

CQ-TV



No. 172

November 1995

REVIEWS

BEYOND TTL

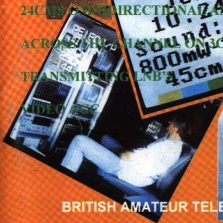
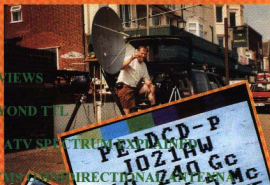
FM/ATV SPECTRUM EXPLAINED

24CM S-BAND DIRECTIONAL ANTENNA

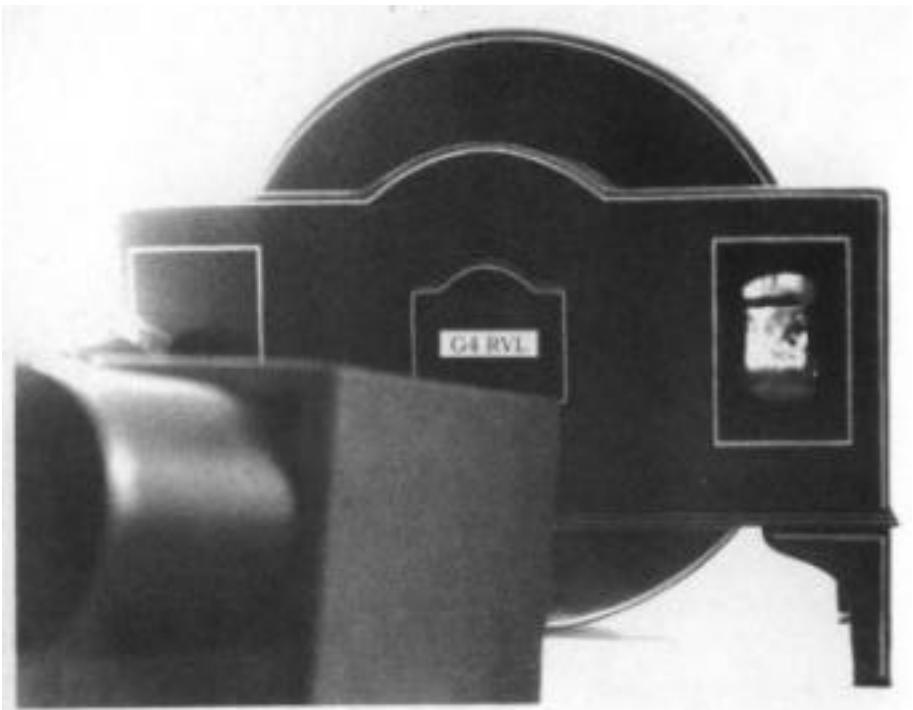
ACROSS THE CHANNEL ON 3CM

TRANSMITTING LNB'S

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BRITISH AMATEUR TELEVISION CLUB



NBTVA Convention 22nd April 1995

Top: Reconstructed Baird Televisor by Dave Gentle G4RVL. 32 line image reproduced by means of a spinning disc.

Left: Magnetic CRT 32 line monitor by Jeremy Jago, under development, hence cardboard box!

Rear Inside Cover:

Top: Mechanical (disc) camera and digital standards converter by Ripley Pedro. Image televised from caption stand on right, displayed (after up-conversion) on 625 line monitor on left. (Douglas Pitt on left, Ripley Pedro on right).

Middle: HF Transmitter, receive converter and display. (30/32 lines) by Peter Smith G4JNU. Caption televised by CCD 625 line camera on tripod, digitally down converted 30 32 lines, transmitted on DSB HF by right hand unit, received on centre unit and displayed of left most screen.

Bottom: LED Matrix NBTV display (32x48) by Grant Dixon (seen in mirror) the digitally scanned array is displaying the picture televised by the above setup.

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CLOSE FOR PRESS FOR THE NEXT ISSUE 20th December 1995

CQ-TV is produced on a 486 PC computer system, using the Word for Windows word processing package. The camera ready artwork is produced on an Epson EPL-5200 laser printer.

WHO TO WRITE TO

The BATC committee are available to help and advise club members on ATV related subjects. Please remember that all club work is done in spare time, so try to keep questions to a minimum. It is better to telephone rather than write (SAE essential if you write). Please do not telephone at unsociable hours, as a guide try to call between 1830 & 2130 hours and not before 1130 at weekends. Thank you.

BATC Chairman Trevor Brown G8CJS

Club affairs, Video tape library, Technical queries, especially relating to handbook projects. 14 Stairfoot Close, Adel, Leeds, LS 16 8JR. Tel: 0 1132 670115

BATC General Secretary Paul Marshall G8MJW

General club correspondence and business. Library queries relating to the borrowing or donation of written material. Fem house, Curch road, Harby, Notts., NG23 7ED. Tel: 01522 703348

BATC Hon. Treasurer Brian Summers G8CQS

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

CQTV Magazine Editor Chris Smith G1FEF

Anything for publication in CQ-TV, Articles, Review items, Advertisements, Letters to the editor, and other material except as below. 19 Ravendale road, Gainsborough, Lincs, DN21 1XD. Tel/Fax: 01427 610578, Mobile 0589 631104

TV ON THE AIR:- Graham Hankins G8EMX, 11 Cottesbrook Road, Acocks Green, Birmingham, B27 6LE. Tel: 0121707 4337

SATELLITE TV NEWS:- Paul Holland G3TZO, Chatterton, Chapel Lane, Threapwood, Nr. Malpas, Cheshire, SY14 7AX. Tel: 01948 81429

CQTV AWARDS:- Bob Webb G8VBA, 78 Station road, Rolleston on Dove, Burton on Trent Staffs., DE 13 9AB. Tel: 0 1283 814582

EXHIBITIONS

Rally 96:- Mike Wooding G6IQM, 5 Ware Orchard, Barby, Nr. Rugby, CV33 8UF. Tel: 01788 890365, Fax: 01788 891883, Mobile: 0860 857434

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: 01734 403121

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

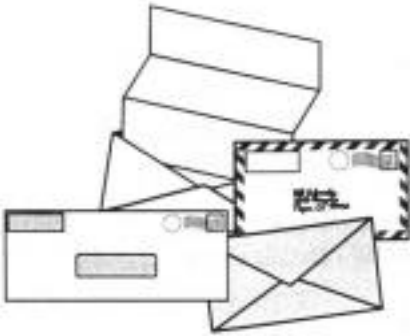
MEMBERSHIP

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

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



REPEATER LINKING

Dear OM,

Through the pages of the mag can I express the following in the letter column. Can I suggest that there is a golden opportunity in the north of England to link ATV repeaters. Perhaps the sister mast to GB3ET ie Winter Hill could be the first opportunity, therefore linking Lancashire and Yorkshire. Even dare we suggest then on to Anglesey and likewise to the south of Yorkshire. Maybe if anybody is interested they could get in touch.

D.J. Long G3BTU Tel: 01274 877211

A.N.T.A.

An important ATV meeting took place in Tours on November 26th 1994. Most of the om's and yl's made a long trip, coming from all parts of France (Dunkerque, Strasbourg, Toulon, Nimes, Bordeaux, Toulouse, etc). This assembly decided to found the 'Association Nationale de Television Amateur' (A.N.T.A.).

The official date of creation is January 16th 1995.

The objectives of the association are to regroup all amateur television enthusiasts and all other people interested by this activity and also to increase their technical abilities. The officers of this new association are:

President: Michel Amiard F6ANO

Vice Psident: Roland Cornuel F8MM, Secretary: Rene Vollard F6BRV, Treasurer: Patrick Pochet F11AKT, Technical Manager: Marc Chamley F3YX.

The association will send its journal B5+ to all members free of charge. The annual subscription was set at 100FF for 1995. The next general meeting will take place next autumn where the A.N.T.A. will probably establish agreements with the REF-UNION (French IARU region 1 representative).

Right now we are facing in Europe a detailed spectrum investigation (D.S.I.) phase II of the European radio Committee (E.R.C.). It began in March 1993 and is reviewing the useage and the administration of the frequencies between 29.7 and 960mhz. The CEPT (Commission Europeenne des Postes et Telecommunications) seems to plan to reduce the 70cm band (430-440MHz) to 432-438MHz!
Your support in this very tough negotiation will be very welcome. We wish you a lot of ATV DX

Our best 73's from France. Michel Amiard F6ANO

PREAMP HELP WANTED

I'm very new to atv and have had problems trying to locate information on a decent preamp. I am located in York where ATV is rare but have seen a few signals like G4YTV etc. My homernade receiver is a bit deaf, test equipment is rare and finances are a bit tight. I could buy a new one but they tend to be a bit pricey and homemade ones tend to need test gear. I would really appreciate any advice.

Paul Bulmer GOTTSS, 61 Middleham, Avenue, Huntingdon Road, York, YO3 9BD.
Tel: 01904 671578 evenings.

DRO PUCKS SOURCE GONE

Chris,

Just a line to let you know that on 31/08/95 Oakbury Components of Lambourne ceased trading. I spoke to Peter Johnson G4LXC who confirmed this. They were a source of 9.1 GHz DRO pucks for the 10GHz project in the last two CQ-TV's apart from Quantelec does anyone know of another source outside the trade? Also does anyone have any info of ideas on modifying existing DRO pucks in standard LNB's to change their frequencies?

Mike Spooner G4PFG

PLEASE SEND ALL CORRESPONDENCE FOR POST & NEWS TO: Editor CQ-TV, Chris Smith G1FEF ,19 Ravendale Road, Gainshorough, Lincolnshire, DN21 1XD Tel/Fax: 01427 610578 Mobile: 0589 631104 E-Mail: Chris@batc.demon.co.uk
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REPEATER REPORT

Dear all,

Could I please ask all persons who are connected with Amateur band voice and Television repeaters in any official way, ie Technical Officers, Secretary, etc. to send me details of their groups activities so I may include them in the next 'REPEATER REPORT'. Basically I am interested in what YOU are doing, using and constructing for the U.K. repeater scene. One good way of keeping me informed would be to send me a copy of your group's newsletter. I look forward to hearing from you soon.

Best 73 de Ken G3SPX @ GB7NRY RSGB RMG Publicity Officer, 12 Woodlands, East Ardsley, Wakefield, WF3 M Tel/Fax: 01924 827572

ATV ON THE LINCS COAST

Dear Chris,

Just thought I'd drop you a line about some 3cm ATV activity over here on the east coast of Lincolnshire on Saturday 19th August 1995.

After trying for an hour or two, I eventually contacted PE1DCD/P who I believe was working Bob Platts from the beach in Holland to Norfolk. He had worked P5 both ways about 70Kms or so.

Anyway, once I got his attention, I got him to send in my direction and after a few minutes I was getting P4 colour pics on 3cms and PE1DCD/P said it was 300Kms+ and it was the furthest he'd ever worked on 3cms. What made it even more interesting was that I received it on my homebrew slotted WG16 omni antenna, estimated gain 10dB! into a 9GHz puck LNB + Standard Sat. RX. I tried sending pictures back, but not having any decent TX gear soon aborted that idea.

The same evening my friend Peter G4RNA also received PE1DCD/P I believe P5 on 3cms at 450Kms approx. and sent the pics back on 23cms P5!

If that wasn't enough excitement for one weekend, the following day I received testcards from G0FVF Adrian in Falkenham, Norfolk 70KMs P5 Colour for several hours SOLID and he was only transmitting 80mW into a six slot omni WG antenna!

All these paths are totally NON line of sight and probably were mainly due to ducting. I am regularly on 3cms ATV on about 10.33GHz and can RX the whole band and often tune around on my omni. Now I want to work Holland on 24GHz! If any Dutch stations want to look for me it's JO 03 DG on 10.33GHz, talkback 144.750MHz.

See you soon. Dave G8KBC

EDITORIAL

Hi folks. first of all, as the next mag doesn't hit your doormats until 1996, let me be the first to wish you all a happy Christmas and a merry new year, or is it a *merry* Christmas and a happy new year (or in some cases a *merry* Christmas and a *merry* new year... Hic!*?!). I hope Santa brings you what you wished for.

I'm hoping Santa will be bringing me a new printer, as you may have gathered the quality of the printing is not up to our usual high standards. The clubs Epson printer has been playing up recently and keeps smudging areas. Hopefully the problem will be resolved before the next issue and I apologise on behalf of the printer for spoiling your magazine, rest assured I gave it a piece of my mind (and foot!).

On a different note, I have been asked by The Boss (i.e. 'er indoors) to include a short request to anyone phoning me. Please call between 7pm and 9pm as before 7pm I'm usually eating my dinner (and she gets most upset if dinner is interrupted) and after 9pmwell you know how it goes, we've only been married a year., give us a chance!

On the subject of phoning up, you won't have been able to recently! The wife got so annoyed she changed the number... No, only kidding! We had a few 'malicious' phone calls from a certain person and asked BT to change our number. Although it is now ex-directory, I have published the new number in the magazine as the person involved has no connection with the BATC. Sorry for any inconvenience this may have caused anyone. (By the way, if Fred Cooper still wants to talk to me, call me back on the new number - I lost yours, sorry!).

OK, that's enough from me, please read on and enjoy. It's quite an action packed instalment this issue, what with 3cms across the channel and folk bouncing TV off electricity pylons - electrifying!

Chris Smith G1FEF
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Lincolnshire DN21 1XD

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E-Mail: Chris@batc.demon.co.uk



CAT'96

YES, IT IS TRUE!

**CAT'96 IS COMING AND IT WILL BE A RETURN
TO OUR OLD STAMPING GROUND**

Conference on Amateur Television 1996

**THE POST HOUSE HOTEL
CRICK
Near RUGBY**

AFTERNOON/EVENING OF 31st AUG AND 1st SEPT 1996

FULL DETAILS IN THE NEXT CQTV

In the meantime ...

Many of you will remember the days (over eight years ago now!) when the BATC Convention (and Rally) was held at the Crick Post House Hotel. The event grew to such a point that a combined 'do' was not practicable even at large venues such as Harlaxton Manor. Consequently the Committee decided over two years ago to split the event and hold the Convention every two years coincident with the club's Biennial General Meeting (BGM).

We left Crick all those years ago because the combined event was too big for the venue - we were in fact not invited back by the management! Now, with a smaller event again we can return.

The last few years that we were at Crick saw the Rally part of the event taking place in a large marquee set up in the hotel grounds. It was this (or more specifically the holes it made!) and the queuing traffic out to the M1 that led the then management to decline having us the following year. ATV was growing very fast then, the technology was becoming more accessible and we saw the membership double in size. CB radio helped swell amateur radio numbers generally and we benefited as well.

It was famed for the late opening hotel bar (the 'Percy Pilcher') where many a year earnest discussions on the then new repeaters and 23cm carried on into the small hours.

Last years Shuttleworth event proved that people really enjoy such a gathering to talk over the issues, socialise, attend the lectures and see what other people are doing.

Hopefully, we are clear of any major events with the dates chosen - if anyone knows otherwise please let me in on it NOW!

Please offer your support to the 1996 event with any offer of help, demonstrations, lectures etc. to:

Paul Marshall G8MJW
Fern House
Church Road
Harby
NEWARK
Notts.

NG23 7ED

Telephone/Fax:
01522 703348

*Traders. Lecturers, Exhibitors,
Demonstrators etc. etc.
are most welcome.*

*Accommodation
and
Saturday evening Dinner*

Hope to see you there!



CAT'96

BSB - TUNER TRANSPLANTS

By Dave Webb

With the demise of B.S.B, quite a lot of DMA C equipment found its way into the hands of us Television Fanatics. Indeed it was largely due to Chris Smith re writing the software and allowing it to be obtained through the club, that much of this equipment is still being used today, albeit not as its maker had intended.

Much has been written about converting these receivers for use with PAL based signals and I have no wish to repeat what has already been printed, however, I hope what is to follow will be of interest to someone, somewhere.

This is not intended as a constructional article, it is just the story of my attempts to improve the overall sensitivity of a B.S.B. satellite receiver. If you are inspired to "have a go", only do so if you are very confident you have the soldering skills and steady hands that this type of project requires. The satellite receiver I use is the Ferguson SRB1 fitted with the above mentioned software and miscellaneous hardware additions to obtain correct video de-emphasis and tuneable sound. The main problem I have found to be its sensitivity, or the lack of it. The tuner block as fitted into the Fergy, is little more than a tuneable converter feeding an FM demodulator chip which gives us a low level baseband video signal as its output. In fact ALL of the satellite tuners are much the same, they all do the same job, they all have the same input frequencies (from the L.N.B.).

Why not try a transplant?

The first tuner I transplanted was a surplus unit supplied by SENDZ Components and manufactured by Hitachi (I think). By coincidence it was the same basic unit that Trevor Brown wrote about in his recent article about stripping. See CQ-TV 168. First came the easy part, remove the new tuner covers, study the layout and get a feel for what is what. There was no sign of a pre-scaled feed from the local oscillator which would be needed by the phase lock loop chip (the one that controls the tuning). There was, however an area on the PCB that was laid out for just such a requirement, all that was needed was the missing components. Try as I did I was unable to obtain component level circuit information, all I could find was the connections to and from the module. In the original Fergy tuner the pre-scaling is done with the aid of a four pin chip mounted in one corner of the PCB With care and very short connections the chip was removed and fitted birds nest style, into the new tuner.

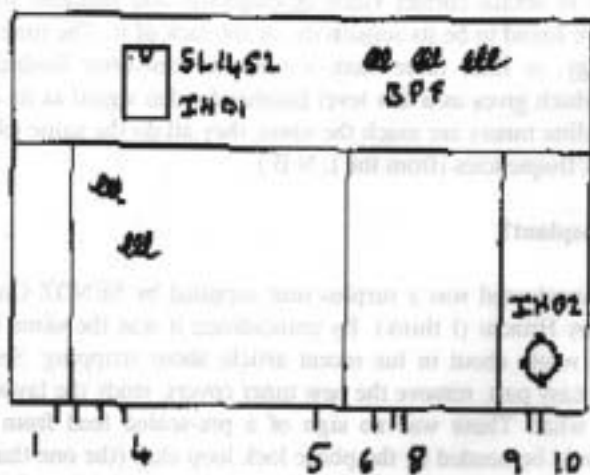
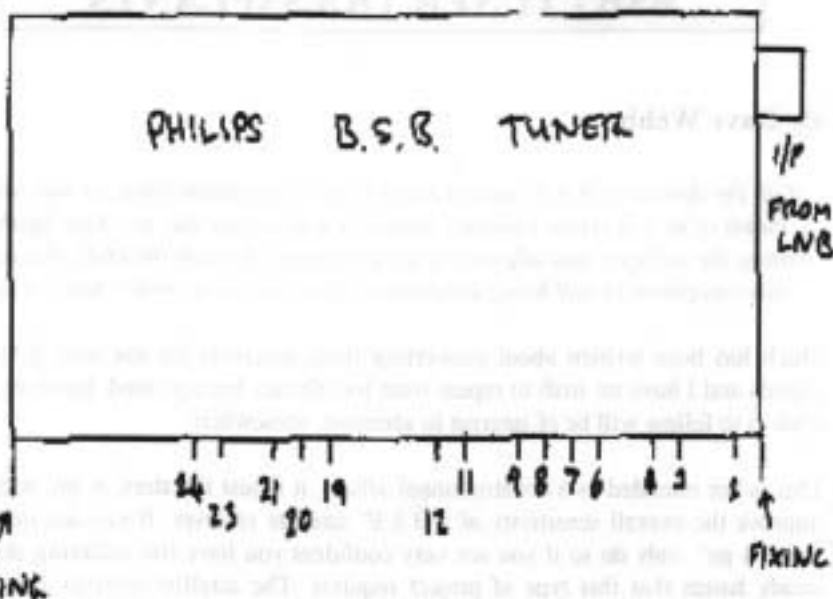


FIG 2 FERGY TUNER

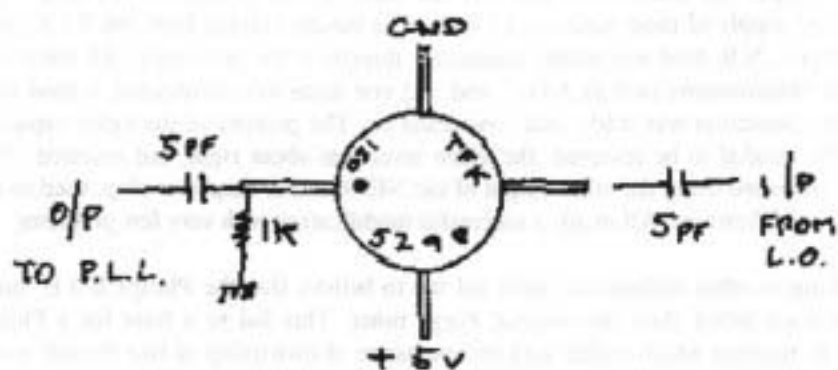


FIG 3 - PRE SCALER IC, IHO2
USED IN FERLY TUNER. $\div 2$

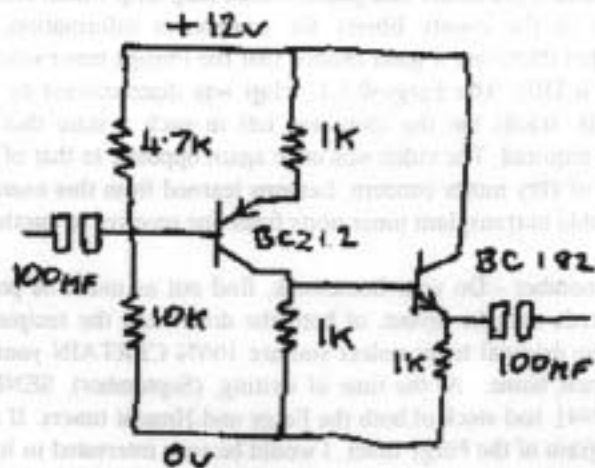


FIG 4

VIDEO BASE BAND INVERTER

The local oscillator R.F. feed was obtained by making use of what was obviously an R.F. output, for pre-scaling, but was not used in that version of the tuner. The voltage supply to most tuners is 12 volts. The tuning voltage from the P.L.L. chip and the L.N.B. feed was simply connected directly to the new tuner. All other new tuner requirements such as A.G.C. and +12 volt feeds were connected, a good solid earth connection was made, and I switched on. The polarity of the video capacitor CV06, needed to be reversed, the video level was about right, but inverted. This was corrected using the other output of the NE592 video amplifier chip, used in the PAL modifications. All in all, a successful modification with very few problems.

