer Bob (Gunmod) Platts - GW8OZP, John (Circuit Notebook) Lawrence - GW3JGA, John Cronk - GW3MEO, David (GB3TM Repeater Keeper) Ellis Jones - GW8PBX and Barry - GW8FEY. All vehicles travelled in convoy from Caernarfon and arrived on site at 10.45 a.m. The location was on the side of Mynydd Carnguwch (NGR SH 376 423),180m asl.

Communication was quickly established with Bob and Brian in South Wales on 144.750 when whip-to-whip signals were S9. 24cms TV was soon up and running with pictures of the five /P stations being transmitted by '3JGA, over the 109km (68 mile) line-of-site path and received P5 in South Wales. Bob '8OZP and John '3JGA were then interviewed over the air for the TV programme. After a bit of dish tweaking, return signals from South Wales on 3cms were soon P5+ and our 24cms signals were 'looped back' so we could see how well we were being received. Further tests were conducted on both 24 and 3 cms for the benefit of the TV crew and to allow some testing of equipment. 3cms provided the best pictures, but was subject to some deep fading.

The WX was brilliant but we didn't realise just how cold the wind was until we switched off the gear and the adrenaline stopped flowing. There was a serious scientific aspect to the event in that after the demonstration, Bob '8OZP and Bob '8AGI at North and South Wales respectively, took their 3 cms gear down to sea level to attempt surface ducting tests across the

Cardigan Bay, but unfortunately the weather conditions were not favourable and no contact could be established.

At Mynydd Garnguwch, GW3JGA, 24cm Loop Yagi, 3cms TX, Penny Feed Dish, RX LNB and Dish

However, it was a great day for showing off our gear, pointing aerials, tripping over cables, borrowing connectors, munching butties, looking down

waveguides (only joking) - we can hardly wait until September when we hope to do it all again!

At Mynydd Garnguwch, GW8OZP, 2m Yagi, 3cms TX and large dish, RX LNB and Offset dish

GW3JGA Portable setup for 24cms

What You See Is What You Get ?

by G8MNY

Camera View finders often lie about what you framed camera on. Height is normally set by a preset pot, but the width is factory component set.
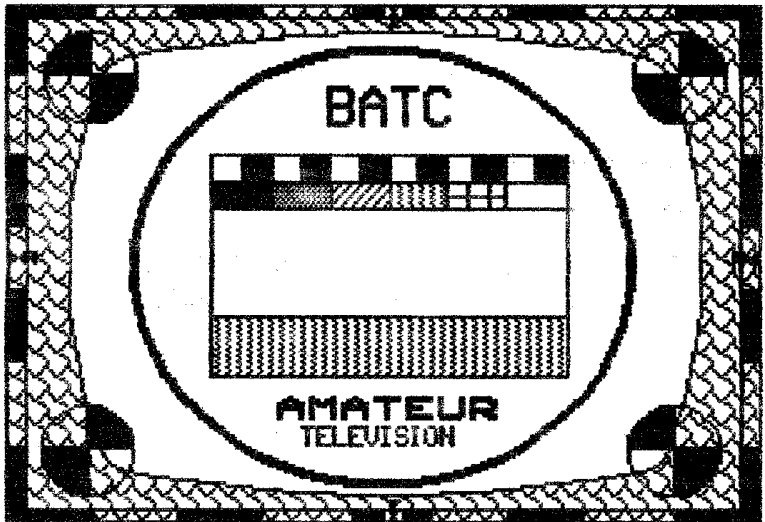
There are 2 ways of width adjustment.

1. Change the tuning capacitor across the line output transformer. Reducing it's value will reduce the scan width, but it will increase EHT, (tube heaters?), but sometimes this is the only option. This method does speed up the flyback time and can stop picture wraparound at the edges on slow flyback designs. Careful selection of value and type of capacitor is needed, as a failure could blow up the line output transistor, EHT tripler, line output transformer etc.

2. Increase the inductance that is in series with the scan coil, by adding one or modify the existing inductor. On linearity corrected line scans designs, there is a magnet biased inductor to correct for the one sided saturation that occurs on the line output transformer. On large TVs (and computer monitors) this parameter may be adjustable both in inductance (width) and magnet strength (linearity). But modern small and miniature designs use fixed production selected values or none at all.

