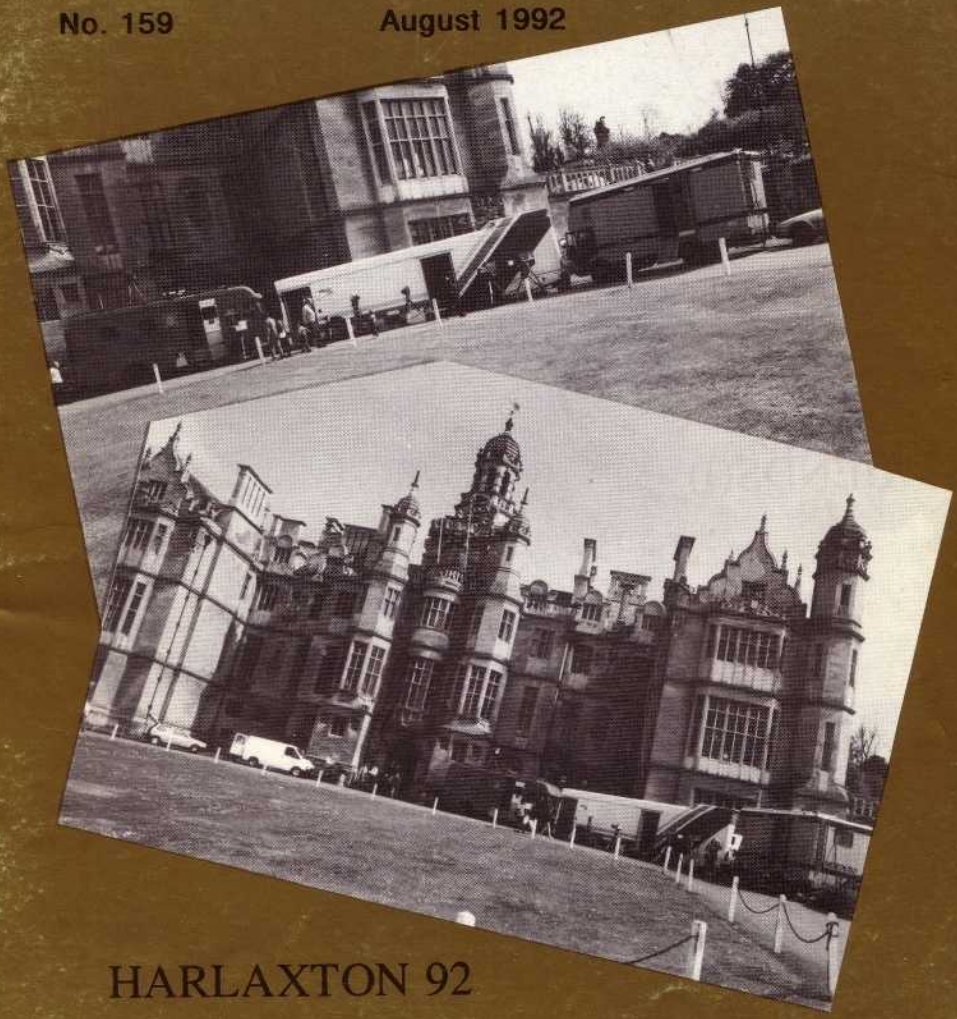
CQ-TV

No. 159 August 1992



HARLAXTON 92

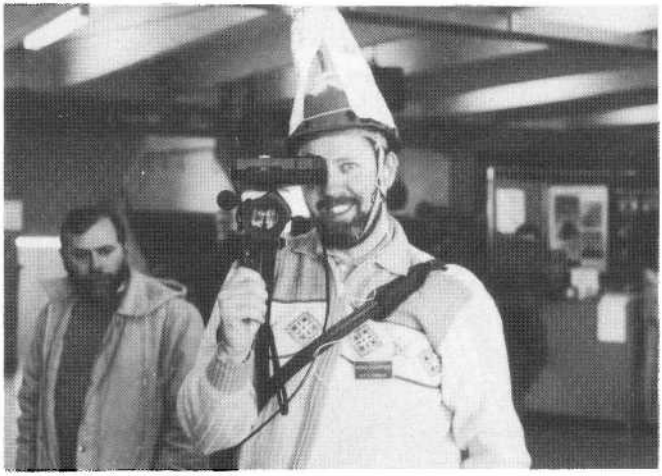
WERE YOU THERE?

Photographs: Patrick White G6CJB

BRITISH AMATEUR TELEVISION CLUB

THE BATC

AND
FRIENDS(!)



AT
SANDOWN

CONTENTS

CLOSE FOR PRESS FOR THE NEXT ISSUE ..... 20th SEPTEMBER 1992

CQ-TV is produced on an ATARI MEGA ST4 computer system, using the PROTEXT word processing package and the TIMEWORKS desktop publishing package. The camera-ready artwork is produced on an OKI OL400 Laser printer.

The magazine is printed and bound by APEX PRINTERS of Rugby.

POSTBAG

REMINISCENCES FROM OUR FIRST CHAIRMAN

Dear Mike

I was delighted to read the two letters from Alwyn Stockley and Doug Wheele in CQ-TV 158 and I hope that you will allow a little space for me to send them greetings through the medium of CQ-TV. I feel as if I belong to the same era as I joined the BATC in 1950 and was the first Chairman of the Club, Holding office from 1952 until 1962. I subsequently became the 'Supplies Officer' and handles the supply of Vidicons, CQ-TV microfilms, PCBs, etc. This task has now been taken over by Peter Delaney, who has done a good job expanding this service to our members.

I have not attended the recent BATC Conventions for personal reasons, but I would like to tell all my old friends that I am still active though not quite in the same direction. I have become interested in weather satellite reception, both of the orbiting NOAA satellites and of the Meteosat geostationary satellite. I still have equipment for sending and receiving SSTV according to the original 128-line monochrome standard, but I must admit that I am not often on the air. I also have a Spectrum computer, with disc drives, for word processing and other 'non-games' purposes and I have used this to print out both weather pictures and SSTV pictures.

Last year I was invited to become the President of the Narrow Band Television Association and I gladly accepted as I was following in the footsteps of the late Ben Clapp, who was assistant to J.L.Baird in the early days of 30-line television.

Greetings to all! ... C.Grant Dixon

A WORD FROM GB3RT's MANAGER (ALL RISE)

Dear Mike

I would like to express my thanks to G1YFI,G1IJT,G8ONX,G0HOV on their continued support financially of the Coventry 24cms Repeater GB3RT.

The Repeater is licenced with the RSGB and affiliated to BATC until April 93. Next on the agenda is the replacement of ''brick'' PA, when the funds permit. I chatted to John of Mainline Electronics at Drayton Rally and he is prepared to offer a discount to Repeater Groups on said PA bricks ... Thanks John.

I would also like to thank Graham (G8EMX) on his proposed Birmingham repeater, newsletter I received very good effort for a first edition - what say you Ed?

Finally I would like to give Len (G8ONX) 10 out of 10 for his German. Without his efforts we would never have made an exchange with DC0DO.

Ein truely denkwurdig wochanende fur der GB3RT Gruppe.

73s Steve G6WLM Manager GB3RT.

Many thanks on behalf of the group Steve, it's nice to see that John's and my little 'baby' is still going strong. I trust that your 'German' above is not risqué? Regarding G8EMX's newsletter concerning the proposed Birmingham ATV repeater, I cannot pass comment as I have not seen it. Obviously the CQ-TV office and your magazine is not considered important enough to be on the mailing list! ... Mike.

WHAT'S WRONG WITH ATV?

Dear Mike

Congratulations to Andy for stating 'What's Wrong With ATV?' in the last issue of CQ-TV.

I am a non-active member (i.e: 'not on the air' or 'helping the club'). I am involved in TV production professionally and shall be firing a few articles in your direction Mike.

Secondly, I am sending off my order to Haverhill, so will expect to be QRV 24cm at last! I would like to add some remarks though Andy - it's fair enough to remark about individual transmitters prices, but when you are starting with absolutely nothing, the total sum for a complete system does add up to real money, even if you can do it 'on the cheap'.

A second remark I would make concerns the ever-present dilemma between innovation/ development and standardisation. You have to consider such points as compatibility and the currency period expected from your purchase. I think it may help members if the club more overtly set general standards for ATV communication purposes. As other develop the technology, these should be widely discussed by the membership, with a view to eventual incorporation. Hopefully, this would assist in reducing the effect of redundant technology in our bottom drawers.

Another point I would make is although I am involved with both the technical and production side of TV professionally, microwave technology is a specialist area and I personally appreciate the articles helping to explain it in CQ-TV. Maybe there is a gap between the simplest of basics and the often very specific practical article.

I am thinking of establishing what our licence obligations mean in practice and how these can be achieved. To be honest I've little idea of the latter at this moment in time - articles please.

From remarks made by traders I have talked to, things sound a bit more promising already Andy. So let us hope that we have stimulated many of you 'silent majority' to GET ACTIVE! Why not start by letting Mike know what you think - IT'S YOUR CLUB!

A quick final on the ATV news idea - excellent! This is just the thing to get the active involvement of younger members - what's more, it's an ideal training ground for anyone wishing to enter the TV production industry - so come on you volunteers!! You never know, if we can convince the DTI of the benefits we may be allowed to link repeaters for a true broadcast! (project for someone?).

I do hope this gets the fur flying!!

73 Norman Ash G7ASH, Rounds, Northants.

Many thanks Norman for your response to Andy's comments. However, you lost me a little at times; concerning your comments re changing standards - this I find confusing. The ATV standard for 70cm has NOT CHANGED since amateurs were first allowed TV on the band circa 1952. The standard for 24cm was initially proposed by the BATC and accepted by the RSGB when activity first picked up on the band back in the late 70's and HAS NOT CHANGED.

The standard for ATV on 3cm and above is the same as that for 24cm essentially. Where are these changing standards you talk about? Also, whilst your comments concerning the cost of setting up a 'black box' ATV station are very true, most of our members are constructors, and as such a complete 70cm station can be set up, with reasonable output powers and including a video source, aerials, etc., for less than £100 - not expensive by modern standards?

I have received another very long letter fron Jeremy Powers also in reply to Andy's article, but it was too long to include in this issue. Hopefuuly I shall be able to include it in the next issue ... Mike.

THANKS FROM THE LINCOLN SHORTWAVE CLUB

Dear Mike

At a recent meeting of our Committee a copy of CQ-TV was passed around for members to see the generous coverage given to Lincoln Hamfest 91.

I was asked to pass on our appreciation for this coverage which I do readily. We look forward to seeing the BATC at Hamfest 92, which will be held on the 13th September.

Yours sincerely, Pam Rose G4STO Chair-person

Pam did sign as Chairman, but I am not brave enough to bear the wrath of our lady members!!! ... Mike

GB3UT BATH

Dear Mike,

Now we all know where 'ZZ is, don't we? But, do you know where 'UT is? Well, to put you in the picture, it is sited at the University of Bath, on the hill just outside the city. The aerials are some 700ft ASL and are co-sited with GB3UB, 70cm and GB3UX the packet repeater, on top of one of the tallest buildings at the University. A prime site for ATV. The repeater has been under development for a number of years, but in the last few months much has been done to improve its performance. It is now running a full-colour four page test card sequence, and with the addition of an extra PA stage, quite a reasonable output. There is a small dedicated bunch committed to improve UT, and with the backing of the Mendip Repeater Group hope one day to be in the same class as 'ZZ. Don't forget, 'UT is an AM repeater, but has AM or FM receive capability.

So, turn your beams in the Bath direction and have a look for GB3UT, we would gratefully receive reports from others. For more information contact: Mike Edwards G8CPF or myself, both QTHR.

73 Richard Weston G0LIB.

Well I'll be blowed! we almost got a contact name for the Mendip Repeater Group after my plea on page 88 of the last issue after the review of the test card generator - probably too much to ask though! Apart from that, thanks for the info Richard, nice to know what's happening down there. However, I am not sure how the rest of the country is likely to be able to receive and recognise your AM transmissions of FM gear! ... Mike.

THANK YOU FROM BRYAN DANDY

Dear Mike

May I please say through CQ-TV a big thank you to Chairman H, G8*** (as he signed himself) for his info received on my colour monitor, only days after my wanted ad appeared in CQ-TV 158. (Note: I am not yet, as I thought, QTHR, but the phone number 0905 620616 is correct and I regularly collect mail from the old QTH - sorry).

Secondly, so far a disappointing (zero so far) response to the second item in my ad - a plea for a loan of 'Now You're Talking' and similar programmes on tape, and/or contact re programme content. Perhaps a mention in Postbag might help generate some interest. yes, I know it's early days, but I am dead keen!!

Thirdly, thanks to all concerned for Harlaxton this year. As always a marvellous day out. See you all next year.

73 Bryan Dandy.

*G8*** ??, mind you that's similar to the name that I call him sometimes Bryan, although I use more *'s! ... Mike*

EVEN MORE THANKS!

Dear Mike,

Just a short note to say thank you for allowing us to attend the BATC Harlaxton Rally recently. We had a good show raising about £90.

Yours sincerely ... Mrs.B.Scarman, Hon.Sec. Lincoln Branch, The Guide Dogs for the Blind Association

A WORD OF THANKS FROM A NEW BATC MEMBER

Dear Mike,

Please can you say thanks to G8GQS Brian (*he of the BATC cheque book!*) who introduced me into the BATC by sending a leaflet with application form. I only met him briefly at an antique shop wherer I help out and occasionally sell bits and pieces. Then, out of the blue the leaflet appears in the post. After this and other happenings with amateurs I can only say that I am very proud to be newly licensed since Feb.92 and therefore amongst some of the nicest, most helpful, friendly, outgoing people I have ever met.

I am at present still quite 'mike' shy (I don't bite - honest!) and don't know many people on the air except G1BFH Chris who pushed (I'm glad to say) me into taking the RAE in Dec.91, but so far I have yet to meet an unfriendly ham.

My technical knowledge/experience, like my finances, are somewhat restricted, so my shack at present consists only of a a 2m hand-held FT209 and an FT76 70cm hand-held, a dual-band colinear and packet on a speccy. But my interest is healthily growing, so hopefully with financial and educational growth the shack will grow.

Although I have not received or transmitted any ATV I am very interested in what it has to offer, the possibilities seem limited only by ones imagination, and of course the licensing regulations. When I can get some I can't wait to more of my time and money into this great hobby. Until then I look forward to hearing and seeing all the hams I can.

Is it OK for amateurs to produce and transmit short features, comedies, documentaries, news, etc., and if so would CQ-TV/BATC, RSGB, PW, HRT, SWM. etc., etc., consider putting together the amateur Oscars or something??? If not, why not?

Anyway, less talk, more action from this ham. For now, I'm getting back to my shack, which may be modest now, but not for too long.

73 from Andy Davie G7LOL

EMBROIDERED CLUB BADGE

A rather smart Club badge for all you sports coat wearers (I would have said Blazers, but that would seriously date me!) is available from Members' Services. Embroidered in silver with the BATC badge on a blue background and approximately 12cm high and 6cm wide, it would be a superb adornment to your jacket, sports coat, anorak, etc. The price of this splendid item is only £3.50 plus 27p post and packing and is available under stock number 82.

NEW PCBs

At the time of going to press the prices, etc., for the new printed circuit boards for the projects in the new Club book, 'An Introduction to Amateur Television', were not available.

Any members interested in details and prices of the new PCBs should please write to Members' Services and enclose an SAE in order that the details can be sent to you as soon as they are available.

NEW AFFILIATED REPEATER GROUP

I would like to welcome the Mendips repeater group, GB3UT, who have just affiliated to the BATC. Mike Edwards says that their group meets on the 1st Tuesday of each month at the "George" Norton St. Phillip, and that visitors are most welcome. GB3UT displays a four page test card in beacon mode with an omni-directional transmit and receive aerial and 6Mhz sound subcarrier. An interesting report from GB3ZZ can be accessed on the BATC's bulletin board (0767 317521) or a hard copy from me or Chris Smith.

73 ... Brian Summers G8GQS, Hon. Treasurer. Tel:081 998 4739

JOTA WEEKEND 92

The 35th Jamboree on the Air (JOTA) takes place this year over the weekend 17th and 18th of October. Last year, radio amateurs working with local Scout and Guide Groups operated nearly 400 stations throughout the U.K., demonstrating amateur radio to more than 20,000 people. While worldwide voice communication is now commonplace, specialist modes such as TV, data and FAX can keep participating youngsters interested for hours.

Could you provide a fast scan or slow scan TV demonstration for your nearest JOTA station? If you need help finding out who they are, contact the Scout Association's National Adviser for Amateur Radio at the address below.

This year as part of a link-up with the World Federation of Great Towers, JOTA stations will be operational from the tops of many towers worldwide, including the London BT Tower and Blackpool Tower. It is hoped to include SSTV and FSTV stations at these sites.

If you could help with these modes operating from the towers in London or Blackpool, please contact as soon as possible: Paul Bateman, Scout Association National Adviser for Amateur Radio, 40 Hathaway Gardens, Ealing, London, W13 0DH. Tel: 081 998 1921.

LETTER OF INTENT!

We havea 'Letter of Intent' from the Cheshunt and District Amateur Radio Club who are planning, subject to licensing, site clearance and site owners permission, to construct, install and operate an ATV repeater located in Eastern Enfield, Middlesex.

Initially a 24cm repeater will be commissioned, followed by a 3cm, and then followed by a cross-link system between the the two repeaters, with provision for interlinking with other ATV repeaters.

Good luck to the Cheshunt and District Club, don't forget to affiliate to the BATC. The Club offers affiliated repeater groups advice, and in many cases financial assistance in the supply of Club PCBs, etc.

Above all, keep CQ-TV informed!

THANKS TO BOB AND BASS

The Committee wishes to pass on its grateful thanks to Bob 'Gun Diode' Platts (or is it now Bob 'MMIC' Platts!) and to Bass Breweries for arranging and allowing us to use the facilities of their Training Centre in Burton-on-Trent for our recent committee meeting.

If there is one thing your committee seems able to do, it appears to be able to organise a whatsit in a brewery!!!

Many thanks again to Bass Breweries for their hospitality.

EDITORIAL

Mike Wooding G6IQM

Well, Convention 92 came and went. I hope all of you that came this year enjoyed it as much as I did. To all of you who came and said nice things to me over the weekend, thank you; to those of you who didn't say nice things, perhaps I deserved it! The weather did us proud this year, with a fine weekend for the sg#how and for those of us who made a weekend of it, caravanning, etc.

Thanks also to the German representatives of AGAF who joined us, and to Paul and his college from our Dutch sister club, VERON, who made the rip over to the show - on their motorbikes! So again, to all of you in the U.K. who complain that the venue is too far, if they can do it, so can you!

Final thanks must go to Peter Smith of Penny Farthing Video for his donation of a VCR as first prize in the raffle.

The show report is a little different this year. Various photographs from the venue are scattered over the covers of the magazine, but I have included below a report written by Dicky Howett, which first appeared in the BBC Internal Communications magazine 'Ariel', and I wish to thank both Dicky and the Editor for their permission to reproduce it here. *(Actually, this permission is retrospective, but thanks anyway).*

Dicky Howett, Freelance writer, cartoonist and BATC member!

The British Amateur Television Club's Annual Convention (billed modestly as the Amateur TV Event of the Year) took place recently at Harlaxton Manor, near Grantham, Lincolnshire.

As a member of the BATC (recently joined) I went to the convention out of curiosity. The club is a long-established organisation with a membership of 2500 keen hobbyists. just like ham radio, amateur television is transmitted on special frequencies allocated by licence. Amateur TV enthusiasts display the fruits of their labours on these channels, but it must be of a technical nature only.

No 'programmes' as such are allowed. Repeater stations ensure that the instructive signal can be carried several hundred miles in all directions.

But it's not all call-signs and test patterns. Within BATC there are sub-branches and other distinct interests - narrow bandwidth, remote imaging (weather satellites), DX-ers (long range TV), vintage equipment preservationists, TV programme collectors (oh, you'd be surprised how many films turn up in junk shops), and black and white 504 line devotees.

Come convention time, everything codifies, and members, friends and the general public gather. Harlaxton Manor played host this year to about 1600 people.

Within the halls of the manor, traders had set up temporary shop, selling a whole range of electronic equipment. In the Gold Room, those interested could hear lectures on 'a microwave linked TV repeater', 'high-power UHF television broadcasting on 70cms' or 'new designs in TV transmitters'.

Outside, in the untended grounds, boot sales and flea markets dedicated to the solid state

proliferated. The more humble spread the contents of their tool chests, lofts and garden sheds, picnic fashion on the grass: boxes full of titchy telly components, twinkling multi-coloured glass beads and threads of copper for the electrically minded. Buyers were encouraged to purchase by filling small plastic bags ..... 'as much as you can get in for 50 pence'. Not bad when some resistors, transistors and dedicated scarts (21-pin plugs) can cost pounds.

Nearby, and slightly more expensive, were heaps of cellophane-wrapped and reconditioned VHS recorders all with six months' guarantee and all at £65 each. A bargain. Further on, there were rows of old test equipment, antennas, handbooks, camcorders, even old transistor radios. An electronic jumble, all for sale.

Lolling disconsolate and gutted on a groundsheet were the remains of two ex-broadcast (BBC/ITV?) television cameras. marked Pye of Cambridge, these once expensive black and white items were now minus tubes, lenses, cogs and wheels. No more than husks, they were mere shells of their former selves. All that was left were cannibalised electronic bones, hoping to attract a really serious amateur with a really serious soldering iron. The general consensus was that these sad remains were too far gone to revive.

But other stuff had been revived. in the manor's forecourt, Brian, BATC treasurer, was giving guided tours of his 1963 ex-BBC TV OB scanner van - a fascinating sideshow. In his spare time Brian had reconstructed the van with redundant and rescued parts. It was an expensive operation, but clearly a labour of love, and Brian boasted that the van had original sound desk and vision mixer.

'I've kept it like that. I know it's all pushing 30 years old but it's nice, I like it,' he said. Other bits were newish, but it all worked a treat. Outside, perched on the van roof, one of Brian's ex-broadcast colour (Marconi Mk.8) fed in a picture. The camera was almost 20 years old, but the picture came out clear and sharp.

Parked next door was a 38-foot Leyland National bus. It belonged to Paul (BATC Librarian), who drives it around the country staging telly exhibitions. His display at the convention was proudly entitled The Marconi Years.

Static exhibits included examples of every Marconi TV camera model. Well, almost. One particular Marconi camera (the Mk.2) was missing, perhaps vanished forever. In order to mount his impressive exhibition, Paul had to beg and borrow cameras from private collectors and museums.

As it turned out, some examples were in less than pristine condition. Nevertheless, the display was instructive. A history lesson in electronic technology and also an object lesson in the misfortunes and pitfalls of British electronic manufacturing.

'The British TV equipment was beautifully engineered,' explained Paul. 'It was put together with loving care and attention. Cost no option'.

'The Marconi Mk.4 black and white camera sold more around the world than all the other camera manufacturers put together! It's all gone now. The Marconi Mk.7 was the world's first four-colour plumbicon colour camera with a design life of 30 years. These days, it's all cut-price Japanese stuff, built with a design life of 30 minutes!'.

A DIGITAL SSTV TX CODER

This article first appeared in 'Radio REF', the 'Revue des Radioamateurs Francais', and I wish to thank the editor for permission to reproduce it here.

Jean-Jacques Noel F6ILR and Daniel Caudroy F6BXC

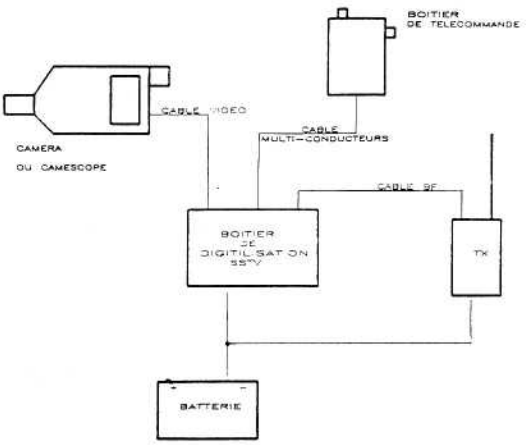
INTRODUCTION

This article describes a digital Slow Scan Television encoder, which will allow you to send SSTV via your usual portable transmitter from any portable location or from your shack, as the unit operates from 12V DC. The unit is complete, in that all that is required is a video source and a transmitter to enable you to transmit SSTV.

The project was the result of extensive collaboration and testing between Jean-Jacques and Daniel during the winter months, with a great deal of indoor operation and mobile from a moving car and a moving bike using two prototype models.