Talking to other enthusiasts, soon led me to believe that the Philips B.S.B. tuner was much better than the original Fergy tuner. This led to a hunt for a Philips B.S.B. receiver which ended with the exchange of ownership of two Pounds and a metal box. No prizes for guessing who now had the metal box. The receiver I had exchanged my hard earned cash for, was an "industrial" variant of the normal Philips receiver. (for use in hotels etc.). In practical terms this meant a grotty metal box, no remote control and no R.F. modulated output. The tuner however, which was the prime reason for the purchase, was the same type as used in the domestic version. The Philips tuner, I soon discovered, was much more of a complete unit in that it contained a pre-scaler and phase locked loop chip which controls the tuning. After a trip to the county library for component information, I came to the conclusion that there was a good chance that the Philips tuner would electronically fit - and fit it DID. The Fergy P.L.L. chip was disconnected by cutting through certain P.C.B. tracks but the chip was left in such a state that it could be reconnected if required. The video was once again opposite to that of the Fergy tuner, but that was of very minor concern. Lessons learned from this exercise show that it is quite possible to transplant tuner units from one receiver to another.

Points to remember - Do your homework, find out as much as possible about the electronic needs and the layout, of both the donor and the recipient. Do not take parts from the original tuner unless you are 100% CERTAIN your new tuner will work in its new home. At the time of writing, (September), SENDZ components, (01702 338894), had stock of both the Fergy and Hitachi tuners. If any member has a circuit diagram of the Fergy tuner, I would be very interested in having copy. One final point, I made use of the Clubs library facilities to obtain circuit information and was horrified when I was asked to write up the project for the Club magazine. Well, the writing and drawing took me only about four hours, (how long it took Chris Smith to correct the spelling mistakes, I dread to think), but the point is, if I can do it SO CAN YOU, so come on, give it a try. If you are not sure if your project is suitable, ring Chris and ask him, he doesn't bite (hard). (*Growl, Gnash Ed*)

Filtech Professional - A Review

By Michael J Wooding G6IQM

Dabbling a little in electronics as I do I have in the past 'designed' filters the hard way - you know..

- 1) decide on the type of filter best suited to the problem in question;
- 2) work out the theoretical values of the components by mathematical analysis;
- 3) glue the bits together.,
- 4) put the circuit on a network analyser and then..
- 5) go back to stage 1 and start again!

Now I know that there are far cleverer engineers than me, but I equally, know that there are many of you out there who use the above method, going round and round until the desired result, or a close approximation of it, is produced. However, help is at hand. Reach for your trusty PC and run *Filtech* or *Filtech Professional* from *Number One Systems*, or if you have not yet purchased your copy, read on and see what you are missing!

FILTECH

Filtech and *Filtech Professional* are advanced circuit synthesis programs that produce both active and passive filter circuits from your specifications. With no mathematics or tedious manipulation of tables required, these programs make the design of complex filter circuits fast, simple, accurate and in terms of development time, very cost effectively.

All that you need to specify for your filter are the frequency limits for the type of filter (i.e. lowpass, highpass, bandpass or bandstop), the stopband attenuation required and the maximum acceptable passband ripple. Then simply run the program, fine tune the design if required and the filter is simulated and designed for you, including all the component values.

Both versions of the program include a built-in circuit simulator allowing you to test the circuit immediately, comparing the simulated result with the original specification. As with all computer design programs the values calculated for the components are real and not necessarily preferred values. However, you can force the program to select components to the nearest preferred value from a list of different ranges and check the effect on the filter performance at a glance.

Filtech can design Bessel, Butterworth and Chebyshev filters up to 6th order types, whereas the enhanced version *Filtech Professional* can design the above plus Caur (elliptic) up to 12th order filters.

The essential features of *Filtech* are:

Passive Filter design

Bessel, Butterworth and Chebyshev to 6th order in *Filtech*

Bessel, Butterworth, Chebyshev and Caur (elliptic) to 12th order in *Filtech Professional*

Active Filter design

Sallen & Key and BiQuad

LowPass, HighPass, BandPass & BandStop Graphical Display of Specification

Built-in Simulator includes Source and Load Impedance Overlays Simulated Performance on Specification

Seamless Link to Analyser III if present

Optionally Forces Values to Nearest preferred Value Results Available as either a Netlist or Text Listing

The computer requirements for running either version of the program are an IBM PC or clone running under MS-DOS version 3 or later, an EGA or VGA screen and a minimum of 640K of RAM. To use all of the features of the program a mouse is also required. Supported printers are 9 or 24-pin Epson or IBM Graphics printers, Laser II Laser printers or equivalent. The programs will also run as DOS applications under Windows 3 and 3.1, Windows for workgroups 3.11 and Windows 95 (and probably Windows NT as well, but as I don't run that version I cannot say for sure).

DOCUMENTATION

As with all Number One Systems software packages these programs come with an extensive instruction manual in A5 binder format. This manual follows their well tried and tested format of a program overview, followed by installation instructions, a chapter on first impressions, the grand tour, a reference section, a chapter detailing customisation, Netlist formats, linking to Analyser III (AC Circuit simulation software package from Number One Systems), a chapter on filter design and numerous appendixes of filter circuits relating to *Filtech* designs.

The program *Overview* and *Installation* chapters are concise and detail the essential properties of the software and all you need to know to load it onto your hard drive.

The *First Impressions* chapter is in reality not just a quick tour of the major components of the programs, but actually a tutorial on the basic aspects of running the package and producing filter designs to example specifications, and reviewing how to fine tune a specification for the real world.

The chapter *Grand Tour* now takes you step-by-step through all the functions of the software at least once, guiding you through detailed filter design simulations producing working filter specifications for practical filters.

The *Reference* chapter describes in greater detail the options of the Specify, Parameters and View menus and how and when to use the powerful features available.

The *Customising* chapter allows you to configure the package specifically for your system and operation. The appendixes give information on various aspects of running the software in association with other packages and DOS, detailed information on filter design aspects and all the circuits that *Filtech* uses in its simulations.

RUNNING *FILTECH*

Filtech is essentially a DOS package, but as stated earlier runs perfectly well as a DOS application within Windows 3, etc. To run from windows of any ilk nothing more than creating an Icon (in Windows 95 a 'Shortcut' to the *.exe program) is necessary. For those of you like me who are graphically oriented, there is no icon provided for Windows so you just have to be inventive. For Windows 95 users nothing need be changed in the properties of the shortcut, unless of course you want to, but *Filtech* runs perfectly well in a standard DOS window without modification.

Upon execution of the program you are presented with the design screen as shown in Fig. 1. The screen is essentially a piece of graph paper on which the spectrum of the filter performance will be plotted. At the top of the screen is the familiar tool bar of drop-down menus and at the bottom of the screen is an array of user-variable filter parameters.

The drop-down menus are:

Configuration; Specify; Parameters; View; !Tools; Help; Quit; File; Model; Type and X-scale.

Configuration: this menu deals with the path settings, file parameters and general hardware settings for the program, printing, etc.

Specify: this menu is a sort of non-menu! What selecting this feature does in fact is to return you to the original design screen, which then allows you to change any of the settings and parameters prior to running the simulation again.

Parameters: this menu allows you to select the style of filter to be designed (i.e. Chebychev, Butterworth, etc.), the allowable ripple and the order of filter.

View: this is the 'all-action' selection box. Clicking on this item runs the simulation software and plots on the screen the actual spectrum of the filter as determined by the parameters previously entered.

!Tools: this menu gives access to basic DOS tools and also give the facility to print a Netlist for the designed filter (a Netlist is a list of components and their values and circuit specifications, etc.).

Help: not surprisingly this menu gives access to the in-built help dialogues.

Quit: guess!

File: the menu for loading and saving filter specifications and for printing screen dumps.

Model: the menu for selecting the type of filter (i.e. lowpass, highpass, etc.).

Type: is a click-selectable box for selecting Passive or Active filter types.

X-Scale: this box selects either linear or logarithmic scaling of the spectrum display.

Number One Systems

FILTECH Professional

Filter Design Synthesizer

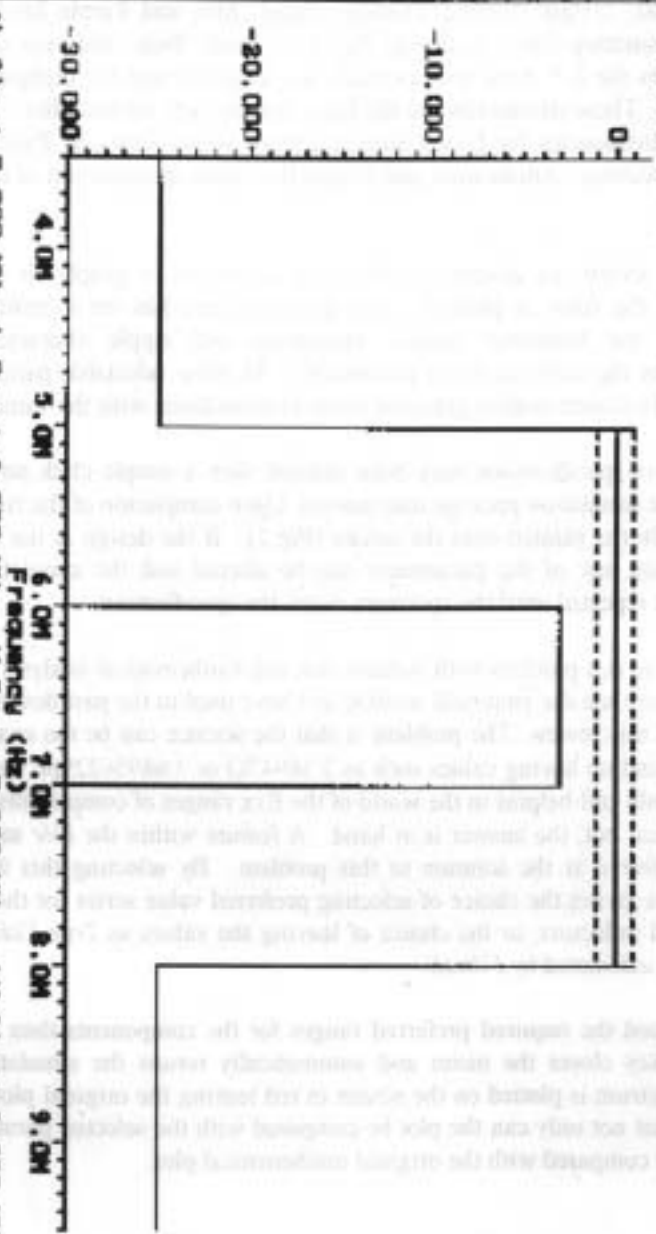
File: FILTER.SPC

Print 8.9.95

5:46 pm.

Type: Passive

Gain (dB)



L.Stops: 5.000 MHz L.Pass: 6.000 MHz U.Pass: 7.000 MHz U.Stops: 8.000 MHz
Zsource: 50.0 0 Zload: 50.0 0 Attn: 25.0 dB Ripple: 1.0 dB

At the bottom of the screen are the user-selectable parameters:

L.Stop; L.Pass; U.Pass; U.Stop; Zsource; Zload, Attn and Ripple for Band pass filters. For bandstop filters exchange the 'Pass' with 'Stop' and vice versa. For lowpass filters the L.* items are obviously not available and for highpass the H.* items are not. These parameters are the basic design tools for the filter. By setting the various frequencies for *Lower.Stop* and *Pass*, *Upper.Stop* and *Pass*, *Z source* and *load impedance*, *Attenuation* and *Ripple* the entire specification of the filter is entered.

The design screen, as described earlier, is essentially a graph on which the spectrum of the filter is plotted. The design screen has on it graticule lines representing the frequency limits, attenuation and ripple characteristics as determined by the user-selectable parameters. As these selectable parameters are changed so the screen display graticule alters in accordance with the values entered.

Once the filter specifications have been entered then a simple click on the View menu sets the simulation package into motion. Upon completion of the simulation a plot of the filter is printed onto the screen (Fig.2). If the design is not quite as it should be then any of the parameters can be altered and the simulation rerun, which can be repeated until the spectrum meets the specification.

However, there is a problem with systems that use mathematical analysis to solve a problem rather than the empirical method as I have used in the past described at the beginning of this review. The problem is that the science can be too exact, per se: components end up having values such as 2.36947 ohms or 3.68956229pF - not exactly what one would call helpful in the world of the Exx ranges of components generally available! Fear not, the answer is at hand. A feature within the *File menu* called *Overlay Preferred* is the solution to this problem. By selecting this item a sub menu appears giving the choice of selecting preferred value series for the resistors, capacitor and inductors, or the choice of leaving the values as True Value, that is the values as calculated by *Filtech*.

Having selected the required preferred ranges for the components then a press of the *Escape key* closes the menu and automatically reruns the simulation. The resulting spectrum is plotted on the screen in red leaving the original plot viewable (Fig.3), so that not only can the plot be compared with the selected parameters but it can also be compared with the original mathematical plot.

Number One Systems

FILTEEM Professional

Filter Design Synthesizer

Print 8.9.95

5:48 pm.

File:FILTER.NET

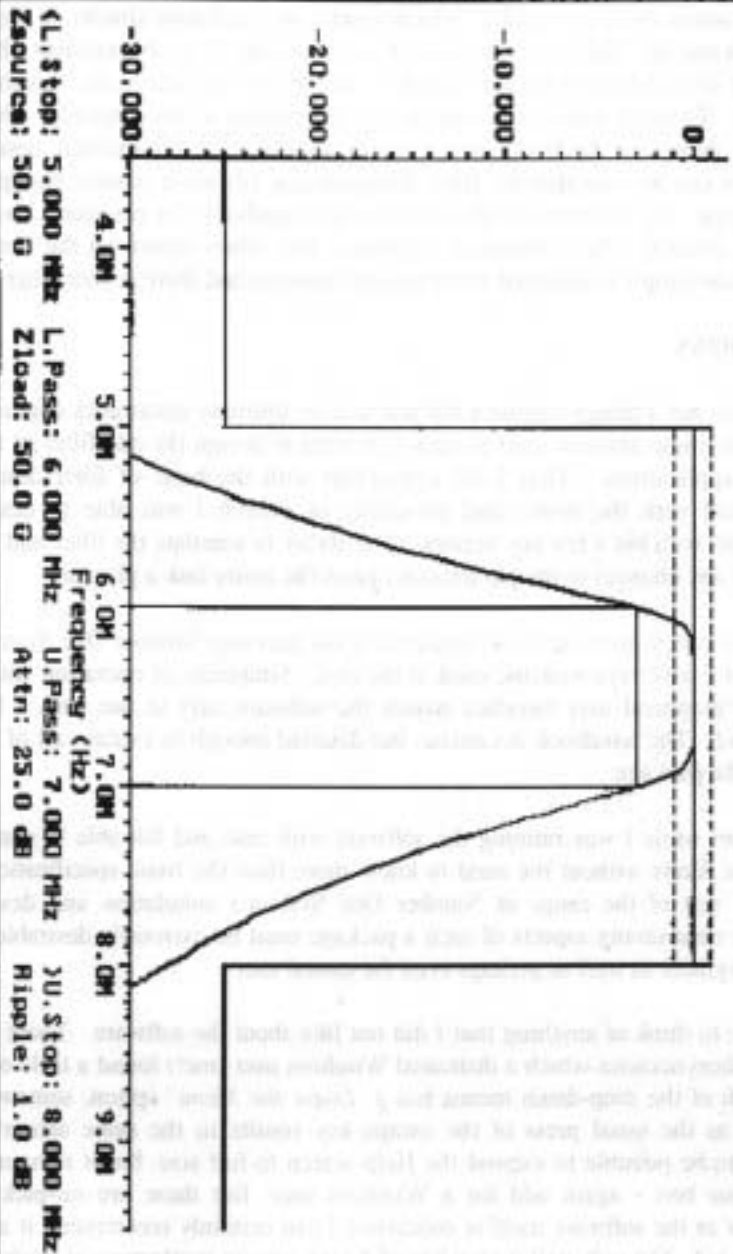
Model: Band Pass

Type: Passive

X-Scale: 1in.

Gain (dB)

FILTER



Now that we have fine tuned our filter design it is time to commit this theoretical device to a practical buildable unit. To do this you once again select the *File* menu and from it select *Print the Netlist*, which results in a printout similar to Fig.4. Now what do you do? Refer to Appendix D is the answer. *Filtech* simulates filters on the basis of pre-defined circuit modules, the circuits of which are shown in Appendix D. To build a filter you refer to the filter tables in the Appendix which show which groups of modules are connected together for a particular design. From Fig.4 it can be seen that the filter designed is a 4th order passive bandpass Chebychev type. By reference to the tables in the handbook the necessary circuit modules are selected. The component references and values shown on the Netlist (Fig.4) are then simply transferred to the circuit elements and there is your filter.

CONCLUSIONS

Although I am not a design engineer but just a plain ordinary electronics engineer, I am an active radio amateur, and as such I do need to design the odd filter or two for specific applications. Thus I am conversant with the basic of filter design, however, faced with the power and versatility of *Filtech* I was able to design complex filters with but a few key presses. The ability to simulate the filter and see the results of any changes to the parameters makes the entire task a pleasure.

This software system lives up to the pedigree of the previous Number One Systems packages that I have reviewed and used in the past. Simplicity of operation with a well-defined graphical user interface makes the software easy to use with a fast learning curve. The handbook is concise, but detailed enough to explain all of the facilities of the package.

Within a short while I was running the software with ease and felt able to design very complex filters without the need to know more than the basic specifications. As with the rest of the range of Number One System's simulation and design software, the time saving aspects of such a package must be extremely desirable to the design engineer as well as perhaps even the casual user.

I am not able to think of anything that I did not like about the software. There are one or two idiosyncrasies which a dedicated Windows user (me!) found a little odd. Namely. each of the drop-down menus has a '*Leave the Menu*' option, somewhat unnecessary as the usual press of the escape key results in the same action! It appears not to be possible to expand the Help screen to full size, but it remains a small dialogue box - again odd for a Windows user. But these are nit-picking things. as far as the software itself is concerned I can certainly recommend it as a development aid. Not only will it save lots of design time in mathematical analysis,

it will possibly save much prototype manufacturing time as well. A necessary addition to the development tools of any electronic design laboratory.

Filtech and *Filtech Professional* are available from Number One Systems Ltd., Harding Way, St.Ives, Huntingdon, Cambridgeshire, PE17 4WR, UK. Tel.. (0)1480 461778; Fax: (0) 1480 494042. The software is also available from KM Publications, 5 Ware Orchard, Barby, NrRugby, CV23 8UF, UK. Tel: (0)1788 890365. ' Fax: (0)1788 891883. The prices are for Filtech £145.00 +£7.50 p&p + VAT and for Filtech Professional £245.00 +£7.50 p&p + VAT.

MS-DOS, Windows 3 and 3. 1, Windows for Workgroups 3.11 and Windows 95 are registered trade marks of the Microsoft Corporation. Laserjet is a registered trade mark of Hewlett-Packard. Analyser III is a registered trade mark of Number One Systems Ltd.

Number One Systems FILTECH Professional Filter Design Synthesizer

Date: 8.9.95

Time: 5:49 pm.

Circuit: C:\FILPRO\FILTECH.NET

```
Source Impedance : 50.0 Ohms
Load Impedance : 50.0 Ohms
Filter Model : Passive Band Pass (N)
Lower Stop Freq. : 5.000 MHz
Lower Pass Freq. : 6.000 MHz
Upper Pass Freq. : 7.000 MHz
Upper Stop Freq. : 8.000 MHz

Filter Design : Chebyshev
Maximum Ripple : 0.01 dB
Filter Order : 3
```

```
Reference: R8 Component: R
A-IN B=1
R:50.000

Reference: C1 Component: C
A=1 B=2
C:64.168pF

Reference: L1 Component: L
A=2 B=3
L:9.399uH

Reference: C2 Component: C
A=3 B=COMMON
C:5.798nF

Reference: L2 Component: L
A=3 B=COMMON
L:104.825nH

Reference: C3 Component: C
A=3 B=4
C:64.168pF

Reference: L3 Component: L
A=4 B=OUT
L:9.399uH

Reference: R999 Component: R
A-OUT B=COMMON
R:50.000
```

A FAIR WIND ON THREE

By John Allsop G3OGX

The smallest breeze inspired a symphony of sway, similar and contrary, blending a counterpoint of gusting overtones. Summer's afternoon heat relaxed the players, until evening's cool raised them again to new heights. Long periods of frenzied frolic offered unceasing challenge to the maintenance of this teasing pathway.

G4IM0 could see little poetry in the dancing pictures on his monitor screen - one moment P5, the next, gone. Appropriately, Rayleigh, the south-east Essex town in which Nick and I both reside, bears a name well known for radio path fading and what was now being witnessed was a classic example of variable-phase multipath propagation.