LINE SCAN
CORRECTION
CHOKE

FERRITE

S N MAGNET

MAGNET

ADJUSTMENT
MAGNET

COIL SPACE
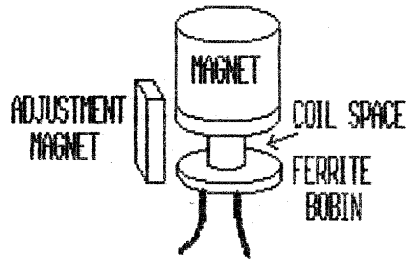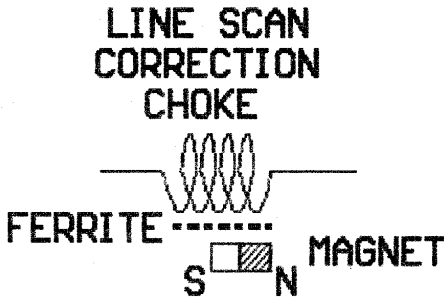
FERRITE
BOBIN

Option 2 is the simplest to try first. Adjustment of the inductance can be done by

a) adding external ferrite pieces,

b) adding a tiny bias magnet to alter the cores magnetic properties.

c) adding or removing a few turns,

In practice for a) & b) a section of rubber sleeve around the inductor to hold on a piece of magnet or ferrite is all that may be required. With both 1 or 2 option, locating the components concerned may be difficult and a diagram and layout might be needed.

Pictures from Rally 96

See the Rally 96 article on page 18

A Day on the Mountains

by Bob Robson

Take the last day of spring, which incidentally was a gloriously sunny day but with a rather cool breeze, two groups of amateurs, a camera crew and separate the two amateur groups by 112 Km. and what have you got ?

This was the situation on the 30th March 1996. One group consisted of GW3JGA, GW3MEO, GW8PBX, GW8FEY, GW8MJO and G(W) 8OZP, and they had foregathered on a site on the Lleyn Peninsular (North Wales to save you getting out your maps), and the other 'group' was Myself (GW8AGI) and Brian GW6BWX. Where do I hear you ask did the film crew fit into this picture? They were with Brian and I on the Preseli mountains (Pembrokeshire, South Wales).

What caused these two groups of normally sane people to act in this way? The cause can be traced to September 1994 when I gave a talk and demonstration of amateur television to the Wales centre of the Royal Television Society. Afterwards one of the audience came up to me and said

'That an ideal subject for a program for one of the channels'. Ha Ha was my reply at the time if my memory serves me correctly !

Early this year the same person contacted me saying ' The commissioning editor of HTV Wales likes the look of the synopsis about a program about ATV and we're going ahead with planning the program '. At this time disbelief still raged, but Pam (the producer) and others from her company came along to see Brian (GW6BWX) and myself to find out more about what ATVers got up to. Over the air we introduced them to the Severn-side repeater group and entertained them with the way the repeater was used.

Fortunately - or otherwise- they liked what they saw and started to flesh out ideas for a 30 minute program. As the program was to be commissioned by HTV Wales it was thought politic to have a strong Welsh bias. 'Is it possible to have pictures from North Wales received in South Wales?. We pointed out that both the BBC and HTV had to have several links to get program material from north to south, what chance did we amateurs have?.

The attempted solution to this problem was the reason for the foregathering on hills and mountains. I contacted John Lawrence GW3JGA in Prestatin to see if he and some of the locals ('local' being anywhere in a 60 mile radius) could go to the top of mount Snowdon (using the train). As the train does not start operating until Easter the provisional shooting schedule ruled that out!

I then suggested a site somewhere overlooking Cardigan bay to send pictures on 24Cms and/or 3 Cms to a point in the Presily mountains that I knew as a good site for atv (i.e. it was accessible by car and there was room to park). John said that the group knew of such a site. Using a computer program that calculates the track/ground profile from the supplied co-ordinates I found that the proposed sites gave a 'line of site' path of some 114.2 Km.

Saturday 30 March dawned and at 8 AM the my Boss (the XYL) was filmed opening the curtains, (to prove it was early morn!) then I was filmed putting the last of the gear into the car, Brian arrived and off we set heading for the Presilies some 120 miles away, calling at HTV's site for some comparison shots between my 1 watt video TX and the half Megawatt aerial setup in the background (Wenvoe for those of you who may know the Cardiff area). The director also wanted a shot of my car bowling along the motorway so Brian transferred to the film crew car to provide comms to me so I would know when they were in place and which lane to use etc.

Suitable delay in my setting off was arranged and when I joined the motorway they were ready for me and that shot went into the can. At the

next junction I left the motorway and waited on the approach sliproad for them to pass so we could then proceed in 'convoy'. 50 miles later we stopped for coffee, then carried on to the mountains of west Wales. As I knew where the site was I was lead car and as I breasted the brow of the hill on the lower slopes of the mountain where the site was I let Brian know over the air where to turn for the car-parking area. To my suprise John -GW3JGA replied to me with a 5 & 9 signal. At least comms weren't likely to be a difficulty!