The specifications were found to be easily maintained with construction and the units conformed to our original schedule:

- portable, requiring between 8V and 15V DC supply
- small size 30 x 165 x 120mm
- usable as a fixed station or mobile
- quite light; approximately 400gm
- selection of high (32 seconds) or low-definition (8 seconds) monochrome picture modes
- manual (single-shot) or automatic (continuous) selection of 'snatched' picture(s)
- visual (LEDs) and audible (buzzer) indication of completion of scan
- controls can be located on the main case, or on a remote hand-held unit
- the contrast of the transmitted picture can be altered by a potentiometer on the control panel



The Principle of Portable SSTV Operation

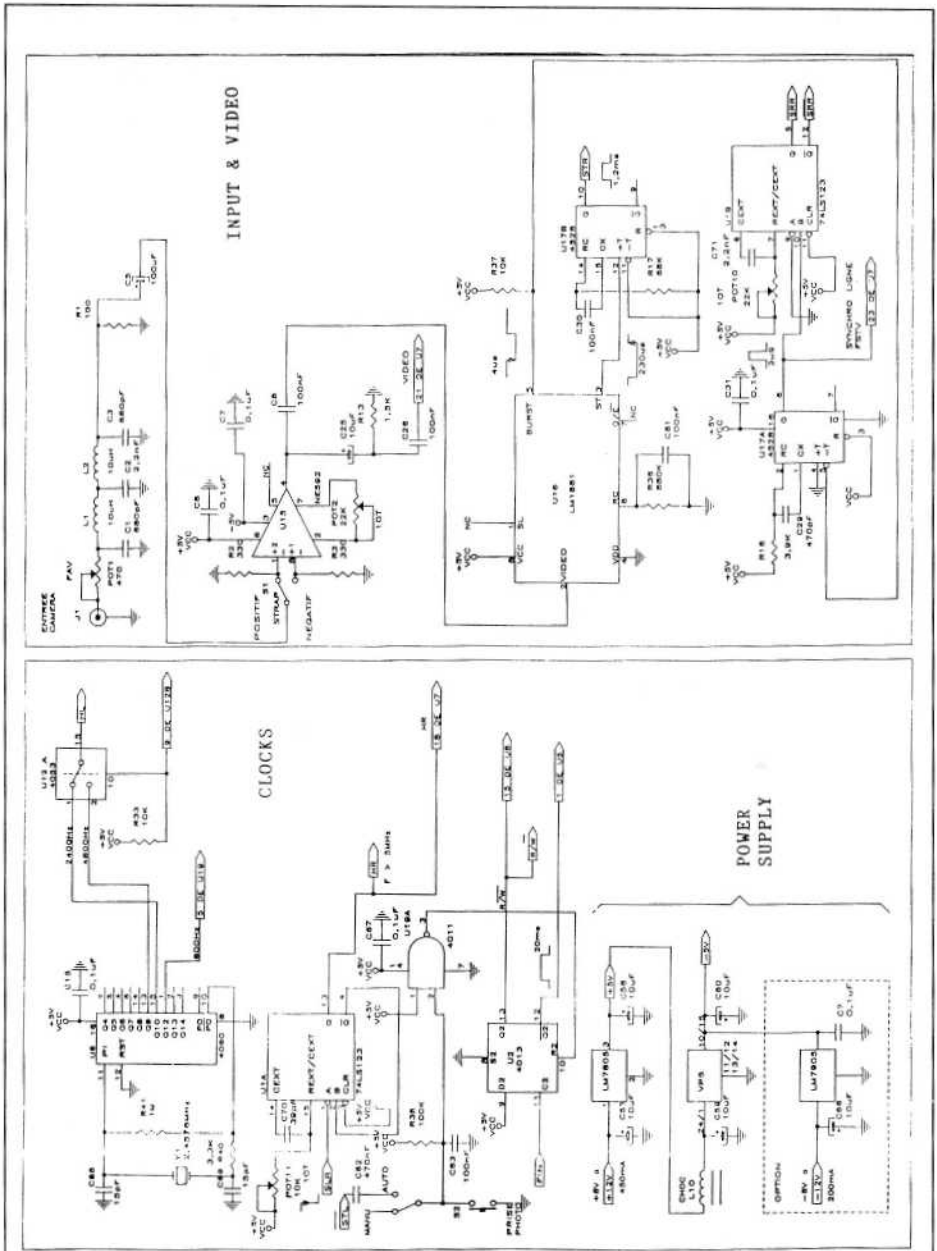


Fig.1a: Circuit Diagram of the Clock, Power supply and Input stages

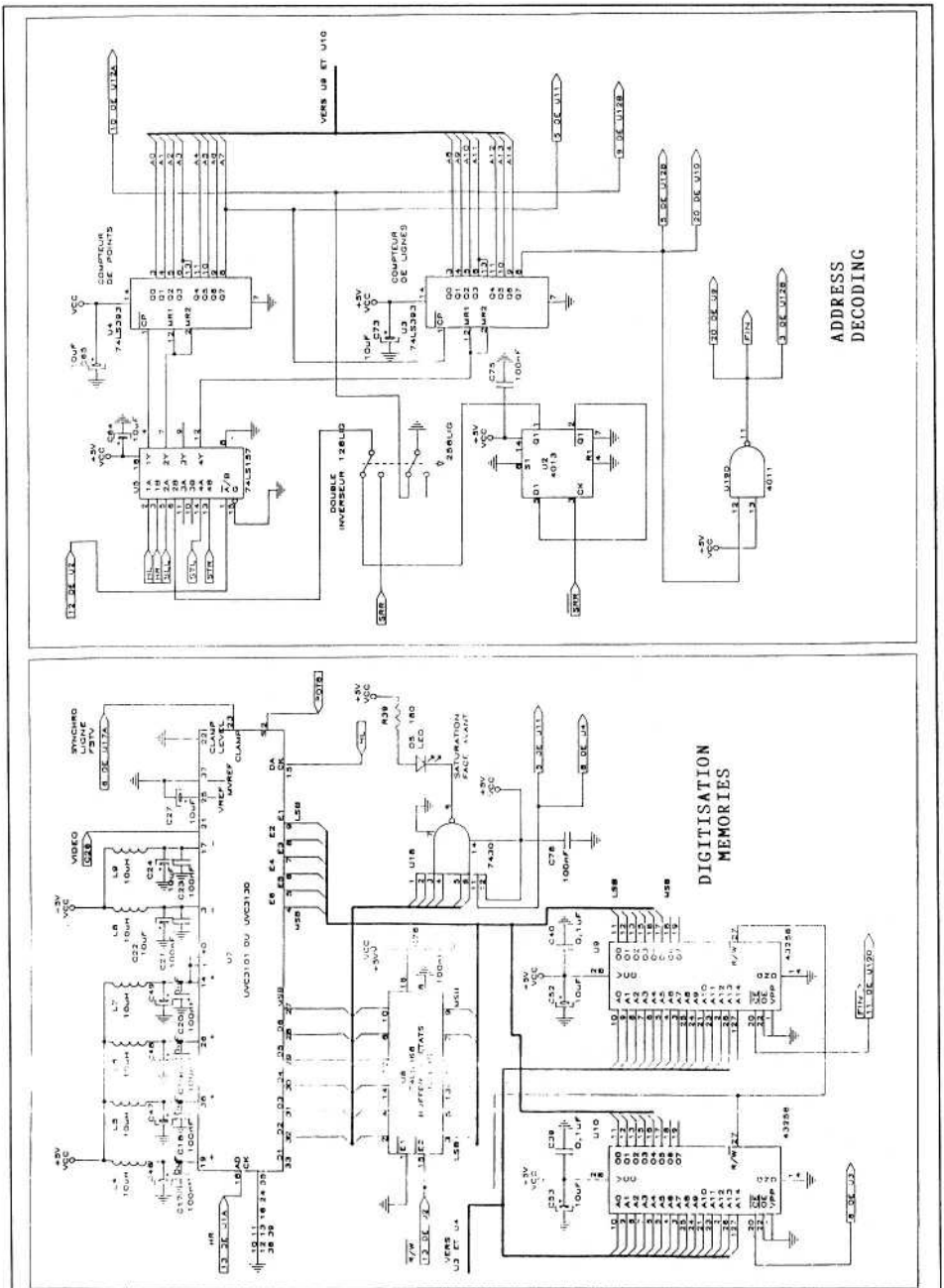


Fig.1b: Circuit Diagram of the Address Decoding and Digitisation and memory

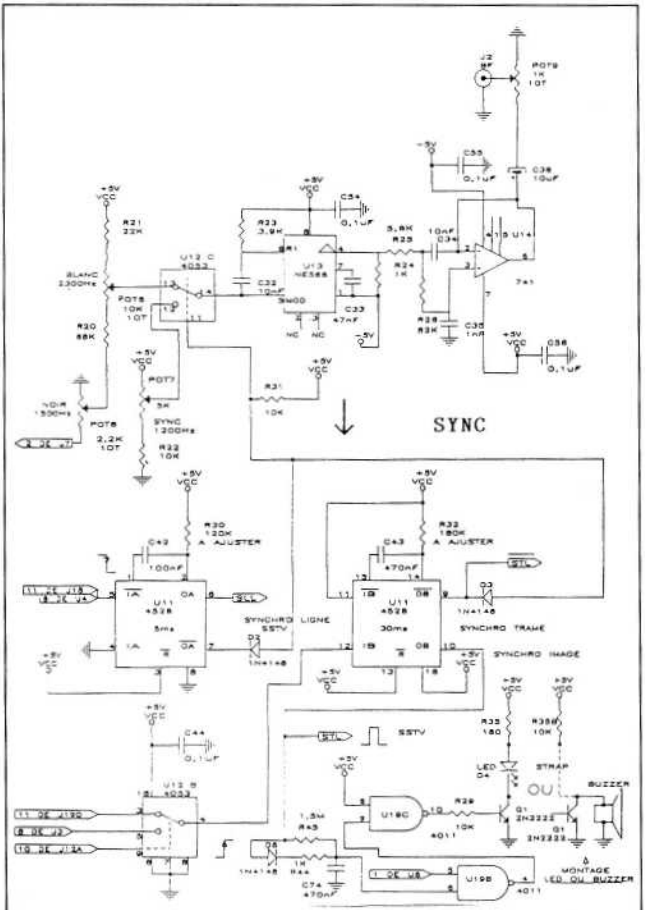


Fig.1c: Circuit Diagram of the Synchronisation stages

- the video input can be from any standard composite video source, i.e: camera, computer, VCR, etc.

CIRCUIT DESCRIPTION

The circuit diagrams of the complete unit are shown in Fig's.1a, 1b and 1c, with the control connection details in Fig,.4. The composite video input signal is initially passed through a 2 MHz band-pass filter to remove the HF and colour components of the signal. The NE592 (U15) is a signal amplifier, which lifts the filtered video to a level of 2 volts peak-to-peak for the A-D input of the Analogue-to-Digital-to-Analogue (AD-DA) converter U7 (UVC3101 or UVC3130).

The video signal from U15 is also fed to the Sync Separator device U16 (LM1881), which receives its clock signal from the monostable U17B (4528).

A free-running oscillator is designed around U1A (74LS123) and produces the fast clock sampler, HR. A crystal-controlled is configured around U6 (4060) which produces, after the necessary division the slow picture-sampling clock, HL, either 4800 Hz for low-definition and 2400 Hz for high-definition transmissions, which is selected by U12A (4053).

When switch S2 pressed the picture transmission cycle is activated. U5 (74LS157) clocks the address counters U3 and U4 (both 74LS393) at video frame rate, the 20ms controlling pulse being generated by U2 (4013).

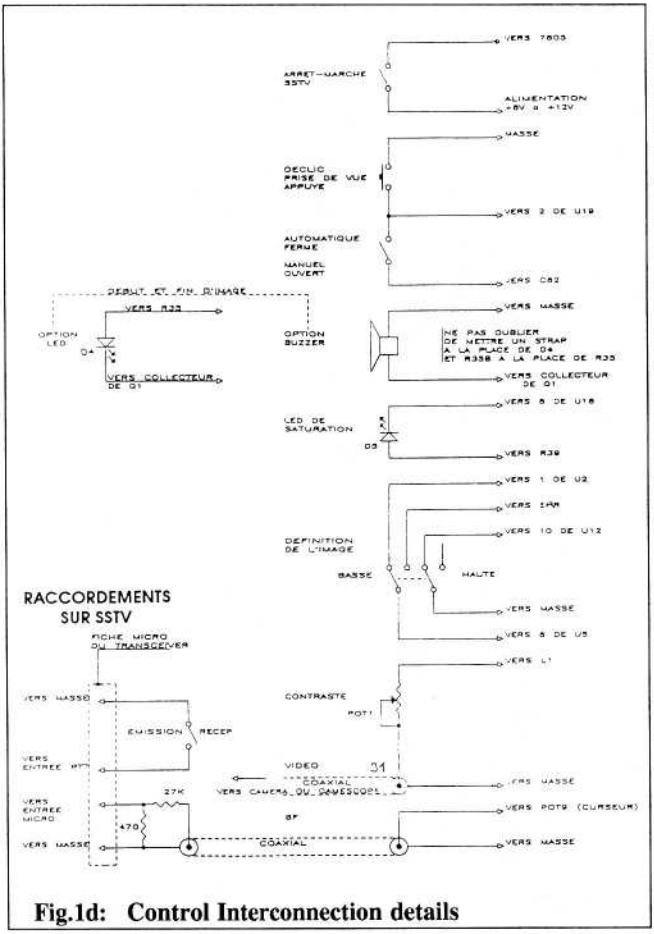


Fig.1d: Control Interconnection details

The video signal is digitised by U7 and then routed by the tri-state buffer U8 (74LS366) to the memory devices U9 and U10 (43256), which have been switched to write by U2 (4013).

When switch S2 is released the 'snatched' picture is locked in the memories (in manual picture 'snatch' mode the video source can now be removed if desired), buffer U8 goes to a high impedance state, U2 switches U9 and U10 to read and the address counter clock U5 is switched to the selected SSTV rate, the sync pulses generated by U1B (74LS123) being corrected for the selected speed (i.e: 8 or 32 seconds) by U2(4013) before being fed to U5.

The stored digital image in the memories is read back into U7 for conversion back into an analogue signal at the selected SSTV speed. The analogue output from U7 is routed to the frequency converter U13 (NE566), which is configured to operate in the range 1200 to 2400 Hz. The extreme ends of the range are adjustable by two 10-turn potentiometers, one for 1500 Hz 'Black' and the other for 2300 Hz 'White'. U12C injects the Sync signal of 1200 Hz, which is adjusted by means of a third 10-turn potentiometer, under the control of U11 (4528).

Finally, the output signal is filtered by U14 (741) and presented to the output socket, BF, for connection to the transmitter's microphone input.

An LED (D4) or a buzzer indicates the end of transmission of a picture and a saturation LED assists the setting of the level of the input video signal. However, it is better where possible to adjust the

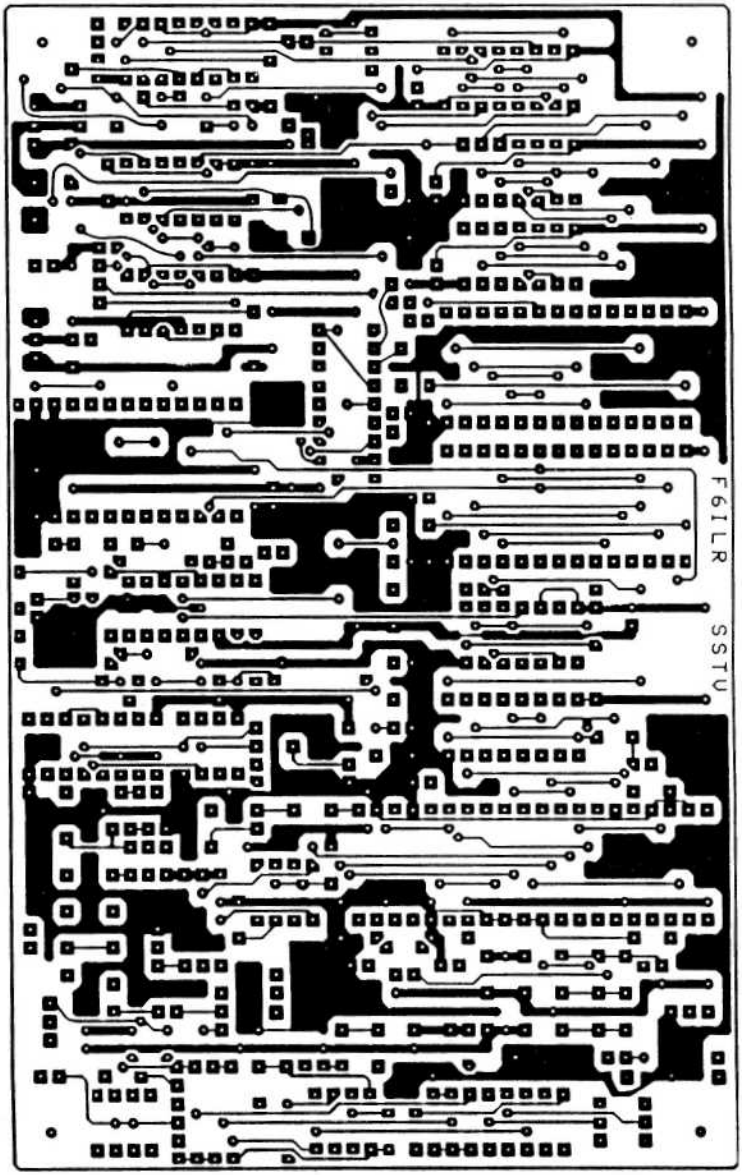


Fig.2a: PCB Layout Track side (actual size)

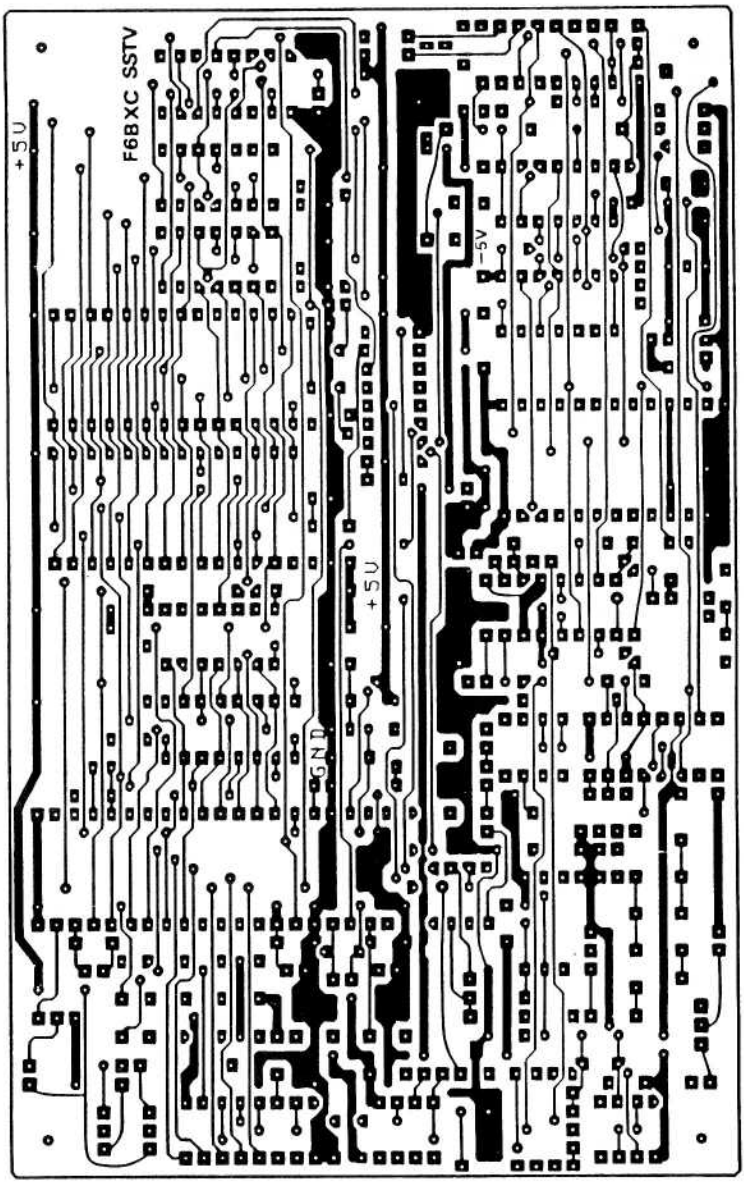


Fig.2b: PCB Layout Component side (actual size)

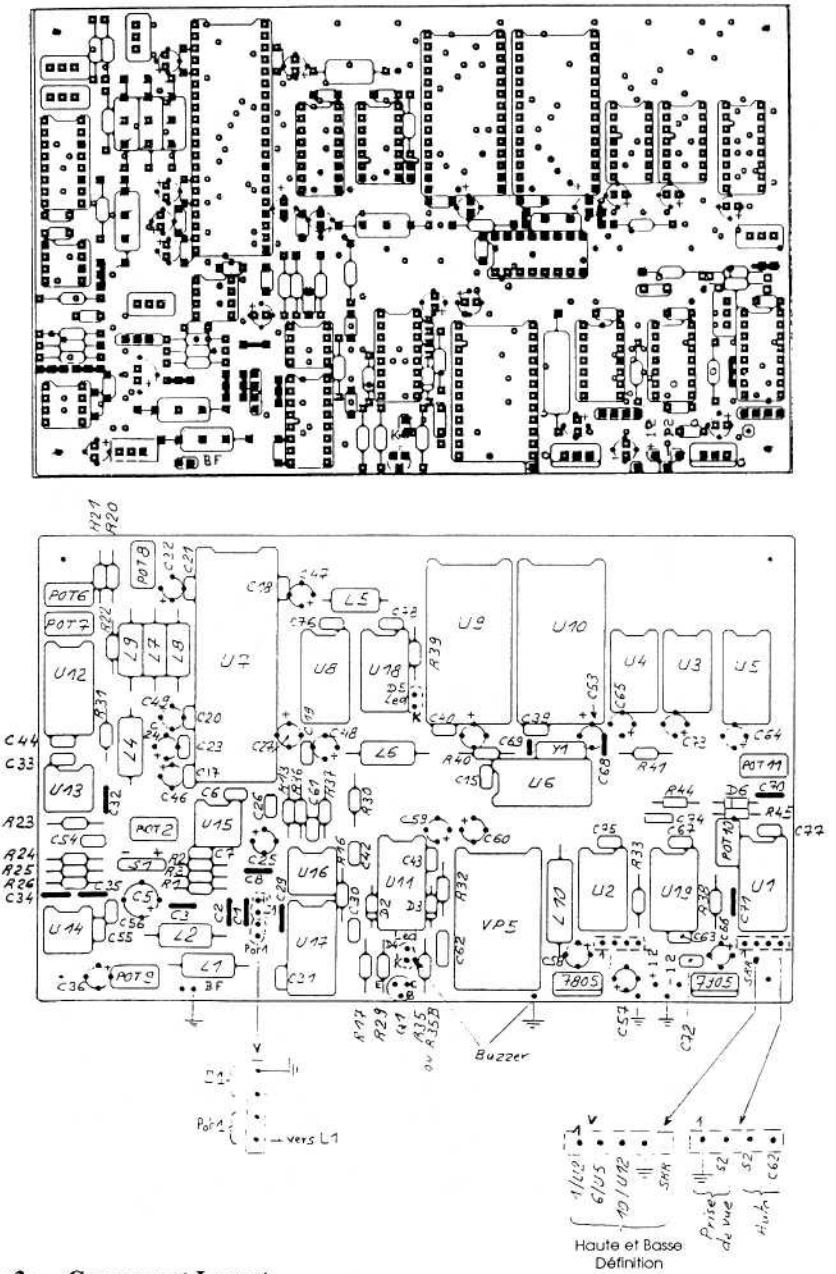


Fig.3: Component Layout

saturation level by monitoring the transmission with an SSTV receive system.

The DC supplies are quite straightforward. If you have +8 to 15 volts and -8 to 15 volts available, then simple 7805 and 7905 regulators will suffice. However, for portable operation, or where only a +8 to 15 supply is available, the DC-DC converter VP5 will be required to generate the -5 volt rail.

There is no design for an SSTV receive converter here, the authors' use either the DK3VF system from VHF Communications 1/86, or the F1JMG system from radio REF March 1990, both of which are suitable for the 8 and 32 second modes utilised here. The low-definition pictures could of course be received on an original high-persistance tube system, such as was used 15 to 20 years ago!