It had been early summer when we first decided to embark upon a joint project. The objective, having accumulated a collection of doppler oscillators and partly defunct satellite front-ends, would be to set up a full-duplex 3cm TV link between our stations.

As a first step, a Marconi-type LNB was selected which was still functional in it's 'vertical' mode, requiring around 14 volts to operate. The local oscillator frequency was easily lowered to 9.4GHz using the original 10GHz puck by simply lifting this from the board and re-assembling it on an insulating spacer about 1mm thick, thereby reducing capacitance. Using a low-level 3cm source, the unit was checked for sensitivity near the top of the 10GHz allocation. It was not too good. Amplifier adjustment would be required.

Tests revealed that with judicious positioning of a slab of ceramic over the first inter-stage coupling, it was possible to peak gain at the test frequency of 10.4GHz. The next coupling and the pre-mixer bandpass filter were similarly doctored, this time with small sheets of PTFE to pad them down in frequency. The result was an LNB which performed quite creditably well into the top end of 3cms.

The next step was to determine whether an available Gunn oscillator would oblige in matching the desired operating frequency. There was no problem here and it's output was soon seen by the receiver. It would later become clear that all this had been the easy bit.

Fading 24cm signals had been exchanged frequently between our stations, but it was not known what the chances were of achieving a 3cm path with just 10mW. Although separated by only one and a half kilometres, our stations are not within sight of each other. Nick operates from fairly low ground. I am located slightly below the peak of high ground, but on the wrong side, with numerous obstructions in the path.

We opted for the convenience of conducting initial tests with audio rather than video, so a tone was fed to a 'transmitter' on a long stick at G30GX, and headphones were connected to the video output of a portable receiver at G4IMO. To improve our chances, 25cm dishes were crudely coupled to the units at each end.

After exhaustive searching - to the amusement of spectators passing my QTH we drew a complete blank. For days afterwards I patiently suffered enquiries as to why I had been walking around at dusk with a 'dark floodlight'! G4IMO had the advantage of maintaining his usual low profile, conveniently secreted behind an upstairs window which offers him extended views of the Rayleigh hills.

TIME TO REFLECT.

A complete rethink was obviously necessary. I considered the possibility of bouncing the signal off an electricity pylon as the hilltop here is studded with these steel towers. By way of a feasibility study, I aimed the Tx dish at one of these and, with the 3cm receiver and dish fitted into a shoulder bag, set off on foot to survey the local fields, green and magnetic.

The signal was strong in the immediate vicinity of the selected tower, but it was obvious that angle was everything. We would have to be very lucky to find metalwork at precisely the necessary angle for our purpose. Nonetheless, I continued along the footpath which leads downhill to the railway. Signals persisted as I periodically aimed the clandestine receiver into the air. It was becoming evident as I progressed that the signals were now coming, not so much from the tower, but from the swaying wires themselves. At some 600 metres range the signal could still be just heard in the noise, despite the receiver's 20MHZ bandwidth.

This had to be the answer, but we were likely to need considerable aerial gain. Some days later Nick assisted me in rescuing my 1.8m dish from it's resting place, buried within the laurel bushes. I set about mounting the transmitter and lining up the dish in a convenient position firing at the power lines where they cross the top of the hill some 200 metres down range. Nick had by now taken the receiver back

to his station and he aimed the small dish at the hill. "I have your tone!" was his immediate report on 2m.

Needless to say, the next half hour was spent getting some video onto the Gunn. Eventually, colour bars were being received at G4IMO, albeit with overshoots from hastily improvised pre-emphasis. We at last had a real hint that we might indeed achieve our aim. And so it was that Nick now found himself watching the extreme effects of bouncing a TV signal simultaneously from several moving reflectors.

ILLUMINATING INSPIRATION.

On Nick's next visit he studied my test rig and suggested that, with the focal length of my dish and the gain of the Marconi horn, I may be under-illuminating. I looked out a short length of 22mm copper pipe, rammed it temporarily inside the LNB horn and reset focus. The improvement in beam sharpness was immediately apparent. making it possible to pick out the individual tiers of cables. Most importantly, when the single top earth line was selected, the deep fades simply vanished.

We watched the situation for some days in varying weather conditions. The signal held well. with just transient loss during exceptional wind gusts, or congregating starlings. But an unforeseen problem prevailed. Entirely in accordance with Murphy's law. the cables were found to be precisely at right angles to our path. Consequently, an overwhelming amount of the transmitted signal from G30GX was reflected straight back, wreaking havoc on the oscillator and superimposing delayed modulation.

Since a 10GHz isolator was not available and the budget for the project was zero, another answer was sought in the form of a buffer-amplifier. This was literally cut with shears, complete with GasFET, from the reject board of another Marconi LNB. It was given two probes, and was attached with double-sticky tape to a piece of WG16 with a centre blocking plate and two holes in the wide face, together with three matching screws and a flange at each end. Inserted between Gunn and dish feed it worked like a dream.

Things were coming together nicely and it now looked as though our objective would be fully achieved. Nick set up his system entirely indoors. A 20cm horn, fabricated from an exhausted oil can. was employed for receive. Mounted just above. a Gunn with 30cm dish provided transmission some 90MHz away from the receive channel without too much crosstalk.

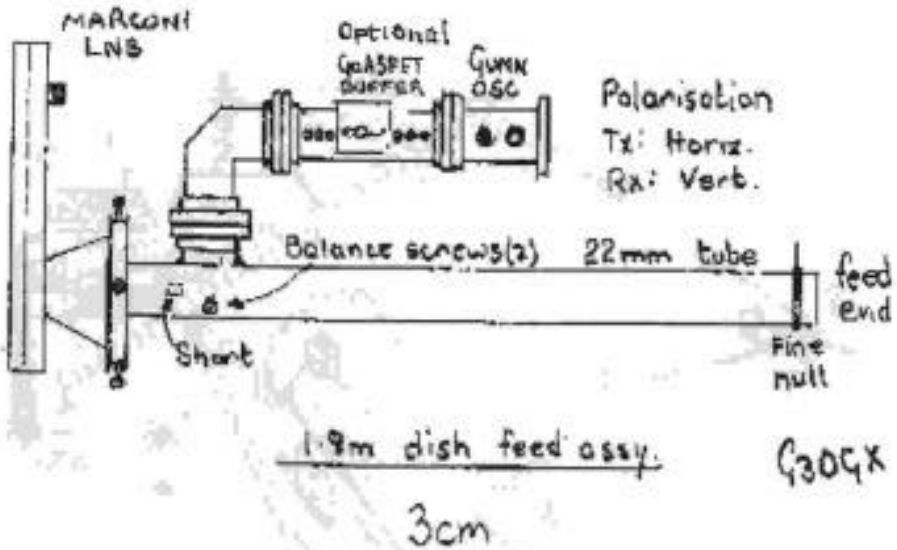
IN AND OUT OF THE BIG ONE.

At G30GX things were not to be so easy. There was room for only one 1.8m. dish. This created the inevitable difficulty that it would have to be duplexed for transmit and receive. Some form of polaplexer might offer the simplest solution.

The LNB was fitted with screws around the horn to secure it to the far end of a length of 22mm tube. A slot was cut in the wall of this tube in front of the LNB and an internal shorting bar was inserted at the LNB end of this slot, at right angles to the receive polarisation.

Transmit energy enters via a short length of WG16 soldered end-on over the slot and is then reflected by the short. down to the open end of the pipe to feed the dish. Two 8BA holes are tapped at 45-degrees opposite the slot. Screws inserted through these allow transmit energy to be balanced out, minimising energy appearing at the receiver. Although the duplexer has been developed more by intuition than science, it has worked exceedingly well.

Early tests had shown that the reflecting cable would not bounce a vertical signal, so we have to live with the 3dB loss each way resulting from slant polarisation's at the big dish.



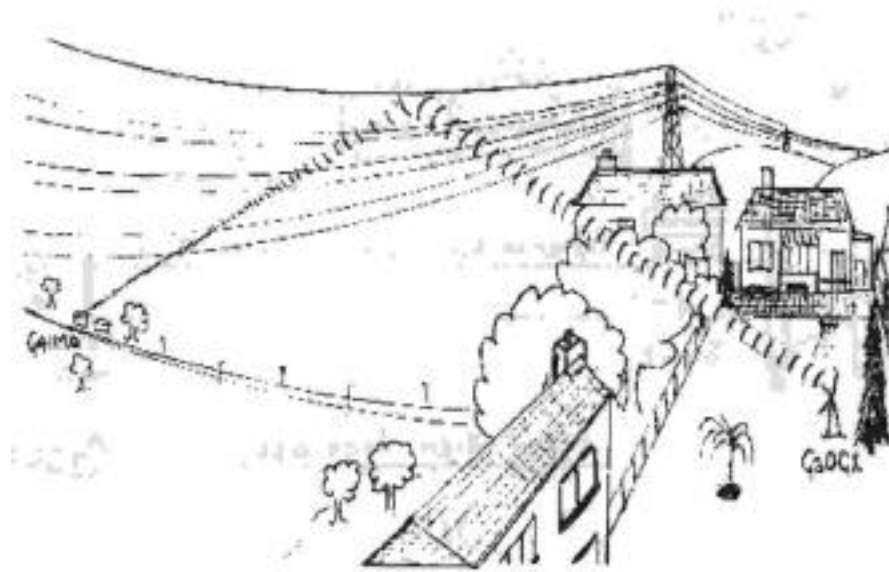
GETTING MY OWN BACK

One consequence of duplexing is the inevitable high level i.f. signal from the associated LNB. To prevent intermodulation products arising from this in the tuner, a filter is inserted in the downlead. This is set to accept the wanted signal only. A double-tuned filter combines good selectivity with a satisfactory response.

Another measure adopted provides fine rejection of the transmit signal before it enters the LNB. This consists of a simple stub soldered to a 22mm olive which fits onto the dish feed. It is critically positioned just behind the open guide to null the signal. But because of the Murphic reflection back into the dish, there is still a strong, variable AM component which cannot be rejected by balancing. This causes slight cross-modulation on received pictures.

At one point it looked as though a 3cm trap might be necessary - an unfortunate complication. Alternatively, as the problem was probably occurring in the last i.f. amplifier of the LNB, a simple attenuator before this might do the job. When Nick saw the effect, he suggested dropping the supply voltage gradually to see if this would reduce gain sufficiently before any increase in noise became apparent.

Having made my feelings clear to him about such an unprofessional approach, I waited until he had left before trying his suggestion. It worked



Circuit Notebook No. 56

A DTMF Controlled video switcher/fader

By John Lawrence GW3JGA

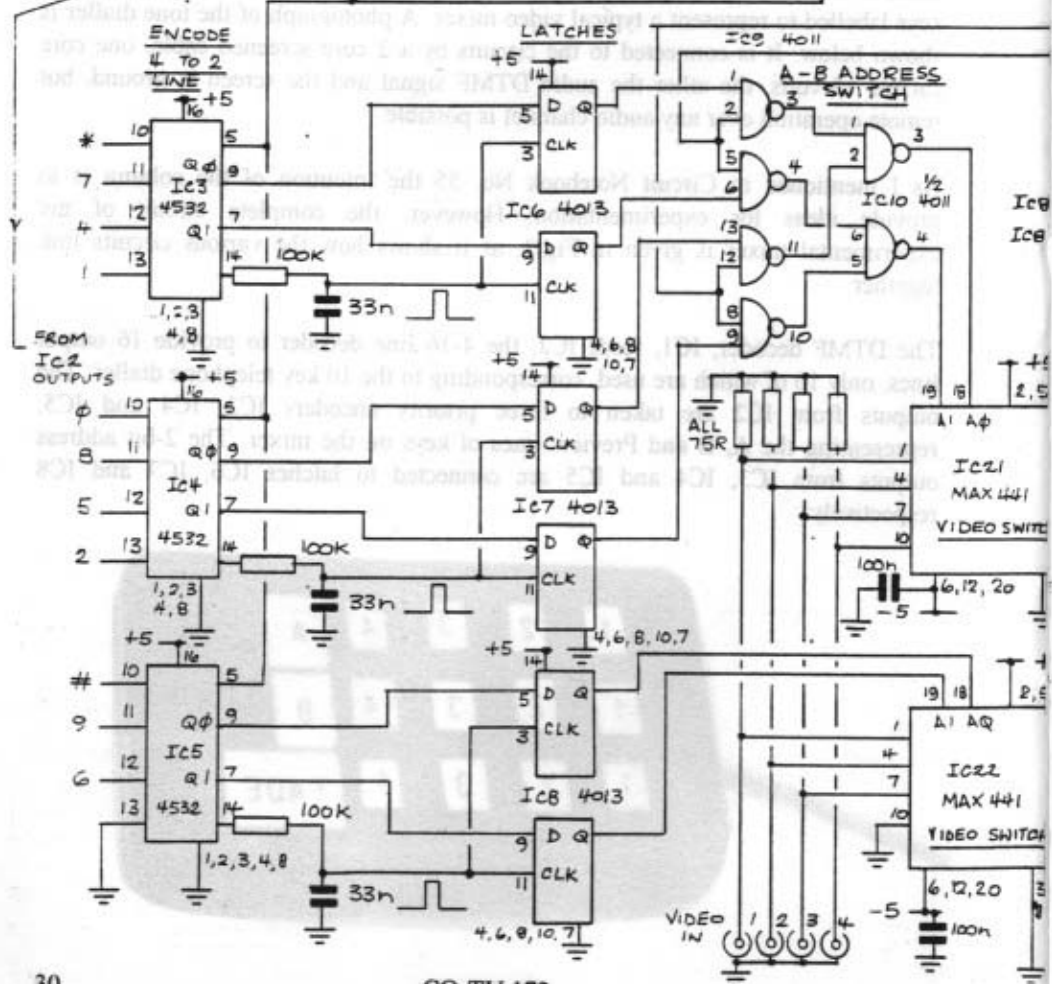
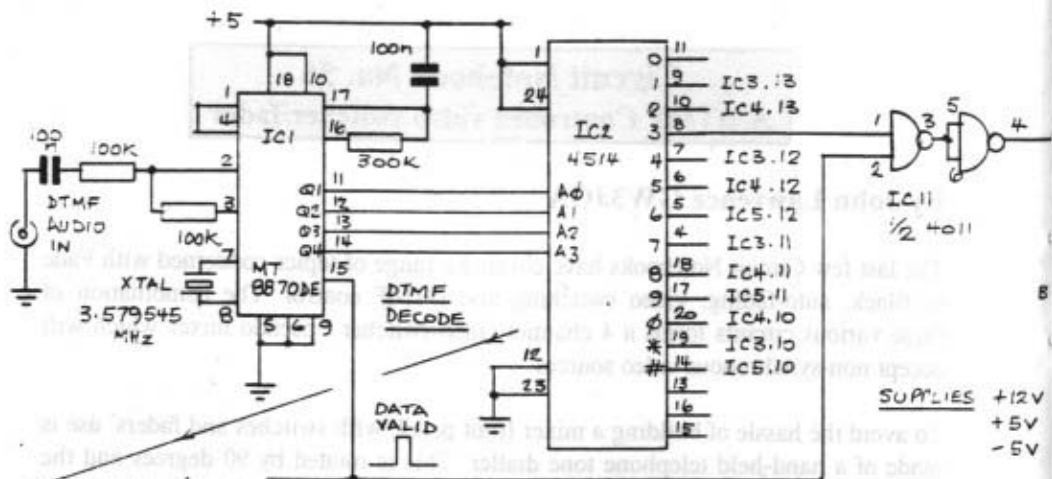
The last few Circuit Notebooks have covered a range of topics concerned with Fade to Black, auto-fading, video switching and DTMF control. The combination of these various circuits forms a 4 channel video switcher / pseudo mixer which will accept non-synchronous video sources.

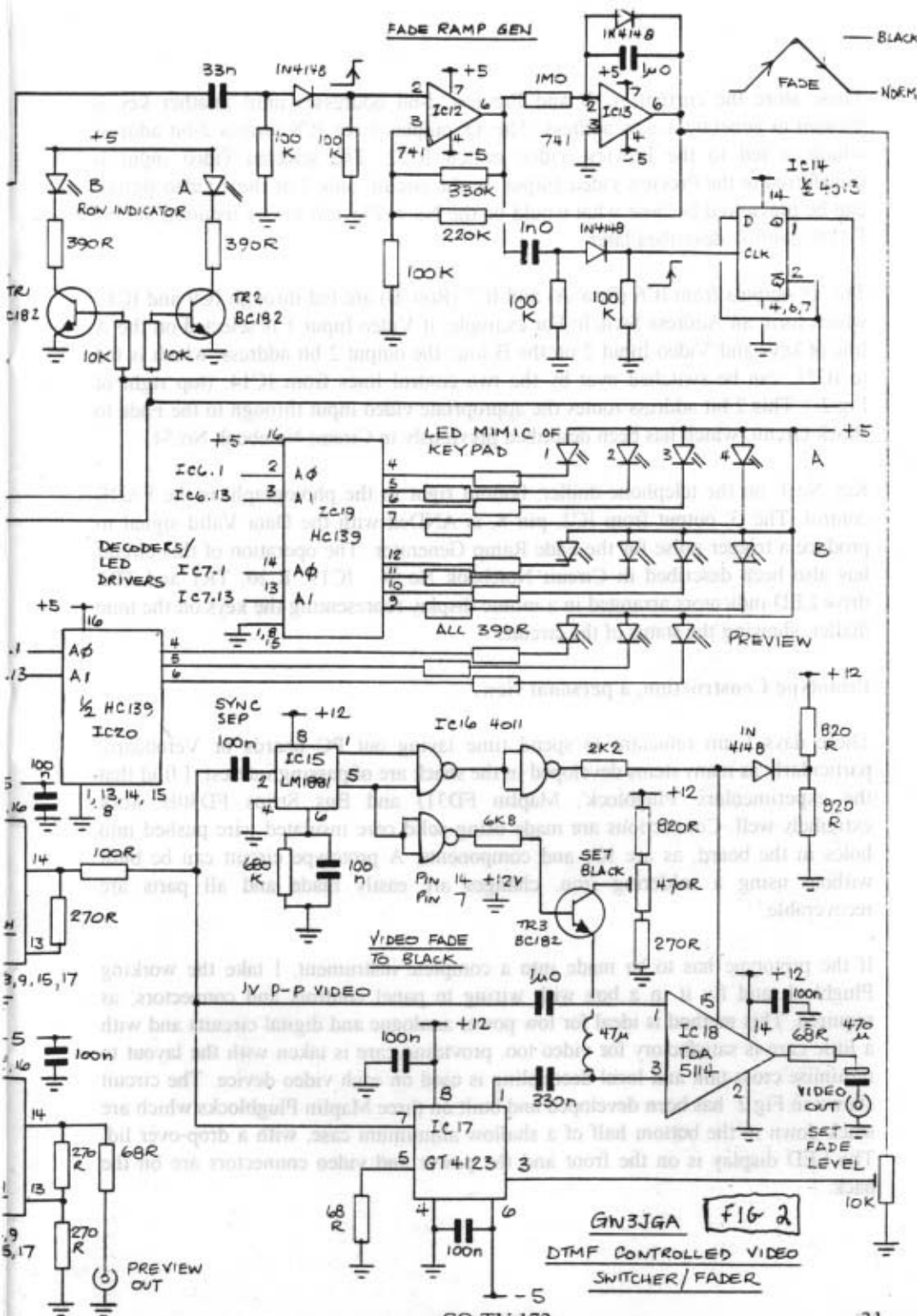
To avoid the hassle of building a mixer front panel, with switches and faders, use is made of a hand-held telephone tone dialler. This is rotated by 90 degrees and the keys labelled to represent a typical video mixer. A photograph of the tone dialler is shown below. It is connected to the circuits by a 2 core screened cable, one core carries +5 volts, the other the audio DTMF signal and the screen is ground, but remote operation over any audio channel is possible.

As I mentioned in Circuit Notebook No.55 the intention of the column is to provide ideas for experimentation. However, the complete circuit of my experimental mixer is given in Fig.2. as it shows how the various circuits link together.

The DTMF decoder, IC1, feeds IC2, the 4-16 line decoder to provide 16 output lines, only 10 of which are used, corresponding to the 10 key telephone dialler. The outputs from IC2 are taken to three priority encoders IC3, IC4 and IC5, representing the A, B and Preview lines of keys on the mixer. The 2-bit address outputs from IC3, IC4 and IC5 are connected to latches IC6, IC7 and IC8 respectively.







These store the current A, B and Preview 2-bit addresses until another key is pressed to generate a new address. The 'Q' outputs from IC8 form a 2-bit address which is fed to the Preview video switch IC22. The selected video input is transferred to the Preview video output. In the circuit, only 3 of the 4 video signals can be previewed because what would be the No.4 Preview key is required for the FADE control, described later.

The 'Q' outputs from IC6 (Row A) and IC7 (Row B) are fed through IC9 and IC10 which form an Address Switch. For example, if Video Input 1 is selected on the A line of keys and Video Input 2 on the B line, the output 2 bit address, which is fed to IC21, can be switched over by the two control lines from IC14, (top right of Fig.2). This 2 bit address routes the appropriate video input through to the Fade to Black circuit, which has been described previously in Circuit Notebook No. 54.

Key No.3, on the telephone dialler, bottom right in the photograph, is the FADE control- The '3' output from IC2, pin 8, is ANDed with the Data Valid signal to produce a trigger pulse for the Fade Ramp Generator. The operation of this circuit has also been described in Circuit Notebook No.54. IC19, IC20, TR1 and TR2 drive LED indicators arranged in a mimic display representing the keys on the tone dialler, showing the status of the circuits.