The film crew set their gear up so Brian and I drove off again so that our 'arrival', taking compass bearings for aerial directions, and setting up the gear could be filmed. Several takes later we looked for signals on 24 Cms - P5, no trouble then Bob GW8OZP came up on 3 Cms but he had negative mod but a strong signal. We used his signal to align my dish the I went over to transmit and Bob got me at P5 so I sent their 24 Cm picture back so they could see how well we received them. All this time the film crew were shooting away getting some footage from the monitor, and various other shots for their film.

For once the weather forecasters had got it right - sunny but temperatures around 10 Celsius (I wish they had got that bit wrong as the breeze was a little chilly to say the least) but the adrenaline seemed to block the cold! We both sent each other the views and in our case we got our own back on the film crew by filming them and sending their picture up north. At 1-30 We had to stop operating from the mountain as Bob Platts & I wanted to try a sea level path across Cardigan bay to add more data towards a theory we are developing, and the film crew wanted to film this as well.

We left our lofty perch (1200 ft ASL) and went down to the coast about 10 miles away to Cwm-yr-Eglwys which as everybody knows is the *Church in the Valley* a very picturesque hamlet in a little bay with access to the beach and more importantly a clear takeoff to the north (why I had picked it!) and the 3 Cms gear was set up ready for the time Bob was to be transmitting. But nothing was seen or heard, and a subsequent telephone call to Bob established that he didn't hear or see me during the planned times of my transmissions.

So how did the day turn out as far as expectations were concerned. At the planning stage we had said to the director that we thought 24 Cms would work reasonably well, 3 Cms 50-50 and the sea level no better that 30-70. So the crew were very happy with the 2 out of the 3 we achieved at high level, but like ourselves disappointed the sea level path failed. Bob & I will talk

more about this. We already have a theory as to why the path 'failed' but more tests will have to be carried out to 'prove' it. Watch this space !!!.

I would like to thank John and his merry band for turning out and providing some very good pictures. Some of the lads in the group had been galvanised into action to complete their gear for the 'event' and I would have liked to have stayed on the first site longer so that they could have carried out any further tests they may have wanted. I have spoken to John and we have provisionally arranged another visit to the two sites in September when we will not have any distractions and we will be able to 'play' ATV. At the time of writing the planned screening date for the film is still some time away and the results are awaited with a little trepidation !!!!


Inside the hall at Rally 96 - see the article on page 18

Squarials for 23cms

By Arthur Barrett G2BWW

The folded dipole array used here is very loosely based on the "dish feed for 1.3 GHz" in the R.S.G.B. Microwave Handbook Vol.3. The differences are shown in the sketches. The original back plane of the Squarial serves as the reflector without modification and the original mounting components are retained.
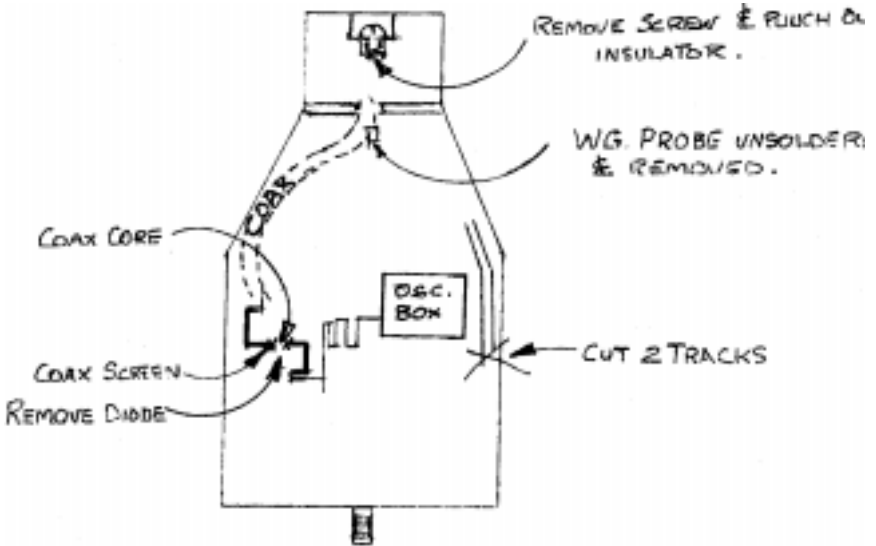
Front and rear plastic covers and mounting hardware are removed, the small central casting and the four sheets comprising the original aerials are removed as they are not required. If the complete electronics assembly is now removed the second small casting can be used as a template to fabricate the brass plate and bush as the sketch.

Modifications to the electronics are very simple. Firstly, the waveguide probe is unsoldered from the PCB and removed, the recessed screw in the end of the casting can be removed temporarily and a small punch can be used through the hole to tap out the probe insulator. Two tracks are cut to break feeds to the 10 GHz circuitry and the oscillator, and one S.M. diode is removed; see sketch for details.

1·5mm ⌀ COPPER W.