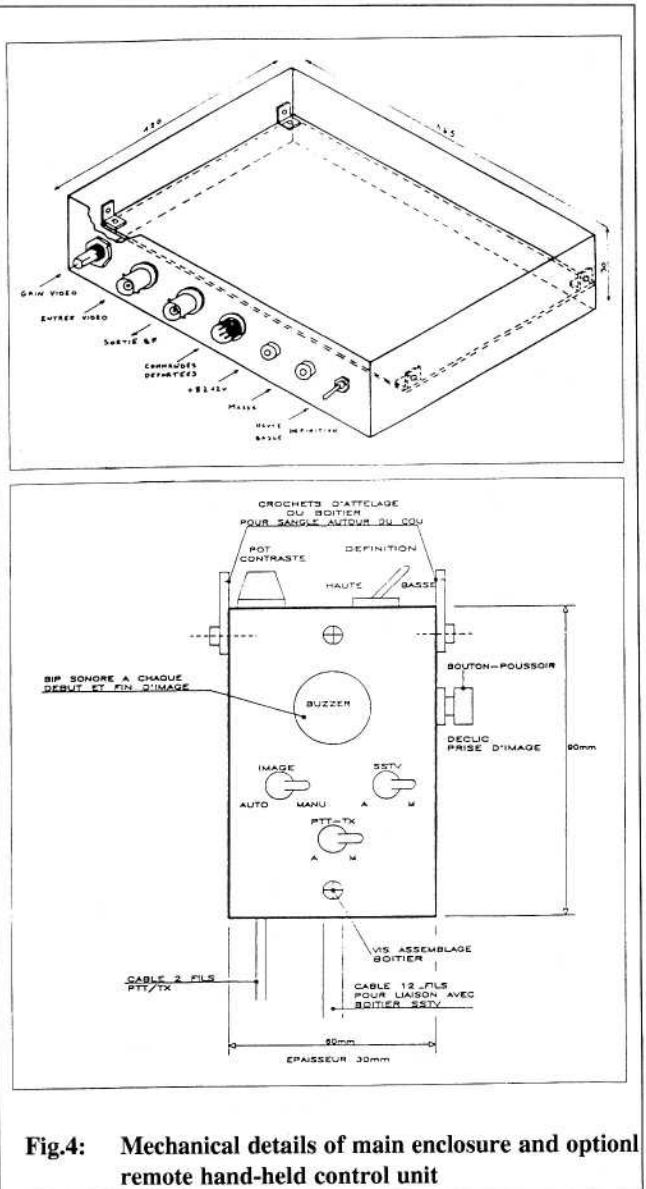


Fig.4: Mechanical details of main enclosure and optionl remote hand-held control unit

CONSTRUCTION

The double-sided printed circuit board layout is shown actual size in Fig's 2a and 2b, with a component overlay in Fig.3. All the integrated circuits should be fitted in sockets, as many of them have to be removed during the adjustment and set-up procedure.

Resistors R30 and R32 at U11 should be adjusted-on-test, as should R16 and R17 at U17, to give the correct pulse-widths as shown on the circuit diagrams.

The values of L4 and L9 are not critical, 15 or 22uH values will be quite acceptable. All potentiometers are upright 10-turn types. Strap S1 should be fitted to suit your video input signal polarity, either positive or negative going. Please also note the orientation of input capacitor C5, according to the polarity of the input video signal.

As mentioned earlier, the 'snatch' switch S2, the on/off switch and the manual/automatic switch may be located on a unit remote from the main case and can thus be wired in place using 1.5 to 2 metres of coaxial cable terminating in a 5-pin plug, with a matching socket on the main unit. The video gain potentiometer can also be mounted on the remote unit, or on its own at the camera.

The power supply regulators are mounted at the edge of the printed-circuit-board so that they can be bolted to the metal case for heat-sinking. Please note that if a 7905 regulator is used, then its case must be insulated from the chassis.

ADJUSTMENTS AND SET-UP

Remove U8, U9, U10 and U11 from their sockets and adjust POT11 so that the frequency of the clock signal at pin-18 of U7 is 5 MHz.

Set POT10 to approximately half way and adjust POT9 for maximum signal at the output socket BF.

Solder a strap across pins-7 and 8 of the U11 socket (still with the ICs removed from the circuit) and adjust POT7 for a frequency of 1200 Hz at the output socket. remove the strap and set POT8 to approximately half way.

Strap together pins-12, 12, 13, 15, 16, 17 and 14 of U19, connecting the strap to pin-14 first (again with the ICs still removed from the circuit board). Adjust POT6 for a frequency of 2300 Hz at the output socket.

Connect the six used outputs of U9 to +5 volts (pin-28). Adjust POT8 for a frequency of 1500 Hz at the output socket. Repeat the last two adjustments as they interact with each other, until both frequencies are correct.

Fit U11 in its socket and ensure that the 128-line low-definition mode is selected. Adjust the values of R30 and/or C12 to give a positive-going pulse with a pulse width of 5ms +/-0.2ms at pin-6 of U11.

Adjust the value of R32 to give a pulse width of 30ms (or more) at pin-10 of U11. Please note that the pulse only occurs every 7.5 seconds.

Fit U8, U9 and U10 into their sockets, set the input saturation control POT1 to maximum, connect a video source and press S2.

Adjust POT2 so that the saturation LED illuminates just before the transmitted picture starts to distort due to overload.

Adjust POT10 to centre the picture on the receive screen, if the picture is too wide or narrow, then slight adjustment of POT11 will correct this.

That completes the set-up procedure and the unit should now transmit good-quality 8 second or 32 second black and white pictures.

A Printed Circuit Board, etc., for this project is available from:

SM Electronic, 20 bis Avenue des Clarions, F.89000 Auxerre, France, or via KM Publications at the editorial address.

COMPONENT LIST

INTEGRATED CIRCUITS

U1	74LS123
U2	4013
U3, U4	74LS393
U5	74LS157
U6	HEF4060
U7	UVC3101 or UVC3130
U8	74LS366
U9, U10	43256 or 20256 (32k x 8)
U11, U17	4528
U12	4053
U13	NE566
U14	UA741 (8-pin)
U15	NE592
U16	LM1881
U18	7430
U19	4011

TRANSISTORS AND DIODES

Q1	2N2222
D2, D3, D6	1N4148

REGULATORS

LM7805	
LM7905	(if + and - supplies available)
VP5	(or any DC-DC -5V output converter

CHOKES

L1 to L9	10uH
L10	50 turns 0.2mm dia. on 4mm ferrite 15mM long

RESISTORS 1/4W

R1	100	R35, R39	180
R2, R3	330	R44, R24	1k
R13	1.5k	R40	3.3k
R16, R23	3.9k	R25	5.6k
R22, R29	10k	R31, R33	10kR
35, R37	10k	R21	22k
R17, R20	68k	R 26	82k
R38	100k	R30	120k
R32	180k	R36	680 k
R41	1M	R45	1.5M

POTENTIOMETERS

POT9	1k	POT8	2.2k
POT7	4.7k	POT6, POT11	10k
POT2, POT10	22k		

CAPACITORS CERAMIC

C68, C69	15pF	C70	39pF
C29	470pF	C1, C3	680pF
C42	680pF	C2, C71	2.2nF
25 off	100pF		

CAP'S METALLISED POLYESTER

C35	1nF	C32, C34	10nF
C33	47nF	C61, C30	100nF
C56, C55	100nF	C62, C43	470nF
C74	470nF		

CAPACITORS ELECTROLYTIC

19 off	10uF 25V TANTALUM
C5	100uF 16V RADIAL

MISCELLANEOUS

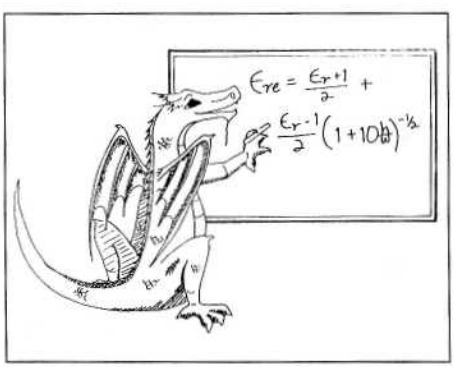
Y1	2.4576 MHz Crystal
1	high-luminosity Red LED
5V BUZZER	

PUFF - A MICROWAVE STRIPLINE CAD PROGRAM FOR THE PC

Robert E. Lentz DL3WR

Back at the beginning of 1990 the authors Richard Compton (Cornell University), Scott W. Wedge (Hughes Aircraft Company) and David Rutledge (California University of technology) brought out version 1.5 of a remarkable versatile software package. Named after Puff, the magic dragon in the Peter, Paul and Mary song, the software was conceived especially for educational use. It was first used on microwave engineering courses at Caltech and at Los Angeles university; later it spread to many other universities and colleges and was also put to practical use by engineers and scientists. More than 6,000 copies were sent out worldwide of the first version alone.

PUFF represents an interactive circuit design environment for producing stripline and microstripline circuitry. Written in Turbo-PASCAL, it is fast, easy to learn and simple to use. Components are placed on the screen with cursor-key movements, followed by analyses in the time or frequency domain at the touch of a key. The results of the simulation can be seen as a plot, in a Smith diagram or in tabular form. Fig.1 (overleaf) shows the PUFF working screen with a simple example:



Top left is a square circuit board with four connections. At port 1 we have a an angled piece of 50-ohm stripline, next a quarter-wavelength piece with Z=87 ohms, and finally a 4mm-long 150-ohm resistor, connected to ground at the far end.

Below this we have (in this case) letters a to f, representing components at our disposal (tline = transmission line; device = a FET on this occasion; clines = couples lines). The design impedance is indicated (50 ohms here) and the design frequency (5 GHz this time).

At top centre we have the commands at our immediate disposal. These vary according to whether we are working on a layout (f1), carrying out a simulation (f2) or arranging components (f3).

Top right we see the plotted results of the simulation - frequency response, impulse results or behaviour over time. Below is the Smith diagram for the S parameters selected.

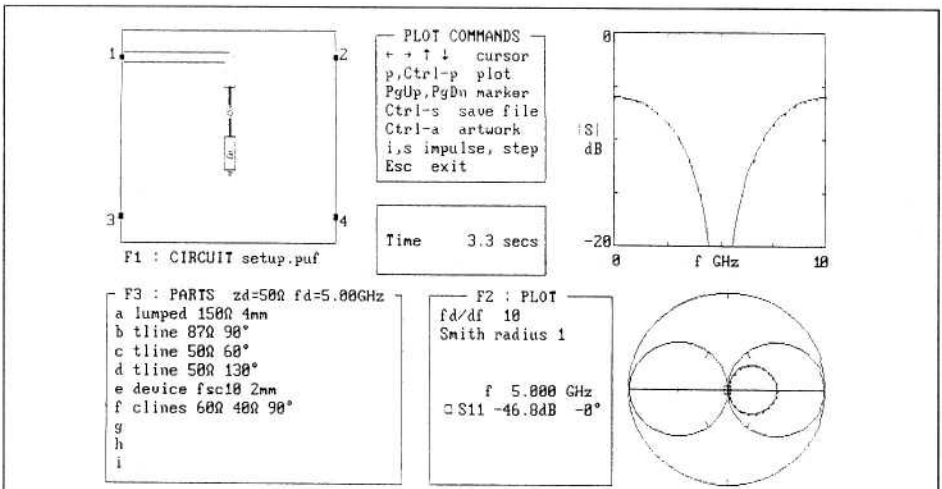


Fig.1: Screen shot of the Program in use

Right in the middle is the time taken for the last calculation, below this the legend for scaling the Smith diagram, the design frequency and the measured value at the design frequency (which is not readable on the plot in the example).

After playing with the examples supplied and mastering the method of operation, you are ready to enter some values of your own. The printed circuit board can be altered according to material (thickness and E_r), dimensions, number and location of ports; the resulting solution can be re-worked to suit components already to hand or a particular frequency required. PUFF calculates all dimensions and avoids crossings of tracks or drawing outside the edge of the board.

Striplines or microstriplines (they should not be confused!) can be characterised by impedance and electrical length.

Concentrated components are SMD-resistors, -capacitors or -inductors. They are entered with their value and mechanical length. PUFF understands four units for impedance or admittance: ohms, Siemens, Z and Y. Reactance values require a "j" prefix or suffix, with the unit for an impedance following; for example 25johms and 0.5jZ specify a reactance of 25 ohms at the design frequency fd.

Devices are components with several ports, defined by S parameters. In the example we have an FSC10 FET from Fujitsu, with S parameters from 0 to 12GHz.

If you are happy with the results of your simulation, you can print out the enlarged layout, photograph and print it to the right scale and produce the PCB by photo-chemical methods.

At Caltech students have a two-hour practice session where they use PUFF to produce the following: solutions to a design exercise, producing film and PCBs, checking PCB track widths with a microscope, introducing concentrated components and "devices", checking

circuitry on a test station, and finally comparing simulation and actual results, which usually turn out very good.

The exercises are: a coupler, a low-pass filter, a band-pass filter, a low-noise FET amplifier and a FET oscillator. Fig.2 shows the comparison of a low-pass filter calculated by PUFF (solid and pecked lines) and the values measured (dots and crosses).

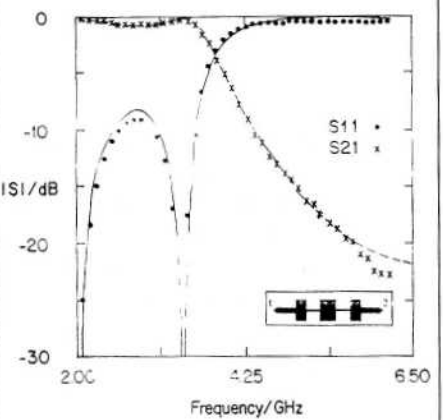


Fig.2: Comparison of calculated and actually measured values

PUFF does not contain an automatic optimisation procedure. The authors have, however, devoted a lot of effort into making it as fast as possible for users to check their circuits manually.

NOTE: The latest version (2.0) of the PUFF package now does contain a simple circuit optimisation routine.

All measurements are given in mm, frequencies in GHz, and characteristics in the form of S parameters. <CTRL>-P is the command for printing a layout, enlarged to a (selectable) scale "p", on an IBM Proprinter. Naturally only the tlines and clines are printed, and bends are automatically chamfered (compensated).

Hardware requirements are IBM PC, XT, AT or compatible with EGA graphics. Slow computers should have a maths co-processor fitted, while on faster models the emulation built into the software works fast enough.

The finer details of the program are too varied to mention all of them here: with the 5.25" 360k floppy you get a neatly printed handbook with 60 pages and many illustrations. Fig's.1 and 2 in this article came from this handbook. The handbook is remarkably clearly written and easy to understand. Studying it is just as much a pleasure as working with PUFF is. The manual also contains a short tutorial with formulas and diagrams on dimensioning striplines, together with comprehensive references and keyword index. It is clear that extremely experienced college tutors have worked on PUFF and its manual!

Even if PUFF is no substitute for advanced (and expensive) microwave design programs, it is no plaything either and clearly more than "just" educational software.

PUFF is available from KM Publications, 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF. Tel: 0788 890365 / 0860 857434; Fax: 0788 890365. The cost is £15 plus £2.50 p&p.

24cm WALK-ABOUT HAT AERIAL!

John Stockley G8MNY

This is a modified skeleton Alford slot aerial with a gain of 6dB or so, but still small enough to be mounted on a hat. An unusual feature, is the "short circuit ends" of the slot, that have been neatly folded inside the end loops to keep the size down.

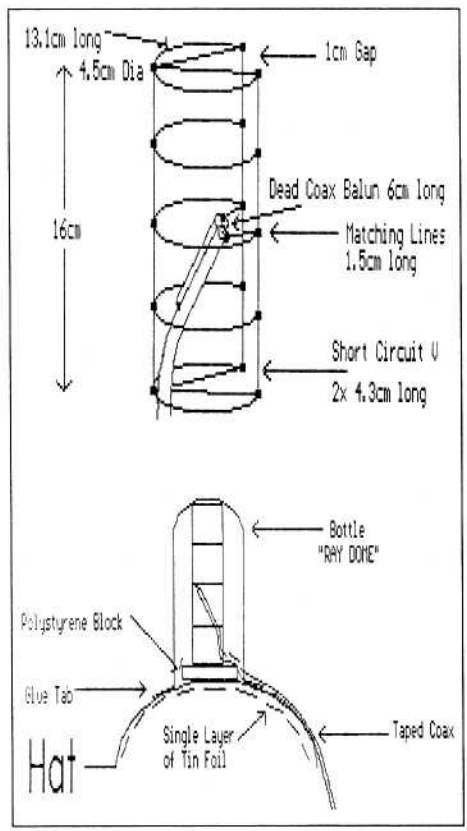
Parts:

1.4 m of 1.5 mm Copper Wire
1 m of Solder.
2 m of UR43 Coax.
1 UR43 coax plug.
1 Drinks Bottle (Ray dome)
0.5" x 2" dia. Expanded Polystyrene
1 Hard Hat
12" of Tin Foil (if no tin hat)
1 idiot to wear it!

The aerial is simple to construct, even if fiddly, with the small balun and matching stubs. Tuning up should just be a matter of bend adjustments to alter the gap.

Line the hat with tin foil, to reduce any chance of becoming a HOT HEAD. Cut a drinks bottle with suitable tabs to fix onto thy hat, to form a radome. This is required as doorways tend to completely wipe out the aerial when you forget to duck!

Although I had had lots of comments as to what it and I look like, (even from police at shows) the performance of this aerial has been very good. From low lying ground level with 1 watt of Colour ATV & sound pictures have been received at P2 over 3 miles away. At the RSGB VHF Convention at Sandown Race course, in the building on the 1st floor, GB3HV at High Wycombe gave a P3 Colour report over a distance of 25 Miles. Pictures from it were being received by the HCATV group on the BATC stand at the rally as I walked around the show.



THE NICAM SYSTEM

This article first appeared in the May 1992 issue of Elektor Electronics and we wish to thank the Editor for permission to reproduce it here.

J.Buiting, Technical Editor
Elektor Electronics

Stereo TV sound has finally come of age with the progressive introduction over the past few years of digital system called NICAM. This article aims at providing a background to the operation of the NICAM (near-instantaneously companded audio of multiplex) system, which is now in use in most to the UK, Scandinavia, Belgium and Spain. NICAM-728,with subversions for PAL systems B/G and I, is also recommended by the EBU as the for multi-channel sound transmission with terrestrial television. It has been adopted for use in several countries, including the UK, and now forms part of a draft CCIR recommendation.

When we talk about different television standards, the discussion is usually about different ways of conveying the picture to the viewer. Up to ten years ago, the sound was taken for granted, which is remarkable because the stereo age was well under way at the time. Following a German initiative, some European countries introduced stereo TV sound based on an auxiliary subcarrier above the main (mono) FM carrier. Although this works, the NICAM system offers superior sound quality at roughly equal bandwidth requirement. Originally developed by the BBC, the NICAM-728 specification has been formally approved by the Department of Trade and Industry as the United Kingdom standard for two-channel digital sound with terrestrial television broadcasts.

A BRIEF HISTORY OF STEREO TV SOUND

Since 1979, a number of stereo TV sound systems have been introduced that were aimed at downward compatibility with the existing mono sound systems. Among the requirements for the new sound systems were:

- minimum interference and crosstalk between the channels;
- quality of existing (main) mono channel must not be affected;
- equipment to upgrade transmitters and receivers must remain as simple as possible.

The need of maintaining downward compatibility, as well as the limited bandwidth available for the new sound system, have forced the designers of analogue stereo TV sound systems to drop some of their target specifications, and agree on certain compromises that reduce the quality that could have been achieved in theory. Analogue stereo sound systems can be made downward compatible in two ways:

♦ by modifying the audio signal before it is modulated on to the carrier (single-carrier principle);

♦ by adding a second sound carrier just above or below the existing (mono) sound carrier (dual-carrier principle).

In both cases, a decoder matrix is required to separate the left and right channels, and produce the stereo sound image.

Some systems also require de-emphasis and/or decompanding to improve the signal-to-noise ratio and the dynamic range.

The dual-carrier system is basically analogue, and offers quite reasonable sound quality. However, in this day and age of digital sound, it is not surprising that alternatives have been sought, based on the technology already familiar from CD players and the sound transmission standard developed for the MAC system.

In particular the channel separation offered by NICAM is much higher than that achieved by any form of analogue is so close to that of a compact disk that it is hard to tell the difference by just listening.

NICAM-728 DIGITAL SOUND TRANSMISSION

Strictly speaking, the NICAM-728 system should be classified as a dual-carrier system, because a second sound signal is introduced in the baseband spectrum (see Fig.1). The spectrum shown is for PAL system-I as used in the UK, with the main sound carrier at 6.0 MHz above the vision carrier, and total channel bandwidth of about 8 MHz. Most other European countries use PAL system B or G, where the main sound channel is at 5.5 MHz, and the channel bandwidth is about 7MHz.

The NICAM signal is recovered from a QPSK (Quadrature Phase Shift Keying) spectrum with a bandwidth of about 600kHz. The centre frequency of this 'molehill' (that is what it looks like on a

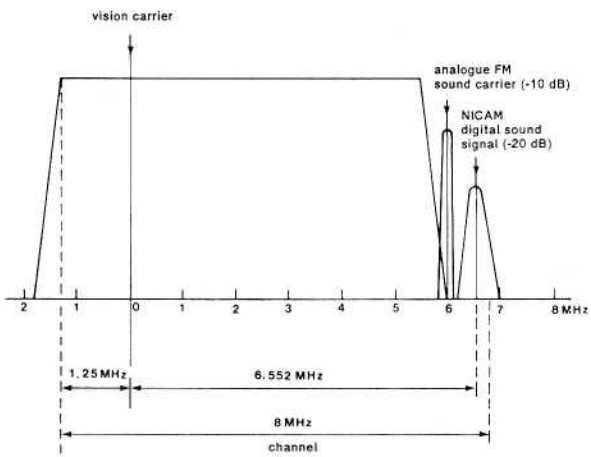


Fig:1 The frequency band occupied by the NICAM-728 digital sound signal in relation to the picture and mono (anologue FM) sound signal components in the TV baseband

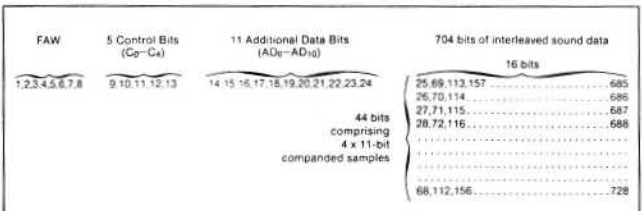


Fig.2: Each frame consists of four groups of bits, each with its own function

spectrum analyser) is 6.552 MHz (PAL system I), or 5.850 MHz (PAL system B/G). The level is about -20 dB with respect to the vision carrier. In the rest of this article, we will refer to the UK standard (PAL system-I) only.

Contrary to the analogue dual-carrier system, the NICAM signal contains all the information necessary to reproduce the two stereo channels, i.e: it is completely independent of the main FM carrier at 6.0MHz (except for the fixed frequency and phase relation), which is currently transmitted only to ensure downward compatibility with existing TV sets.

SOUND MULTIPLEX AND SOUND CODING METHODS

To understand how the NICAM system works, we will take a look at the structure of the serial data stream at the transmitter side.

Frame structure and bit interleaving

As shown in Fig's.2 and 3, the data consists of 728-bit frames which are transmitted continuously without gaps. One frame is transmitted every millisecond, so the overall bit-rate is 728 Kbit/s, whence the system designation NICAM-278.

The 720 bits that follow the frame alignment word (FAW) have a structure that closely resembles that of the first-level protected, companded sound signal blocks in the systems of the MAC family. After the control bits and the additional data bits follows a block of

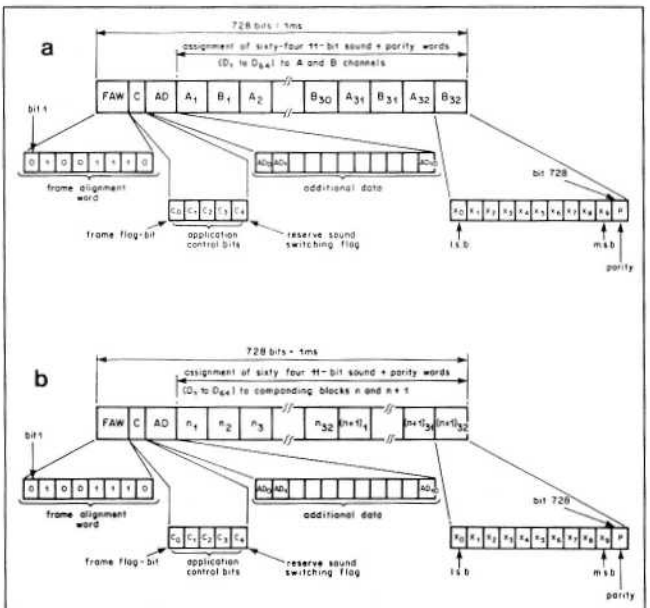


Fig.3: (a) Structure of a 728-bit frame containing a stereo sound signal; (b) the same for a mono signal (both before interleaving)

704 interleaved sound data bits and the additional data bits. The interleaving pattern relocates data bits which are adjacent in the frame structure of Fig.2 to positions at least 16 clock periods apart in the transmitted data stream.