Prototype Construction, a personal view.

These days I am reluctant to spend time laying out PC boards or Veroboard, particularly as many items developed in the shack are of passing interest. I find that the experimenters 'Plugblock', Maplin FD31J and Bus Strips FD30H work extremely well. Connections are made using solid core insulated wire pushed into holes in the board, as are ICs and components. A prototype circuit can be built without using a soldering iron, changes are easily made and all parts are recoverable.

If the prototype has to be made into a complete instrument, I take the working Plugblock and fix it in a box with wiring to panel controls and connectors, as required. This method is ideal for low power analogue and digital circuits and with a little care is satisfactory for video too, providing care is taken with the layout to minimise cross-talk and local decoupling is used on each video device. The circuit shown in Fig. 2, has been developed and built on three Maplin Plugblocks which are stuck down in the bottom half of a shallow aluminium case, with a drop-over lid. The LED display is on the front and the power and video connectors are on the back.

Beyond TTL #10

By Trevor Brown G8CJS

In the last issue I left you with the hardware for a simple Snooker Score Board and the challenge of writing the software. The challenge was a little more advanced than I planned!

The problem was that the circuit did not have any component values other than the IC numbers with the exception of IC6 74HCT04 The rest are as follows:

R1, R2	1K	R3	2k2
R4	390	R5	680
R6 to R8	390	R9	2k2
R10	47 (AOT for sound level)	R11 to R18	10K(not critical)
C1	2.2 MFD	C2	390pf
C3	10n	C4	100MFD
XTAL	1 to 4 Mhz.		

The first stage of writing the software is to draw a flow chart, The decision boxes have only two answers yes or no. This is an important stage and it is worth spending time on (See Figure 1).

The next stage is to work out the sequence of LED's as the score advances and create a look up table, first in binary and then to convert this data to hex. As the score advances you can then advance a pointer along the table and send the correct byte to the LED's as and when required. The source code is reproduced here. It will need assembling to produce the binary code to programme an EPROM, but comments are included that will enable you to navigate your way through it.

The first instruction tells you to jump over the look up table and start the programme. C3 is the jump instruction and OOAF is where you jump to, only you require low byte first so it becomes AFOO. This is all taken care of in the assembler all you would enter is JP PROG and it would find where you have put PROG and work out the Data and Address columns for you. Remember there is no RAM in the hardware so avoid instructions that require it i.e. CALL.

```

; Snooker scoreboard
; source code by Trevor Brown
; vers 5 6/09/95 dual player
; lamp test and bleeper included
; no RAM memory required
; all rights reserved

```

```

.equ sound      0x0000
.equ display 0x0001
.equ keypad 0x0002
.equ cntrl      0x0003
.org 0x0000
.jp prog

```

```

.....80 to 99.....
.db 0x80,0x81,0x82,0x83
.db 0x84,0x85,0x86,0x87
.db 0x88,0x89,0x8a,0x8b
.db 0x8c,0x8d,0x8e,0x8f
.db 0x90,0x91,0x92,0x93

```

```

.....100 to 119.....
.db 0xa0,0xa1,0xa2,0xa3
.db 0xa4,0xa5,0xa6,0xa7
.db 0xa8,0xa9,0xaa,0xab
.db 0xac,0xad,0xae,0xaf
.db 0xb0,0xb1,0xb2,0xb3

```

```

;look up table for LED display...
;bar graph driven by 2x74154
;and 1x7442 connected to 8255
;port b

```

```

.....120 to 139.....
.db 0xc0,0xc1,0xc2,0xc3
.db 0xc4,0xc5,0xc6,0xc7
.db 0xc8,0xc9,0xca,0xcb
.db 0xcc,0xcd,0xce,0xcf
.db 0xd0,0xd1,0xd2,0xd3

```

```

.....0 to 19.....
table: .db 0x00,0x01,0x02,0x03
       .db 0x04,0x05,0x06,0x07
       .db 0x08,0x09,0x0a,0x0b
       .db 0x0c,0x0d,0x0e,0x0f
       .db 0x10,0x11,0x12,0x13

```

```

.....140 to 159.....
.db 0xe0,0xe1,0xe2,0xe3
.db 0xe4,0xe5,0xe6,0xe7
.db 0xe8,0xe9,0xea,0xeb
.db 0xec,0xed,0xee,0xef
.db 0xf0,0xf1,0xf2,0xf3
.db 0xff,0xff,0xff,0xff
.db 0xff,0xff,0xff,0xff
.db 0xff,0xff,0xff,0xff

```

```

.....20 to 39.....
.db 0x20,0x21,0x22,0x23
.db 0x24,0x25,0x26,0x27
.db 0x28,0x29,0x2a,0x2b
.db 0x2c,0x2d,0x2e,0x2f
.db 0x30,0x31,0x32,0x33

```

```

.....end of table .....

```

```

.....40 to 59.....
.db 0x40,0x41,0x42,0x43
.db 0x44,0x45,0x46,0x47
.db 0x48,0x49,0x4a,0x4b
.db 0x4c,0x4d,0x4e,0x4f
.db 0x50,0x51,0x52,0x53

```

```

.....programme starts here..

```

```

prog: ld  a,0xff ;delay loop
loop: dec a ;for pia to
      jr  nz,loop ;recover from
      ;reset

```

```

.....60 to 79.....
.db 0x60,0x61,0x62,0x63
.db 0x64,0x65,0x66,0x67
.db 0x68,0x69,0x6a,0x6b
.db 0x6c,0x6d,0x6e,0x6f
.db 0x70,0x71,0x72,0x73

```

```

.....set up pia .....
ld bc,cntrl; init c
ld a,0x89 ; c in ab
out (c),a ; out

```

```

;.....test lamps.....
    ld    hl,table ;table start
    ld    bc,display
lampok:
    ld    a,(hl)   ;get display
    out  (c),a    ;light display
    inc  hl       ;next lamp
    ld    a,(hl)  ;table end
    cp   0xff     ;yes no
    jp   z,lampgood
    ld    de,0x01ff ;delay loop
loop6: dec  de    ;so it waits
    ld    a,d     ;so you can
    or   e       ;see lamp
    jp   nz,loop6 ;light
    jp   lampok

```

```

;.....set pointers.....
lampgood:
    ld    de,table ;player2
    ld    hl,table ;player1
    ld    a,(hl)
    ld    bc,display
    out  (c),a    ;cl display
    ld    bc,keypad ;store which
    in   a,(c)    ;player selec
    and  0x80
    ld    i,a

```

```

;.....here we go then.....
;    bleeper when button pressed

```

```

top:    exx      ;change reg
    ld    d,0x90 ;duration
beepa: ld    a,0x80 ;set a8
    ld    h,0x02
b3a:   ld    l,0x40 ;tone
bla:   ld    bc,sound
    out  (c),a
    dec  l
    jr   nz,b1a
    ld    a,0x00 ;clear a8
    dec  h
    jr   nz,b3a
    dec  d
    jr   nz,beepa

```

```

;.....wait until finger off button.....
digiton:
    ld    bc,keypad
    in   a,(c)
    set  7,a     ;ignore player 1,2
    cp   0xff
    jp   nz,digiton ;jp button press

```

```

;.....pause routine.....
    ld    de,0xffff ;delay
loop7: dec  de    ;for
    ld    a,d     ;keybounce
    or   e       ;problems
    jp   nz,loop7

```

```

;.....check finger off again.....
digit:  ld    bc,keypad
    in   a,(c)
    set  7,a     ;ignore player 1,2
    cp   0xff
    jp   nz,digiton ;button pressed
    exx      ;change back

```

```

;..... check player one or two.....
scan:  ld    a,i     ;get 1,2 store
    ld    c,a     ;put in c
    in   a,(0x02) ;get 1,2 switch
    and  0x80    ;strip bits
    cp   c       ;compare
    jp   z,keystan ;jp if no change

```

```

;.....player select has been changed...
    ex   de,hl   ;swop pointers
    ld    i,a    ;store 1,2 switch
    ld    a,(hl) ;get other score
    ld    bc,display ;update display
    out  (c),a

```

```

;-----
;   scan input keys
;   red yes or no
keyscan:
    ld    bc,keypad
;get key press
    in    a,(c)
    bit   6,a      ;red press y,n
    jp    z,redscore

```

```

;-----
;   yellow yes or no
;   ld    bc,keypad
;get key press
    in    a,(c)
    bit   5,a      ;yel press y,n
    jp    z,yelscore

```

```

;-----
;   green yes or no
    ld    bc,keypad ;get key press
    in    a,(c)
    bit   4,a
    jp    z,grescore ;grn press y,n

```

```

;-----
;   brown yes no
    ld    bc,keypad ;get key press
    in    a,(c)
    bit   3,a
    jp    z,brnscore
;brn press y,n

```

```

;-----
;   blue yes no
    ld    bc,keypad
;get key press
    in    a,(c)
    bit   2,a      ;blu press y,n
    jp    z,bluscore

```

```

;-----
;   pink yes no
    ld    bc,keypad ;get key press
    in    a,(c)
    bit   1,a      ;pnk press y,n
    jp    z,pnkscore

```

```

;-----
;   black yes no
    ld    bc,keypad ;get key press
    in    a,(c)
    bit   0,a      ;blk press y,n
    jp    z,blkscore

```

```

;-----
;   end of key scan
;   repeat key scan
    jp    scan ;repeat scan

```

;.....Display routines.....

```

redscore:
    ld    a,(hl) ;check for
    cp    0x1f ;table end
    jp    z,prog ;reset
    inc  hl
    ld    a,(hl)
    ld    bc,display
    out  (c),a
    jp    top

```

```

;-----
yelscore:
    ld    a,(hl) ;check for
    cp    0x1f ;table end
    jp    z,prog ;reset
    inc  hl
    inc  hl
    ld    a,(hl)
    ld    bc,display
    out  (c),a
    jp    top

```

```

;-----
grescore:
    ld    a,(hl) ;check for
    cp    0x1f ;table end
    jp    z,prog ;reset
    inc  hl
    inc  hl
    inc  hl
    ld    a,(hl)
    ld    bc,display
    out  (c),a
    jp    top

```

.....
brnscore:

```
ld a,(hl) ;check for
cp 0xff ;table end
jp z,prog ;reset
inc hl
inc hl
inc hl
inc hl
inc hl
ld a,(hl)
ld bc,display
out (c),a
jp top
```

.....
bluscore:

```
ld a,(hl) ;check for
cp 0xff ;table end
jp z,prog ;reset
inc hl
inc hl
inc hl
inc hl
inc hl
ld a,(hl)
ld bc,display
out (c),a
jp top
```

.....
pnkscore:

```
ld a,(hl) ;check for
cp 0xff ;table end
jp z,prog ;reset
inc hl
inc hl
inc hl
inc hl
inc hl
inc hl
inc hl
ld a,(hl)
ld bc,display
out (c),a
jp top
```

.....
blkscore:

```
ld a,(hl) ;check for
cp 0xff ;table end
jp z,prog ;reset
inc hl
inc hl
inc hl
inc hl
inc hl
inc hl
inc hl
inc hl
inc hl
ld a,(hl)
ld bc,display
out (c),a
jp top
```

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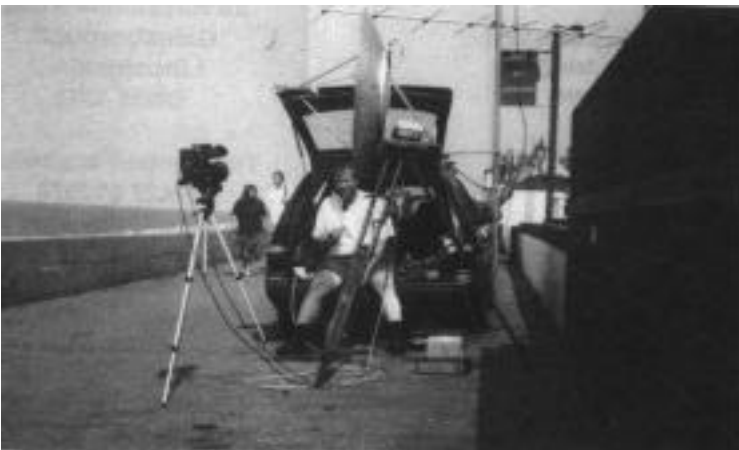
The North Sea spanned on 3CMs.

By Bob Platts G8OZP

Many years of experimentation and operation culminated in a highly successful weekend of the 19th and 20th of August this year with a superb 3cms contact with Hans PEIECO.

It all started back in 1987 with my first GASFET. 3cms RX, which together with a 10mW Gunn diode transmitter proved that despite some of the views of pundits and some 'experts' wide band ATV communication using low power (10mW) was possible over paths of greater than about 50 miles. A none line of sight contact over a path length of 74Km by the means of scatter from the top of an intervening hill encouraged me to peruse experimentation of 3cms ATV further.

Before to long, a distance of 142Km, line of sight was achieved from near Gloucester, down the Bristol Channel to Exmoor. The weather was typical summer sunny periods with showers. Some of the showers were very heavy and strong QSB was noted on the path. This was put down to the heavy rain cells. Then a path of 274Km from the top of Beachy Head to Start point in Devon was attempted. This path had recently been worked on SSB with only a few milli watts, so an attempt was considered worth while. Despite the excellent fine weather the attempt proved unsuccessful with only very weak syncs being seen. If nothing else it proved what was already known by the 'experts', that is that wide band width signals (ATV) require far higher ERPs and highly sensitive RX's to achieve long distance communications, then only over LOS. paths. (Satellites bear this out).



Experimentation continued. I made the first 3cms ATV transmission from Eire to Wales, a line of sight path of 182Km. This was in appalling weather conditions of low atmospheric pressure, thick cloud and very heavy rain over the whole path length. P5 pictures were attained despite the appalling conditions and a TX power of only 10mW. From this test it was discovered that cloud and rain attenuation was no where as great as I had expected. Also water in the wave guide does not attenuate as greatly as I would have thought, but Irish rain running down inside your clothes does tend to attenuate one's enthusiasm.

To achieve greater path lengths either very high mountains, lift or atmospheric ducting conditions would be required. All of which can be inconvenient. We don't have real mountains here in the UK and lift conditions can be unpredictable, but what about ducts.

Microwave ducts have been reported many times. These are conditions of very enhanced propagation over long paths. Atmospheric ducts are conditions where if circumstances are right, a signal which is injected into an atmospheric duct can travel very long distances with little attenuation. Research indicates that they can be fairly common at microwave frequencies but to get into one the incident angle is fairly critical. (one way to envisage a ducts is to imagine a condition where there are long length of flexible wave guide floating in the atmosphere. If you know it is there and you can get a signal into it, and someone is at the other end, hey presto, brilliant DX. Due to there transient and unpredictable nature, atmospheric ducts are not a suitable mode for ATV working.



From early days I had been aware of several of phone DX contacts over long sea paths via some form of ducting phenomenon. These were none L.O.S. paths with one or both stations at low elevations above sea level. In 1989 I conducted a test at the Wash on the east coast. With the stations located nearly at sea level the path was not true line of site due to the path length. again 10mW and a GASFET. RX. was used. Signals were P5++ with only a small horn antenna. This was encouraging.

At this time I was also developing my ideas for ATV repeaters on 3cms. This and other personal matters delayed further experimentation. In 1992 some tests were planned across the Bristol Channel. Three paths were selected, but due to very bad weather and the loss of one of the planned days, only one test was conducted. Both stations were at elevated positions and the centre of the path was at sea level.. At the start of the test the weather was very wet with cloud and thick mist right down to sea level. At first no signals were seen, but as the weather lifted, signals appeared. Eventually as the sun broke through and cleared away the mist and cloud signals peaked at P4 - 5 with strong QSR The immediate analysis of the contact was simply that the bad wet weather was causing very severe signal attenuation. As the atmosphere dried out attenuation reduced and hence signal level improved. However in hindsight it is now believed that a different mechanism was involved. The L.O.S. but very wet path from Eire to the UK proved that atmospheric water does not appear to attenuate as much as expected, so why did it appear to prevent contact over the much shorter path over the Bristol Channel?



Private life again intervened and it was not until the BATC convention in 1994 when the subject of 3cms DX was discussed between myself and Hans Dekker PE1ECO. Hans was also aware of reports of sea path ducting. We have both accrued considerable 3cms operating experience and we both had TXs of accurate frequency and sensitive GASFET. RXs. It was decided that we should attempt a transmission across the North Sea. However due to various personal commitments an attempt was not made that year.

At this years convention at Coventry we met again. Hans had built a new very stable transmitter that developed about 250mW. His RX also had improved performance. I had designed and built my very stable DRO transmitter and a new PLL. TX. during the winter. I now have a power output of 900mW into a 3 foot prime focus dish (ERP 3.6KW).

We agreed to conduct a test transmission during the weekend of 19th - 20th of August. We discussed our findings and experiences so far with over water paths and decided to make the attempt from sea level at each end. The path length would be about 145Km so the extra performance from our equipment would come in handy.

Due to the possibility that we might not be able to work each other on two meters it was decided that Hans would transmit first at 10.00AM on the 19th on 10.404GHz. At 10.30AM he would go to RX and I would transmit on 10.278GHz for half an hour. This would continue until 8PM. We would repeat the tests again the following day.



I chose as my location the small town of Alderburgh on the north Sussex coast. Conveniently a road runs along the top of the beach where it is possible to park the car and set up the station. Also there was a good convenient hotel for myself, my wife and daughter. Hans set up his van and equipment at the north western tip of Walcheren, Holland.

Initially the test were to be between just myself and Hans. However a few days before the weekend I received several phone calls from Holland. Peter PE1DCD asked if he could also attempt to work me. He would be located on high ground (well as high as you get in N Holland) near the Hook van Holland near Rotterdam, a slightly longer path. I of course agreed, who would turn down the offer of some DX. Yan PA0VHF phoned latter and also asked if he could join the attempt. He mentioned that Jack PA0BOJ and Fred PE1EXM would also be about.

I set the station up at Aldeburgh and called Hans on 144.750 at 10AM. He was readable but only about S2. The 3cms ATV. RX. was switched on and immediately produced a rock solid P5 picture of Han's test card, followed by a broadcast quality view of the assembled group, the equipment and the local area. Hans reported that my return transmission was also a rock solid P5 and of very good quality. Transmissions continued throughout Saturday and Sunday with the signals remaining rock solid. PE1DCD/P from near the Hook van Holland was also providing very strong signals with good pictures being exchanged. However they were not quite as strong as PE1ECO.



There were occasions when the signal, for no apparent reason, either went very noisy or as in most cases dropped out completely. This was at first put down to some form of QSB until we realised that it was caused by ships passing through the beam. Once we had realised this we were able to predict the occurrence accurately as we saw ships pass.

I had also taken my Gunnmod2 Transmitter which produces about 10mW. this also produced an excellent PS signal with Hans. This again proves that you do not need high power to work the DX. A 20db horn was fitted to the RX. LNB. and pointed towards Holland. Again a superb P5 signal. The horn was removed and hey presto a good signal with QSB. just on open wave guide. If I had known I would not have bothered to take the dish.

We also had 24cms equipment (15Watts into a 20db yagi). Signals proved only to be P4, peaking P5 with heavy QSB. Nowhere near as strong as 3cms.

Results far exceeded our expectations. So why were the 3cms signals so strong when 2 meters was flat and 24cms not producing quite the signal expected. It appears the mode of propagation on 3cms was by a mechanism involving the surface of the sea. Whilst yet to be proved I believe It may be along the lines of this.

The weather that weekend was fine with clear skies and a barometric pressure of 1020mB The sea was calm with a light breeze.



Under these conditions the atmosphere above the sea surface is of varying density due to water vapour. It is most dense at the sea surface and reducing with height. A 3cms signal arriving at the sea surface at a very shallow angle is reflected by the sea surface, as it is reflected back up through the atmosphere the varying density refracts the signal back down to the sea surface where it is again reflected. The process continues and the signal skips like a skipping stone. Water can be a very good reflector of 3cms signals. This is an effect I have noted many time from wet trees, buildings and in particular from the wet roofs of houses. Signal attenuation by this over sea mode is very low. It has been suggested that attenuation by water vapour can be quite high. If so then the signal would be attenuated by the relatively high water content of the air immediately above the surface. However the Eire / UK test showed that water attenuation is nowhere nearly as high as predicted. Propagation must be within the 10 meters of the surface, otherwise the ships would not have the effect they do.

Further test are needed to confirm my findings. If propagation is by this mode I suspect that during conditions of a high swell, no or very little signal should be observed. This is because the incoming signal would not hit the sea at the correct angle and the signal would be reflected off at random angles. Also during conditions of fog I suspect the propagation mode will not work. This is because the atmosphere is saturated with water vapour and not of varying density, so the wave would not be refracted back to the surface. This explains the results of the test from Devon to Wales. Part of that path was at sea level. At the start of the test the cloud was down to zero feet so the signal could not propagate across the surface. As the weather lifted the propagation mode was established and good signals were seen.



For best results both stations I believe should be as close to sea level as possible. It would be interesting to set up a test with two stations at the same location but one at sea level and one well elevated on high cliffs. I predict the sea level station will take a far stronger signal. In fact there is a possibility that the cliff top station would not see anything. Perhaps If the attempt from Beachy Head to Start Point had been tried from sea level the results may have been P5 instead of the very weak syncs observed at cliff top.