//5

57·5

10

107

S = SOLDER.

¼" BRASS TUBE

57·5
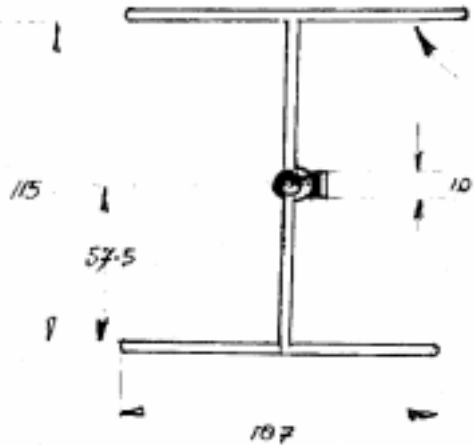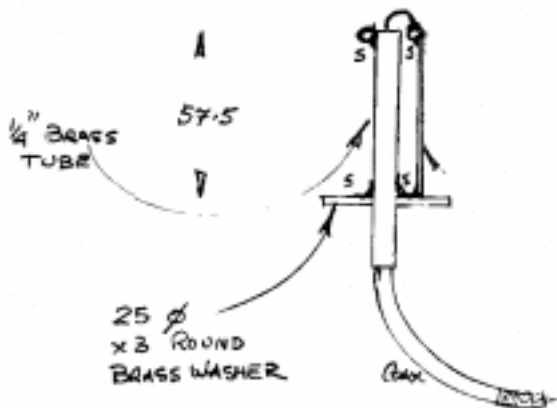
1·6 × 10 DOUBLE SIDED PCB 2mm GAP

25 ⌀ × 3 ROUND BRASS WASHER

Coax

Completion of the antenna assembly as sketch should be the next exercise, and the free end of the coax fed through from the front skin (in line with the centre of the original waveguide) and the front cover screwed back in place. The coax and 1/4 brass tube now protrude into the rear of the assembly and the brass plate and bush threaded over them. With the plate properly positioned, the 1/4 tube can be pushed through the bush until the front cover dimples (the brass washer then seals the hole) and the grub screw is then tightened.

N.B. It is important at this point to ensure that the grub screw is tightened only when the elements are in the correct rotational position relative to the mounting hardware to give correct polarisation.

SOLDER

⅛" BRASS PLATE & BUSH
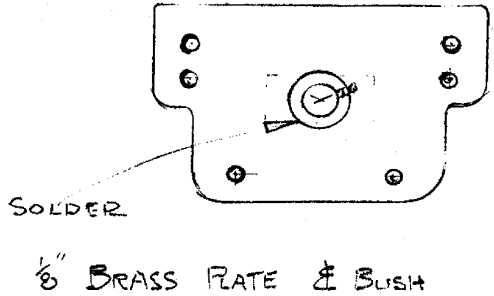
The coax is now fed into the electronics area through the waveguide hole and the probe hole, easing it through until the main casting can sit fully home and be screwed back in place.

Connecting the coax as sketch, replacing the screening plate screws and gasket, rebuilding the mountings (only removed for ease of working) and fitting the rear rain cover, completes the unit.

15 to 18 volts from a typical satellite RX is fed on the coax centre pin of the F connector in the usual way.

Performance

Beam width Estimated at 90 +

Gain not less than 6 db better than a 23 element YAGI under same conditions.

Conclusions

The results obtained were very surprising as a number of liberties were taken such as the characteristics of the coax used. Other types of passive elements could have been used; but this was the simplest with the materials to hand and the use of this and other type L.N.Bs can be a profitable source of 23cm preamps.

Footnote

The PCB strip in the sketch is not needed if a very small coax is used; if the centre conductor and dielectric can be found to just fit into the brass tube, the PCB strip may improve matching.

Severnside Television Group (Advert)

TROUGH REFLECTOR SIDE VIEW

23 cm 38 & 18 ELEMENT WIDEBAND YAGIS
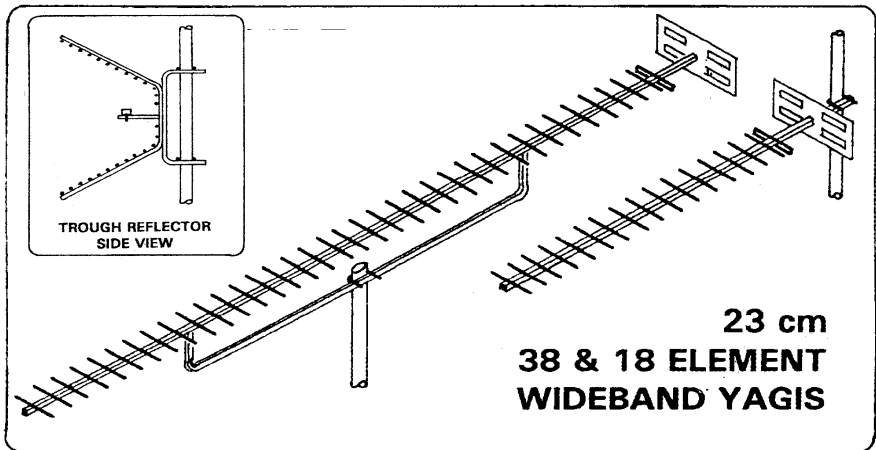
All of our 23 cm Aerials are specifically designed for ATV use - although they can be used for other rnodes as well. Wideband characteristics mean that you need only one aerial to cover the repeater input and output channels. Our famous wideband yagis come fully assembled in two versions :