Energy dispersal scrambling

The transmitted bit stream is scrambled for spectrum-shaping purposes (remember the restrictions as regards the base-band bandwidth). The scrambling operates synchronously to multiplex frame. The FAW is not scrambled, and used to synchronise the pseudo-random sequence generator used for descrambling in the receiver. Fig.4 shows the general layout of the scrambler.

The following parameters apply:

♦ the bit that follows the FAW is the first scrambled bit, and is added modulo two to the first bit of the pseudo-random sequence;

♦ the bit that precedes the FAW is the last scrambled bit;

♦ scrambling takes place immediately after interleaving (and descrambling is therefore prior to de-interleaving in the receiver);

♦ the pseudo-random sequence is defined by a generator polynomial

x[9]+x[4]+1

and an initialisation word ('seed')

111111111.

Thus, with reference to Fig.2 the sequence starts:

0000 0111 1011 1110 0010.

FAW and control information block

The Faw is 01001110, which is a series of bits transmitted in that order. The control information converged to the receiver consists of a frame flag bit, C0, three application control bits, C1, C2 and C3, and a reserve sound switching flag, C2 (see Fig.3). The frame flag bit, C0, is set to '1' for eight successive frames, and to '0' for the next eight frames. The frames are numbered within the sequence as follows: the first frame (Frame 1) of the sequence is defined as the first of the eight frames in which C0=1. Hence, the last frame (Frame 16) of the sequence is the last of the eight frames in which C0=0. This frame sequence is used to synchronise changes in the type of information being carried in the channel. The function of the three application control bits, C1, C2 and C3, is to define the current application of the last 704 bits in each frame, which may be used to convey either sound samples or data.

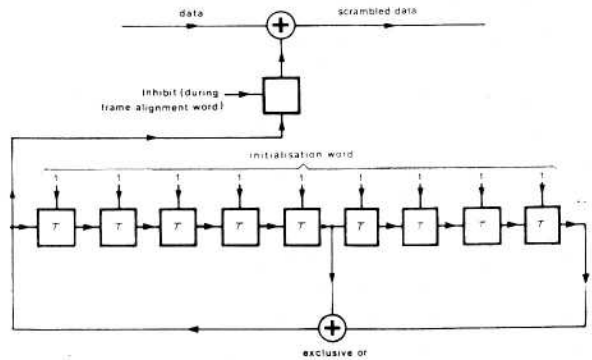


Fig.4: Psuedo-random sequence generator (PRSG) for spectrum shaping (energy dispersal scrambling)

Application control bits			Contents of 704-bit sound/data block
C_1	C_2	C_3 *	
0	0	0	stereo signal comprising alternate A-channel and B-channel samples
0	1	0	two independent mono sound signals (designated M1 and M2) transmitted in alternate frames.
1	0	0	one mono signal and one 352-kBit/s transparent data channel transmitted in alternate frames.
1	1	0	one 704-Kbit/s transparent data channel.

* C_3=1 provides for signalling additional sound or data coding options. When C_3=1, decoders not equipped for these additional options should provide no sound output.

Table 1: Applications of 704-bit sound/data blocks

The available options are shown in Table 1. When a change to a new application is required, these control bits change (to define the new application) on Frame 1 of the last 16-frame sequence of the current application. The 704-bit sound/data blocks change to the new application on frame 1 of the following 16 frame sequence.

The reserve sound switching flag, C4, contained in the control information block is used to switch back to the output of the conventional FM demodulator when the digital sound decoding system fails. This is, of course,acceptable only if the FM sound channel carries the same programme as the failing digital channel. The means to inhibit such switching is incorporated in the control information. Control bit C4 is set to '1' when the FM channel carries the same sound programme as the digital, mono signal (where two digital mono signals are transmitted, this refers to the M1 signal only). When the FM channel is not carrying the same programme as the digital sound channel, C4 is set to '0'. In this state, it can be used to prevent switching to the FM sound. Finally, C4 has no meaning in the case of data transmission.

Additional data and the sound/data block

Data bits AD0 to AD10 (see Fig.3) are reserved for future applications yet to be defined. The last 704 bits in any frame form a block of either sound or data (the two types of information are not mixed within one frame). One frame contains 64 sound samples (D1 to D64). The structures of a stereo sound frame and a mono sound frame are shown in Figs.3a and 3b respectively. In stereo mode (AC:C1=C2=C3=0), the odd-numbered samples convey the A-channel, and the even-numbered samples the B-channel. Thus, 32 samples of each channel are transmitted (AC: C1=0;C2=1; C3=0), it is contained in odd-numbered frames, and M2 in even-numbered frames. Thus, for mono sound signal, each frame with sound information in it contains 64 consecutive sound samples, which will span two complete companding blocks, shown as blocks n and (n+1) in Fig.3. No format has yet been defined for data information.

SOUND SIGNALS

Sound signals are sampled at 32kHz, and coded initially with a resolution of 14 bits per sample. Near-instantaneous companding is used to reduce the number of bits per sample from 14 to 10, and one parity bit is added to each 10-bit sample

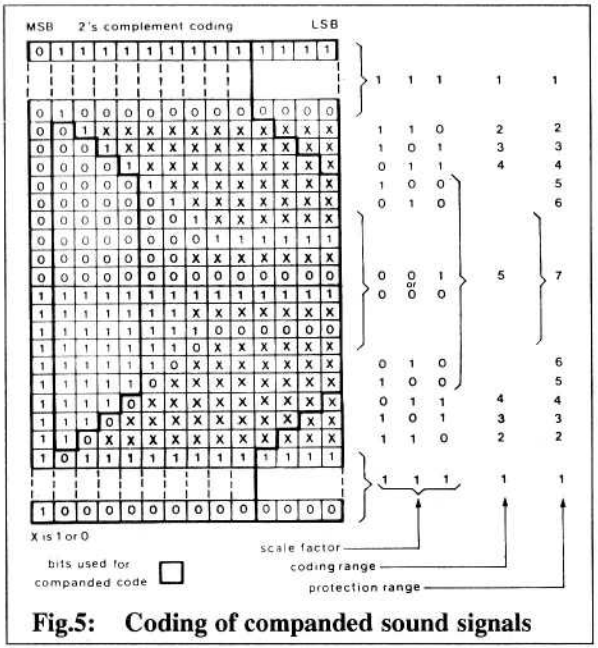


Fig.5: Coding of companded sound signals

word for error detection and scale-factor signalling purposes.

The companding process forms the 14-bit digital samples corresponding to each of the sound signals into blocks of 32. All of the samples in each 1ms block are subsequently coded, using a 10-bit 2's complement code, to an accuracy determined by the magnitude of the largest sample in the block, and a scale factor code is formed to convey the degree of compression to the receiver. Fig.5 illustrates the coding of companded sound signals.

Prior to compression,a pre-emphasis to CCITT recommendation J17 (Ref.2) is applied to the sound signals, either by using analogue pre-emphasis networks before digitisation, or by using digital filters with the digital signals. For stereo transmission, the signals of the left and right sound channels are sampled simultaneously. The Channel-A samples convey the left-hand (L) sound signal, and the Channel-B samples the sight-hand (R) sound signal. One parity bit is added to each 10-bit sound sample to check the six most-significant bits for the presence of errors. The parity group so formed is even (i.e: the modulo-2 sum of the six protected sample bits and the parity bit equals 0).

Subsequently, the parity bits are modified to signal the 3-bit scale factor word associated with each sound signal block. In addition to signalling the coding range, the scale factor signal seven protection ranges. This information may be used in the receiver to provide extra protection for the most significant bits of the samples. Table 2 shows the coding ranges and protection ranges associated with each 3-bit scale factor word. The five coding ranges

Coding range	Protection range	Scale factor value		
		R_2	R_1	R_0
1st	1st	1	1	1
2nd	2nd	1	1	0
3rd	3rd	1	0	1
4th	4th	0	1	1
5th	5th	1	0	0
5th	6th	0	1	0
5th	7th	0	0	1
5th	7th	0	0	0

Table 2: Codein/protection rangeselection

indicate the degree of compression to which the block of samples has been subjected for the near-instantaneous companding process. The 3-bit scale factor R_2-R_1-R_0 associated with each 32-sample sound block is conveyed by modification of the parity bits (see Fig.5).

When a stereo sound signal is being transmitted, FE1 (Factor echelle; scale factor) is the scale-factor word R_{2B}-R_{1A}-R_{oA} associated with the 'A' samples and FE2 the scale-factor word R_{2B}-R_{1B}-R_{0B} associated with the 'B' samples. If Pi is the parity bit of the i[th] sample, this is modified to P'$_i$, by modulo-2 addition of one bit of one of the scale-factor words according to the following relationship:

$P'_i=P_i + R_{2A}$ for i = 1,7,13,19,25,31,37,43,49

$P'_i=P_i + R_{1A}$ for i = 3,9,15,21',27,33,39,45,51

$P'_i=P_i + R_{0A}$ for i = 5,11,17,23,29,35,41,47,53

$P'_i=P_i + R_{2B}$ for i = 2,8,14,20,26,32,38,44,50

$P'_i=P_i + R_{1B}$ for i = 4,10,16,22,28,34,40,46,52

$P'_i=P_i + R_{0B}$ for i = 6,12,18,24,30,36,42,48,54

When a mono signal is being sent, FE1 is the scale-factor word R_{2n}-R_{1n}-R_{0n} associated with the first block of 32 samples in the frame, and FE2 is the scale -factor word R_{2n}+1-R_{1n}+R_{0n}+1 associated with the second block of 32 samples in the frame. As in the case of stereo sound, the parity bit of the i[th] sample, P_i, is modified to P'$_i$ by modulo-2 addition of one of the scale-factor words. However, in the mono case, the the modification of the parity bits relates to the block structure of the mono signal, as follows:

$P'_i=P_i+R_{2n}$ for i = 1,4,7,10,13,16,19,22,25,

$P'_i=P_i+R_{1n}$ for i = 2,5,8,11,14,17,20,23,26

$P'_i=P_i+R_{0n}$ for i = 3,6,9,12,15,18,21,24,27

$P'_i=P_i+R_{2n}+1$ for i = 28,31,34,37,40,43,46,49,52

$P'_i=P_i+R_{1n}+1$ for i = 29,32,35,38,41,44,47,50,53

$P'_i=P_i+R_{0n}+1$ for i = 30,33,36,39,42,45,48,51,54

It should be noted that some of the scale-factor information in the second block of samples is conveyed in the parity coding of samples 28 to 32, which are in the first block. This conforms with the specifications for the purpose of error concealment. The control information described in Section 6.2.3. of Ref.1 (Chapter 3, Part 3) is not used. However, other information could be transmitted by the same means, i.e: two information bits such that one modifies samples 55 to 59, and the other samples 60 to 64. NICAM receivers should be designed to take account of this facility.

MODULATION PARAMETERS

The characteristics of the AM vision (vestigial sideband) and FM sound are defined in the UK specification for PAL system-I transmissions (Ref.3), with the exception that the FM sound carrier power is 10dB down with respect to the vision carrier, instead of 7 dB. In the case of PAL system-B/G transmission, the definitions given in CCIR Report 624-3 apply.

The NICAM signal in the baseband is classified as differentially encoded quadrature phase shift keying (DQPSK or 4-phase DPSK). This is four-state phase modulation system in which each change of state conveys two data bits. The input

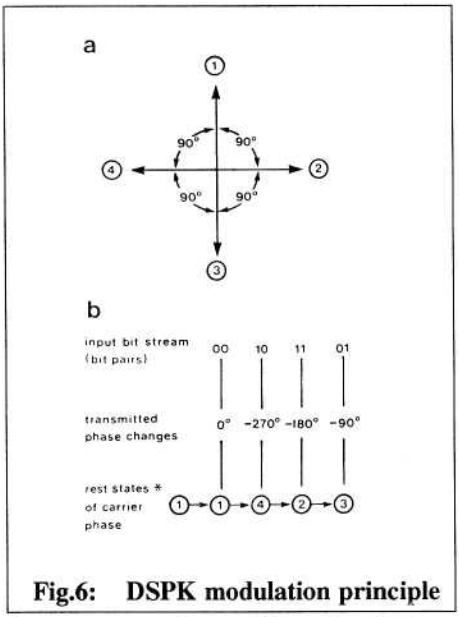


Fig.6: DSPK modulation principle

data stream at the modulator is differentially encoded. This is done in two steps: (1) serial to two-bit parallel conversion, And (2) coding of the transmitted phase changes.

The amounts of the changes of carrier phase which correspond to the four possible values of the input bit pairs (An - Bn) are shown in Table 3. Thus, the carrier phase can be at one of four rest-states which are spaced at intervals of 90 apart (Fig.6a). An input bit-pair will shift the carrier phase into a different rest-state by the amount of phase change assigned to that particular value of bit-pair. The transmitted phase-changes and resulting carrier rest-states for the input bit-pair sequence 00, 01, 11 and 01 are illustrated in Fig.6b.

Input bit-pair		Amount by which the carrier changes phase
A_n	B_n	
0	0	0° (no change)
0	1	-90°
1	0	-270
1	1	-180°

Table.3: DQPSK carrier state changes

In the receiver, the transmitted data stream may be unambiguously recovered by determining the phase-changes between one bit-pair and the next. It was already mentioned that spectrum-shaping techniques are applied to keep the bandwidth of the NICAM signal in the baseband within limits. For best performance in the presence of random noise, the amplitude/frequency response of data spectrum-shaping filters at the receiver should be identical to that at the transmitter. The target amplitude frequency response, Ht(f), is given by:

$$H_T(f) = \begin{cases} \cos\dfrac{\pi f t_s}{2} & \text{if } 0 \le f \le \dfrac{1}{t_s} \\ 0 & \text{if } f > \dfrac{1}{t_s} \end{cases}$$

$$\text{where } t_s = \frac{1}{364{,}000} \text{ s}$$

and the filter has a constant group delay for all frequencies < 1/ts. The filter made on the basis of the above transfer characteristic has a 100% cosine roll-off (for PAL systems B and G a filter with 40% cosine roll-off is required).

In the UK, the NICAM subcarrier is located at 6.552 MHz above the frequency of the vision carrier (see Fig.1). This frequency is obtained by multiplying the transmitted bit-rate (728 Kbit/s) by 9. In countries where Pal systems-B or -G is

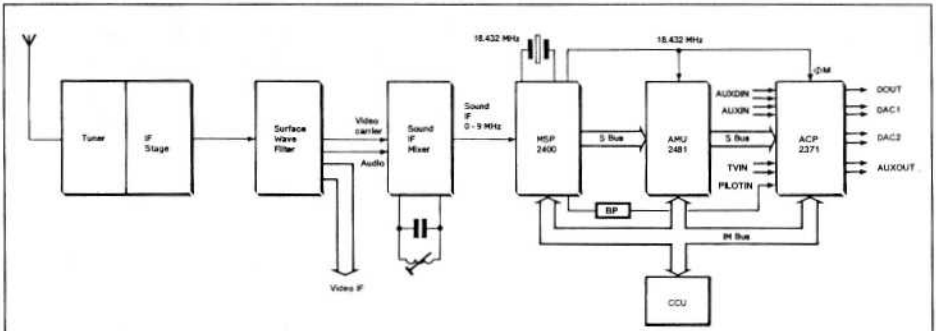


Fig.7: NICAM Decoder concept proposed by ITT Semiconducters

used the subcarrier frequency is +5.850MHz.

NICAM DECODER CONCEPTS

Among the IC manufactures that have developed NICAM processors for use in commercial-grade receivers are ITT Semi-conductors of Germany, and Micronas, Inc. of Finland.

A decoder based on ICs from the latter manufacture will be described in the next issue.

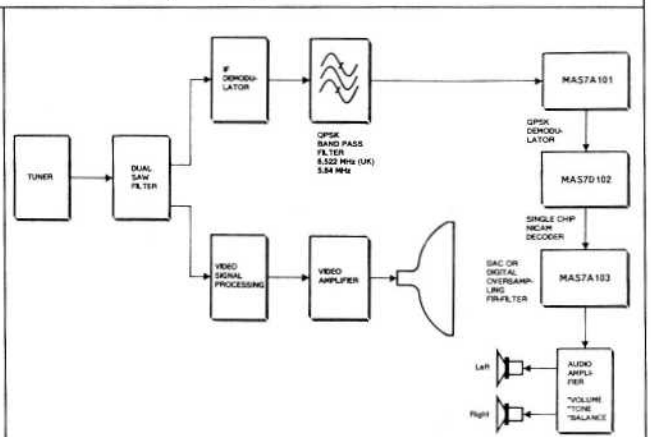


Fig.8: NICAM Decoder concept by Micronas Inc.

ITT Semiconductors have integrated their NICAM processors, the MSP2400 and MSP2410, into the Digit 2000 TV system. Fig.7 shows the block diagram of the ITT approach. Apart from the MSP2400 or MSP2410, two additional ICs are required, the AMU2481 and the ACP2371. Remarkably, the MSP2400 has a digital filter to extract the NICAM information from the baseband spectrum (0 to 9MHz). This is in contrast to the Micronas circuit (Fig.8), which uses a conventional L-C bandpass filter tuned to 5.84 MHz (PAL system B/G) or 6.552 MHz (PAL system I).

The ITT circuit has a number of interesting options such as multi-standard sound processing and automatic standard recognition and switching. The configuration as shown in Fig.7 is capable of handling mono FM, stereo FM (the German dual-carrier system) and all NICAM modes (a special version of the ACP2371 is available for satellite TV sound). The disadvantage of the ITT circuit is, howe-

ver, that it can not work without control software, and this is where the Micronas system has the edge on the ITT system: it can work 'stand alone', and offers an optional way of computer control.

SOURCES

(1) NICAM-728: specification for two additional digital sound channels with System-I television.

(2) Document SPB 424, 3rd revised edition, European Broadcasting Union.

REFERENCES

1. *Specification of the system of the MAC/Packet family.* European Broadcasting Union (EBU) Technical Document 3285 (1986).

2. CCITT red Book, Volume III, Fascicle III.4: *Transmission of sound-programme and television signals, recommendation J.17 'Pre-emphasis used on sound-programme circuits'.*

3. *Specification of Television Standards for 625-line System I transmissions in the United Kingdom.* Department of Trade and Industry, Radio Regulatory Division, London, 1984.

HI-FI SOUND ON 24cm ATV

John Stockley G8MNY

On testing several 6 MHz intercarrier designs, I found that most of them did not come up to scratch, some don't attempt to conform to any of the accepted standards. Give your transmitter the square wave test at 10% level and see how bad, or good, it is.

Try going through these check items:-

TRANSMIT Check list:

1. Check Transmit is on 6.000 MHz? (error of 5 kHz means 10% off channel).
2. Deviation limited to +/- 50KHz?
3. Deviation symmetrical?
4. 75us pre-emphasis working? (6 times 1 kHz level at 15 kHz)
5. Is there a vision trap at 6 MHz?
6. 6 MHz injection level adjustable to -15dB of carrier.

RECEIVE Check list

1. Receive has 6 MHz filter?
2. Discriminator is centred on 6 MHz?
3. 75us de-emphasis working? (15 kHz 1/6 of 1 kHz)
4. LF OK down to 30 Hz?

STANDARDS

The 75us emphasis standard should be used, as this will give best improvements on distortion and noise with "non music" audio. There is only a 3 dB difference between the 50 and 75uS standards anyway! The deviation should be set at 50 kHz as this is the bandwidth that 6 MHz receive filters are designed for.

When tone testing make sure your not over loading the modulator, by starting with the uplifted 15 kHz first and checking the deviation. It is best to limit (clip) the deviation by using a potentiometer after the last audio stage (Fig 1).

DEVIATION

The correct deviation can be set up by using a DC oscilloscope and a frequency counter. (Note: the frequency counter may pull the oscillator when connected!). First set the frequency to 6 MHz, then put the oscilloscope probe onto the output of the preset deviation control.

Connect up a potentiometer (1k-100k) across the supply rail and use the DC on the slider to swing the opamp's bias up and down, and hence the varicap diode DC bias high and low. This then lets you calibrate the oscilloscope for the +/- 50 kHz points. (Note: it will not be symmetrical due to the varicap diode's characteristics).

Now remove the added bias circuit and apply overloading audio, and adjust the deviation preset so that the clipped waveform is at the same level.

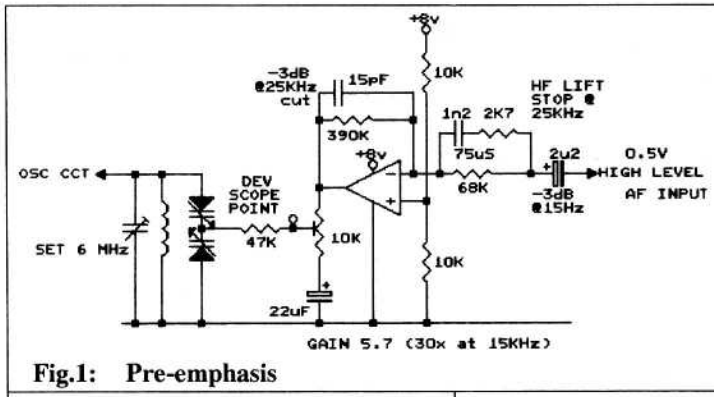
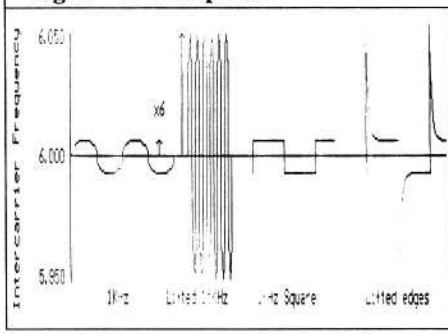


Fig.1: Pre-emphasis



IMPROVEMENTS

I noted that most circuits use a 100k series resistor to feed the varicap diode. However the capacitance of the varicap diode with the 100k resistor, may be high enough to cut the HF response at 15 kHz, so use a 47K resistor instead.

Opamps can also cause problems if they are pushed to their "gain bandwidth product" limit. Remember, the amp doing the pre-emphasis has to give 6 times more gain at 15 kHz, so limit its gain to a sensible value, and stick another one in front if need be.

In the receiver there is not too much to go wrong, possibly the de-emphasis capacitor/resistor value is way out of tolerance, or the capacitors in the output amplifier are too low for the LF response.

RESULTS

So far the "tune ups" have been very good, with a 30 Hz to 20 kHz frequency response to the -3dB points, instead of the 100 Hz to 4 kHz starting point. The mono output is now good enough to go into Hi-Fi system, and those steam engine videos now not only look good but sound good too! Under marginal signal reception conditions (P2-3) best results are obtained when modulation levels are maintained at just under clipping level. I use an audio AGC limiter circuit to give high levels with minimal risk of overloading, but watch out for excessive compression!

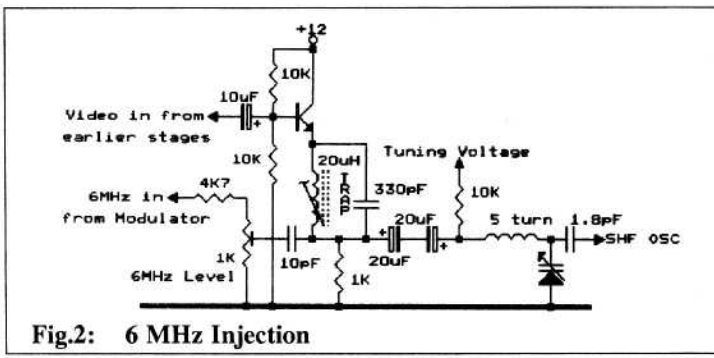


Fig.2: 6 MHz Injection

MODIFYING BSB RECEIVERS FOR RECEPTION OF D2 MAC SIGNALS

Trevor Brown G8CJS

After last issue's D Mac Packet overview, a number of you have written and asked what is the difference between D Mac and D2 Mac with a view to using BSB receivers for D2 Mac reception. The imminent demise of the BSB service on Marco Polo means that BSB equipment can often be found new and boxed for £20, try ringing a few of your local Satellite shops. It was not too long ago that they would have been asking £400 for this same equipment.

If the receivers can be converted to D2 Mac then there will still be satellites around to watch after Marco Polo stops broadcasting the BSB service at the end of this year.

The video part of the waveform is the same for D Mac D2 Mac and C Mac what changes is the data format. C Mac and D Mac both use a data rate of 20.25 MHz D Mac uses Duobinary data (see the diagram at the top of page 44 in the last issue). C Mac uses 2-4 QPSK. D2 Mac also uses Duobinary data, but instead of 20.25 MHz the data speed is halved to 10.125 MHz, This reduces system bandwidth at the expense of data capacity, but is the system favoured by Europe.