Further work is required and I intend to make many more tests. What would be very useful is a fixed link across a sea path of 100Km + with both stations close to the sea. This would allow much more data to be gathered about the frequency of such conditions, which I suspect to be fairly common. This could hopefully lead to the setting up of permanent links across to several points on the continent and to Ireland, which when (if) repeater linking is achieved opens up new horizons. So how about it you coastal groups. The ground work has been done. I have proved it can be done, lets do it.

I would very much like to thank all concerned in the Netherlands, Peter G8UIQ and Malcom. G1XUV who turn up at Alderburgh to give moral support and in particular my wife and daughter for being so supportive. Thanks.



A 24cm Horizontal Omni Antenna

By John Cronk GW3MEO

In searching for a horizontally polarised onini-directional antenna, that was not called an Alford slot, I experimented with the 'Big Wheel' cofiguration (VHF Communications 4/79) I was not able to achieve a very good match to a 50 ohm feeder. While trying to understand its operation I cut each of the loop radiator elements in the centre, and with some bending, and after removing the stub, three dipoles with 1/4 wavelength feeders can be formed.

Assuming the dipoles each have an impedance at the centre of about 60 ohms, the 1/4 wavelength feeders now become 1/4 wave transformers, matching 60 ohms to 16.6 ohms (50/3). The figures are not important as the exact impedance of the 1/4 wave transformers can be adjusted by changing the spacing.

The design shown in Fig. 1. has conveniently separate adjustments for resonance and impedance. The length of the dipoles can be trimmed and the spacing of the Q bar transformers adjusted until the co-ax feeder sees 50 ohms. A balun of the 1/4 wave sleeve type (Bazooka) would seem to be appropriate, in particular if a stacked array is considered.

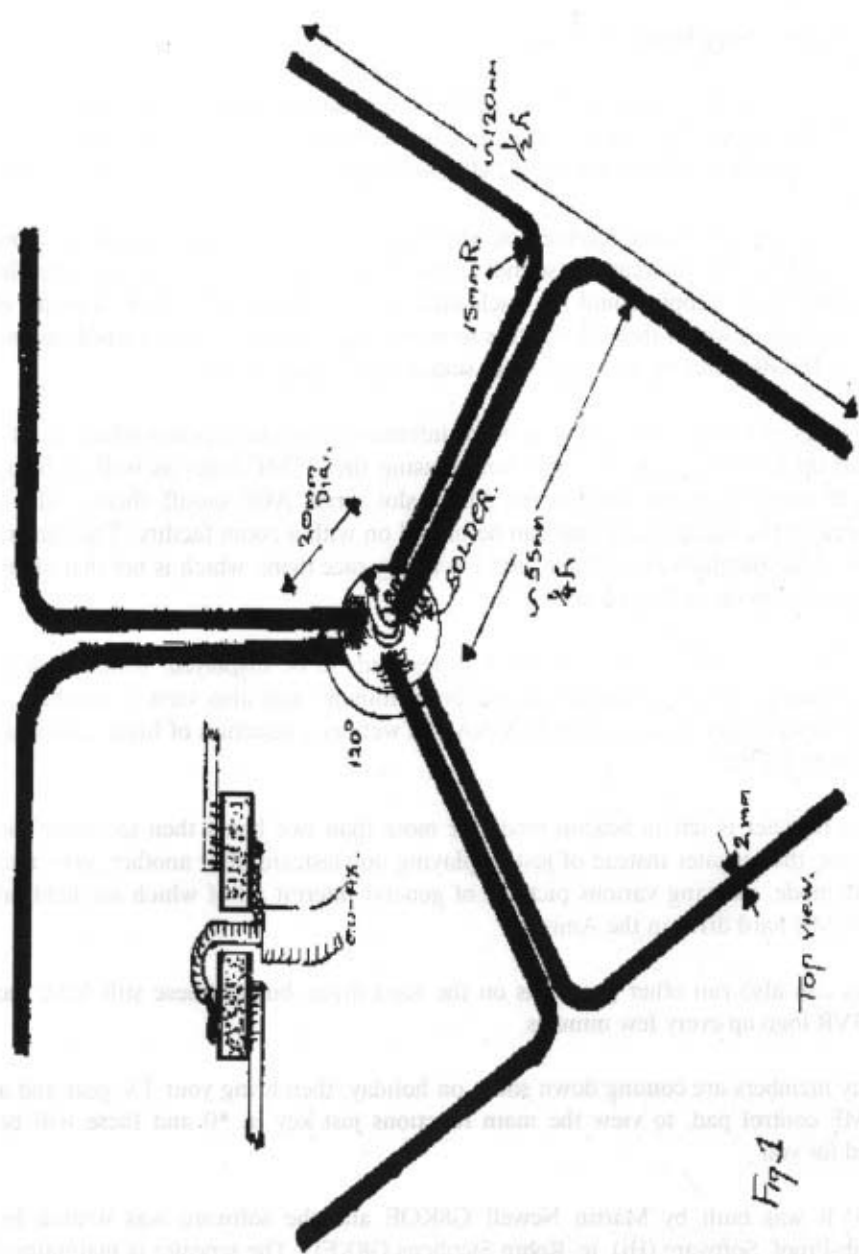
I'm still uncertain exactly how the three dipoles operate relative to each other, but there seems to be a slight gain over a simple dipole, rather than a loss as might be expected if the dipoles did not interact. The radiation pattern appears to be quite good, without any sharp nulls.

Construction

The centre is a disc of double sided PCB material (20mm dia), with a hole in the middle for the co-ax inner which is connected to the top surface, and the braid to the lower surface. I used 2mm bare copper wire for the elements and transformers. The best match was when the parallel sections were almost touching.

The dipoles can be bent to form a circle, but I had best results with the elements straight. The proximity of the ends of adjacent dipoles affects resonance and is quite critical as might be expected.

I believe this arrangement has potential for development of a repeater antenna. My experiments will continue.



GB3VR - A Quick Tour

By Robin Stephens G8XEU

GB3VR is now being controlled by a 2MB Amiga 600 with hard drive, output is via the Maplin parallel O/P port and input is using the two joystick ports to give us 16 inputs using BCD. This is for the DTMF control pad, sync detect and carrier detect.

There is also a 70cms receiver on the repeater which has its speaker output connected to the intercarrier sound of the video repeater. This is to cure the problem where people could see each other but not hear each other. You do of course need to watch through for this to work. This receiver can be turned on and off via DTMF tones on the intercarrier sound input, or on 70cms.

The users of GB3VR have quite a bit of information on the repeater which can be called up from the menus on the Amiga using the DTMF tones as well as being able to select the beam aerial or the Alford slot aerial, AGC on/off, there is also a camera on the repeater site that can be turned on with a zoom facility. The camera looks at the Brighton race course, and when they race there, which is not that often, you can zoom up on the riders.

The users can also select from 60 or so testcards to be displayed, whilst it is in beacon mode, which changes testcard every minute, and also view a number of aerial designs that were sent by G7GNA. As well as a selection of high resolution scenes by G4JEI.

If the repeater is left in beacon mode for more than two hours then to amuse the viewers, the repeater instead of just displaying one testcard after another, goes into scene mode, showing various pictures of general interest all of which are held on the 80MB hard drive in the Amiga.

Users can also run other programs on the hard drive, but all these still have the GB3VR logo up every few minutes.

If any members are coming down south on holiday, then bring your TV gear and a DTMF control pad, to view the main functions just key in *0 and these will be listed for you.

GB3VR was built by Martin Newell G8K0E and the software was written by Bomb-Proof Software (Hi), ie. Robin Stephens G8XEU. The repeater is maintained and run by the Worthing & District Repeater Group.

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SLOW SCAN TELEVISION EXPLAINED (275gm) <i>By Mike Wooding G6IQM</i> The latest SSTV handbook detailing all the information you need to enter the fascinating world of Slow Scan Television: Basic principles, explanations of all the modes to date, commercial hardware and computer-based SSTV systems. Also various construction projects for SSTV equipment.	£5.00
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VIDICONS

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Members requesting information on availability, prices or other types of tube or equivalents are asked to send a stamped, addressed envelope for their reply. Please note that the relatively inexpensive 'amateur grade' tubes are no longer available to the club, although ex-equipment tubes, suitable for test/line up of cameras can often be supplied.

CIRCUIT DETAILS can be found as follows:

Revised ATV Handbook (vol 2): PCB's 21, 22, 53

An Introduction to ATV.. PCB's 10, 18, 25, 40, 41, 82, 83, 84, 85, 86

TV for Amateurs: PCB 19

Slow Scan TV Explained: PCB's 59, 60, 61, 62

Amateur TV Compendium: PCB's 11, 12, 27, 54, 55,56, 57

Micro and TV projects: PCB's 14, 33, 34

CQ-TV (Issue No. in brackets): PCB's 13(128), 16(134), 20(130),
26(142), 35(143), 58(139)

Item 46 is supplied with circuit details, etc.

BATC Publications can supply back copies of the original articles if required.

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 plated holes and doubled sided eurocard size.

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

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

**Trevor Burndred G0KBI, 52 Everest Road, Whitehall,
Kidsgrove, Stoke-on-Trent, ST7 4DY Tel: 01782 782886**

NARROW BANDWIDTH TELEVISION ASSOCIATION

The Narrow Bandwidth Television Association, founded in 1975, specialises in the mechanical and low definition aspects of ATV, and offers genuine (moving) TV within a basic bandwidth of 6-7KHz. The techniques, basically an updated form of the Baird system, are a unique mixture of mechanics, electronics and optics. Membership is open World-wide on the basis of a modest yearly subscription (reduced for BATC members), which provides an annual exhibition and quarterly 12-page newsletter, together with other services.

For further details write to: **DOUG PITT, 1 BURNWOOD DRIVE, WOLLATON, NOTTINGHAM, N28 2D1** Telephone_01602 282896.

RALLY 96

Sunday April 28th The Sports Connexion Coventry

**All the usual features of the BATC
Rally: lots of traders, large outdoor
flea market, specialist mode
television displays, ex broadcast
vehicles, etc.**

All enquiries: Mike G6IQM

Tel: 01788 890365 Fax: 01788 891883
Email: vhf-comm@g6iqm.demon.co.uk

THE BRITISH AMATEUR TELEVISION CLUB

Balance sheet

At 31 December 1994

	1994	1993
Fixed assets		
Office equipment		
Additions	1,320	1,130
less- Depreciation	<u>(1,320)</u>	<u>(1,130)</u>
Current assets		
Stocks- members services	5,562	7,817
publications	5,972	7,014
Debtors	--	500
Nationwide Building Society	10,791	11,550
Girobank account	119	119
Royal Bank of Scotland- current account	4,121	5,527
investment account	<u>25,040</u>	<u>25,010</u>
	51,605	57,537
less-		
Current liabilities		
Creditors and accruals	1,015	959
Subscriptions received in advance	<u>13,582</u>	<u>18,748</u>
	14,597	19,707
	<u>£37,008</u>	<u>£37,830</u>
Represented by-		
Accumulated fund		
Balance brought forward	37,830	34,634
(Surplus of expenditure over income)		
/Surplus of income over expenditure	<u>(822)</u>	<u>3,196</u>
	<u>£37,008</u>	<u>£37,830</u>

In accordance with instructions given to us, we have prepared these accounts from the accounting records of The British Amateur Television Club, and from information and explanations supplied to us.

Chartered Accountants
Gainsborough
14 September 1995

THE BRITISH AMATEUR TELEVISION CLUB

Income and expenditure account

Year ended 31 December 1994

	1994	1993
Income		
Subscriptions	16,577	17,470
Members services	840	925
Publications	355	1,055
Advertising	558	621
Building society interest	241	494
Bank interest	1,085	655
Exhibitions	4,934	3,018
Donations	310	342
Postages	103	359
Donated equipment sales	<u>39</u>	<u>7</u>
	25,042	24,946
less-		
Expenditure		
CQ TV printing	9,055	9,401
CQ TV postage	3,813	4,377
CQ TV production	1,216	1,757
General office expenditure	1,408	664
General postages	689	858
RSGB affiliation fee	15	15
Committee members expenses	178	28
Exhibitions	4,403	2,478
Insurance and legal	71	60
Miscellaneous expenses	27	--
Members benefits	236	1,144
Accountancy	311	255
Rally attendance	180	322
Recruitment	533	207
Advertising and publicity	520	--
Project development	6	56
Bank charges	94	128
Conference	<u>3,109</u>	<u>---</u>
	25,864	21,750
(Surplus of expenditure over income)	<u> </u>	<u> </u>
/income over expenditure	£ (822)	£ 3,196

SATELLITE TV NEWS

By Paul Holland

The dark winter nights are nearly upon us and now is the time to grease the moving bits of the antenna, WD40 all the connections and settle down indoors with the satellite receiver to sample the latest offerings from the Clark Belt.

This edition of "Satellite TV News" is a little shorter than usual due to pressures from the day job getting in the way of gathering news. With luck we should be back to normal next time.

SATELLITE LAUNCH PROFILE ASTRA 1E

By the time you read this ASTRA 1E should have been launched in preparation for European wide digital DTH services. It will however be Astra 1D which carries Europe's first digital service provided by Canal Plus and is due to launch about now. Details of ASTRA 1E follow.,

Launch Vehicle	Ariane 42L
Launch Site	Kourou, French Guyana
Launch Mass	3000kg
Manufacturer	Hughes (HS601 platform)
Stabilisation	3 Axis type
Expected life	14 years
Total Power Consumption	4.1Kw
Transponder Capacity	18
TWTA Output Power	85W
Nominal EIRP	52 dBW
Transponder Bandwidth	26 Mhz in FSS, 33 Mhz in BSS

Astra 1E provides full back-up for either ASTRA 1B, 1C, 1D or BSS band services with a total capacity of 66 channels.

10.70 - 10.95 Ghz	16 Channels (Astra 1D Back-up)
10.95 - 11.20 Ghz	16 Channels (Astra 1C) Back-up)
11.45 - 11.70 Ghz	16 Channels (Astra 1B Back-up)
11.70 - 12.07 Ghz	18 Channels (BSS Band Back-up)

EUTELSAT NEWS

Eutelsat are now planning the new generation of satellites beyond HOT BIRD 3 which will launch in 1997. Five satellites will be ordered including HOT Bird 4 which will be a fifth TV only satellite to be co-located at 13.0 Deg E. The other four satellites will be used principally for telecommunications services including public telephony, business services, SNG and programme exchanges (feeds).

Hot Bird 4 will carry 20 transponders and be built by Matra Marconi Space . It will be launched in the third quarter of 1997. Three of the planned telecommunications satellites will replace current Eutelsat II capacity at 7.0, 10 and 16.0 Degrees from 1998 onwards. Each of these satellites will provide 50% more capacity with 24 transponders each and will have increased power and improved coverage areas. The fifth satellite which will be located at 48.0 Deg E will be launched in 1998. It will have 18 transponders and is targeted at East European markets.

LAUNCH NEWS

Intelsat Launch planned launch dates are as follows.

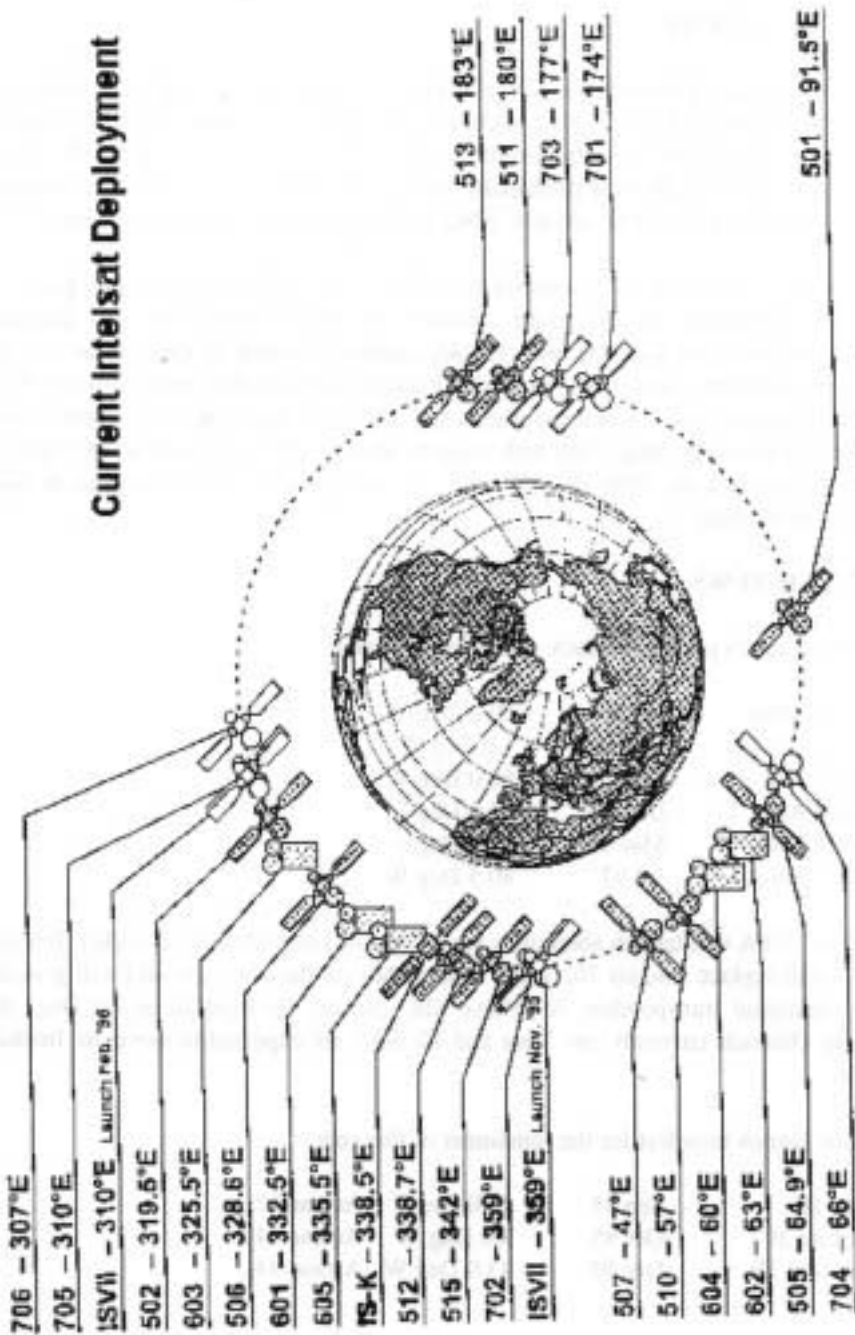
Intelsat 708A	Nov 95	50.0 Deg W
Intelsat 707A	Feb 96	1.0 Deg W
Intelsat 709	May 96	56.0 Deg W
Intelsat 803	Dec 96	64.0 Deg E
Intelsat 804	Mar 97	21.5 Deg w
Intelsat 806A	Jul 97	40.5 Deg W

Intelsat 708A will launch about now via a Chinese Long March 3B rocket. Intelsat 707A will replace Intelsat 702 when it launches in the new year and will provide two additional transponders to relieve the current Tp shortfall at 1.0 Deg W. Some channels currently on Thor and TV SAT are expected to move to Intelsat 707A.

Ariane launch manifest for the remainder of this year;

Astra 1E	Sep 95	19.0 Deg E	Ariane 42L
Telecom 2C	Oct 95	3.0 Deg W	Ariane 44L
Panamsat 3R	Dec 95	43.0 Deg W	Ariane 44L

Current Intelsat Deployment



NEW CHANNELS

MCM have confirmed plans to launch a Classical/Jazz Music Channel as part of the Canal Plus Digital DTH service over Astra which is planned to start this month.

A new Swiss Adult Channel called "Happy Love" has announced plans for a launch in Autumn of next year. The service will be exclusively Pay per View and will be carried digitally over Astra and via an analogue feed on a Eutelsat satellite.

NBC are launching a European version of the American CNBC channel early next year. Early signs of this will be split programming between NBC Super Channels feeds on Astra and Eutelsat II F1.

Danish Radio and Television (DRTV) are planning a satellite delivered channel which will also be retransmitted on Danish cable networks. No details of satellite are yet available though the satellite feed is reported to be planned as an analogue transmission with digital distribution via cable.

TRANSPONDER NEWS

PaAmSat 4 68.5 Deg E

This newly launched satellite started testing in mid September and will initially carry the NHK Channel from Japan for onward distribution in Europe and to the US.

DFS 2 Kopernikus 28.5 Deg E.

The Swiss RTL service can now be found on 11.548 Ghz (V). This is a 24 hr a day feed for cable nets. Premiera TV on 11.525 GHz (H) will change over to an MPEG 2 Feed in January or February of next year.

ASTRA 1A,1B,1C,1D 19.2 Deg E

A number of new channels from SKY are scheduled to have launched in October. Most of these new "channels" will in fact share time on existing Tp's. Preliminary information as we closed for press was as follows;

European Business News	Sharing time with BRAVO on Tp 42
The Paramount Channel	Film channel - no Tp details
The History Channel	No Tp details
The Disney Channel	Tp 26 with Sky Movies Gold
The Playboy Channel	Taking the night hrs on Tp 41
Sky Sports Gold	Vintage (old) sports material
Sci Fi	Not confirmed as being the Sci Fi Channel - perhaps just Sci Fi programming for part of the day

Home Order TV (HOT TV) launched in October in clear PAL on Tp 62.

Eutelsat 11 F1 13.0 Deg E

TV Eurotica has been changing Tp's of late and should by now be occupying the lower half of Tp 22 11.146 Ghz (H). This is a temporary move until September of next year when the German Game Show Channel WIN-TV takes over this Transponder.

Eutelsat II F6 13.0 Deg E.