38 ELEMENT HIGH GAIN : 14 dB gain, 1.8 m long, **£26.00** plus postage.
18 ELEMENT STANDARD : 10 dB gain, 0.9 m long, **£15.00** plus postage

Don't forget our **20 ELEMENT CONVERSION KIT,** which converts your existing 18 element aerial to the full **38** element high gain specification : **£13.00** plus postage. Our 23 cm **TROUGH REFLECTOR** is quite unique, combining 11dB gain with wide bandwidth *and* wide beamwidth. It's also compact, just 0.55 m high, 0.35 m wide and 0.3 m deep. Supplied as a kit of predrilled and preformed parts. for easy "Screwdriver" assembly : **£19.00** plus postage. All aerials feature an SWR of less than 1.5:1 and are supplied with mast clamps suitable for masts up to 55 mm diameter. Mast poles shown are not supplied.

POSTAGE: **£3.75** for one aerial, **£5.00** for two or more. Telephone orders with cash on delivery: **£2.75** supplement per order, Orders from outside of the UK - please write for carriage quotation.

CHEQUES payable to "SEVERNSIDE TELEVISION GROUP" and send to 18, Linnet Close, Patchway, Bristol BS12 5RN. Telephone (evenings & weekends only please) 0117 969 8136. Please allow 28 days for delivery.

Golden Oldie - A Horizontal Aperture Corrector

This circuit appeared in the first Amateur Television Handbook (blue front cover) it requires a delay line which was made out of 20 metres of coax but now with the availability of delay lines as per the equaliser in the last issue it may be worth re engineering. If you don't mind the long length of coax the circuit works as is.

An aperture corrector is a device used to automatically correct poor definition in a television camera, it has been used in broadcasting for some time in the form of a video aperture corrector (VAC) which provides compensation in both the horizontal and vertical planes. Vertical correction is not yet within the capabilities of most amateurs but a great improvement can be made by horizontal correction alone.

It is usual to process non-composite video (i.e. without syncs) and then to add syncs later, in this way the sync information is preserved unmodified. Amateur sync pulse generators however are not always as good as they might be and therefore it is considered acceptable to process the full composite video signal, this also results in a certain amount of simplification in the circuitry.

Circuit Description.

To sharpen up a picture the transitions from black to white and white to black must be speeded up, to do this it is necessary to know what the signal level is (present), what the signal has just been (past) and what the signal is about to become (future), with this information available a deduction can be made as to whether the signal is about to change in such a way that requires correction or not. This information is obtained with the aid of a delay line.

The input signal to the delay line represents the future since it is the signal which will appear later on (after being delayed), The output of the delay line represents the present and, because the delay line is not terminated and hence reflects the signal back to the input the reflected signal represents the past. The future and past signals are amplified by T6 and applied to T9. The present signal is applied to T7 via T2, the three signals will add in T9 and will cancel the present signal, T9 output is thus future and past. This signal is then applied to T4 via a level control RV2, the present signal is also passed to T4 via T3, the resulting corrected signal is output via an emitter follower T5 to match 75 ohm coax.

Construction and Use.

RV1 is adjusted to the characteristic impedance of the delay line, a fixed

The delay line is made from about 20 metres of thin coaxial cable which can be coiled up or otherwise stowed as convenience dictates. The 12 volt supply rail should be well regulated to avoid distortion of the signal, The input is standard 1 volt p-p 75 ohm composite video. When the corrector is in use it may be noticed that noise signals are also sharpened, this undesirable effect is reduced by the two back-to-back diodes (OA81) into the signal line after RV2. This will limit correction to large signals only and will leave noise un-processed. When using the aperture corrector with colour signals it should be connected in the luminance path for a R-Y, B-Y, y drive to the coder or in the green path for a RGB feed system, In either case the corrector will delay the signal because of the delay line and so any signals which are not fed through the corrector must be delayed by a similar amount.