The richest source of D2 Mac signals is 19 degrees west, where TDF1 and 2, TVSAT 1 and 2, and Olympus are located. The later being used for experimental work with some of its transponder frequencies above the normal tuning of BSB receivers.

Both TDF and TV SAT use circular polarisation, TDF uses Right Hand circular and even channel numbers and TV SAT uses left hand polarisation and odd channel numbers. In this way they can both coexist at the same location without interfering with each other.

CONVERTING A SQUARIAL

If you are using an unaltered Squarial then you will only be able to see the French TDF channels,(MCM Music, Canal+, la Sept, and Antenna 2.) because the Squarial is right hand polarised.

To receive TV SAT on a Squarial you need to convert it to left hand polarisation. This is done by removing the front which is secured on by self tapping screws around the rear edge of the aerial. Now carefully remove the director plate and foam spacer, having noted their positions, remove the printed circuit membrane, turnover, replace and reassemble.

Most of the small BSB dishes with the exception of the Philips can be changed to left hand or linear polarisation by

twisting the polyrod polariser, unfortunately the polyrod polariser is glued in the right hand mode and needs the glue seal breaking. To do this first remove the black conical cover to expose the white polyrod polariser and wrap some good wide sticky tape around it to get a good purchase and then try pulling, to break the seal, if it is stubborn then immersing the barrel only part of the LNB in boiling water may help.

If you get one that does not cooperate in this way then the LNB needs to be taken apart. This entails drilling out the rivets and de soldering the PCB. The white plastic polyrod can then be knocked out from the inside using a mallet and wooden block. The LNB can then be reassembled and the rivets replaced with nuts and bolts.

The polyrod polariser can then be pushed back into place in one of three positions preset by notches in the barrel left, right, and linear. Left for TV SAT and right for BSB and TDF. If you choose linear then the signals will be reduced in signal strength and some sparkles result here in the north of England, it is also difficult to separate TDF and TV SAT channels. The best system is to use the circular settings and move the polariser when you change from TDF to TV SAT the dish does not need re positioning unless you move to BSB (Marco Polo) 32 degrees west.

If the dish is mounted in an easily accessible position, then changing the position of the polyrod polariser is easy. Re aligning the dish to BSB is not quite as simple and perhaps a pair of dishes or three Squarials (BSB TDF TV SAT) and three downleads and a change over system is the answer for cold winter evenings.

Aligning the dish on TDF1 or if you change the polarisation on TV SAT, can easily be accomplished by using the install menu, only the signal strength meter will not work on either of these Satellites.

Some of the spare channels are usually tuned to either TDF or TV SAT it depends on your receiver. The problem is they will not lock and will be mute because the sound and sync are part of the data system, and we have a set which is looking for D Mac not D2 Mac data.

THE PHILIPS RECEIVER CONVERSION

The conversion for the Philips receiver was a software change only, the software (80C31 code) resides in EPROM and is complex as it was compiled from a high level language. Peter Anderson was the first person to attempt the necessary changes. I tried his EPROM in a Philips set first.

The EPROM is fitted into a socket which is located by removing the top cover to expose the PCB and is located at the front left of the PCB (component 7502 on the PCB legend).

The new software is in EPROM, i.e: it has the glass window; the old software was mask programmed, i.e: had no window, but both chips are compatible, just get it the right way round in its socket.

Once the new software is fitted the TDF or TV SAT channels will lock in. I now had to find out how to work the set all over again, but I was pleased with the results, but for only one problem, a repeated relocking of the sound and picture every few minutes. The disturbance was slight but there.

If you enter the set up menu by removing the case and shorting links 9505 and 9506 together for a few seconds, then you can minimise the disturbance by setting up the VCO using the menu option 4 and the third and forth buttons from the bottom left of the hand set, followed by the menu button and 6 to store it.

The only problem is that this menu that normally controls the VCO and RGB drives is difficult to read on the D2 MAC software because it is wrapped around. The answer being to practice on Marco Polo with the normal BSB software fitted, you can then cope with the wrapped around menu presented by the D2 software.

This D2 Mac software also allows you to switch back to D Mac and BSB by pressing the next programme button and after a delay of 2 seconds up comes BSB, to go back to D2 Mac just press the button again. The Philips channels are divided into bands with the third and fourth buttons from the bottom left performing the necessary band change.

To receive ANT 2, a shift change is required and is not indicated in the channel display nor will it happen automatically on the channel increment and decrement buttons.

One fix for this locking problem is to enter the install menu where the problem does not occur and then remove the menu on screen display by bending pin-19 of the connection to the ACM (the piggy back PCB) out of the module and grounding it. This removes the half wipe menu, but stops the channel change from working so you need to add a changeover switch, so the connection can be restored to the ACM. Clearly this is not an elegant fix.

The second set of software I tried was written by Richard Russell, Brandon Butterworth, and Steve Rogers. This software was free from the locking problems of Peters Software and also enabled me to access the additional sound channels located on most of the channels by stepping through them with the left and right arrow keys located in the blue part of the handset. The sound channel is indicated on the 7-segment display and resets to the original programme sound on changing channel.

The menu's are again distorted, as was the case with Peter's software, but if you half the speed of the pixel clock this is to be expected and it is not difficult to work the set without them.

This software was easier to drive with all the channels of TDF and TV SAT programmed on the normal 1 to 8 and BBC\ESA\EURO (Olympus) on button 9 and TV3 Norway (Astra) on button 10. This prom however does not allow you to switch back to D mac for BSB working, this will soon not be a problem when Sky discontinue their Marco Polo service at Christmas.

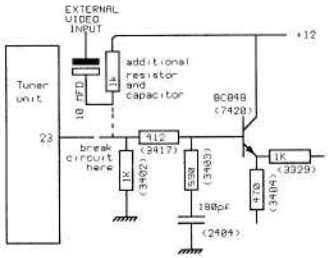


Fig.1: External Video input for the Philips receiver

I also investigated on the Philips how to feed an external baseband signal into the receiver so I could have a look at the D mac signals that I keep coming across on my Astra receiver.

Remember the tuning of BSB receivers is preset in the software. The output of the tuner pin-23 requires disconnecting and an external resistor fitting to pull up the base of the BC 848 in the absence of the tuner. The external baseband output of the Astra receiver can then be fed in via a capacitor and the D2 Mac signal is decoded and displayed by the Philips receiver. The components are easy to locate and I have included their part numbers in brackets which are printed on the PCB adjacent to the components. (Fig.1).

CONVERTING THE FERGUSON RECEIVER

I tried the Ferguson SRB1 software next, this was also an EPROM change but the Ferguson set uses the CCU 3000 MPU (6502 instruction set) so the software is different. It was free from the locking problems of Peters D2 Mac software. It also had the advantage of access to the other sound channels. This is achieved by pressing the cancel button and then the + and - buttons to cycle through these additional audio channels which are indicated as L0, L1, L2 and L3 on the 7-segment channel display.

The Ferguson would also cope with the wide screen transmissions often found on Antenna 2. Pressing the menu key expands the picture to 16:9 and requires panning, which is at this stage under the control of the broadcaster. To control the panning from the handset shift and enter and you can control panning from the left and right arrow keys, the view key returns you to 4:3 format.

The Ferguson SRB1 also has continuous tuning in 5 MHz steps to enter this mode press the test button on the rear and the display window will indicate A1, the arrow keys will toggle this to A1 or B1. These are the two frequency blocks the A1 is the first 400 MHz in 5 MHz steps and the B1 is the second 400 MHz again in 5 MHz steps.

This means you can step your way up the band with the programme up and down keys, but the B1 section needs hardware mods in the form of an increased tuning supply voltage. The first 10 channels in both blocks are set to existing TDF or TV Sat channels then after that you can work your way up the band in 5 MHz increments.

The Ferguson software would not switch between D Mac and D2 Mac. To fix this problem I had to resort to putting the BSB software into the bottom of a 27512 and the D2MAC software into the top,

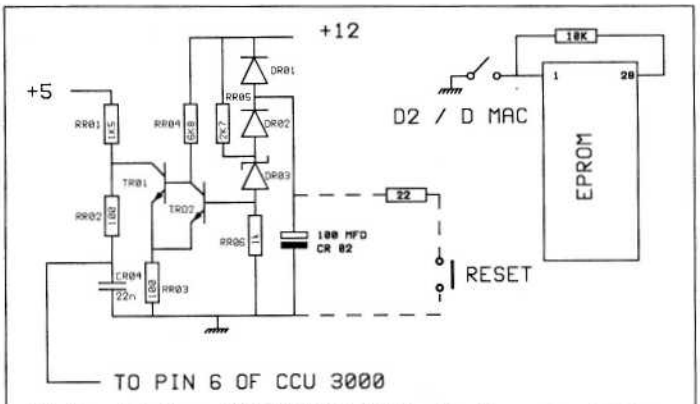


Fig.2: Paging a 27512 EPROM in the ferguson receiver

you can then switch between with a hardware switch fitted to pin-1 (A15) of the EPROM and wired Via a 10k resistor to +5 which is on pin-28 of the EPROM. I could then add a toggle switch between pin-1 and ground to page the EPROM between the two sets of software.

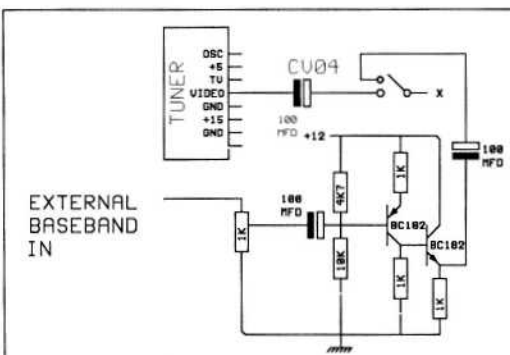
Paging the EPROM must be followed by a reset to the micro processor and this I initially achieved by switching the unit off and on again.

A more elegant fix that involves some PCB track following is to add a reset button that will momentary ground pin-6 of the CPU. This is driven by a reset generator TR1 TR2 the push-button needs connecting across CR 02 and should include a small series resistor of about 22 ohms. (Fig.2).

There is no doubt that these receivers are very nice to play with and the small dishes are very friendly to use and can easily be panned between Marco Polo at 32 degrees west and TDF and TV SAT at 19 degrees west. They only tune 400 MHz which is enough for the DBS band (950 MHz to 1350 MHz at the receiver).

The tuning is preset by the software. As was the case with the Philips a base band input can be added by locating CV 06 and lifting the end not connected to the tuner and putting a change over switch in series with it, you can then add the little inverting amplifier below to enable the switch to select tuner or base band input.

Other mods are around that enable both the Ferguson and Philips to tune higher for use on Astra.



CV 04 originally went between the tuner and point x

Fig.3: Baseband input for the Ferguson receiver

The experts on the Ferguson receiver are Track Systems who sell the modified receivers and also the Ferguson software they can be reached on 0642 468145 or Fax: 0642 440927.

The Philips software is at present on my desk and I will investigate if it can be made available, so at this point in time I can only say send me an SAE and If I can find a way to legally distribute it I will.

Satellite	Channel	Frequency	Polarisation
18.8 degrees west			
TDF	MCM Euromusic	11.727	RH circular
TDF	Canal Plus	11.804	RH circular
TDF	La Sept	11.881	RH circular
TDF	Antenna 2	12.034	RH circular
Note: Canal+ is often scrambled using Eurocrypt			
19.2 degrees west			
TV SAT	RTL+	11.747	LH circular
TV SAT	SAT1	11.823	LH circular
TV SAT	3SAT	11.900	LH circular
TV SAT	Eins Plus	12.054	LH circular
19.2 degrees west			
OLYMPUS		12.092	RH
OLYMPUS		12.168	tuning volts need
OLYMPUS		12.530	lifting for these
OLYMPUS		12.570	3 transponders
Marco Polo		12.091	RH circular
Marco Polo		11.938	RH circular
Marco Polo		11.861	RH circular
Marco Polo		12.015	RH circular
Marco Polo		11.785	RH circular

MCM Euromusic is none stop pop music all day long, 75% of which is English. The quality of the video source material is excellent and the digital sound puts MTV to shame. Canal Plus is the French encrypted movie channel . La Sept a mix of news, sport, documentary, and game shows. Antenne 2 is rather like the BBC in news, sport, movies, and light entertainment. RTL Plus lots of imported soaps all sound dubbed to German language with some sport and a rather famous strip quiz show. SAT 1 similar to RTL Plus without the Strip Quiz show. 3SAT European arts show, opera and ballet all in German language which you either hate or love and if you love it then the digital stereo must add to its attraction. Eins Plus German seems to be discussions and little programming.

SATELLITE TV NEWS

Paul Holland G3TZO

OPENING SPEECH !

This issue of CQ-TV marks my first attempt at editing the SATELLITE NEWS section of the magazine following our Chairman's plea for volunteers for this job in the February issue. I did let several weeks elapse to allow sufficient time for others to get their bids in, but as you can see my timing was still somewhat imperfect !

My purpose with this column in CQ-TV is to build on the work that Trevor Brown has already started in previous issues. I hope to both stimulate and mirror interest within the BATC for all aspects of Satellite TV transmission and reception. It goes with out saying therefore, that unless you the members tell me what interests you, then you will only read what interests me !!

WHAT TO EXPECT

In each issue I plan to cover a range of topics. Bearing in mind the long lead times for publication and the highly transitory nature of transponder activity, I will not report on sporadic sightings for each orbital position. I will, however, comment on planned activity of a more permanent nature, where it is likely that the information will still be news when you are going to be reading it.

I hope to include footprint information on those satellites for which information has not been widely published. This issue includes info on the Telecom 2A & 2B Satellites at 8.0 and 5.0 deg W . I will, if possible, include reviews for those bits of kit rarely covered in such publications as "What Satellite". This ambition can only be fulfilled if I can cajole somebody to offer me the material for review. Any offers ?

Finally, I hope we can use this column to share ideas on developing techniques and systems for satellite reception. From my lowly base of technical expertise I will pass on my excuses for why I couldn't get something to work, as well as relaying your successes in performing the technically impossible at absolutely no cost.

Please write to me and let me know what you are doing and what you would like to hear about.

ABOUT D2MAC

Elsewhere in this issue Trevor Brown is expanding on his previous articles dealing with the emerging D2MAC standard. Although much of what is currently broadcast in D2MAC is Eurocrypt encrypted, D2MAC offers a fascinating avenue of exploration with the multitude of features and facilities it offers over the existing PAL standard. During the Winter Olympics from Albertville a number of broadcasters provided 16:9 and HDTV programming via Satellite, using both D2MAC and HD-MAC. German Broad-

caster ZDF relayed Vision 1250's HDTV coverage via ASTRA. This was subsequently claimed as a dirty trick by proponents of HD-MAC as the future European standard. They claimed that ZDF was attempting to discredit DTH broadcasting of HDTV as a result of the claimed poor performance achieved in the tests by ZDF using only 60cm antenna at locations across Europe.

My own experience of D2MAC to date has shown it to be a real competitor to PAL transmissions via satellite. The immediate benefit is in the area of marginal picture quality. Although a PAL transmission can be copied right down to the equivalent of a P1 picture, there can be sometimes quite annoying effects of chrominance noise at really quite healthy receive levels (fixed receiver bandwidth probably influences this fact). Although at low levels a D2MAC transmission tends to drop out and fail to decode properly, the tolerance of the signal-to-noise above this threshold appears to very good. My own experience of TV link testing expired with pulse and bar/staircase measurements. Can anyone shed light on what objective and subjective tests are used by D2MAC broadcasters to measure broadcast quality for transmissions via satellite.

TRANSPONDER REPORT

DFS 1 Kopernikus 23.8 Deg E.

TP B(L) 11.548 V formerly occupied by Eurosport has been taken over by a new channel called ARTE. This channel is understood to be a collaboration with the French La Sept channel and is also being carried on TDF1A.

ASTRA 1A & 1B 19.2 Deg E.

The new resident of TP 22 is MTV. This dual illumination is geared at improving reception of MTV in Spain and even N.Africa. A launch date for Thames Gold, the Thames TV/BBC enterprises light entertainment channel, is now imminent.

Thames are exercising their long held option on ASTRA 1B. The choice of potential transponder is limited unless SES goes in for some kind of celestial musical chairs.

Rumours circulating in the press indicate that both Discovery and Bravo, now on Intelsat VI F4 at 27.5 W, will move to 19 Deg E with the launch of ASTRA 1C. A "GAMES CHANNEL" is also rumoured to be awaiting the launch of Astra 1C.

In the interim it is likely that the company involved, Chrysalis, will use Intelsat VI F4 27.5 Deg West launching some time in the Autumn.

Eutelsat II F3 16 Deg E.

Scheduled to commence in June was RTPI, Portugal's answer to TVE International. This new channel for Eutelsat 2 F3 is planned to occupy TP 37 (11.566 V). Transmission times were scheduled at the time of writing for three to four hours per day commencing at 1630 GMT.

Another new station to look out for from this satellite is "HOT TV'. This French based service is planned go live before September and so far indications are that the service will be PAL. Encryption will be Videocrypt with smart cards available via mail order from France at a monthly fee of FF90. Transmissions will com-

mence at 2200 British Time for 4 hours per day, 7 days a week.

Incidentally, the word "hot" in the title for this channel will relate to the temperatures under our ITC's collars when transmissions start. All this should give enough clues as to what "HOT TV' is scheduled to show !!

Telecom 2B 3.0 Deg E.

Telecom 2B launched in late April. Testing started in late May on the same frequencies utilised by Telecom 2A. Most transponders have been active with unmodulated carriers observed during the first few weeks of the testing phase. A move soon to 5 Deg W to take over from Telecom 1 C will follow. As Telecom 1C has at least 2-3 years life left it is likely that it will relocate in due course to either 3 Deg E (reserved for Telecom 2C) or 2 Deg W.

Tele X 5 Deg E.

Rumours still circulate that one of the MarcoPolo satellites will eventually end up at this position, expanding the theoretical capacity to 10 channels. No firm news is expected on this possibility until "letters of interest" to take over from B-SKY-B at 31 Deg west are lodged with the ITC. The formal cut off date for this was June 3rd, so news may well be leaking out by now of the degree of interest shown.

Telecom 1C 5 Deg W.

Following the collapse of La Cinq in April, TP R3 was observed for many weeks with just an unmodulated carrier. Plans were announced for ARTE, a Franco/German cultural channel, to take over this transponder. However, ARTE commenced transmissions only on DFS1 Kopernikus and TDF1A when it launched on May 30th.

Telecom 2A 8 Deg W.

The first live transmissions since Telecom 2A moved to this position from 3 Deg E were observed in late May. TP R3 relayed Antenna 2's coverage of the French Open Tennis in D2MAC.

The current row between the French Government, which is backing France Telecom's Visiopass (Eurocrypt) in D2MAC, and CANAL PLUS who want to use NAGRAVISION in SECAM is, as I write, still unresolved. The effect of this to date is that all eleven transponders have been active with little more exciting than a combination of PAL, SECAM and D2MAC test cards.

Intelsat K 21.5 Deg W.

The launch of INTELSAT K, planned for May 21st, was cancelled. No new date was available as deadlines for this issue approached. Planned footprints for Intelsat K give a level of 48dBW across the majority of the UK. The satellite will carry 16 54 Mhz Transponders downlinking in the ECS and Telecom Bands.

PROFILE - TELECOM 2A & B

The Telecom 2 series of satellites (2A, 2B & 2C) are operated by France Telecom and carry both C and Ku Band transponders. The Ku Band signal power within the main zone is increased to 52 dBW, from the Telecom 1 series which provided only 47dBW. Telecom 2A initially came into service at 3.0 Deg E carrying a multiple of feeds from the

Winter Olympics at Albertville. It has now taken up its permanent position at 8.0 Deg West from where it is planned to carry the Canal Plus Bouquet of 8 Channels. Telecom 2B's launch followed some two months after 2A and will take over from Telecom 1C at 5 Deg W. Telecom 2C will eventually reside at 3 Deg E.

The footprinst for these satellites (Fig.1) shos that for the majority of England and Wales good reception with a 60cm dish should be possible. For the rest of the UK 90 cm should prove adequate.

Telecom 2A principle information:

11 Ku Band transponders:

TP R1 12.522 V	TP R7 12.543 H
TP R2 12.564 V	TP R8 12.585 H
TP R3 12.606 V	TP R9 12.627 H
TP R4 12.648 V	TP R10 12.669 H
TP R5 12.690 V	TP R11 12.711 H
TP R6 12.732 V	

Power @ TWT 55 Watts
Transponder Bandwidth 36 MHz
Operating life : 10 yrs.

NEW AT CABLE & SATELLITE '92

This years Cable and Satellite show at Olympia, back in April, revealed little which was really new in Satellite TV. One exception to this was the display by Space & Scientific of both S and C-Band Yagis.

The two antenna illustrated here (see centre fold!) both appear to be of disc/loop construction. The S-Band Yagi is available as either a two or four phased array. The C-Band Yagi comes as a quad array.

The minimal specs available at the show reveal the following:

S-Band Yagi:
Freq 2.5 - 2.75 Ghz
Gain 24dBi (2 Phased arrays)
Input VSWR 1.2:1
Boom 2.8 Metres
Max Dia 5cm
LNB output 950-1250 Mhz
LNB NF < 75 deg K (approx 1.0 dB)
Gain > 50dB

C-Band Yagi:
Freq 3.7 - 4.2 GHz
Gain 36 dBi
Input Return Loss 20dB
Boom 2 Metres Max
Dia - not quoted
LNB output - not quoted
LNB NF - not quoted
Gain - not quoted

The S-Band antenna is aimed principally at Arabsat 1B and 1C reception from 26 & 31 Deg E respectively. By now TV Egypt should have moved from Arabsat 1A at 19.0 deg E to Arabsat 1C. Assuming the transponder allocation is identical it should be found on TP 1A, 2.560 Ghz (Linear polarisation).

The C-Band antenna is marketed for the far east as ideal for Asiasat, 116 deg E. As this satellite utilises linear polarisation, it begs the question of how the antenna performs on circularly polarised signals which are the norm for most C-Band satellites in Region 1.

I am trying to get my hands on one to find out - come on you nice chaps at Space and Scientific !!

C Band programme details for Arabsat 1C are as follows:

TP	Frequency	Pol	Programme
7	3.829 GHz	RHCP	CNN
15	3.975 GHz	RHCP	Saudi 1
19	4.061 GHz	RHCP	Saudi 2
24A	4.137 GHz	LHCP	Doordarshan TV (India)
20	4.070 GHz	RHCP	Oman TV
22B	4.115 GHz	RHCP	Doordarshan TV
24A	4.137 GHz	LHCP	Doordarshan TV
26B	4.188 GHZ	LHCP	Doordarshan TV

TECHNICAL TIPS

For those of you possessing the Chapparal Monterey receiver, I have received details of some useful mods. These cover audio loop through, removal of patterning due to 5.8 Mhz audio subcarriers, improving the 13/17V LNB switching capability, reducing parasitic video patterning and improving the extended frequency tuning ability of receivers with no 70 Mhz IF loop facility.

Well that it for this issue. Please let me have your news and views on all matters relating to Satellite TV. If you would like a reply please let me have an SAE. I can be contacted by telephone (answer machine) on 094881 476 or at the address below.

With your input I can hopefully make this column one which can stimulate further interest within the club and helps us all develop our interest in this aspect of the hobby.

Paul Holland G3TZO, Chatterton, Chapel Lane, Threapwood, Nr.Malpas, Cheshire, SY14 7AX.