The now proscribed TV Erotica was announcing plans as we closed for press to move their Eutelsat II F3 service to Tp 16 11.534 Ghz (V) with transmissions commencing nightly at 11.0pm GMT. The Spanish channel TV3 Catalonia has now taken the Tp 14 (v) 11.492 Ghz.

Tele X 5.0 Deg E.

Teracom and the Swedish Space Corporation are to buy a new 32 transponder satellite to replace this satellite which is now nearing the end of its planned life. The new satellite will be co-located with Sirius at this orbital location. Sirius 2 will be built by Aerospatiale.

Intelsat 60127.5 Deg W

The Dutch VTV Women's TV channel launched in October using the same Tp as Kindernet on 11. 175 Ghz (H). The service can be found in the mornings only following closedown of Kindernet. CMT has now moved permanently to Tp 73 at 11. 168 Ghz (V).

TDRSS 41.0 Deg W

SSVC have announced they will change from their current Cryptovision to an MPEG 2 feed on this satellite during October.

FREQUENTLY ASKED QUESTIONS ABOUT MPEG1

To reflect the growing emergence of digital technology for satellite delivered TV services I will be reproducing regular edited extracts of the FAQ (Frequently Asked Questions) from the Internet World Wide Web. This month we look at the MPEG 1 standard for video compression.

Q. What is MPEG?

A. MPEG is a group of people that meet under ISO (the International Standards Organisation) to generate standards for digital video (sequences of images in time) and audio compression. In particular, they define a compressed bit stream, which implicitly defines a decompressor. However, the compression algorithms are up to the individual manufacturers, and that is where proprietary advantage is obtained within the scope of a publicly available international standard. MPEG meets roughly four times a year for roughly a week each time. In between meetings, a great deal of work is done by the members, so it doesn't all happen at the meetings. The work is organised and planned at the meetings.

Q. So what does MPEG stand for?

A. Moving Pictures Experts Group.

Q. So how does MPEG 1 work?

A. First off, it starts with a relatively low resolution video sequence of about 352 by 240 frames by 30 frames/s (US--different numbers for Europe),but original high (CD) quality audio. The images are in colour,but converted to YUV space, and the two chrominance channels (U and V) are decimated further to 176 by 120 pixels. It turns out that you can get away with a lot less resolution in those channels and not notice it, at least in "natural" (not computer generated) images.

The basic scheme is to predict motion from frame to frame in the temporal direction, and then to use DCT's (discrete cosine transforms) to organise the redundancy in the spatial directions. The DCT's are done on 8x8 blocks, and the motion prediction is done in the luminance (Y) channel on 16x16 blocks. In other words, given the 16x16 block in the current frame that you are trying to code, you look for a close match to that block in a previous or future frame (there are backward prediction modes where later frames are sent first to allow interpolating between frames). The DCT coefficients (of either the actual data, or the difference between this block and the close match) are "quantised", which means that you divide them by some value to drop bits off the bottom end. Hopefully, many of the coefficients will then end up being zero. The quantization can change for every "macroblock" (a macroblock is 16x16 of Y and the corresponding 8x8's in both U and V). The results of all of this, which include the DCT coefficients, the motion vectors, and the quantization parameters (and other stuff) is Huffman coded using fixed tables. The DCT coefficients have a special Huffman table that is "two-dimensional" in that one code specifies a runlength of zeros and the non-zero value that ended the run. Also, the motion vectors and the DC DCT components are DPCM (subtracted from the last one) coded.

Q. So is each frame predicted from the last frame?

A. No. The scheme is a little more complicated than that. There are three types of coded frames. There are "I" or intra frames. They are simply a frame coded as a still image, not using any past history. You have to start somewhere. Then there are "P" or predicted frames. They are predicted from the most recently reconstructed I or P frame. (I'm describing this from the point of view of the decompressor.) Each macroblock in a P frame can either come with a vector and difference DCT coefficients for a close match in the last I or P, or it can just be "intra" coded (like in the I frames) if there was no good match.

Lastly, there are "B" or bidirectional frames. They are predicted from the closest two I or P frames, one in the past and one in the future. You search for matching blocks in those frames, and try three different things to see which works best. (Now I have the point of view of the compressor, just to confuse you.) You try using the forward vector, the backward vector, and you try averaging the two blocks from the future and past frames, and subtracting that from the block being coded. If none of those work well, you can intra- code the block.

The sequence of decoded frames usually goes like:

Where there are 12 frames from I to I (for US and Japan anyway.) This is based on a random access requirement that you need a starting point at least once every 0.4 seconds or so. The ratio of P's to B's is based on experience.

Of course, for the decoder to work, you have to send that first P *before* the first two B's, so the compressed data stream ends up looking like:

Oxx312645.

..

where those are frame numbers. xx might be nothing (if this is the true starting point), or it might be the B's of frames -2 and -1 if we're in the middle of the stream somewhere.

You have to decode the I, then decode the P, keep both of those in memory, and then decode the two B's. You probably display the I while you're decoding the P, and display the B's as you're decoding them, and then display the P as you're decoding the next P, and so on.

Q. Where did they get 352x240?

A. That derives from the CCIR-601 digital television standard which is used by professional digital video equipment. It is (in the US) 720 by 243 by 60 fields (not frames) per second, where the fields are interlaced when displayed. (It is important to note though that fields are actually acquired and displayed a 60th of a second apart.) The chrominance channels are 360 by 243 by 60 fields a second, again interlaced. This degree of chrominance decimation (2:1 in the horizontal direction) is called 4:2:2. The source input format for MPEG 1. called SIF. is CCIR-601 decimated by 2:1 in the horizontal direction, 2:1 in the time direction, and an additional 2.1 in the chrominance vertical direction. And some lines are cut off to make sure things divide by 8 or 16 where needed.

Q. What if I'm in Europe"

A. For 50 Hz display standards (PAL, SECAM) change the number of lines in a field from 243 or 240 to 288, and change the display rate to 50 fields/s or 25 frames/s. Similarly, change the 120 lines in the decimated chrominance channels to 144 lines. Since 288×50 is exactly equal to 240×60 , the two formats have the same source data rate.

ASTRA DIGITAL RADIO (ADR)

It is now clear how ASTRA have re-allocated the audio sub-carriers associated with each Transponder to allow the introduction of digital radio services. The majority of digital audio currently occupying these sub-carriers is provided by Digital Music Express (DMX) who are charging a monthly subscription administered by B-Sky-B. Some mostly German free to air services are available however. The frequency plan for each ASTRA transponder is now as follows;

D1 6.12 Mhz	D2 6.30 Mhz
D3 6.48 Mhz	D4 6.55 Mhz
D5 6.84 Mhz	A1 7.02 Mhz
A2 7.20 Mhz	D6 7.74 Mhz
D7 7.92 Mhz	D8 8.10 Mhz
D9 8.28 Mhz	D10 8.46 Mhz

FROM THE POST BAG

Thanks to Roger Bunney for passing on a letter from one of his Swedish readers reflecting a rather chaotic situation in Scandinavia. During much of the earlier part of this year there were a number of "deals" for cheap PAL satellite equipment intended for pointing to Sirius at 5.2 Deg E. The actual figure of systems sold is in dispute (anywhere from 100,000 to 350,000) however purchasers are now somewhat disgruntled to find that the Swedish TV3, ZTV and TV6 services are to move from clear PAL to D2Mac Eurocrypt M before Christmas. I don't know what caveat emptor is in Swedish!!

John Bodle has written in to ask if anyone is aware of Press Fax pictures being transmitted via satellite on sound subcarriers. If anyone has any information please let me know and I will pass the information on.

NEW PRODUCTS

PACE DVC 350 Eurocrypt/Videocrypt Decoder

Although not formally launched in the UK many German dealers are offering this "Multi-crypt" decoder for about 450 pounds sterling. The basic specification is as follows;

Eurocrypt M&S, D/D2Mac
Videocrypt 1
Mac Teletext
Pay per view compatible
16:9 Widescreen format
S-VHS output
RGB output
2 Card readers
3 Scarts

Contact Mega SAT Gmbh Tel (49) 234 9536131/2/3 or Fax (49) 234 9536134
Address Troskenstr.7 A, D-44807, Bochum, Germany

CONCLUSION

That is it for this edition of Satellite TV News. Thank for the letters and please keep writing to let me know what interests you in the world of Satellite TV.

*Paul Holland, 'Chatterton', Chapel Lane, Threapwood, Near Malpas, Cheshire,
SY14 7AX*

70cms - USE IT OR LOSE IT

Fixing The Image

By Dicky Howett

Dick v Howett once again dons his investigator's cap and recalls the era of Telerecordings, reminding us that it wasn't always Digital Video and Virtual Reality.

The worlds first recording of a television image can be dated as ...well what's in a date? The BBC reckon they did it first (but then they always do!) This recording was of the Cenotaph ceremony on the 9th Nov. 1947. It was shown later on the News. Of course the big problem with recording an electronic image on film (high definition only-I'm not including here low-def stuff) is the sheer seemingly incompatible mechanics of it all.

It's true that simply by pointing a cine camera at a tv screen, an image of sorts will result. But 'scan bars' and general picture instability will occur due to the concomitant unsynchronised shutter/tv scan rate. (Actually an unsynchronised camera with a mirror reflex viewfinder system can overcome scan bars by slightly varying the camera's shutter speed. The operator has to keep watching the image through the viewfinder and varying the speed all the time in order to keep the scan bars away).

For a full-quality recorded image, both fields of the tv interlace (50th sec) have to be recorded by the film camera (running at 25 frames per second). The first stumbling block is that half of the time a cine camera film transport intermittent is blanking out the tv image., this to allow for the film to be pulled down. Engineers had to overcome little problems like that: Losing half the picture information.

Initially, an attempt was made to record the full interlaced picture, In Feb. 1939, C.O.Browne and Gordon Newton at EMI linked a 35mm Mechau film mechanism with a projection CRT and an image sourced from an Emitron camera. (The German Mechau film system used a drum of eight mirrors that followed and held stationary an image relative to the moving film for the duration of a complete scanning cycle. Mechau projectors were used as telecine machines with Emitron cameras picking up the image by poking into the optical path. Results were quite crude).

The 35mm EMI film recording (Paul Lucas 'eating' out of a giant tin of Fluxite) displays optical distortions associated with the Mechau system, not helped by

However, the resulting short test film is an impressive demonstration, proving that the fleeting video signal could be preserved. This Full Field system was further investigated and developed by the BBC immediately post-war.

(The American's were also fully apprised of 'kinescope' recordings as they termed them. North American continental time differences precluded simultaneous tv networking even after the introduction of the East Coast-West Coast co-axial link. So film recordings were a convenient 'time shift' solution. However, American engineers had the tasty task of first devising a viable method of recording an interlaced monochrome 525 line image of 30 f.p.s. at a cine rate of 24 f.p.s. and then re-transmitting at 30 f.p.s. Safe to say it all worked and the end results were first rate.)

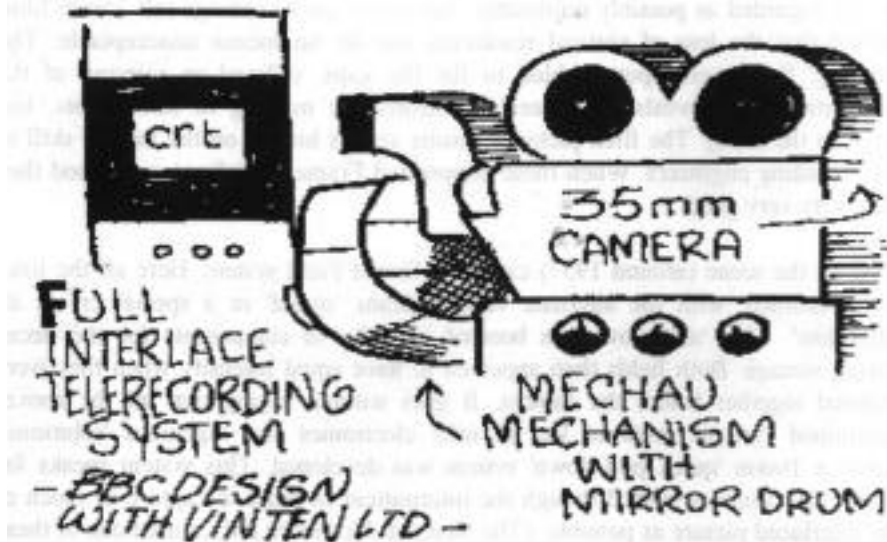
In 1953, the BBC's Engineering Research Department devised a variant on Full Frame recording.. This variation was produced to record the 1953 Coronation broadcast. The system was called the Suppressed Frame method. To quote from a BBC Engineering Monograph (No.1) this system means that the recording cycle would consist of exposure only during one whole television frame (field) while the film was stationary in the gate and the pull down of the film taking place during the next (suppressed) television frame.'

In other words, only 2022 lines of picture information gets exposed. This loss was at first regarded as possibly intolerable, but many test recordings (all 35mm film) proved that the loss of vertical resolution was by no means unacceptable. The 'missing' lines were spot-wobbled to fill the gaps- (Closed-up viewing of the Coronation film reveals the Queen's eyebrows are missing in some shots, lost between the lines). The final pictorial results always hinged on the line-up skill of the recording engineers. When these Suppressed Frame recordings were good they were very very good

Next on the scene (around 1957) came the Stored Field system. Here all the lines were recorded, with the alternate vertical scans 'stored' in a special crt as an 'afterglow'. This 'afterglow' was boosted in order to compensate for the decay during storage. Both fields then appeared to have equal intensity when they were exposed together before the camera. It goes without saying that all the above-mentioned systems involved lots of nifty electronics and ingenious 'solutions'. Later, a 16mm 'quick pull down' system was developed. This system speaks for itself. The film was rushed through the intermittent in order to capture as much of the interlaced picture as possible. (The News at Alexandra Palace used one of these channels it had a bright blue screen and screamed at lot, as I recall ...)

With the advent of quad tape. (1958 at AR-TV. 1959 at the BBC) film recording techniques moved sideways to provide programme export copies and archive material. (It's these 'export telerecordings' that continue to saved the BBC's archival bacon since most early tapes were eventually, wiped).

It's a little-recalled fact that in the mid 1960's,, 'Stored Field' recordings were used as a drama production tool.. Eager and impatient producers got fed up with the time-consuming and difficult process of VT 'editing' (using a microscope and metal adhesive). So what they did was record electronic studio scenes onto tape in the normal way, and then later in post-production convert these taped scenes into telerecordings. Once on 35mm film, all the production fluffs, jumps and wobbles were edited out and scenes tightened up or re-arranged. just like a real motion picture. Visually the end results were very dynamic. Exterior 'insert' scenes were filmed in the normal way with ordinary 35mm cameras and then edited in with the studio electronic stuff. All very fine, but one could always tell when the medium changed. Even a very high quality 625 line TR is no match for a 35mm movie monochrome image. (Equal to at least 1250 lines). This novel telerecording and film drama system was not seamless, but it gained favour for a short while. Once tape to tape dubbing with frame accuracy arrived, the old TR drama system flew out the. cutting room window. However, it was fortunate that these telerecording techniques lasted as long as they did, otherwise we'd have nothing much left to show of the monochrome era.



TV ON THE AIR

By Andy Emmerson G8PTH

Just one report this time, but what a report! It concerns a spectacular contact, or rather set of contacts, between the UK and the Netherlands. Nothing spectacular in that, I hear you say, except that this was with P5 pictures on 10GHz and without a lift! In fact it may change your whole perception of the 3cm band and its possibilities. Why waste time struggling with expensive power devices on 70cm and 24cm when you can achieve perfect contacts on 3cm with flea power?

There's got to be a catch and yes, there is if you want to see it that way. But just as a bottle can be either half-full or half-empty, depending on your viewpoint, I think the opportunities presented on this band are the most exciting thing I've heard in ages. See for yourself anyway...

The catch. Oh yes, the catch. Well, you need an over-water path but it can be a lengthy path. Then, if conditions are right (and remember, you don't need a tropo opening, merely calm weather) then you too could work international DX over paths up to 300km or more. Is this special pleading? I think not.

August event

The actual contacts were made over the weekend of 19/20 August this year (and were set up by letter a couple of weeks beforehand), but the genesis of the idea goes back to meetings at several BATC conventions. This is where Bob G8OZP met Hans Dekker PE1ECO and his colleagues who visit our ATV meetings regularly. They conceived the idea of trying ATV on 10GHz across the North Sea under normal conditions.

The hook-up in August involved Bob located on the sea front at Aldeburgh, Suffolk and Hans, who was on the foreshore at the north-west tip of Walcheren, the most westerly point of the Netherlands. Note that neither of them was on an elevated position (this is crucial); both Bob and Hans were at the top of the beach, barely above sea level.

Bobs transmitter was a DRO-stabilised affair producing 900mW on 10.278GHz into a 3ft prime focus dish. His receiver was a converted satellite LNB and homebrew electronics. For his part, Hans had a similar receiver and 250mW of transmit power on 10.4GHz to a 75cm dish. Several other hams joined in the QSO on the Dutch side, including PA0VHF and PA0BOJ.

Surface ducting

Bob says signals in both direction were absolutely rock-steady P5, exploiting the propagation mode of sea surface ducting. It appears that the signal is launched into a layer of air just above the surface of the water; the duct is formed by the changing air density caused by water vapour just above the sea. Signals enter this duct, graze the sea surface and are refracted back into the duct, rather like the action of a stone skimming on water. the height of the duct is not very great; Bob and Hans noted that passing ships interrupted their signals and in the end they could predict visually when their signals would be lost due to action at sea. This proves that ducting is not taking place in the upper atmosphere.

Height, which is normally an advantage in VHF and UHF work, is in fact of no help with this mode of propagation. Bob also worked PE1DCD/P stationed atop sand dunes at the Hook of Holland and received signals were noticeably noisier despite similar transmit power over there.

Signal levels were remarkably constant over the weekend; tests were carried out from 10.00 to 18.00 on Saturday and from 10.00 to 16.30 on the Sunday. The sea was quite calm and Bob now wants to repeat the experiment under rougher sea conditions, although he fears the results will prove contact impossible. This is real amateur radio, says Bob. The theory may be well known but at least we were able to prove it in a practical and very real manner.

Just for fun

To provide a bit of variety Bob and Hans also tried out some QRP experiments. Bob brought along a 10mW Gunn diode transmitter that he makes available as a kit (see footnote) together with the prototype of a new kit-built receiver. Solid P5 pictures were achieved even at this low power level! By Sunday afternoon we were running out of new things to do, continues Bob, so just for fun I removed the dish antenna and pointed the waveguide feed alone towards Holland. Amazingly Hans could still receive my pictures at strengths from P0 to P5, albeit with heavy fading. But at this stage we really did run out of things to do!

Because of the wide frequency split (10.278 and 10.4GHz) they were able to pull off one other stunt, namely simultaneous full-duplex working and loop-back (with Bob re-transmitting Hands signals to Walcheren). The path was 145km or 290km for the round trip. Needless to say all this was achieved with P5 signals and no problems. Operation was also tried on 24cm, with Bob sending 15W Results were nowhere near as good as 3cm, with signals of P3 to P5 strength and much fading.

You might be thinking that working ATV from the UK to the Netherlands on 10GHz was a first... but that its not. In fact its interesting to note this was achieved by Paul G8IXE and Ken G4ALN back in the late 1970s. Exactly how and where from and to I must investigate, also whether they too exploited sea-level propagation. The sea-level technique also works at lower frequencies, although possibly not so effectively owing to the longer wavelengths. I recall French hams used to transmit 70cm pictures to us Bruits from the dunes at Dunkirk with great success; perhaps they still do but we havent had any reports of this.

(Bob is making available kits of parts for his equipment designs; the Gunned 2 transmitter costs just 20 or 30 with a pre-tuned Gunn oscillator, whilst the receiver will work out around 65. For details send SAE to Bob Platts G8OZP 220 Rolleston Road, Burton on Trent, Staffs., DE 13 OAY.)

SSTV activity

It is four years since I had news of slow-scan activity, so it is with some surprise and pleasure that I can report some SSTV news. The irony is that it comes from Poland, since SSTV is apparently now dead in the British Isles. Still, its good to know that some amateurs are keeping the mode alive.

In the polish league table of 1994 SP4KM came top, with 64 countries worked with this mode. SP2JPG logged 53 countries, SP1LOP and SP0213GD both achieved twelve each, whilst SP2UUU managed just one! The Polish RVG (Radio Video Group) transmits a news broadcast through station SP2ZCD on 3.582MHz on the first Sunday of each month at 08.00 CET. Apparently this is in RTTY format.

Current council of the RVG are:

Chairman	Wojciech Cwojdzinski SP2JPG
Vice-Chairmen	Bartosz Pastusiak SP3CAI Bohdan Machowiak SP3CJW Krzysztof Ulatowski SP2UUU
Secretary,	Erwin Strzesak SP3TYYY.

And thats the end of the news for slow-scan

Handover time

And that's also the end of my stint as your TV On The Air columnist, although I shall still be waving the amateur television flag from time to time in Practical Wireless and Short wave Magazine. But as of the next issue Graham Hankins G8EMX will be taking over, so please make Graham welcome and send him the same kind of newsy and interesting letters and photos that I have (sometimes!) received. This last column of mine has depended entirely on the efforts of just one BATC member (yes, just one!) and a kindly TV-Dxer friend of mine who spotted the SSTV item in a Polish magazine. Everyone else was too busy but without Bob's contribution you would have had no on air news at all this time. Think about it...

And also consider that there are people demanding unconditional retention of ATV privileges on 70cm, justifying this on the basis of heavy ATV activity on that band. Prove it, not just to me but to other users of the ham bands and to the powers that be! We must be seen to be active. The future of the bands you cherish lies in your own hands. Really. Over and out.