GB3VR & GB7VRB
1996 Prices

1Watt FM-TV 24cms Transmitter

This 1 watt transmitter generates its signal at the wanted frequency which can be set anywhere in the band, colour or B/W. On board intercarrier sound and fixed pre-emphasis are standard features. The kit includes the PCB, all on board components, pre-drilled heatsinks, an Eddystone di-cast box and full and comprehensive instructions. Building time is three evenings work. The 1996 price for this kit is **£60.00.** With over **600** units sold to the Amateur market alone, this is probably the biggest selling TX kit in the world!!

Two channel phased locked loop kit.

This add-on kit vastly improves the overall stability of the 1 watt transmitter. Two crystal locked channels and a third free running tuning position are available. Kit price **£30.00.**

AMIGA ATV Program-2

The New Amiga ATV has more features than ever, up to 56 testcards, 20 wipes, superb text control, 30 screens of text messages, QRA calc, testcard music, selectable displays, and this version has a DTMF tone pad to control your repeater.

All test cards are over-scan i.e. the whole screen is used. Load in your own customised testcards, Extra Large Text, Scrolling text, clock**,** callsign extensions, Hot key operation, Doe reader, ATV Cli, Cross Hatches, Purity, and a comprehensive section for genlock users.

For any Amiga with 1Meg or more, state callsign and QRA (if known) when ordering. This three disk set is now only **£15.00.**

The Spectrum ATV Program

Still selling after all these years, why, its good, its cheap and it works on all spectrum based machines. The 48k version has over 60 commands which

include 7 testcards, memo pad, clock, maps, tones, QRA locator, various size printing, plus disk transfer routines and much more. Now only **£5.00.**

Orders Should Be Sent To:-

Treasurer of GB3VR, R. Stephens, 21 St. James Ave., Lancing, Sussex, BN15 0NN. Cheques payable to:- **"W&DVRG".** Telephone (01903) 765760 7 to 8 pm.

CAT '96 - Stop Press!!

See the enclosed response form for the most up to date details, how to book, times, places and contact information. (Or, ring Paul Marshall on 01522 703348, E-mail: CompuServe 101573,2170)

- EVENING DINNER ON 31st Aug. - Semi formal, Dinner Jackets (+owners!) welcome, suits preferred, but jeans and a *clean* T- shirt will do.

- EXTENDED EVENING BAR ON 31st Aug. - By popular request! (Hotel residents only) In the 'Percy Pilcher' Bar.

- FULL LECTURE PROGRAMME - Commences 1st Sept. @ 10-30 am. Talks on ATV topics, TV History and Video Graphics.

- EXHIBITION & MEMBERS DEMONSTRATIONS - All day from 10-00 am on Sun 1st in and around the Hotel. What are **_YOU_** taking?

- OB VEHICLE DISPLAY - Setting up on evening of Sat 31st Aug., demos on Sun 1st Sept. from 10-00 am onwards (Hotel power feeds willing!).

- PRODUCTION COLLOQUIUM - Come and pick up some tips, and maybe pass some on. Sunday afternoon, 2-00pm. Masterminded by Norman Ash.

- ATV FORUM - Repeater Groups and individuals are invited to discuss the issues - licensing, technical specs., etc. Graham Shirville in the chair.

- BGM - yes, you lucky people, your chance to vote for new committee members, chew the existing ones up and maybe even volunteer to help! Sunday 1st sept. @ 4-00 pm. Be there. (or we send the boys round!). Items for the agenda, nominations and suggestions to the gen. Sec., Paul Marshall asap. Agenda available by request to the gen. Sec. Two weeks prior to the BGM

- *And of course -* Some selected ATV type traders and the ATV Boot Sale in the carpark - no need to book for the Boot Sale, just come along. Traders please ring Paul Marshall.

TV on the Air

by Graham Hankins G8EMX.

Repeater News

The Nottingham ATV repeater is off the air but undergoing some up-grades at the hands of G6SKO. It is hoped a new location can be found and it will be back on the air soon. There is also a new ATV repeater in the pipeline for Dartmouth. Tony Reynolds G8CEQ (ex VK6ZGZ) Chairman of the West Devon ATV group has been given permission to install a 24cms repeater on the North Hessary BBC transmitter mast. The repeater was able to put P4 signals into Plymouth, Torbay, and Newton Abbot, during beacon mode tests. The final aerial will be a corner reflector or bow tie to give several directional headings instead of the all-round radiation pattern. GB3AT is now ready for installation, NOV is still awaited and meantime tests are planned to prove radar friendlines. GB3RT is back to full power after replacement of the mixer/PA feeder. GB3EY East Yorkshire has a new logic using I2C logic. GB3ZZ is gearing up for repeater first at 7.30 on 4 May it will relay HTV's transmission output for the broadcast of a programme all about ATV featuring

Bob GW8AGI and Brian GW6BWX, for those of you outside the HTV area or not in range of GB3ZZ I am sure we will have a copy for you to see at CAT 96.