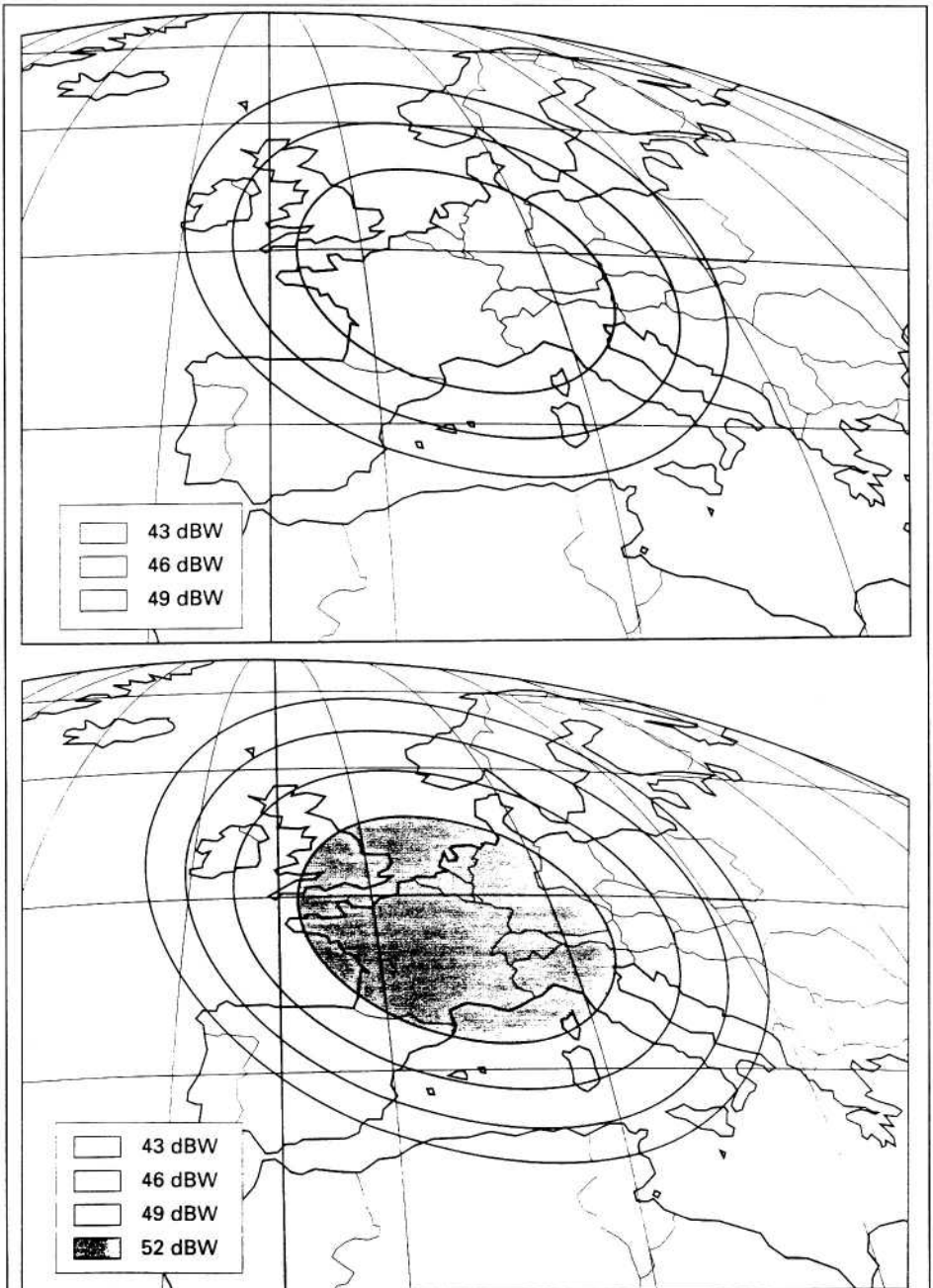
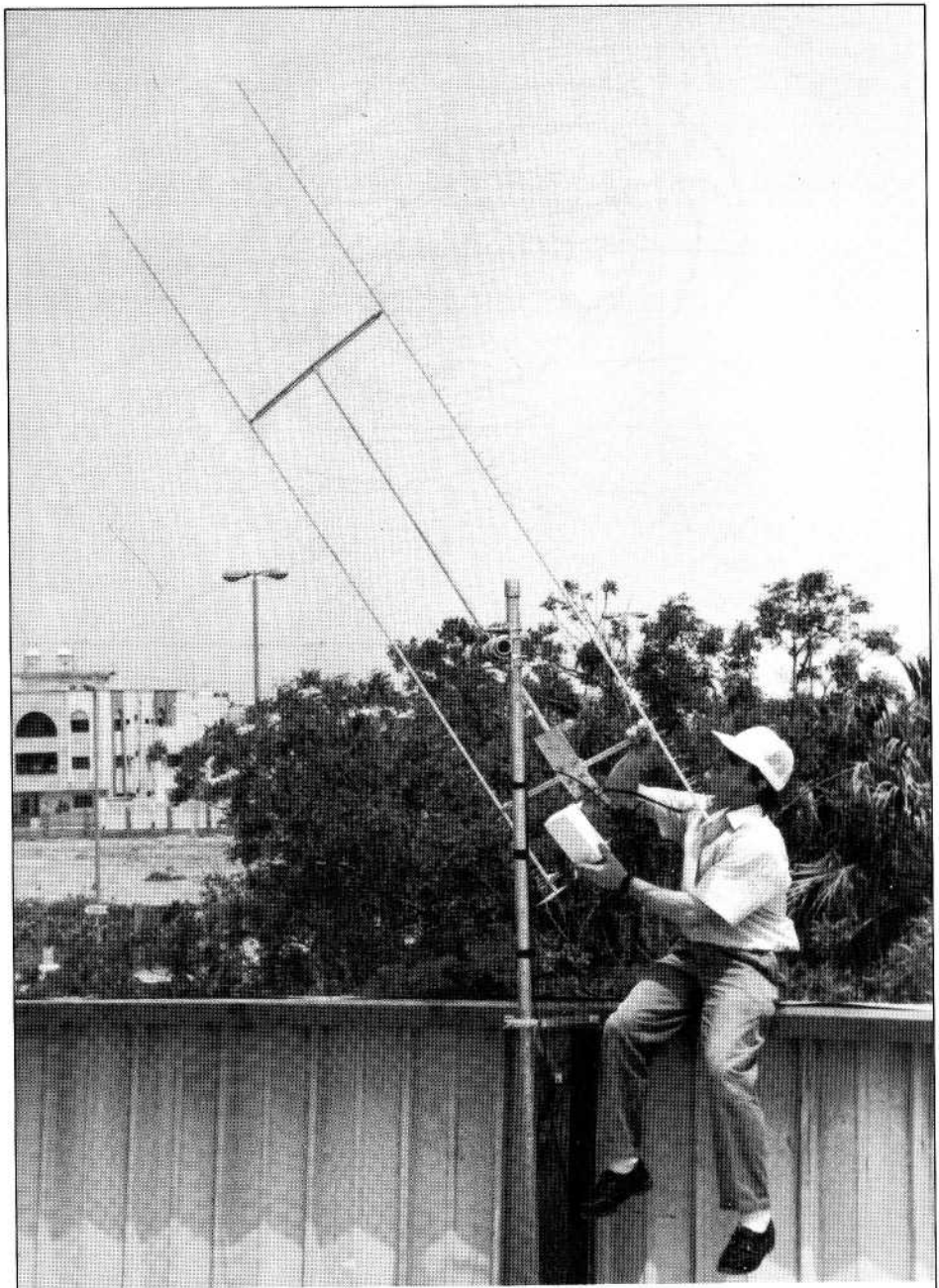


Fig.1: Footprints for Telecom 1 and 2



The S-Band Yagi array from Space and Scientific

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PUBLICATION	EACH	QTY	AMOUNT
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THE AMATEUR TV COMPENDIUM (155gm) by Mike Wooding G6IQM. A BATC handbook featuring construction articles on video units, 24CM and 3CM ATV, a Digital Frame Store, and much more.	£3.50	.....	.....
THE BEST OF CQ-TV (150gm) By Mike Wooding G6IQM A compilation of the best construction articles from CQ-TV's 133 to 146.	£3.50	.....	.....
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153, 154, 155, 156, 157, 158, 159	£2.00	.....	.....
Special Offer Any four back issues	£5.00	.....	.....
	TOTAL THIS PAGE		£.....

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Photocopies of any article from past publications are available. Please quote the issue number, page numbers and the article name. Discounts as shown, prices are per sheet:			
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CQ-TV BINDERS	£3.50	.....	.....
BATC The Video	£3.50	.....	.....

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MEMBERS' SERVICES

Items from these lists can ONLY be supplied to CURRENT members of the BATC. These lists supersede all previous ones. Components for club projects are not available from Members Services unless contained within these lists.

PUBLICATIONS should NOT be ordered on this form. A separate form is provided for that purpose elsewhere in this supplement. We reserve the right to change prices without notice.
All Club crystals are HC18/U (wire ended).

1" vidicon tubes are available in different heater ratings (95 and 300mA) - 6" long; (EMI types 9677, 9728 and EEV types P849). 2/3" tubes have 95mA heaters (EEV type P8037). These tubes are all of separate mesh construction, with magnetic focus. Electrostatic vidicon and Leddicon tubes are available, to special order. Members requesting information on prices or other types of tube or equivalents are asked to send a stamped, addressed envelope for their reply.

STK NO.	QTY	CAMERA TUBES, SCAN COILS, BASES & LENS MOUNTS	EACH	P&P	TOTAL
1	.....	One inch Vidicon scan coils	£6.00	£1.40	.....
2	.....	2/3 inch Vidicon scan-coils	£6.00	0.90	.....
3	.....	One inch Vidicon base	£1.00	0.27	....
4	.....	2/3 inch Vidicon base	0.65	0.27	.....
5	.....	C Mount for lens	P.O.A.	0.27	.....
6	.....	Camera tube type	-	1.00	
	QTY	VIDEO CIRCUIT BOARDS AND COMPONENTS	EACH	P&P	TOTAL
7	.....	ZNA134 Sync pulse generator PCB	£3.00	0.38	.....
8	.....	2.5625MHz crystal	£2.75	0.27	.....
11	.....	Character generator PCB	£4.00	0.35	.....
12	.....	Teletext pattern generator PCB	£3.00	0.35	.....
13	.....	Greyscale/colour bar generator PCB	£3.00	0.35	.....
14	.....	Colour test card PCB set	£15.00	0.65	.....
15	.....	TBP28L22 circle program PROM	£10.00	0.27	.....

TOTAL GOODS THIS PAGE £.....

STK	QTY	VIDEO CIRCUIT BOARDS & COMPONENTS	EACH	P&P	TOTAL
16	.....	PAL colour coder	£6.00	0.38	.....
17	.....	Character Colouriser PCB	£5.00	0.38	.....
18	.....	TEA2000 colour coder PCB	£2.00	0.27	.....
19	.....	Video filter PCB	£1.00	0.27	.....
20	.....	Vision processing amplifier PCB	£4.00	0.38	.....
21	.....	Vision switcher matrix PCB	£4.00	0.38	.....
22	.....	Vision switcher logic PCB	£4.00	0.38	.....
23	.....	Vision mix effects amplifier PCB	£4.00	0.38	.....
24	.....	Wipe effect generator PCB	£3.00	0.38	.....
25	.....	4 Input TEA5114 vision selector PCB	£3.00	0.38	.....
26	.....	Video level indicator PCB	£5.00	0.38	.....
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28	.....	Digital video read address PCB	£5.00	0.38	.....
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34	.....	Spectrum PROM blower PCB	£3.00	0.38	.....
35	.....	FLEX PROM blower PCB	£5.00	0.38	.....
40	.....	I^2C CPU PCB	£7.50	0.38	.....
41	.....	I^2C VDU PCB	£7.50	0.38	.....
42	.....	13.875 MHz Crystal	£4.00	0.27	.....
43	.....	SAA5231 genlock IC	£6.50	0.27	.....
44	.....	SAA5243PE Teletext IC	£11.50	0.27	.....
45	.....	PCF8583 Clock IC	£6.00	0.27	.....

TOTAL GOODS THIS PAGE £.....

I²C Part-7 - THE AUDIO SWITCHER

To compliment the vision switcher that was featured in part three of this supplement, we now present an audio switcher. Like the vision switcher, it has broadcast quality specifications and a doubled sided, plated through PCB is available from Members' Services.

It is an eight input (un-balanced into 47K) two-channel unit. The switching devices feed to a virtual earth bus, so you can mix as well as switch. The software allows two operating modes:

☞ **1.** Audio follow video: in this mode, the input selected is the same as the vision switcher. No mixing is allowed and there is no separate control over the audio switcher, it simply follows the vision switcher.

☞ **2.** Independent: this mode allows greater freedom of control, you can switch any of the eight inputs to either or both of the two outputs. You may turn more than one input on at any time and the result will be a mix.

The operation of the software is very similar to the way the relay menu works, pressing the letter corresponding to the input toggles that input on or off. There is however an extra menu option, this toggles the switcher between the two modes described above. When in the 'audio follow video' mode the input selections are inoperative.

CIRCUIT DESCRIPTION

There are eight identical input circuits and two identical output circuits, I will therefore describe only one of each. The circuit references will be to input circuit 1 and output circuit 1.

Audio arrives on pin A6 of the connector CON 1. It is terminated by R79 (47k) and AC coupled by C45 (1uF) to the non-inverting input of op-amp IC15a, R78 (100k) providing a DC reference. The input impedance of IC15a is extremely high, so the parallel combination of R78 and R79 set the input impedance. If a higher or lower impedance is required, alter the value of R79 appropriately.

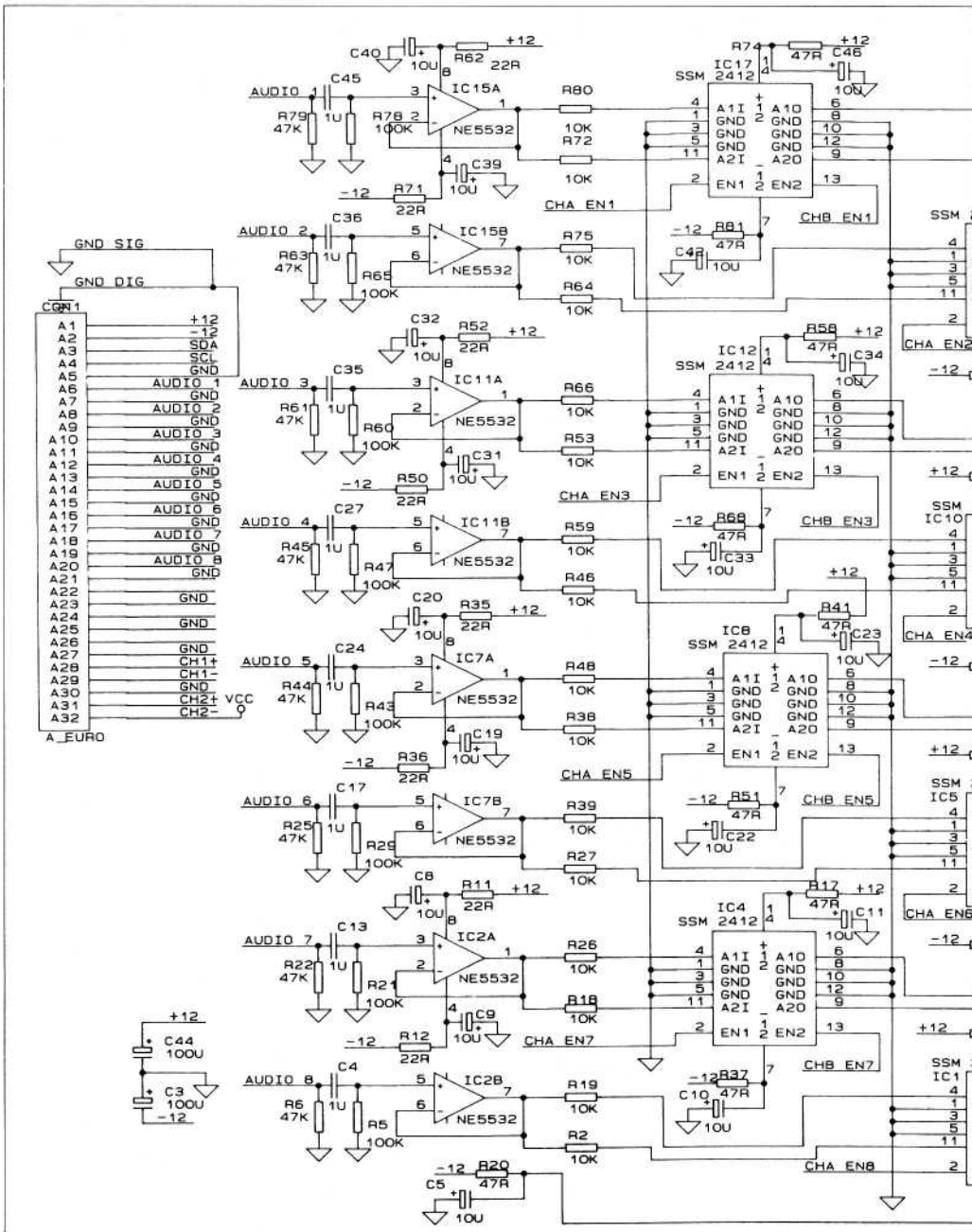
IC15a is configured as a voltage follower and has unity gain set by applying 100% negative feedback from its output pin (pin-1) to the inverting input (pin-2). It therefore acts as a buffer between the switching IC's and the outside world.

The output from the buffer is split into two, one half going to each of the two output channels (via the switch IC's). Two 10k resistors are used to perform this task (R80 and R72).

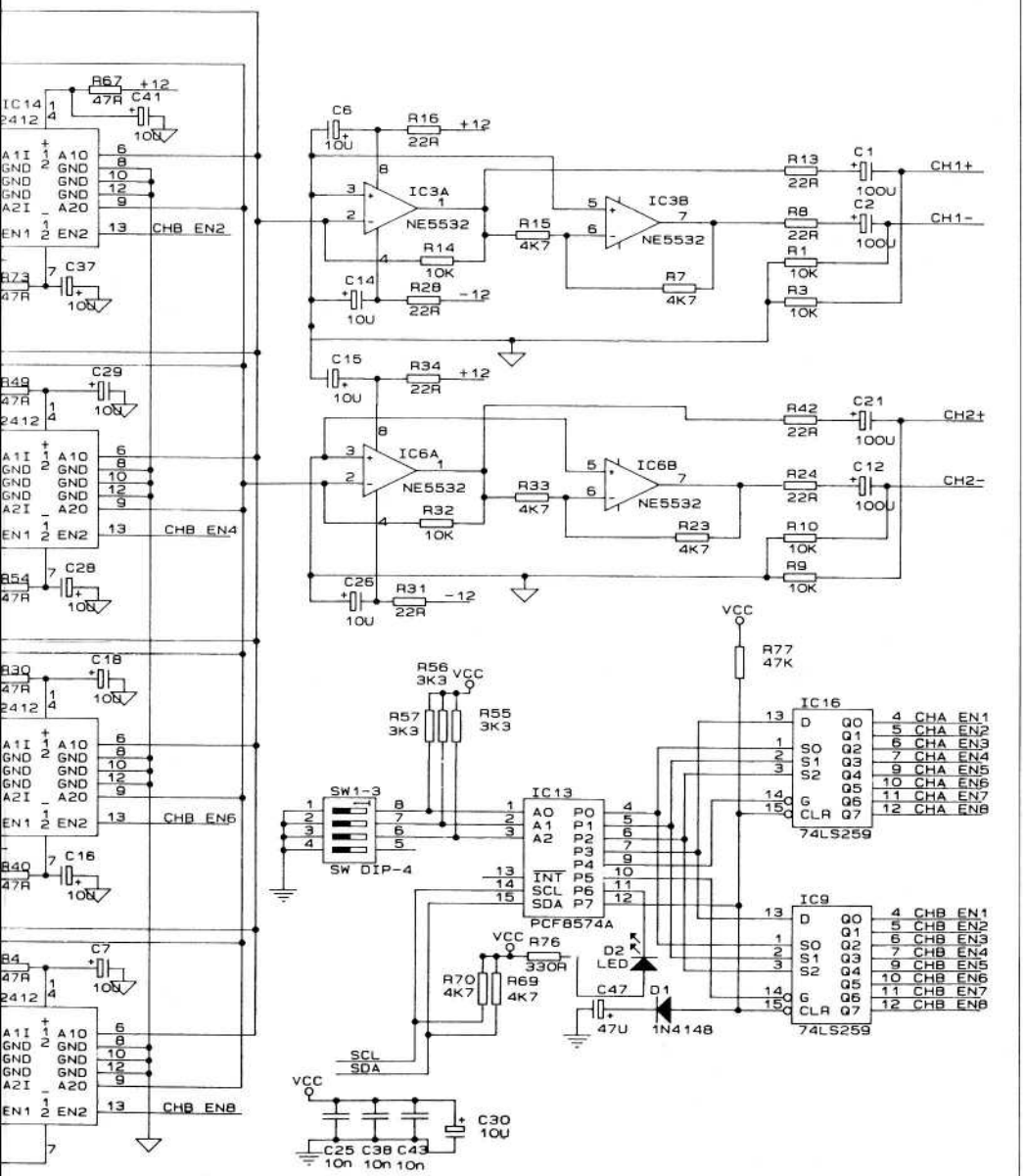
IC17 is the switching device for this channel. It is a state-of-the-art audio switching device, providing very high off isolation, low noise and low distortion. There are several ground pins on these devices, allowing a good ground plane to be formed, thus isolating the input from the output even more. These switches are so good, that any 'bleed-through' of signal you detect in the off state is likely to be cross-talk on the PCB itself, rather than through the IC's!

The output from each switch is fed to a virtual earth bus, one for each output channel. This allows the audio signals to be mixed as well as switched.

Following output channel one, the bus is termed virtual earth because is is connected



The Audio Switcher Circuit Diagram


IC14
2412
R67
47R
+12
C41
10U
A1I
A10
GND
A2I
A20
EN1
EN2
CHB EN2
C37
R73
47R
R49
C29
CHB EN4
C28
R54
R30
C18
CHB EN6
C16
R40
R4
C7
CHB EN8
C6
R16
22R
IC3A
NE5532
R14
10K
C14
R28
-12
R15
4K7
IC3B
R7
R13
C1
CH1+
R8
C2
CH1-
R1
R3
C15
R34
IC6A
R32
IC6B
R33
R23
R42
C21
CH2+
R24
C12
CH2-
R10
R9
C26
R31
R56
3K3
VCC
R57
R55
SW1-3
SW DIP-4
IC13
PCF8574A
AO
A1
A2
INT
SCL
SDA
P0
P1
P2
P3
P4
P5
P6
P7
R77
47K
IC16
74LS259
D
SO
S1
S2
G
CLR
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
CHA EN1
CHA EN2
CHA EN3
CHA EN4
CHA EN5
CHA EN6
CHA EN7
CHA EN8
IC9
CHB EN1
CHB EN2
CHB EN3
CHB EN4
CHB EN5
CHB EN6
CHB EN7
CHB EN8
R76
330R
D2
LED
R70
4K7
R69
C47
47U
D1
1N4148
SCL
SDA
C25
10n
C38
C43
C30
10U

to the inverting input of op-amp IC3a. This pin on an op-amp is maintained at ground or earth potential, it being a current input, rather than a voltage input. The gain of IC3a is set at unity by virtue of the fact that it has a 10K feedback resistor (R14) and the input impedance of the inverting input is also 10k (R80 + O/P impedance of IC15a + 'on' resistance of IC17). OK, so the input impedance isn't exactly 10k, but the 'on' resistance of IC17 + the O/P impedance of IC15a doesn't add up to a whole lot, so it's near as makes no difference.

The output from IC3a is fed straight to the outside world via R13 (22R) and C1 (100uF). R13 is to protect IC3a in case you short circuit the output and C1 is to block any DC. The output from IC3a is also fed to IC3b, which is configured as a unity gain inverting buffer, who's output is also fed to the outside world in an identical fashion. This is a simple (but effective) way of providing an electronically balanced output signal.

If you're not interested in balanced signals, just use one leg of the output, referenced to ground.

The last part of the circuit is the I²C control. Unfortunately, this is slightly more complicated than the vision switcher circuit, mainly because we want to mix and switch, so more outputs are required. Rather than do it the easy way and use two I²C ports and hence two I²C address's, I thought it would be best to keep to one board, one address. Hence IC16 and IC9!

The idea is that you make P0 (IC13) go low (to turn a switch off) or high (to turn a switch on), then you select which input it is you want to address, in binary, on P1, P2 and P3. Finally, you strobe either P4 low (for output channel one) or P5 low (for output channel two).

P7 is used as a reset, whenever the software strobes this line low, both latches are cleared, thus turning all inputs off. There is also a capacitor (C47) that holds this pin low for a short while after power is applied, thus providing a power on reset.

This all left one spare bit (P7), so waste not want not! I stuck an LED on it. The software turns this LED on (briefly) whenever you address this card.

As usual, the address input pins of IC13 are taken to a DIP switch allowing more than one switcher to reside on the same I²C system. Note also that IC13 is a PCF8574A while the device on the vision switcher is a PCF8674. The difference is that the preset (internal) part of the I²C address is different in the two devices. This means that you can set your vision switcher AND your audio switcher to address '0' on the DIP switches, the software automatically takes care of the internal offset. This is how any one audio card is 'married' up to a vision card.

CONCLUSION

The next project in the pipeline is a two channel vision mixer/fader, after that we may give I²C a rest for a while, depending on any response we get from YOU. We may publish another software description as the software has altered quite a bit as more and more functions are added. If anyone has a particular project they would like to see added to the system, please let us know.