BRITISH AMATEUR TELEVISION CLUB CONTEST RULES FOR 1996

By Richard Guttridge. G4YTV

PREAMBLE:- The main object of an Amateur Television Contest is to promote ATV activity. Anyone interested in ATV whether they are members of The British Amateur Television Club or not. are welcome to take part.

These rules apply to all BATC contests except the International, which takes place under IARU rules in September. Dates for the contests follow a set pattern. The WINTER CUMULATIVES start on the FIRST THURSDAY in January, with the other three sessions at eight day intervals. Start time is 19.00 GMT finish is 23.59 GMT. for all four sessions. All other contests take place on the Saturday and Sunday over the second full week-end in the months of MARCH (The Spring Vision), May (May Microwave), June (Summer Fun), September (The International), November (Autumn Vision) and December (Winter Vision). Start time is 18.00 GMT on the Saturday, finish at 12.00 GMT on the Sunday. Apart from The Cumulatives and The May Microwave all sessions will coincide with ATV activity on the continent.

1) ELIGIBILITY:- Contests are open to all licenced radio amateurs who are equipped to transmit and receive pictures by Fast Scan. Some of the events are open to Slow Scan TV as well. Non transmitting amateurs or SWL can also take part with their own section.

2) DATES AND TIMES:- See above. Dates and time are also published in CQTV (only available to BATC members), other amateur radio periodicals from time to time and on application to the BATC Contest Manager.

3) LOCATION:- Operation must be within the terms of your licence, from either the main station as listed in the current RSGB Call book known as a FIXED station or a PORTABLE station A portable station, can not be located in a permanent building, does not support its antennas from a permanent structure and does not power its equipment from the mains electricity supply. Please get the permission of the land owner.

4) FREQUENCIES:- Within the allocated segments of the HF bands and 2m for SSTV only, 70cm, 24cm, 13cm, 3cm and 1.5cm bands for SSTV and FSTV. Operation via repeaters does not constitute a valid contest contact.

5) POWER:- Output power must not exceed that set out in the terms of your licence.

6) EXCHANGE:- CALL SIGN and a FOUR-FIGURE code number must be conveyed via video. Confirmation of reception is by transmitting back THE SUM of the code numbers on the talk-back channel, NOT THE ACTUAL TRANSMITTED NUMBER. Please note all FOUR digits in the contest number should be different and not consecutive. The numbers must be different for each band, e.g. these numbers are OK :- 2741, 4820, etc., these are not :- 1111, 1138, 1381, 1234, 375 etc.

7) SCORE:- ALL BANDS 2m and above, 1 point per km. one way. Multiply by 2 for a two way contact. It's the same score rate for ALL BANDS. SSTV on the HF bands is scored 3 points for a contact within EUROPE and 5 points for a contact outside EUROPE. MULTIPLY by 2 for a two way exchange of numbers. The contest manager will apply multipliers for the BATC CHAMPIONSHIPS. See 9 below. Note your computer program should give 6371.290982 km as the earth's radius and 111.2036 km. for each degree change in latitude before rounding off to the nearest km.

8) LOGS:- Separate combined log/cover sheets should be submitted for each band. Each sheet should indicate:- Callsign of station entering contest, Contest name, Band, TX Power, Aerial etc., Code number used, Your locator, Total number of QS0s and best DX etc., Name and address of 1st operator, names and callsigns of operators and the signed declaration. Any other useful details. For each contact the date/time, Station Worked, Report/serial number sent, Report/serial number received, Locator of other station, Code number received, km and points claimed. Each band should begin with the serial number 001. No station to be worked more than once on any band. Please mark dupes. You could lose points for gross errors, however the contest manager will correct minor errors of scoring and distance calculation. Logs must be posted by the third Monday after the contest. This could vary with The International.

9) AWARDS:- Certificates are issued to band winners and runners up. All logs entered for ATV contests go forward into the BATC CHAMPIONSHIP and are scored by the contest manager on the following basis:- 70cm points no change, 24 cm, points are multiplied by 2 and bands above 24 cm by 5. The total for each band is added up which then gives an overall contest winner. This score is adjusted to

1000 points and all other stations totals will be pro-rata. These are carried forward for all BATC ATV fast scan contests including the International. A Trophy will be presented annually to the leading Portable and Fixed station. The trophies must be returned to the contest manager on request and can not be won outright.

10) RECEIVE ONLY SECTION:- Send log sheet or a copy of it giving your Callsign / BRS No. and name and address, Band, Date/Time in GMT., Callsign of station seen, 'P'report on signals seen, Code number seen, Locator of receiving and DX station if possible. The contest manager will work out your locator if you send him your National Grid Reference (two letters and six figures please) UK only or your Lat./Long. in degrees. The locator of the DX station will if possible be abstracted from other logs received. Scoring is 1 point per km.

11) DISPUTES:- The decision of the contest manager and/or the BATC Committee is final.

12) SPIRIT OF THE CONTEST:- DON'T LEAVE YOUR VIDEO TX ON ANY LONGER THAN NECESSARY on 70cm. There is only a limited space for a TV transmission. Other stations might be trying to resolve a weak signal. Move off the ATV calling freq. 144.750 MHz. as soon as possible. Check before you land on any freq. that it is not in use. Try using SSB if you can't find a free FM channel for talk-back. Contests mean activity and good fun, join in, and even if you only work one or two stations please send a log in.

13) DECLARATION OF INTEREST:- As some of you know, Clive G8EQZ and I take part in ATV contests.

14) COMPUTER LOGS:- Computer logs are quite acceptable provided they have all the information listed above under LOGS. Hard copy with a 3.5" floppy are OK, however a declaration like the one on the bottom of the BATC contest log/cover sheet must be signed. The file should be simple ASCII, and I can handle either AMIGA-DOS or MS-DOS formats.

15) CONTACT ADDRESS:- For entries, logsheets, bouquets, brickbats and any other flying missiles along with, I hope, the odd useful comment, direct towards:

***RICHARD GUTTRIDGE G4YTV, IVY HOUSE, RISE ROAD, SKIRLAUGH,
HULL. EAST YORKSHIRE. HUM 5BH. ENGLAND. TEL:- 01964 - 562498***

BATC Contest Calendar 1995/1996

Autumn Vision 95

Saturday 11th / Sunday 12th November 1995

Winter Vision 95

Saturday 9th / Sunday 10th December 1995

Winter Cumulatives 96

Thursday 4th / Friday 12th / Saturday 20th / Sunday 28th January 1996

All sessions start at 1900 hrs UTC and finish at 2359 hrs.

Please send all logs in marking the three you want including in the contest.

Spring Vision 96

Saturday 9th / Sunday 10th March 1996

May Microwave 96

Saturday 11th / Sunday 12th May 1996

Summer Fun 96

Saturday 8th / Sunday 9th June 1996

The IARU International 96

Saturday 14th / Sunday 15th September 1996

Autumn Vision 96

Saturday 9th / Sunday 10th November 1996

Winter Vision 96

Saturday 14th / Sunday 15th December 1996

PLEASE NOTE

All contests except the Winter Cumulatives start at 1800 hrs UTC on the Saturday and finish at 1200 hrs UTC on the Sunday All logs have to be postmarked by the third Monday, after the contest finished. Combined log/cover sheets are available from the contest manager.

CONTEST RESULTS

Winter Vision 94

70cm TX

Place	Callsign	Points	QSOs	Best DX @	Km
1	G8GKQ	128	1	G8MNY	128

Winter Cumulatives 95

NO ENTRIES !

Spring Visions 95

70cm TX

Place	Callsign	Points	QSOs	Best DX @	Km
1	G8MNY	348	5	G3KKD	99

24cm TX

Place	Callsign	Points	QSOs	Best DX @	Km
1	G8MNY	127	3	G0PIA	29

2m Slow Scan

Place	Callsign	Points	QSOs	Best DX @	Km
1	G7OZE	250	8	G7DGF	70

May Microwave 95

24cm TX

Place	Callsign	Points	QSOs	Best DX @	Km
1	G8EQZ/P	1450	15	G3UVR	174
2	G8GKQ	134	2	G8CKN	76

3cm TX

Place	Callsign	Points	QSOs	Best DX @	Km
1	G8EQZ/P	296	2	G4RNA	78

Summer Fun 95

70cm TX

Place	Callsign	Points	QSOs	Best DX @	Km
1	G8EQZ/P	3048	12	G7ATV/P	324
2	G8MNY/P	2919	12	ON6AJ	355
3	G7ATV/P	2257	13	G8EQZ/P	324
4	G8GKQ	514	3	G8EQZ/P	258

24cm TX

Place	Callsign	Points	QSOs	Best DX @	Km
1	G7ATV/P	1460	17	G8DKC/P	112
2	G8EQZ/P	1454	12	G3UVR	174
3	G8MNY/P	837	7	G3LES	71
4	G8GKQ	138	1	G8MNY/P	69

Thanks to G1IFV/P for the check log.

3cm TX

Place	Callsign	Points	QSOs	Best DX @	Km
1	G7ATV/P	708	9	G7JZP/P	83
2	G8EQZ/P	156	1	G4RNA	78

CONTEST REPORT

Once again I have to apologise to you for the lack for contest results and reports in the past CQTVs It has been a horrendous year at work in the salt mine with very little spare time even to get on the air let alone put pen to paper. I think that should read hit the keyboard these days. August has been a bit quieter and hopefully we've caught up a bit.

It is painfully obvious from the results that activity is at an all time low during most of the contests with very few people bothering to come on the bands let alone send in a log. "Use it or lose it." You've heard it many times before. How can we justify keeping 70cm for Fast Scan TV with such a low level of activity? Answers to the Editor please. Contest logs prove to interested parties that we are using the bands. Even if you only work one or two stations please send a log in. It will encourage others to do likewise.

The May microwave is worth mention as Clive (G8EQZ), Richard (G7MFO) and I pulled fifteen contacts out of the bag with a couple across the Pennines that we were very pleased about. We also had a good local turnout, thank you one and all. Beacons on 24cm were up.

Summer Fun was very close on both 70cm and 24cm. One extra contact on either band for the runner up would have changed the order. The 3cm repeater down Sevenside way paid dividends for the G7ATV operators with nine contacts on that band, not I hasten to add via the repeater. It has just raised the activity level on that band, well done. Conditions were up slightly.

The logs are still arriving, I hope for The International. Conditions were very similar to The Summer Fun.

I hope by the time you have read this you will have all received your contest certificates.

Please make an effort to get on for contests, they provide activity and please send those logs in.

SPECTRUM OF FM ATV

By John Stockley G8MNY

Most people are familiar with FM modulation and the sidebands it produces, but Colour ATV with intercarriers is more complex and it is very difficult to see and understand what is going on.

ATV COMPONENT PARTS

SOUND SUBCARRIER

The signal feed to the FM modulator has many components, the simplest of which is the 6MHz FM subcarrier sound. This has a peak deviation of +/-50KHz. The audio pre-emphasis network should give 50uS pre-emphasized (+15dB @ 15KHz Treble lifted) audio, to obtain best Signal to noise from the FM process. Audio Bandwidth 30-15KHz @-3dB is easily possible.

LUMINANCE and SYNCs

The Luminance and Syncs signal has a bandwidth from near DC (10Hz) to 5.25MHz. A flat gain, phase, and group delay, over this frequency range is essential if the picture is to remain intact. Frame sync are at 50Hz and Line is at 15.625KHz, and all the picture information is repeated at these rates.

COLOUR SUBCARRIER

To the luminance is added the complex 4.43MHz PAL colour signal. It is a double sideband signal made with a Phase & Amplitude modulator driven from the colour difference signals. It produces a colour signal bandwidth of 1.3MHz.

FM

TELEVISION

PRE-EMPHASIS

As with the FM audio, the TV signal to noise ratio, is much improved when Pre-emphasis & de-emphasis is used. This is because the FM modulation and demodulation process suffer from high levels of HF noise.

With the Video signal frequency range, simple CR time constant pre-emphasis, will not work due to the number of octaves it contains. The emphasis standard used for all FM Video is the CCIR 405, that describes a 14dB HF lifting curve, made from 5 components. This gives lift only to the picture detail like, edges and colour information, above 2MHz that suffer the most from noise. leaving the bulk of the signal unchanged. It is applied to the composite video signal before modulation, but not the sound subcarrier!

FM MODULATION

PROCESS

Rather than attempting to explain the complexity of all these signals applied to an FM modulator, lets go back a step and consider what happens when we FM modulate with a simple square wave.

With a square wave you get two CW carriers switched on and off at the square wave frequency both with sets of AM sidebands. The depth of deviation only separates the two CW frequencies. So high deviation separates these signals, low brings them together so their sidebands overlap. Increasing the Square wave frequency, just increases each of the CW sideband widths.

Now you know what is going on, lets take a look at simple video signal consisting of 8 levels of Luminance and syncs (standard grey scale) this gives 9 CW carriers all pulsing on and off in sequence at line rate.

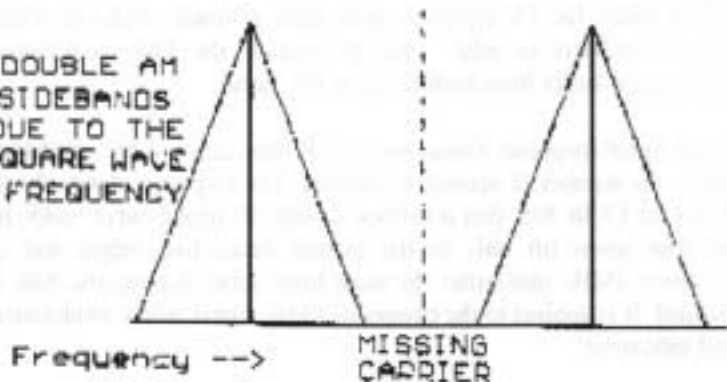
However if we use 6MHz sound subcarrier with no video, we generate 2 main sub-carriers 12Mhz apart, at a level dependent on the injection level similar to AM.

Put back the grey scale video with the subcarriers and we have not 9, but 27 CW signals. Consisting of the 9 instantaneous carrier frequencys each with a pair of lower power sound subcarrier sidebands at +/-6MHz. From this you can see there are repetitions of all the Video information on the sound subcarriers.

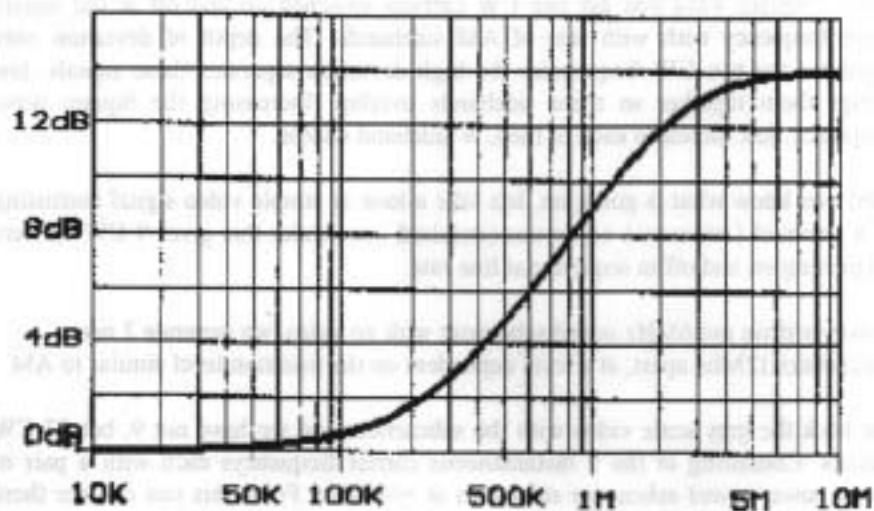
SQUARE WAVE ONLY

←----- DEVIATION ----->

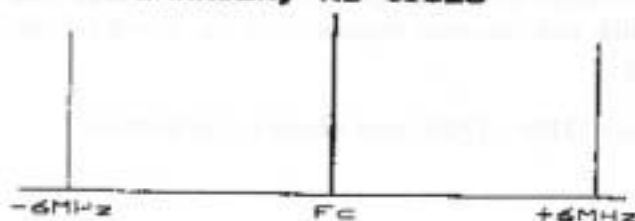
DOUBLE AM
SIDE BANDS
DUE TO THE
SQUARE WAVE
FREQUENCY



CCIR 405 EMPHASIS CURVE



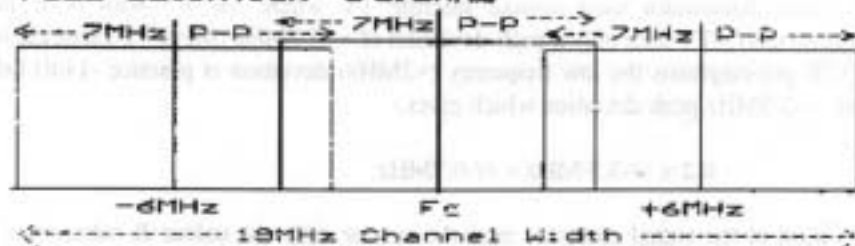
SOUND SUBCARRIER, NO VIDEO



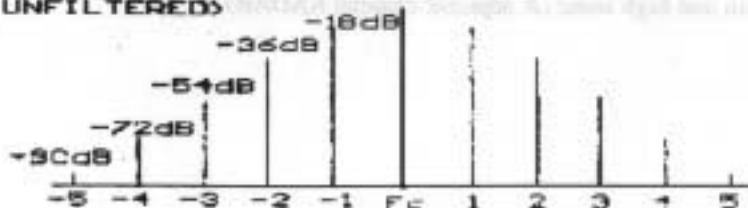
SUBCARRIER & GREY SCALE



FULL DEVIATION $\pm 3.5\text{MHz}$



HIGH ORDER SOUND SIDEBANDS (UNFILTERED)



BANDWIDTH

Without taking the higher order of FM sidebands into account, it can be shown the full channel needed is 19MHz wide. If we look at the above example the two sound subcarrier are 12MHz apart. When the recommended +/-3.5MHz peak deviation of video is applied, each subcarrier frequencies are also moved over the same +/-3.5 MHz, making

$$12\text{MHz} + 7\text{MHz} = 19\text{MHz total subcarrier displacement.}$$

FM SIDEBANDS

Go on forever! Yes its is true, unfortunately with FM not only the first order of sidebands are generated. The levels of the other orders (Fm x 2,3,4,5,6,7,8,9,...) depending on the Modulation index (Dev/Fm), but they are always present at some level!

However the video signal varying in intensity, pre-emphasis, and sub-carriers, the use of Modulation Index to try to describe what levels of higher order products you actually get is just not possible. In practice these higher orders products decrease depending on their fundamental injection level.

FM ATV DEVIATION

To limit bandwidth used (unlike satellite TV where MI=1.5 with 6 or more subcarriers) ATV uses only a peak deviation of +/-3.5MHz (MI=0.7). However with CCIR pre-emphasis the low frequency (<2MHz) deviation is practice -14dB below the +/-3.5MHz peak deviation which gives.,

$$0.2 \times \pm 3.5 \text{ MHz} = \pm 0.7 \text{ MHz.}$$

So most of the signal energy is near the carrier, only the colour & subcarriers are spread.

When using a Satellite Rx for ATV, this narrow deviation causes problems of low video gain and high noise (& adjacent channel RADAR).

SUBCARRIER

LEVEL

The ATV recommended subcarrier levels are -18dBc. In the receiver this level of subcarrier just about provides FM limiting for the sound demodulator, when the picture is about P4 grade. But as the Picture grades reduce the sound will be totally lost at a P2 while a noisy colour picture remains.

The result of this subcarrier level however is to make the ATV signals 19MHz edges -51 dBc with successive 6Mhz products falling off at a rate of 18dB/6MHz.

FILTERIN

G

Although narrow Rx is effective on FM for weak signal, the effect on good signals when the weaker parts of the spectrum are lost due to over filtering causes all sorts of video distortions like;

Sparkly edges,
Colour problems,
Video on sound
buzz, Poor syncs.

For Transmitters as well as the above problems, tight filters cause SWR increases as modulation is applied, introducing AM modulation mixing problems in the PA.

Filtering below 19MHz flat bandwidth will cause some of the above on good P5 signals, but will not be noticed on weaker ones. Filtering below 12MHz on weak signals is very useful where sound & quality are not wanted.

Transmitting LNB's Revisited

By Peter Johnson G4LXC

As a result of some phone calls and a letter from John (G8MNY) I have noted some errors on the circuit diagrams on pages 58 & 59 of CQ-TV 171. I would also like to incorporate a very significant improvement to the S. O. S. injection which provides a lot more Sound Subcarrier to the transmitted signal.

- 1) 75ohm terminating resistor missed out across output of pre-emphasis network and must be included for correct operation (See figure Five).
- 2) Reduce emitter resistor preset 470R that provides 'N' video at link to 250R preset (See figure Five).
- 3) The circuit shown as figure four is correct, components shown on the PCB are not correct. This was an early version which did not function correctly. However a PCB is still available for the job and correct circuit.



Trevor G0VUN/P With 1W 23cm TX, 20mW 3cm on an Amstrad dish with Peter G4LXC taking the picture!