Internet News

John DL4EBJ is running http://www.regio.rhein-ruhr.de/hamradio/atv for ATV articles in German and English John's Email address is jkoering@mail.regio.rhein-ruhr.de

3 cms

G4WTV IO90ST and John G6MPE have been exchanging P5 pictures on a full duplex link and G6FFH can also look in and see pictures. While on the subject of 3cms cast your memory back to TVOA November 1995, which reported a remarkable example of microwave ducting, when 10GHz Amateur Television pictures skimmed across the surface of the North Sea. Well, it turns out that you don't always need a vast stretch of water. The recent very cold winter produced more evidence of amazing microwave propagation. G4CBW (Stoke on Trent) was receiving 10GHz signals from

somewhere south. It later transpired the pictures were from GB3XG,the Bristol 3cm Repeater P5 at times. This was a path length of about 187km. The weather conditions - feezing fog from the south coast to the Midlands. Thanks to Phil Smith G1HIA of the Severnside ATV Group for that report.

24 & 70 cms

In the West Midlands there is an ATV net on Sunday mornings from about 1100 hours and on Tuesday evening from 2000 hours. Regulars are Arthur Bevington G5KS John G7UNB Alan G6WJJ, John G1GST and Brian G0KGG.

SSTV

SSTV is still alive and kicking at least in Teignmouth Ken Darby G3MLD is active using the JVFAX 7 Programme on a 386 PC with a HAMCOM interface. Ken is not yet into making his own pictures but the JVFAX software comes with some stored pictures that you can add your own callsign to. Ken can be found Sunday morning on the 80m net 1000 to 1200.

For those of you not familiar with the JVFAX programme it will allow you to acquire SSTV pictures as JPG files which can be viewed on any PC using software such as Paint Shop Pro (WINDOWS) and Image Alchemy (DOS). JVFAX software and HAMCOM interfaces are available both as packs or ready to run hardware/software from Peter Lockwood G8SLB 36 Davington Road Dagenham RM8 2LR TEL 0181-595 0823

That's all Folks keep the copy coming to :-

Graham Hankins 11 Cottesbrook Road Acocks Green Birmingham B27 6LE UK. Packet address G8EMX@GB7SOL.#29GBR.EU

Stop Press

Kent TV GROUP will be holding an at home 20 October 96 12pm to 4pm at Tunbury Hall, Walderslade, nr Bluebell Hill, Junction 3 M2 (A229) Talkin 144.750. Admission free all welcome

MARKET PLACE

£

Copy should be sent to 'The Editor' at: 14 Stairfoot Close, Adel, Leeds, LS16 8JR. Tel: 01132 670115. E-mail: trevor.brown@betwixt.dircon.co.uk

For Sale

Books for Sale. SHOW BOOK ATV No. 1. Adprint 1957. Almost mint copy of this popular ATV picture-book series. Plenty of early ATV shows featured with lots of production photographs of ITV stars. £8.50 SEE IT HAPPEN--The Making Of ITN. Geoffrey Cox. 1983. Fascinating illustrated history of ITN. £6. ITV 1982. Getting rarer. £6. ITV ANNUAL 1963 £3. No spine paper. Plenty of studio shots. WORLD RADIO AND TV HANDB00K. 1973. 1975. £3 each. Dr Who Annual No. 1. £5. Slightly chewed cover. The Blue Peter Book Of Television. £3 VGC RCA Receiving Tube Manual. 1966. Lots of circuits and details. £5 IBA Technical Review (No.2) Technical Reference Book. 1977. £3. IBA Technical Review. (No.10) A Broadcasting Engineer's Vade Mecum. May 1978. £3. Essentials Of Electricity For Radio and Television. Slurtzberg and Osterheld. Pub. McGraw Hill 1950. Illustrated. No d/w £5. All books clean and ín vgc. Postage £1 per book. Contact Dicky Howett 01245 441811

Mobile Public Address Control Room fitted with 8 x 25 Watt Amplifiers, 4 Channel Mixer, Microphone, Flashing On Air Lights and Battery Charger £950.00 o.n.o. 4 x Xenon Studio Lights complete with Lamps, Stands and Control Unit £600.00 o.n.o. JVC Lo-Band Portable U-Matic with Camera CR4400E 550.00 o.n.o. House Clearance: Over 100 items from Broadcast equipment please telephone for list on 01634 723838. Peter Snell, Amp House, 2A, Grove Road, Strood, Kent, ME2 4BX.

JVC GH-X10E Video camera with character generator. Hard case, second superior mic, cables, headphones etc. Auto/Manual zoom lense 9.8 to 80mm F1:1.4 and macro, £200. Sony TT-FlUB Tuner/Timer with

Audio/Video/UHF in and out, £38. Ken Domminney, 7 Chestnut Close, Eastbourne, East Sussex, BN22 OSZ. Tel: 01323 500174.