All I²C technical enquiries may be addressed to:

Chris Smith (G1FEF) 107 Hitchin Street, Biggleswade, Bedfordshire, SG18 8BL. Tel: 0767-313292

STK	QTY	RX, TX AND SSTV PCBS & COMPONENTS	EACH	P&P	TOTAL
36	.....	I^2C Video Switch PCB	£7.50	0.38	.....
37	.....	GX414 Video Switch IC	£7.50	0.27	.....
38	.....	PCF8574P Input Expander IC	£3.00	0.27	.....
39	.....	LM1881N Sync Separator IC	£3.00	0.27	.....
46	.....	4 rail power supplies PCB	£3.00	0.38	.....
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49	.....	70cm DSB Transmitter PCB	£3.00	0.35	.....
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59	.....	G3WCY SSTV Scan Converter PCB set	£10.00	0.65	.....
60	.....	G4ENA Colour etc. SSTV mods PCB set	£5.00	0.35	.....
61	.....	G4ENA SSTV Transmit mod to 'WCY PCB	£6.00	0.35	.....
62	.....	G4ENA Auxiliary PCB	£2.00	0.27	.....
63	.....	SSTV Sync and Pattern gen PCB	£3.00	0.35	.....
64	.....	SSTV SPG/Pattern 2732 EPROM	£12.00	0.27	.....
65	.....	MC1445 Gated Video Amplifier IC	£3.50	0.27	.....
66	.....	TEA2014 Video Switch IC	£1.10	0.27	.....
67	.....	TEA5114 Video Switch IC	£1.50	0.27	.....
68	.....	4.433618 MHz Crystal	£2.75	0.27	.....

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69	.....	5 MHz Crystal	£2.75	0.25	.....
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71	.....	BATC diamond button-hole badge	£0.40	0.27	.....
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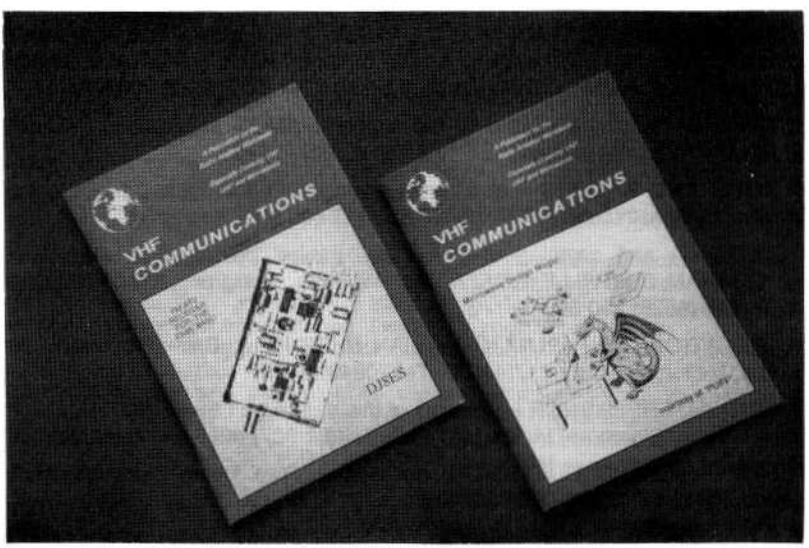

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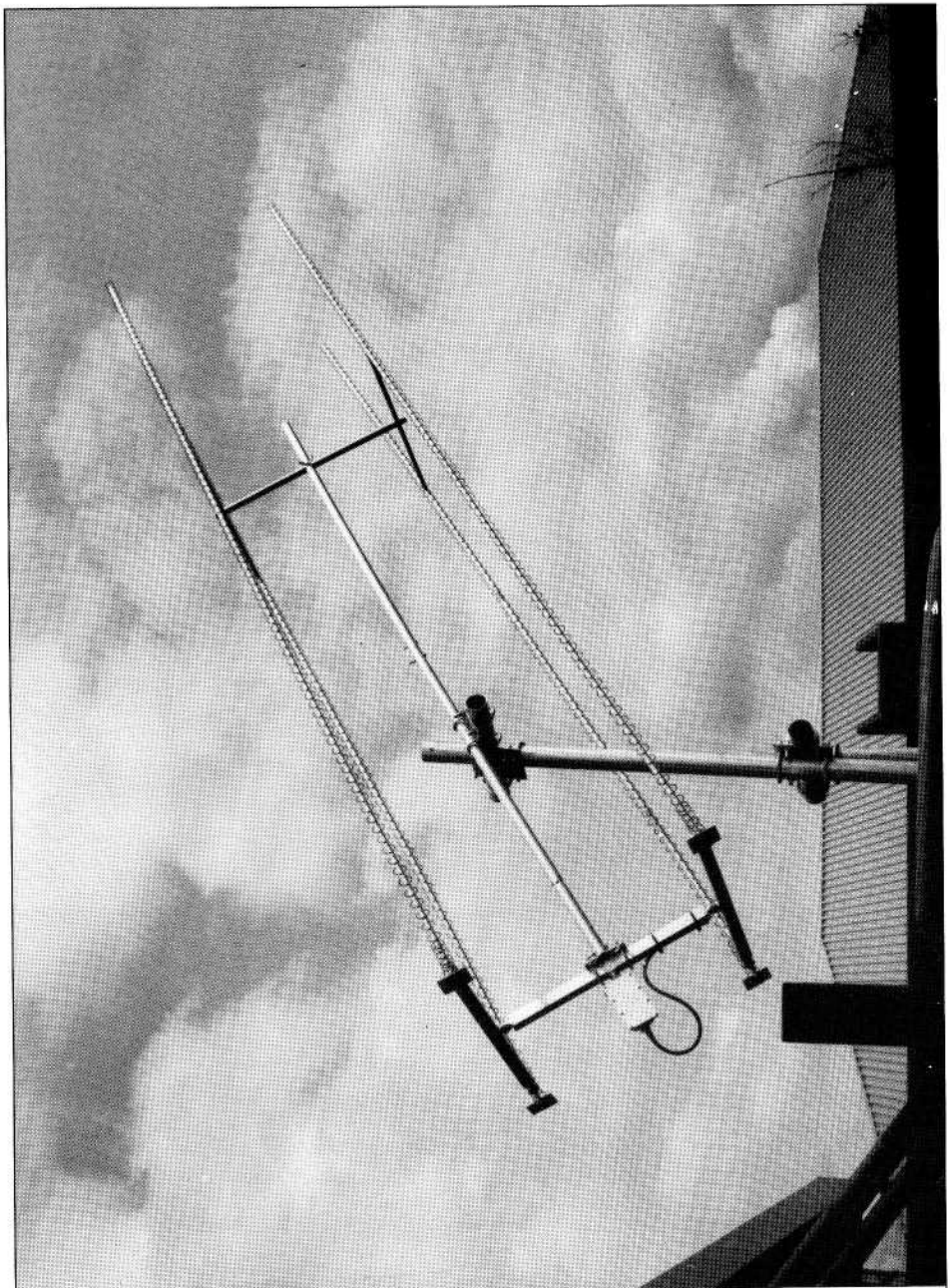


The new C-band Yagi array from Space and Scientific

Another photograph from the BATC archives;
Brian Partridge of the Chelmsford BATC Group, circa early 1957

IN THE STUDIO No.14

John Goode

As promised earlier in this series, I am covering sound circuits from time to time. This time I will describe a portable battery audio mixer and a low-noise, high-quality microphone amplifier.

MONO 4-CHANNEL BATTERY AUDIO MIXER

Most of the original material for the kind of programmes we are asked to make these days is shot with a single camera on location. Depending on the assignment, a small mono battery microphone mixer can be very useful, allowing several microphones to be used (interviews, group discussions, etc.). A second crew member is necessary, however, to operate the mixer and balance the sound - the camera operator cannot be expected to do everything!

The mixer is powered externally from 12 volts DC, usually from the camera battery-belt, or a separate rechargeable battery-pack. If a mains unit is used it must provide a well-smoothed 12 to 15 volts. The current consumption is fairly low - worst case (maximum headphone volume) is approximately 35mA.

The circuit is shown in Fig.1. The microphone channels accept balanced microphones of 200 to 600 ohms impedance. As drawn, no phantom powering is provided; this means that it is safe to ground the 'cold' connection, allowing unbalanced microphones to be connected. If, instead of XLR connectors, 3-pole quarter-inch jack-sockets are used, any unbalanced microphone wired to a 2-pole quarter-inch jack-plug will automatically unbalance the input when plugged in, as the extended sleeve on the 2-pole plug grounds the ring connection on the socket. (This may only be true of plugs and sockets from the same source - it is certainly true of RS Components quarter-inch series). See Fig.2.

If phantom powering is required for capacitor microphones (as in the prototype) the matched 2k2 resistors at the input should be returned to the +12 volt supply instead of ground, and the input capacitors' polarity reversed. Under these circumstances, unbalanced microphones must not be connected directly. Special adaptors with DC blocking capacitors will then be required.

An NE5532 low-noise dual op-amp is used in each microphone channel. An optional line input is shown at the second stage input (approximately 100mV, 30k in). Channel gain is set in the feedback loop. From the channel faders the signals feed the 'mix-bus' and are summed at IC2A.. A second feed, taken before the fader, goes to the PRE-FADE selection for monitoring. This is simply arranged so that with all pre-fade switches off, the headphone amplifier is fed with mixer output; operating any one of the pre-fade switches overrides this, the order of

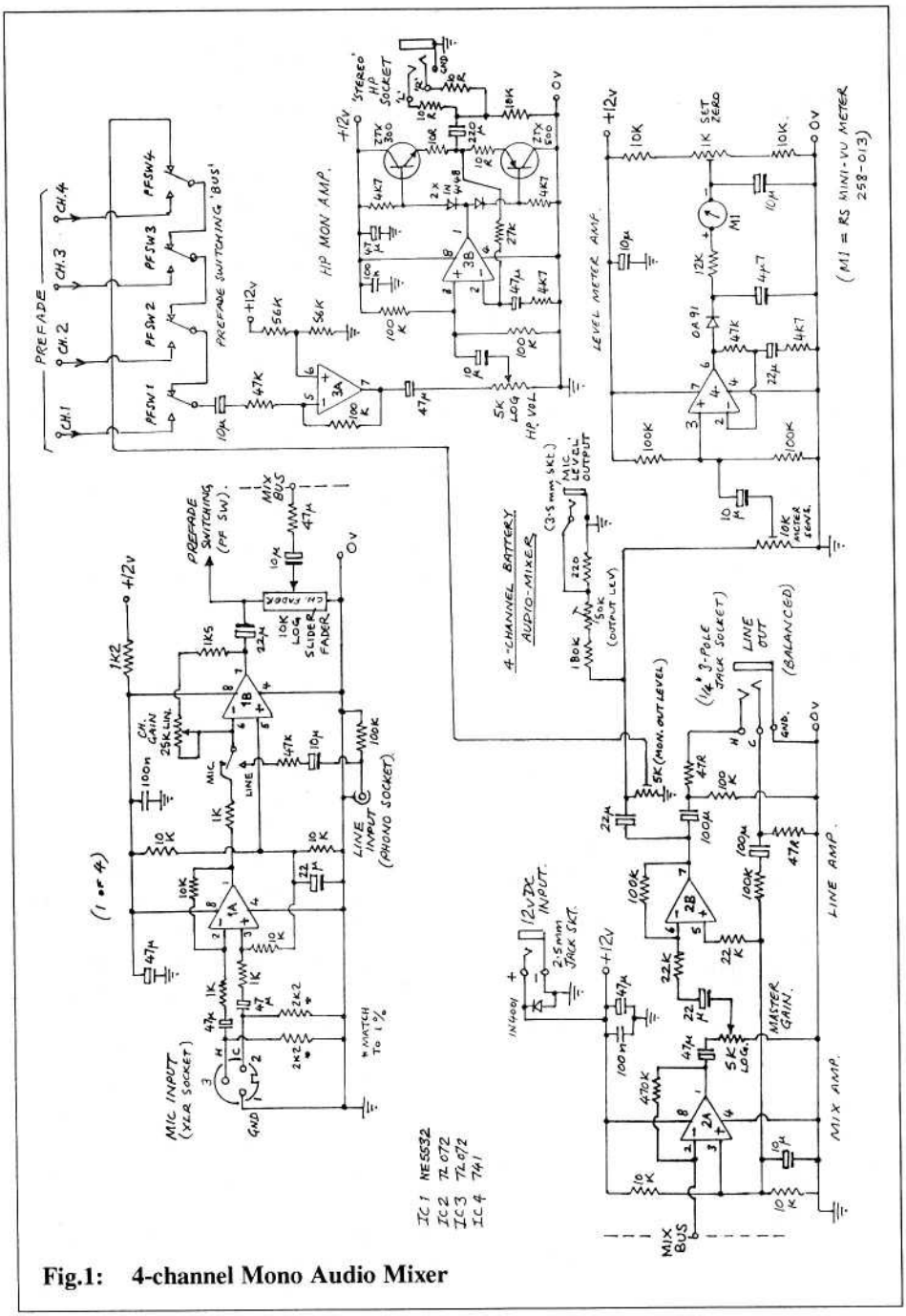


Fig.1: 4-channel Mono Audio Mixer

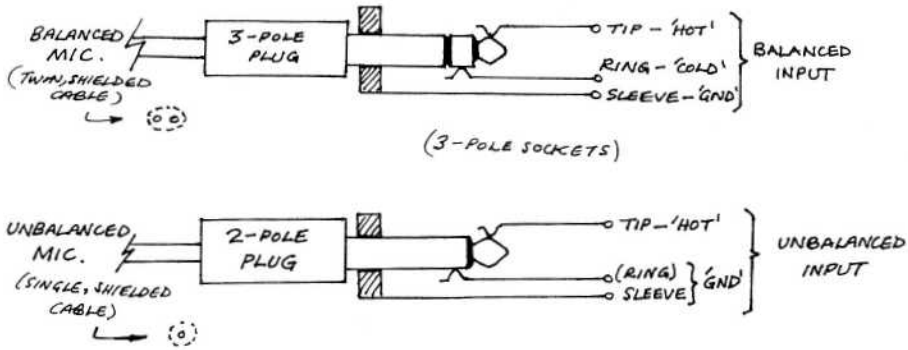


Fig.: 1/4" Jack Connectors

priority being Ch.1, 2, 3, 4, OUTPUT. The 'MON-OUT PRESET' is used to make the output level match that of the pre-faded channels in the headphones.

The headphone amplifier is capable of driving good-quality stereo headphones (in mono!) of preferably around 600 ohms impedance; it will drive 8 ohm types, but with higher current consumption.

The output stage is wired for balanced line, as the prototype works into professional recorders which have balanced inputs. However, this output may be unbalanced by connecting a 2-pole jack-plug, as described above. For use with domestic Camcorders that are not fitted with a line-level input, a microphone level output is provided that can be connected to the 'EXT. MIC.' socket.

A simple level meter circuit is connected across the input. This should be adjusted to show '0dB' on a 1kHz tone, when the output level is 775mV, as measured on a calibrated oscilloscope. Any other output level (not less than 250mV) may be chosen if 775mV is thought to be too high, but don't forget that the microphone level will also be lowered.

Although very basic in its facilities, this mixer has proved to be very useful in location set-ups. It is built on copper stripboard into an RS console case of dimensions 196 x 158 x 58mm (RS stock no: 508-188).

A larger version with more channels, or perhaps a stereo version, would be possible of course. For stereo, pan-pots would be needed in each channel - see 'Sound in the Studio, part-2, CQ-TV 141, page 63.

The performance of the mixer is more than adequate for speech and 'wild sound', but due to the limitation of a 12 volt supply rail, output overload margins are not as high as they should be for truly professional performance. Also, the use of dual op-amps in the microphone channels compromises the signal-to-noise performance in absolute terms; that said, in day-to-day use no-one seems to have any complaints!

A HIGH-QUALITY MICROPHONE AMPLIFIER

When setting up the audio facilities at the Educational Media Unit where I work, a low-cost (c. £500) Seck 6-2 Audio Mixer was purchased, as this offered all the facilities we required in terms of monitoring, pre-fade, auxiliary feeds, etc., at modest cost. However, the microphone channels had insufficient gain for our use - the Seck is suitable for 'pop vocal' type microphone technique, with VERY close microphones giving a relatively high output. Our requirement was for 'normal' and 'dramatic' speech recording; for instance we regularly record stories for children, and this involves the microphone being placed at 15 to 18 inches from the reader, with a full 'dramatic' dynamic range being recorded. At the time that the Seck was installed the microphone used for these stories was an AKG D202 professional dynamic type, and in quiet passages the signal could be up to 10dB below the maximum gain capability of the Seck microphone amplifier. It was therefore decided to build a suitable high-quality microphone amplifier, the output of which gives an excellent account of itself.

The circuit is shown in Fig.3. The microphone transformer, Parmeko P2571, has a step-up ratio of 1:4, thus giving an extra 12dB of 'noiseless' gain! Whether these transformers are still available (or if Parmeko are still in business) I don't know. However, an alternative from Sowter Transformers, who advertise in Electronics and Wireless World, could probably be found.

The input transistor, a 2N4403, may seem a peculiar choice, as it is not claimed to be a low-noise type. However, it turns out that when it comes to very low-noise circuits, the transistor characteristic that contributes most to the noise performance is the internal resistance between the base lead and the semiconductor base itself. This is NOT a value that the manufacturers normally publish, and so audio designers have been doing some measurements of their own (Ref.1). It turns out that PNP transistors are consistently better than NPN types in this respect; also, it seems that some rather unexpected types exhibit good low-noise characteristics - for instance, one of the lowest base resistance measurements came from the BC461 high-voltage driver transistor! Anyway, the 2N4403 was one of the lower noise types, at the same time offering a reasonable current gain.

The first and second transistors form a complementary pair, with DC stabilising feedback as well as AC feedback from the BC547 collector to the 2N4403 emitter. The nominal gain of this pair is 100 (40dB) as defined by the 10k feedback resistor and the 100 ohm in the 2N4403's emitter. A second pair of transistors arranged as a virtual-earth feedback pair provide adjustable gain - the upper part of the gain control is in series with the input, whilst the lower part is in the feedback loop, and the gain is defined by the ratio of these plus two other components - the 27k resistor at the input and the 2k2 in the feedback loop.

Phantom powering is applied to the centre-tap of the input transformer so that

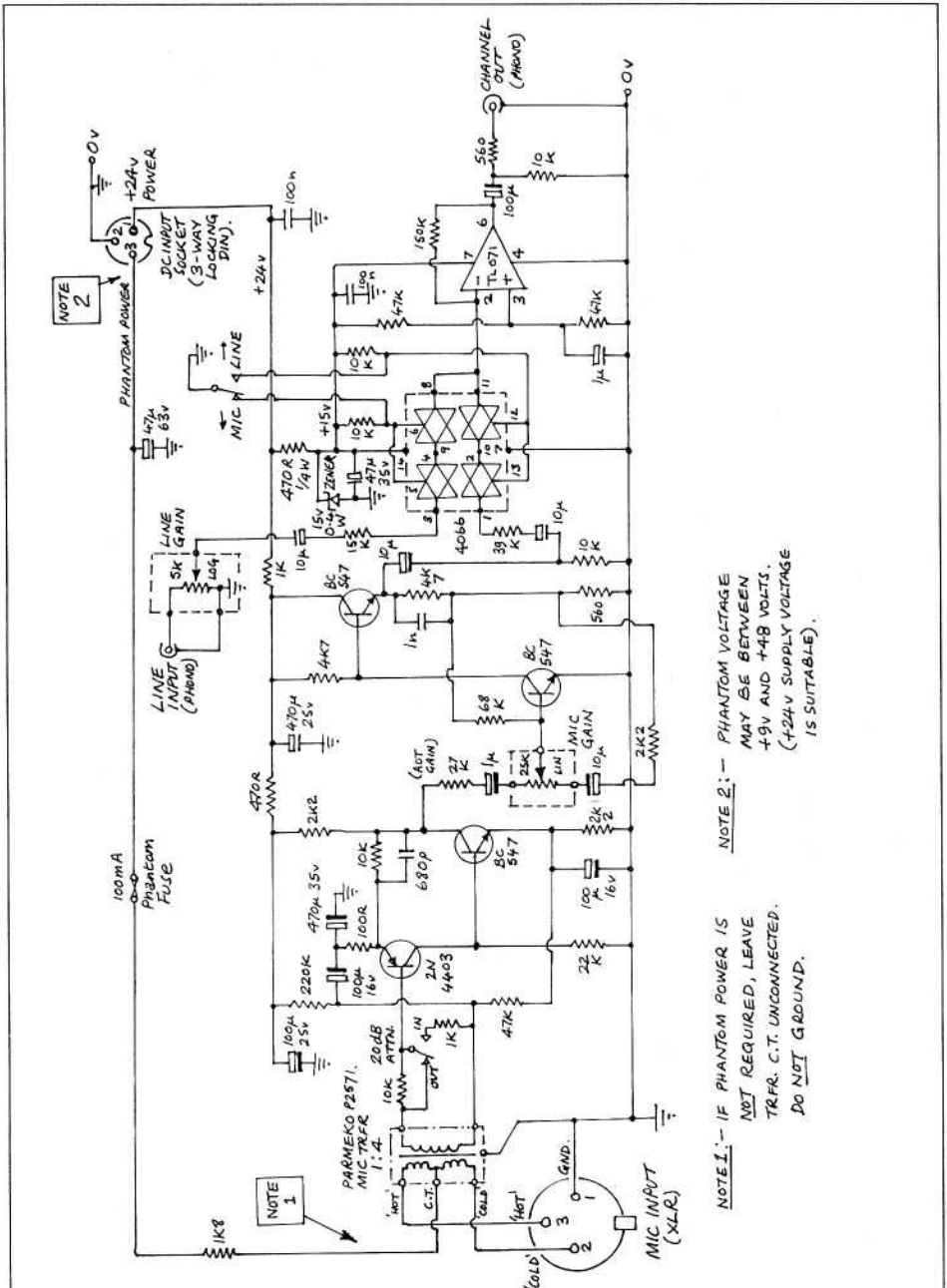


Fig.3: Low-Noise Michrophone Amplifier

professional capacitor microphones may be directly connected. These have a higher output than dynamic or ribbon types and so a switchable 20dB input attenuator is included. Capacitor microphones will operate from any DC voltage between +9 and +48V; there is a slight loss of gain at lower voltages.

A well-smoothed and regulated 24 volt supply is required for the best results. Single-point earthing to the chassis should be adopted. Note that the microphone line CMOS switch IC (and the output TL 071) are fed from +15 volts, this being the maximum supply voltage allowed for 4000 series CMOS.

Ref. 1: Tim McCormick: 'Putting Mic Amps On The Line' - Electronics and Wireless World, May 1992.

CONSTRUCTING A 10 GHz FEED FOR AN AMSTRAD DISH

This article first appeared in the May 1992 edition of the RSGB Microwave Newsletter and I wish to thank the Editors for permission to reproduce it here.

Barry Chambers G8AGN

The black perforated steel 60cm Amstrad dishes are widely available from satellite TV dealers for around £30. The dish is normally fed by a horn which forms an integral part of the so-called 'Blue Hat' LNB. This horn is of the stepped diameter, dual-mode, conical type, which has almost equal vertical and horizontal plane radiation patterns, resulting in dish illumination which is much better than that achievable using a penny feed in a focal plane dish. The graph in Fig.2 shows the calculated vertical and horizontal radition patterns of the Amstrad feed horn when operating at its nominal centre frequency of 11.3 GHz. When used at 10.368 GHz, however, the graph in Fig.3 shows that the horn has a much poorer vertical plane performance and a barely adequate match.

For many purposes this performance is probably still adequate, but if you are interested in ultimate performance, then it might be worthwhile altering the horn

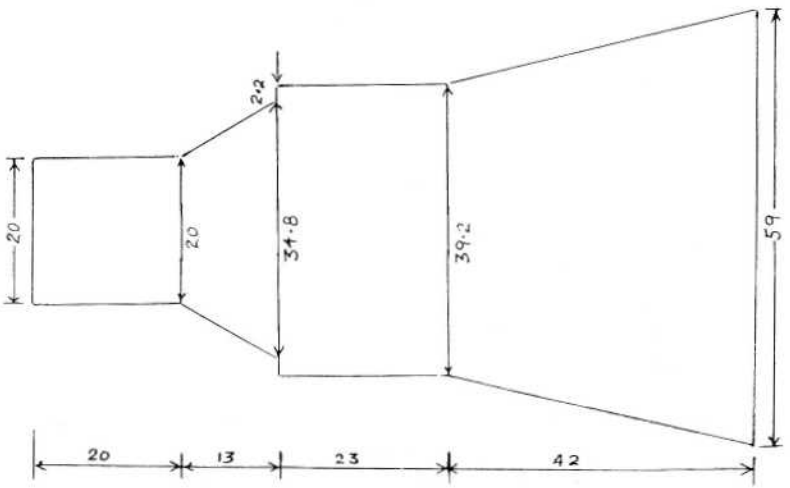


Fig.1: Cross-section through a Cylindrical Horn Feed for the Amstrad 60cm Dish. (All dimensions are internal and in mm).

dimensions so that it again has radiation characteristics at 10.368 GHz which are similar to those at 11.3 GHz.