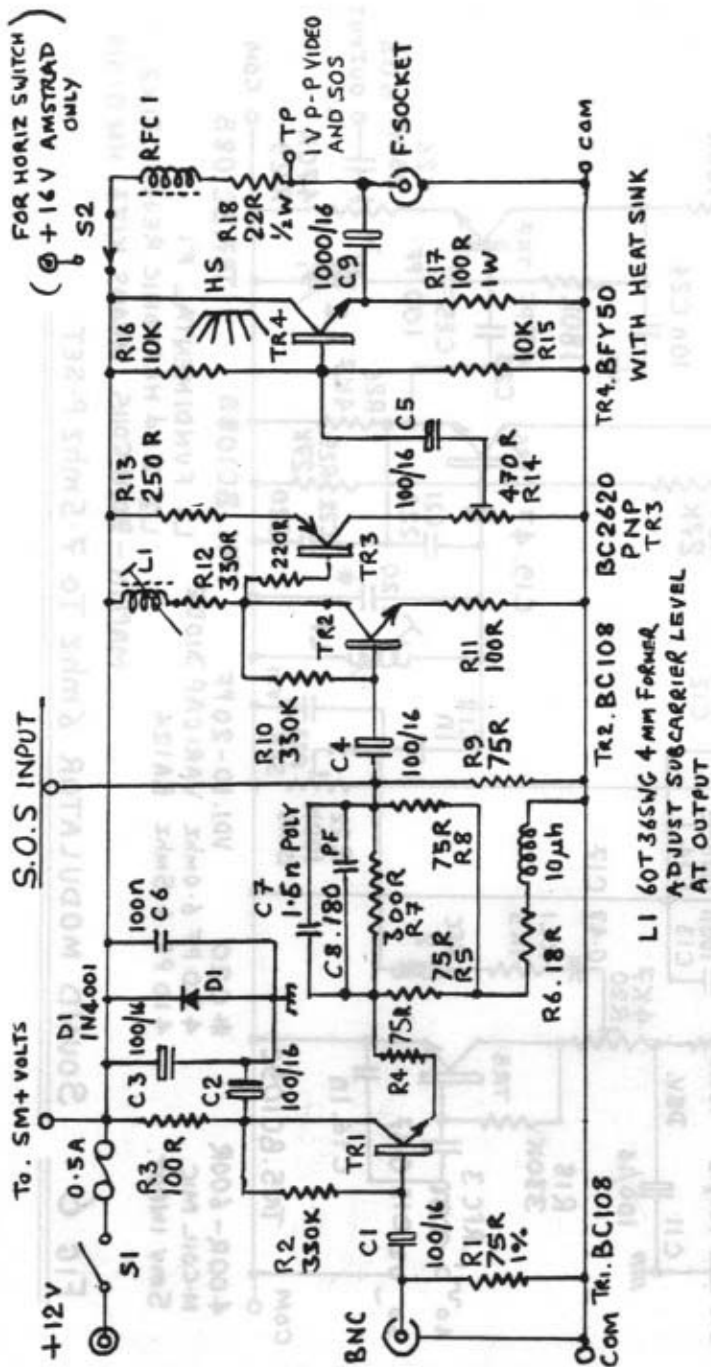


FIG 5 VIDEO & SOUND ON SUBCARRIER MODULATOR DRIVER

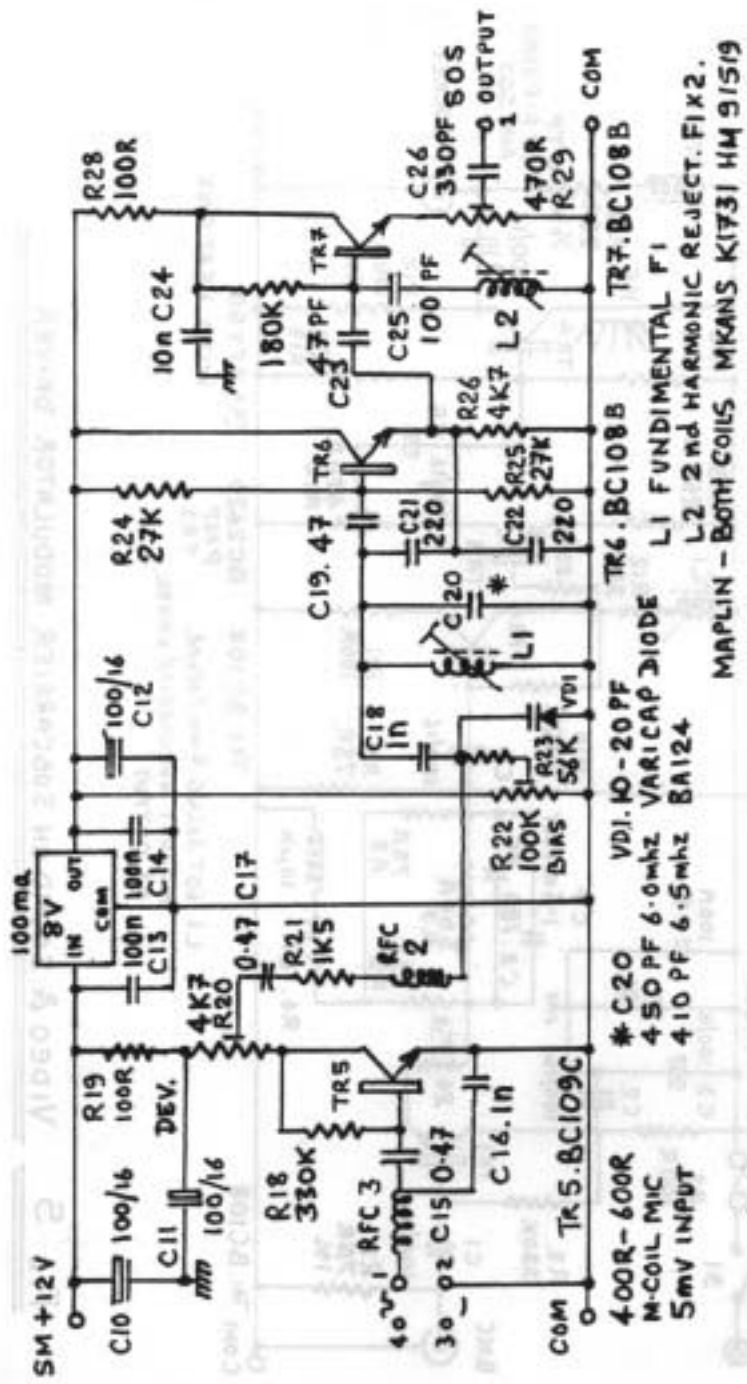


FIG 6 SOUND MODULATOR 6mhz To 7.5mhz P-SET

- 400R-600R M-COIL MIC 5mV INPUT
- # C20 450PF 6.0mhz VARICAP DIODE
- 410PF 6.5mhz BA124
- VD1 10-20PF
- TR6 BC108B L1 FUNDAMENTAL F1
- TR7 BC108B L2 2nd HARMONIC REJECT. FIX 2.

MAPLIN - BOTH COILS MKANS KI731 HM 91519

A Video AGC Circuit for ATV

By Eric Edwards GW8LJJ

I needed a circuit to give me a constant 1 volt of video for inputs between 1/2 - 2 volts. Looking around the shack i. c.'s I came across a useful "chip" usually found in older VHS machines. It was designed for the purpose I had in mind Because I wanted the circuit to be repeatable as far as construction is concerned, I did not want to use any "special" components.

With this plugged into my breadboard and a few variable resistors and other components, I set about developing the enclosed circuit. I have built a few of these -they have all worked first time. As it is operated from 12 volts it is ideal for portable / mobile use. It can be installed either between an ATV receiver and monitor or, perhaps more usefully, between a camera (or other source) and the ATV transmitter to give a constant 1 volt of video to achieve full modulation on AM or full deviation on FM, thus eliminating over-modulation or over-deviation.

In Theory

The heart of the circuit is an AN302 i.c. available from most suppliers of video spares at around #5 each. It is a 16-pin device and fits 0.1" stripboard, or pcb mounting. It contains other circuits as well, but I was only interested in the AGC at this time.

The video I/P is fed into pin 11 (AGC amp) the O/P taken from pin 7. This O/P is 2v at high Z, so to make it useful for our needs it is fed into an emitter follower via a suitable resistor. The components around the i.c. have been selected to give the required 1v O/P at 75 ohms.

In Practice

Construction can be on "Veroboard" or a custom pcb can be made. Usual rf care applies eg. keep all component leads as short as possible, good decoupling caps., fitted as close to the i.c. and transistor pins as possible. Try to stick closely to the component values to achieve the desired result.

Once built, you will wonder how you used to manage without it - especially for maintaining a fully modulated or deviated transmission! Be careful to thoroughly screen the unit if used close to a transmitter.

Testcard Generator Modification

By G8SUY, Kent Repeater Group

The Cropredy Test Card Generator has been a very popular test card source, with an updated board available from the GB3UD Stoke on Trent Repeater Group. Although it works well, it is noticeable that the screen area is not central. Investigating, it was found that the field pulse was incorrect, giving the appearance of the card being too high, also the active line started too soon, shifting the card to the left.

These errors can be easily overcome by software mods. in the ROM. First, to correct the field pulse error (to bring the card down by 8 lines), the following ROM locations need to be changed as follows:

```
0800 46 46 46 46 46 46 46 46
0808 46 46 46 46 46 46 46 46
08A0 00 00 00 46 46 00 00 00
08A8 00 00 00 00 00 00 00 00
08B0 46 46 46 46 46 46 46 46
08B8 00 00 00 00 00 00 00 00
08C0 00 00 46 46 46 00 00 00
08C8 00 00 00 00 00 00 00 00
08D0 00 00 46 46 46 00 00 46
08D8 46 46 46 46 46 46 46 46
08E0 00 00 46 46 00 00 00 00
08E8 00 00 00 00 00 00 00 00
0817 41 41 41 41 41 41 41 41
081F 41
```

The second mod. to the ROM so that the active line starts within a microsecond or so of the correct place gives the appearance of shifting the picture to the right of the screen. It is a little more time-consuming but can be achieved by moving all the display data one byte to the right and deleting the last byte on every data line.

I have done both these mods. to some of my ROM's and it has worked in all cases.

WORTHING & DISTRICT VIDEO REPEATER GROUP

GB3VR & GB7VRB

1W FM-TV 24cm TRANSMITTER

This 1 watt transmitter generates its signal directly at the wanted frequency which can be set anywhere in the band, colour or BM. Onboard 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 new price for this kit is **£75.00**. With over **550** 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

The New Amiga ATV has even more features 56 testcards, over 20 different wipes, even better text control, including 30 screens of text messages, QRA calc, Testcard music, selectable displays, and now with a DTMF tone pad to control your repeater (including security tones if required). All testcards are over-scan ie the whole screen is used, Load in your own customised testcards (users your palette), Super Large Text. Silky smooth scrolling text, 24Hr clock, call sign extensions, Hot key operation, Docreader. ATV Cli, CrossHatches, Purity, and a comprehensive section for gen lock users. If you have an Amiga then this is the program for you, if you don't, go and buy one. This is a three disk set, the program, extra testcards, and the music disk.. 1 meg min required, state callsign and QRA (if known) when ordering. This program was £20.00 but now only **£15**.

The Spectrum ATV Program.

Still selling after all these years, this 48k version has, over 60 commands which include 7 testcards, memopad, clock., maps, tones, locatorcalc(old&new), UK flag, X-Hatch, various size text printing plus disk transfer command and more. Now only **£5.00**.

We still have a few add-ons for the cropready testcard generator, phone for details. The new AGC kit will be out shortly, unless any one knows of a supply of AN302's at a sensible price.

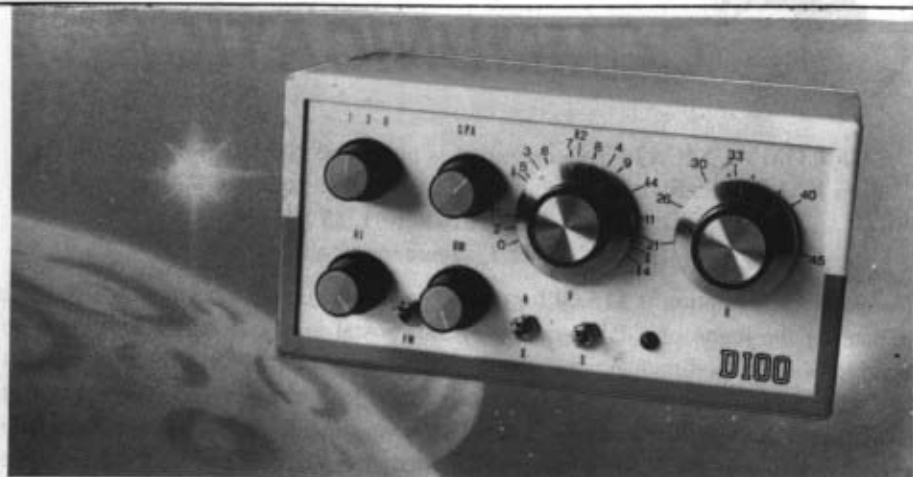
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**Treasurer of GB3VR, R.Stephens G8XEU, 21 StJamesAve., Lancing, Sussex,
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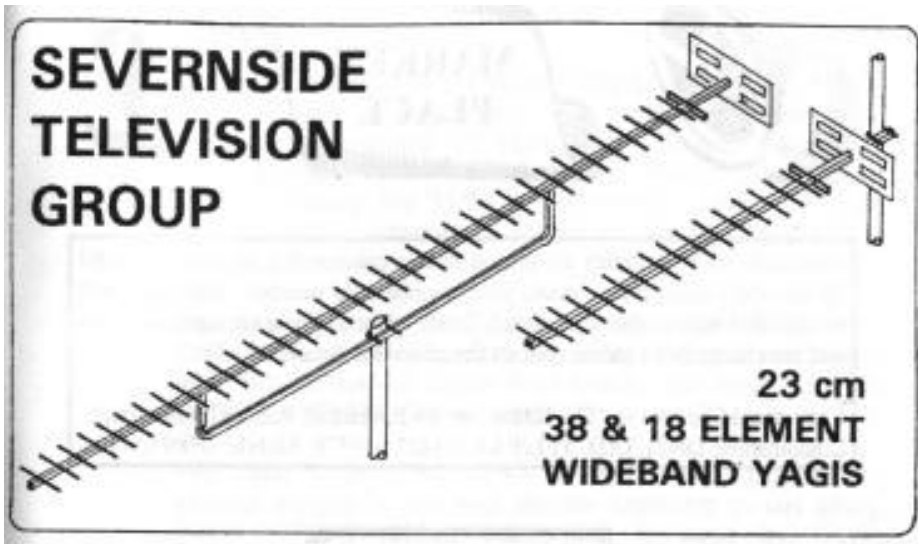


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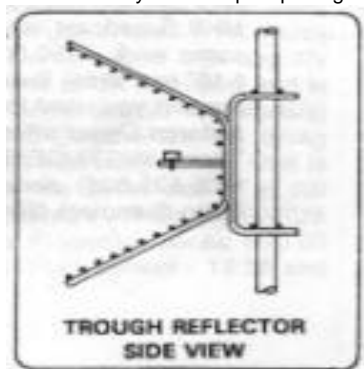
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Copy should be sent to 'The Editor' at: 19 Ravendale Road, Gainsborough, Lincolnshire, DN21 1XD TEL/FAX: 01427 610578 Mobile: 0589 631104

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Books for sale: Book for Norton Utilities version 4.5 £5.00.. General Electrical Engineering, 448 pages,1947, £5.00.. IBA Technical Review Nos. 11, 15,16,17, 20, Swaps. Handbooks for :- Fernseh MC37 colour monitor, Barco CM33 colour monitor, Prowest PM 11/3A mono monitor, offers or swaps. Contact Brian Summers G8GQS on 01895 810144/0850 014892

For Sale: Sensible offers only. Sankyo SUPER Hi-Focus CME440 home movie camera. Excellent condition, well looked after. Boxed, manual. Super 8mm format. Tel: Kevin (G6INM) on (01782) 594374. Buyer collects.

For Sale: Wrasse SSTV/FAX converter (SCI) plus Colour camera adapter to suit and Wrasse keyboard to suit (SCI). Yaesu RT191B (260vr) transciever (serviced by Castle Electronics). Contact H. Burten (G2JR) on 01203 455021 (QTHR) Not mornings.

For Sale: Heathkit scope 10-18U £30.00 Solartron CD1016 £30.00 Advance audio generator £15.00 Contact Mr. D. Griggs (GOIPT) on 0181 883 3474

For Sale: 20 Inch Sony Profeel monitor with matching speakers, tuner unit, text unit, remote control and interconnecting leads. The monitor is full multi system, and has composite video and TTL RGB input, using BNC/RCA and Scart connections, it also has stereo sound (not NICAM). It had a new tube fitted and set up about six months ago. The tuner unit is mains powered and designed for use in the UK. It is only mono, but has two AV inputs with stereo sound and two AV outputs with stereo sound. The text unit is UK standard and is powered from the monitor. All the items are in full working order. Buyer collects. £225 ono D100 De-luxe DX-TV tuning system with 'Bandscan' facility and full instruction book. Unit is in perfect condition, as only used a few times and is in full working order. Also to help you get started I will include TV DX For Beginners and The World At Your Fingertips books. £70.00 ono. Contact Nigel Page on 01376 517141 between 18:30 and 21:00 Monday to Saturday.

For Sale: Offers invited for a wealth of information. Mags dating from 1950 to 1988, many sets. Inc. Practical Television, Television, Practical Wireless, Wireless World, Radio Constructor, Practical Electronics etc. 650 in all. Send S.A.E. for list. Also Oscilloscope based test set 73 and ID-6 A/APN-4, R1132A Ser. No. 13593, Ecko T344F TV, Evershed & Vignoles 500V Megger, and other listed gear inc. valves, transformers. Contact Ken Domminney on 01323 500174. 7 Chestnut Close, Eastbourne, East Sussex, BN22 OSZ.

For Sale: BBC PAL Coder CD2L/522. Produces coded outputs from one of two selectable RGB inputs. One can be 4-tube. Internal colour bar generator (100.0. 100.0) IRS or full-field bars. VT patch or second white bar. 3x units in 4U 19" rack frame. All musa links. Handbook. Working condition. £40.00 for all three. Plumbicon tubes 25mmr XQ1071 (industrial grade) front loading. Red Green and Blue. 2x sets. £6.00 per set. Contact Dicky Howett on 01245 441811. 23 Micawber Way, Chelmsford, Essex, CM1 4UG

For Sale: EV 6000 19" Colour monitor £30.00 Hitachi 12" mono monitor £10.00 Two Vega 6" TV's working order model 402 £10.00 each Vega 6" 402 non worker £3.00 Box of spares, some new £5.00 Two Pye 15" monitors 842844/00 with manual and spares £40.00 Cub Microvitec as new £60.00 Two Cub Mmicrovitec second hand £15.00 each Tannoy PA valve amp 60W AP60/3 MKII £10.00 Two EHT units valve monitors 14" Peto-Scott model 1204 £2.00 each Lowe VHF monitor RX ASU-1515 Marine band but tuned down to 2mtrs, no crystals £5.00 (very small) Contact David Longstaff G4WCD on 01482 509898

Free to good home or offer of a donation to local radio club: 2 Burtle 20" mono monitors G.W.O. Also (For Sale) 3 Heatsinks 9" x 6", ideal for Mitsubishi blocks. £5.00 each. Philips dictation machine, complete with morse tape G.W.O. £5.00 ono Contact John Brown G0PIA on 01708 477493

WANTED

Wanted: Information on a scope tube Telefunken DG13-14 Pin data etc. Contact Dave Longstaff on 01482 509898

Wanted: Rigonda VL100 R" mono TV circuit diagram and line fault/modification info. National Panasonic NV-8170-B VHS player circuit diagram and modulator. Performance improvement for Heathkit 0-12-U Oscilloscope. Offered to good home, Sync Processor (CQ-TV 129) less IC1, X1, VR3, 33pF. Contact Ken Domminney on 01323 500174, 7 Chestnut Close, Eastbourne, East Sussex, BN22 OSZ.

Wanted: Loan or photocopy of user manual for a Rockdale AP100 dish positioner, all expenses paid. Contact Mr. J. McCormack 920 Manchester Road, Castleton, Rochdale, OL1 1 2SR.

Wanted: Circuit for TV Rediffusion CV513037. Scope tube LD924E. Circuit heathkit SSB-HW-160 Transciever. Contact Mr. D. Griggs (GOIPT) on 0181 883 3474

Wanted: Ni-Cad battery NB-P1 for JVC portable VCR HR2200. Dead or Alive. Contact Mike (G3VXZ) on 01628 27350, 18 Rushington Avenue, Maidenhead, Berks. SL6 1 BZ.

Wanted: Any of the following for Hitachi C2 Camera; various lengths of multi-core, CCU and OCP, studio viewfinders, lens remotes, original handbooks and especially maintenance manuals. Contact Nigel Phillips on 01202 670733. 80 Johnston Road, Oakdale, Poole, Dorset, BH15 3HT

Wanted: Technical Handbook for Marconi waveform monitor type BD 810. Also Dallmeyer 'Super Six' 4" fl.9 lens. Other lenses required: Watson, Taylor Hobson in any condition for Turret Image Orthicon cameras (ie. fixed focus). Also required any old books/brochures on (guess what) TELEVISION (technical or otherwise). Money waiting. Contact Dicky Howett on 01245 441811. 23 Micawber Way, Chelmsford, Essex CM1 4UG

Books Wanted: IBA Technical Review No. 1. 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?. Contact Brian Summers G8GQS on 01895 810144 / 0850014892

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.

Wanted: A Co-processor for a 80287 and some memory in 30 pin format? Plastic CEE17 blue mains connector, fixed sockets needed. Also wanted a Nagra VPR5 portable Video recorder. Contact Brian Summers G8GQS 01895 810144 / 10850 014892