1.2 meter precision Ex Navy dish. Machined from solid alloy casting. With cassigrain feed by G8OZP or may be used as prime focus. Mounting ring on rear. £50 buyer collects. Bob Platts 01283 531443 Burton upon Trent.

Memory board for IBM At with 6 megs ram no details œ30.. Glass BBC test transparency No. 52 (12" * 10" test slide) Swap for something of equal interest. .. TV lens, the sort you used to hang in front of your 1952 tele to make the pictures bigger offers .. Thorn WG71/GE5M/501 SPG, potentially triple standard(405,525,625) circa 1965? will need fixing œ15.00 ....EMI dual pal coder 4U high. cica 1968?....Thorn Pluge Generator, 3U high..... BBC test gen set, pulse & bar + assorted staircases, self contained in 3U high portable case....Wheeled Camera dolly, big & heavy. **Cameras for Sale** Marconi MK8 Broadcast studio colour camera, complete but will need some work, £150.00, Marconi Mk9 camera head in poor condition for spares .. Spares available for Marconi Mk8 & Mk9's + LDK5's and some extenders for this and that. **Books for sale** Book for Norton Utilities version 4.5 œ5.00. General Electrical Engineering, 448 pages,1 947, £5.00, IBA Technical Review Nos. 15, 16, 17, 20, Swaps.

Handbooks for :- Barco CM33 colour monitor, Prowest PM 11/3A mono monitor, . BARCO MONITOR 3/37. JVE MONITOR MK1. PYE MONITOR LDM1911/15. MARCONI MONITOR B3905. TEKTRONICS waveform monitors 528 and 529. CLAUDE LYONS STABLISER TS3. LINK DA 280. DECCA CHECK RX. RU4011. SELTECH SPG 110P. Part H/Book for LDK5, BBC ITS GEN. GE4M/554, BBC DIGITAL PHASE SHIFTER UN17/529, BBC LINE SEND AMP. AM7/512, BBC SPG(PART) GE6L/535, BBC SUBCARRIOR GEN. GEL/508, BBC SUBCARRIOR MONITOR MN7M/505, BBC MATRIX, BBC B&B GEN. GE6/504

I have a large amount of handbooks for BBC equipment please enquire (by post with SAE)

CQTV Nos. 85, 87, 90, 91,93, 95(poor), 97, 99, 100, to 110, 117,118, 119, 120, 121, 122, 123, 124, 125 These are out of print issue at £5.00(pre100) and £3.00(post 100) Proceeds to club funds.

B. Summers G8GQS QTHR 01895 810144 / 0850 01489 The mobile is subject to battery and not being down the tube.

Wanted

Wanted: Over the years I have had many opportunities to buy an image orthicon camera but for various reasons I have never taken up the offers. Now I've decided it's high time I did something! If any member is considering parting with one, please get in touch with me. Obviously these things don't grow on trees nowadays and I am fully resigned to paying a substantial, probably four-figure sum but that's only right for something which is quite scarce now. I am also offering œ500 for a Marconi valve 405-line sync pulse generator, rack type. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. 01604-844130.

LENSES: WATSON 8" f/4.5 image orthicon turret camera lens. (i.e. fixed focus). Any condition suitable. Also old STUDIO LIGHTS. MICROPHONES, stands etc. Plus books/ brochures on TELEVISION. contact Dicky Howett 01245 441811

Camera bits Wanted: To complete restoration of NEC 100 camera; A pal encoder board No.11 and a suitable lens. A scrap camera or any other bits would also be most welcome. Bosch KCN portable camera circa 1975 to match the CCU I have already got. A Marconi MKIII camera or parts to make my incomplete camera whole again, any bits most welcome. A Nagra VPR5 portable Video recorder. I am allways interested in Items of old broadcast equipment of my collection.

If any of the items below take your fancy give me a ring. I would point out I am not into parcels or interesting conversations with parcelforce etc. so except for that which will go into the post box it's collect only.

B. Summers G8GQS QTHR 01895 810144 / 0850 01489 The moblie is subject to battery and not being down the tube. Where prices not shown offers/haggle??

Books Wanted: Early Pye, EMI, and Marconi television product catalogues for 1946 - 1960 wanted for research for article / book. TV related books wanted, in particular; "Electronic Motion Pictures" by Albert Abramson and any of the "Fink" TV series published by McGraw-Hill, WHY?. I have a nice book on microphones available for barter. Wanted :- Circuit for Cossor Scope CDU130. Phillips Colour analyser PM5539.

B. Summers G8GQS QTHR 01895 810144 / 0850 01489 The moblie is subject to battery and not being down the tube.