After some computer modelling it was found that the simplest solution was to scale all of the horn's internal dimensions by the ratio of the frequencies, i.e: by 11.3/10.37 (*obviously, using this technique then the dimensions of a horn feed specifically for 10.250 or 10.150 GHz can be calculated ... Mike) and the* resulting horn characteristic is shown in Fig.4.

The internal dimensions of the new horn (for 10.368 GHz) are shown in Fig.1. When constructing the new horn, to be consistent with the original Amstrad design, I also included a 7.6mm wide flange at the horn aperture. The new horn throat diameter is 20mm, and this matches the inside diameter of standard 22mm copper water pipe.

A transition to rectangular waveguide 16 was made using the tool I described in an earlier issue of the 'Microwave Newsletter', or see Volume 3 of the Microwave Manual. (This information is available by writing to Barry Chambers, Editor 'Microwave Newsletter', RSGB, Lambda House, Cranborne Road, Potters Bar, Hertfordshire, EN6 3JE).

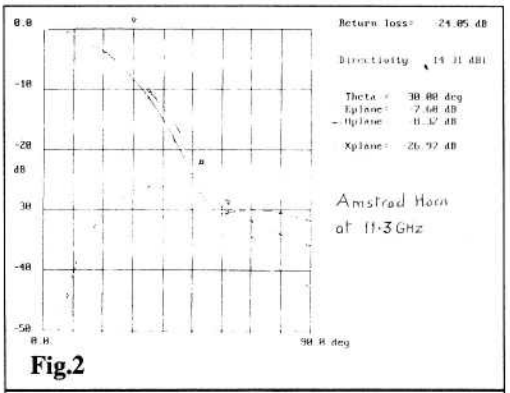


Fig.2

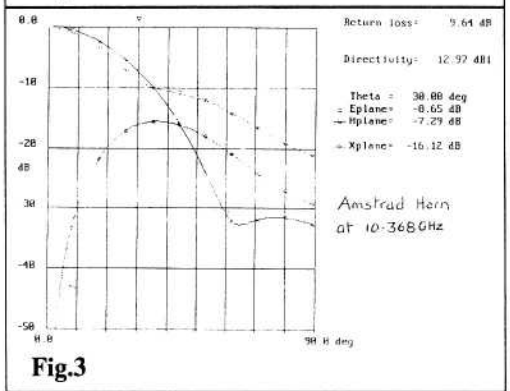


Fig.3

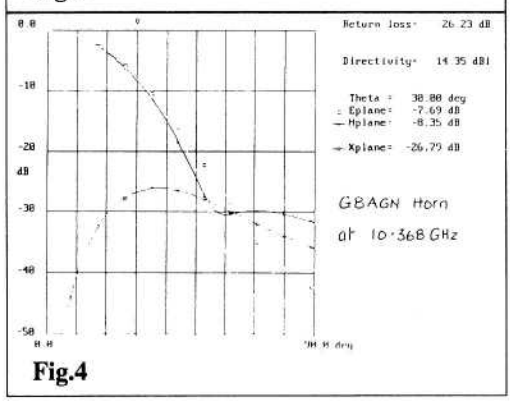


Fig.4

ATV 10 GHz FREQUENCIES
10.125 - 10.250 GHz

CIRCUIT NOTEBOOK No.47

John Lawrence GW3JGA

BNC COAXIAL ATTENUATORS

When experimenting with aerials and coaxial feeder cables it is useful to have a selection of 50 ohm coaxial attenuators. These can be temporarily connected in the coaxial cable to the receiver to confirm changes in signal level and/or to calibrate an 'S' meter.

Coaxial 50 ohm attenuators with BNC male-female connectors are available from RS Components (Electromail). They can sometimes be found at rallies, amongst the coaxial connectors, for a couple of pounds each. They are usually made by Greenpar and are marked with the attenuation factor in dB.

The frequency rating is given as DC to 1 GHz, but the results from measurements made indicate that they are useable up to 1.3 GHz, as shown in Fig.1. The 10dB version being particularly good up to and beyond 2.5 GHz.

Atten	R.S. No.	Greenpar No.	Power Rating
3dB	404-862	B35 X21 E003 X99	1W
6dB	404-878	B35 X21 E006 X99	1W
10dB	404-884	B35 X21 E010 X99	0.5W

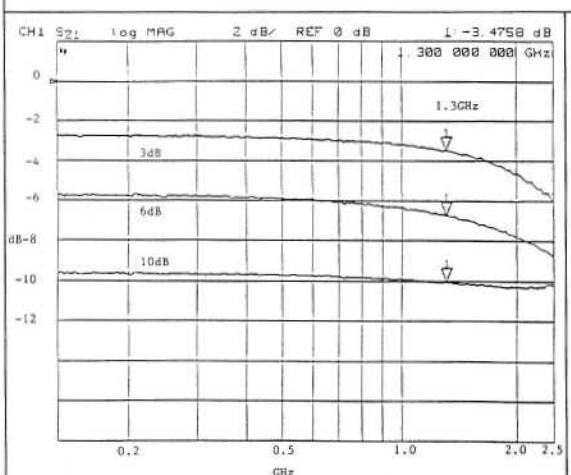


Fig.1: Coaxial Attenuators

PORTABLE OPERATION

Murphy's Law states 'When operating portable, if there is any way in which the battery leads can get crossed over - they will!'.

There are several ways of preventing damage to equipment. One is to fit a series (idiot) diode in one of the supply leads, but unfortunately this drops 0.6 volts of precious voltage. Another method is to fit a fuse in the supply lead and a diode, reverse-connected, across the equipment. In the event of Murphy having his way, the diode conducts and, theoretically, the fuse blows, thus disconnecting the supply.

A more elegant method is to feed the equipment through the normally open contacts of a 12 volt relay, where the coil is fed from the incoming supply

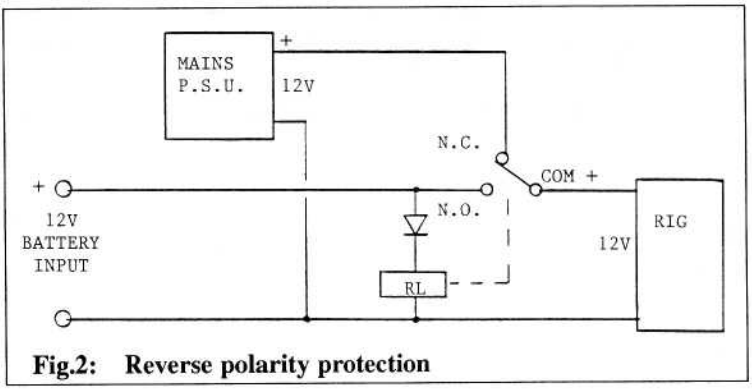


Fig.2: Reverse polarity protection

through a diode, as shown in Fig.2. If the supply polarity is correct the relay energises and the supply is applied to the equipment, with virtually no loss of voltage, but if Murphy is present nothing happens. If the equipment has an internal mains power supply then the unused normally closed contacts can be connected to this supply to provide automatic changeover from mains to battery.

THE BRITISH AMATEUR TELEVISION CLUB

BALANCE SHEET AT 31 DECEMBER 1991

		1991		1990		1989
FIXED ASSETS						
Office Equipment						
Additions	625		1,023		1,445	
less: Depreciation	625	-	1,023	-	1,445	-
CURRENT ASSETS						
Stocks- members services	4,106		2,735		3,415	
publications	4,161		4,926		5,992	
Payments in advance	-		156		430	
Midshires Building Society-						
deposit account	12,161		12,180		9,557	
Lloyds Bank plc-						
current account	6,333		6,311		3,779	
investment account	22,000		17,500		13,000	
GiroBank account	80		80		30	
		48,841		43,888		36,203
less:						
CURRENT LIABILITIES						
Creditors and accruals	1,087		952		932	
Subscriptions received						
in advance	18,280		17,290		11,293	
		19,367		18,242		12,225
		£29,474		£25,646		£23,978
Represented by:						
ACCUMULATED FUND						
Balance brought forward		25,647		23,979		22,532
add:						
Surplus of income over expenditure		3,827		1,668		1,446
		£29,474		£25,647		£23,978

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
23 March 1992

THE BRITISH AMATEUR TELEVISION CLUB

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 DECEMBER 1991

	1991	1990	1989
INCOME			
Subscriptions	17,317	12,907	12,669
Members services	873	783	897
Publications	781	(306)	2,314
Advertising	475	494	809
Building society interest	481	623	649
Bank interest	1,714	1,516	976
Tape sales	-	195	-
Exhibitions	1,912	1,871	1,839
Donations	107	31	58
Postages	265	358	296
Donated equipment sales	364	1,042	-
	24,289	19,514	20,507
less:			
EXPENDITURE			
CQ TV printing	8,955	7,547	9,794
CQ TV postage	4,179	4,464	4,184
CQ TV production	1,149	1,123	2,431
General office expenses	924	1,151	309
General postages	1,068	691	364
RSGB affiliation fee	18	12	12
Committee members´ expenses	139	141	116
Exhibitions	1,789	1,470	724
Advertising	14	311	295
Insurance and legal	55	323	55
Miscellaneous expenses	314	311	238
Members´ benefits	1,177	-	-
Accountancy	245	210	190
Rally attendance	436	92	349
	20,462	17,846	19,061
SURPLUS OF INCOME OVER EXPENDITURE	£3,827	£1,668	£1,446

MORE ON SSTV STANDARDS

Richard Wilmot GW3RRI

I read with interest G4UKL's item in CQ-TV 158 but must disagree with Allan Mathieson's recommendation on a DIS byte. I also think that it is a shame that this proposal has been sent to the IARU in such a rush without plenty of time for as many people as possible to consider it and make suggestions.

A new standard is certainly needed as soon as possible but it would be a disaster if it turned out to have a fundamental defect. This would just encourage people to invent new variations on it and before you could turn round we'd be right back where we are now. Is it really so difficult to learn one simple lesson?

The main reason why the DIS byte as shown on Allan's diagram seems to have been chosen, rather than the VIS in the original article, is to take advantage of the larger shift. This and G4UKL's comments show that sloppy tuning is causing problems and a large shift is wanted to copy this byte correctly.

But, let's suppose that the receiver is 300 Hz off-tune. It gets the DIS OK but can't detect the sync pulses and so must rely on the fact that the transmission is synchronous. But what (oh horror of horrors!) if the DIS byte shows that it isn't?

It seems to me that the whole concept falls flat on its face.

I get the impression that this DIS suggestion has been based on the assumption that anybody who is anybody in SSTV will, of course, be using a Robot 1200C or similar top-notch gear and that therefore all transmissions will be synchronous. This is not the case.

One of the 'desirable features', which G4UKL agrees with, was that the system can be easily implemented on as many different types of equipment as possible, including those which do not have close tolerance crystal oscillators. This DIS suggestion does not meet this criterion.

In general, if a transmission is to be resolved the tuning must be correct to +/-150 Hz, to ensure proper detection of the sync pulses. I don't see that there is any great problem at all about this. Users of digital modes regularly tune to +/-20 Hz or so without difficulty and if this means using some form of tuning indicator then so be it. If the transmission of a few seconds of 1200 Hz tone before a frame will help people tune in correctly then let's do that but let's avoid a system which is only of benefit to the few.

The object of the new standard is to make SSTV as cheap, simple and accessible as possible, not to let operators be really lazy about their tuning.

It is possible to increase the shift of the VIS byte from the +/-100 Hz of the original article to +/-150 Hz but there is no point in going further. Tuning to an accuracy of 150 Hz should present no

problems at all given the simplest of indicators, which is easy enough to implement in software. Even without any indicator, just looking at the brightness of the picture is enough to tune to this accuracy and, with some experience, quite a bit better. So once he has copied one picture, an operator should be properly tuned in for all the others.

Another reason why the DIS byte is unsatisfactory is that it is not properly compatible with existing mono standards, another 'desirable feature' which Allan and G4UKL agree with. An existing mono system would see this signal as being the first line of the frame and the fact that it will probably not be the same length as the other lines may also cause problems. As existing mono equipment has such a variable length for its frame sync pulse, it is usually able to accept an arbitrary length frame pulse without any problems. Therefore this coding should be in the frame sync period, where equipment which cannot use it can just ignore it without any ill effects.

To avoid confusing references to existing equipment, may I suggest that we drop the terms VIS or DIS in favour of 'start code' and also suggest the inclusion of a 'stop code'. This is sent during a frame period which follows the end of the last frame in a transmission. It will ensure that the frame is not overwritten by noise and could also be used to implement features such as automatic save to disc or a fully automatic TX/RX system. Reception would resume on detection of a valid start code. The stop code would have a value of 85 (55 hex) which, in the order of transmission, has the bits 10101010. This is easily distinguishable from a start code as the parity is incorrect but bit 7 is still the complement of bit 6.

The composition of this byte also needs discussion. I agree with the original article that having minimum transmission time steps of 4 times is a little drastic, especially when you get to the longer times. FAX operators often send short frames and CQ calls of 1/4 screen are normal. There must be provision for this. Allan's DIS byte does not permit this and I would recommend the original byte coding.

Perhaps the 'number of lines' field in the originally proposed byte could be redefined so that instead of specifying an absolute number of lines, it specifies 1/4, 1/2, 1 or 2 times the nominal number of lines for the chosen speed. This would extend the useful range of formats available from 1280/1920 (16 minutes monochrome) to 160/30 (1.875 seconds). This latter combination could possibly be used for contests or re-defined as an exception to represent the 80/60 format G4UKL mentions. It is important that the new standard permits as many things as possible to be done, to remove the urge to produce variations.

There doesn't seem to be any need for the start bit mentioned in Allan's proposal as the initial 1200 Hz bit performs this task. It could be changed to logic 0 (1100 or 1050 Hz) if this would produce an advantage.

As the shift is 200 or 300 Hz, I would think that the originally proposed timing of a 125 mS frame period and 12.5 mS bit length would be best for reliable copy.

I see no reason why this byte should not be transmitted two or four times to increase the probability of correct reception in bad conditions. Even at four times, the frame sync period would only be 500 mS, not a major increase in total frame transmission time.

Nearly all the formats have the video frame time an exact multiple of 500 mS. If the frame sync period were 500 mS also (= 4 transmissions of the start code) this would let the whole transmission be easily synchronised to a simple 120 rpm FAX speed generator. If the 1.875 second mode (160/30 or 80/60) had a 125 mS frame sync (1 transmission of the start code) and the 3.75 second mode (160/60) had a 250 mS frame sync (2 transmissions) then all formats could be thus synchronised, enabling operators and listeners to get the benefits of a synchronous transmission at minimum cost.

To avoid the IARU getting bombarded with 93 different versions of what a new standard should be, please can we discuss it first and agree? As well as transmitting SSTVers, we need to bring in SWLs and consider the position of novices. What do our friends in the Americas, Africa and Asia think of the proposals? Very many interested people do not have large sums to spend on top grade SSTV equipment but they deserve consideration, too.

Finally, I do sympathise with Klaus DL4KCK in finding that the proposed standard is not quite as handy as his existing system for his 3-D experiments but I would urge him as strongly as possible to keep to the standard once it is established.

This could be done either by transmitting in mono mode with twice the normal number of lines (e.g. 320/480) and alternating left and right eye images line by line or else selecting colour mode and dividing his red signal among the red and blue periods, so that they each convey the information of half a line, and recombining them at the receiving end. Both of these will look odd to a casual viewer but, as he says, an announcement will clear matters up.

The modification to the 'number of lines' definition would allow both of these possibilities as part of the standard transmission formats so please, Klaus, don't invent an extra mode - this is what we're trying to avoid.

VHF Managers' Meeting Vienna March 1992

EDR (OZ9AU Denmark) introduced a proposed SSTV standard for discussion and adoption. *'There are many commercial systems, most of which were mutually incompatible, and some of which required a licence fee to use. A common standard is needed.*

RSGB said that their ATV organisation (BATC) fully supported this proposal.

After discussion it was agreed that the standard be published and tried, and if successful could be the subject of a paper at a future conference.'

If anyone would like a copy of the paper presented please send an A4 SAE to Graham Shirville at the address shown on the 'Who To Write To' page in the Members' Services supplement (SUPP7).

CONTEST NEWS

Richard Guttridge G4YTV.

It was nice to meet so many of you at Harlaxton in May and have a good natter. Please keep the feed-back up, it does help to know if we are doing it right or wrong!

CONTEST RESULTS

Conditions were as flat as rice paper for the Spring Vision Contest. The weather didn't do us any favors either with gales and snow forecast for Northern hills and a clash of dates with the Sandown VHF Convention in the South. No one was prepared to risk the weather, so there were no portable stations out, although the forecasters got it wrong in this part of the world and it turned out a nice sunny and calm week-end. A total of 75 QSO's took place with yours truly just scraping in ahead of John G7ATG. Andy G4WGZ found things very slow, while John G8MNY thought conditions abysmal, so he went to Sandown and gave a little ATV demo.

The Mayday Microwave contest had plenty of local support for the two portable stations in the North and South of the country, but very little in the middle! It was nice to see a couple of novice licence holders on 24cm enjoying themselves. They were Neville 2E1ACS and Georgina 2E1AHP, son and daughter of Ken G8VDP. It was just as well Clive G8EQZ had 70cm available for talk-back! Contest groups could do well to remember that small point. At the end of the day, after much hard work and knob twiddling by Colin G3NNG who received Clive's numbers, Clive and I just pipped Andy G4WGZ and John G8MNY to the post. Andy and John had a couple of good contacts with low power stations G8UMP & G4AYT which pleased them. The number of logs entered was disappointing, do remember to keep those logs rolling in if you want to win the Fixed or Portable Championship!

It's coming around to International time again. All those that took part in the UK and EIRE, in the last two International ATV Contests in 1990 and 91, will receive a copy of the IARU rules, plus a entry/coversheet by post from me, if you are QTHR in the 91/92 Callbook. If not, please send an A4 size SAE to me G4YTV at the address below. You should receive them by 1st August, if you don't, let me know please. One last reminder about the International. The logs and entry forms **MUST BE POST-MARKED ON OR BEFORE MONDAY 21st September**, the second Monday after the contest.

Whilst on the subject of mail, I know of some items that have not reached me by post during the last few months. No contest mail has been lost yet. I think the only way around this problem, is to include a stamped addressed post-card with your logs, for me to post back to you as confirmation that your precious logs have arrived safely. Please remember to keep a copy!

SPRING VISION 70cm 1992

Place	Callsign	Points	QSO'S	Best DX	@Km
1	G4YTV	1368	12	G3NNG	261
2	G7ATG	1236	14	G8MNY	222
3	G3NNG	1011	5	G4YTV	261
4	G8MNY	559	5	G7ATG	222
5	G7AVU	551	9	G4YTV	61
6	G0IMP	360	8	G4YTV	77
7	G4WGZ	264	3	G3NNG	119

SPRING VISION 24cm 1992

Place	Callsign	Points	QSO'S	Best DX	@Km
1	G7ATG	554	5	G3NNG	129
2	G8MNY	482	7	G3NNG	114
3	G3NNG	357	2	G7ATG	129
4	G4YTV	78	2	G3PWN	28
5	G4WGZ	36	3	G7KAO	12

MAYDAY MICROWAVE 24CM 1992

Place	Callsign	Points	QSO'S	Best DX	@Km
1	G8EQZ/P	1805	15	G3NNG	258
2	G4WGZ/P	1638	17	G3NNG	117
3	G7AVU	188	2	G8EQZ/P	56
4	G6WLM	24	1	G0HOV	12

Well that's all for this quarter, keep those logs rolling in please along with all your news. 73 Richard.

All contest details, logsheets etc from Richard Guttridge G4YTV. IVY HOUSE, RISE ROAD, SKIRLAUGH, HULL. NORTH HUMBERSIDE. TEL:-0964 562498.

CONTEST CALENDAR

INTERNATIONAL ATV

Saturday 12th to Sunday 13th September 1992 1800 GMT Saturday to 1200 GMT Sunday Fast Scan all bands Rules - Cover sheet/entry form will be sent to 90/91 competitors by 1st August. It hasn't arrived? Then send A4 size SAE to G4YTV who will post the tome to you. **PLEASE NOTE THIS:** Entries to be postmarked no later than Monday 21st September.

AUTUMN VISION

Sunday 15th November 1992 0001 GMT to 2359 GMT Slow Scan & Fast Scan all bands Entries to be received by Monday 23rd November 1992

WINTER ATV

Saturday 12th to Sunday 13th December 1992 1800 GMT Saturday to 1200 GMT Sunday Fast Scan all bands Entries to be received by 28th December 1992

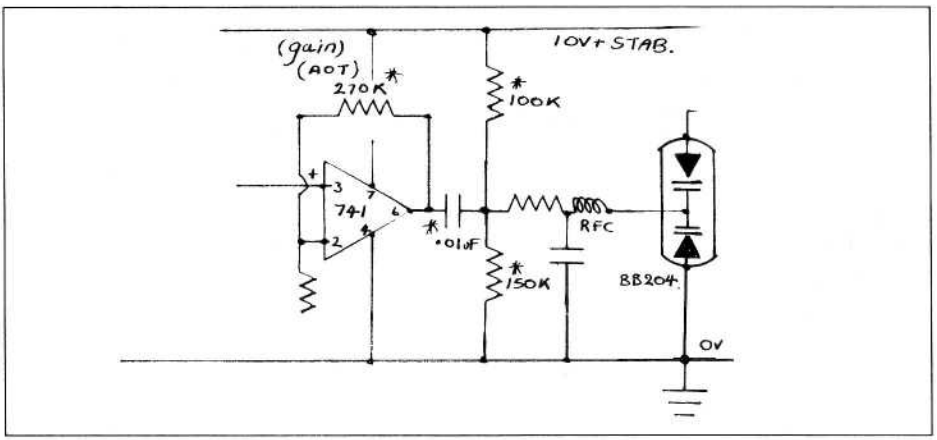
Please refer to CQ-TV 157 February 1992 for the BATC rules or send an SAE A4 size to Richard Guttridge G4YTV, Ivy House, Rise Road, Skirlaugh, HULL. HU11 5BH. England.

IN RETROSPECT

CQ-TV 157 24cm FM TV TX, page 32 John Cronk GW3MEO

A couple of small improvements to the sound circuit of my 24cm ATV transmitter design. I got carried away with keeping the sound circuitry simple. The feedback resistor that sets the gain of the 741 Op-amp had a suggested value of 470k, but at this gain level the frequency response of the device is insufficient. With a feedback resistor value of 270k there is still sufficient gain and a loud noise will cause the Op-amp to go into limiting. This now means that on sound peaks the varicap diodes' bias will go too low and stop the oscillator. The cure is to AC couple the audio and bias the diodes from via a divider from the supply.

For simplicity, no AF pre-emphasis is used, but if required the new 0.01uF coupling capacitor may be reduced to 200pF.



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Mike Wooding G6IQM

Trevor Brown G8CJS

THE VIEWPORT VGA SSTV SYSTEM FOR THE PC COMPUTER

REVIEW

R.W.J.Humphries B.Sc.
G4UKL

Another system, but not another mode, of late there seems to have been an upsurge in developments and although ViewPort VGA has been around for some time in an experimental form, its commercial release has added a less expensive means of getting into colour SSTV.

For the past year John Montalbano KA2PYJ has been sending out disks of the experimental versions and carrying out on-air tests with a group of amateurs world-wide. Centred round dedicated software the system uses an interface based on a modified John Langer design for the Atari. The interface links to the computer via the printer port and to the transceiver audio in and out analogue signal sources. Also there is a PTT controlled microphone facility. All displays are on the computer monitor screen.

Using a mixture of 'dirty' wiring and wire-wrap my own efforts with the experimental system were doomed not to work satisfactorily, but picture files transmitted and received by other experimenters were clearly heading in the right direction.

It was an ambitious project which consumed over 1000 hours of work, always limited by the graphic resolution of the standard VGA display, colour palette algorithms and the diversity of PC computers in use. Very much a middle path option which would present problems at a later stage, when the transmission of modes reliant on the presence of a high stability oscillator running at 12 MHz was to be included.

Typically, the frequency deviation of most computers is around 95%, which taken together with the diversity of fundamental frequencies used by different XT and AT computers, is a complication with no easy answer.

Fortunately such frequency stability restrictions are of lesser importance when considering solely Robot modes of operation. It is claimed that in practice ViewPort will work up to 486 machines and that most 4.77 XT types should be OK, although there may be exceptions.

HARDWARE

The computer is required to be IBM compatible with at least 640K of memory, a standard printer port and a VGA display capable capable of 320 x 200 x 256 colour mode. The system will work agonisingly slowly from a floppy disk, a hard drive is really essential. Most clones are quite adequate.

SOFTWARE

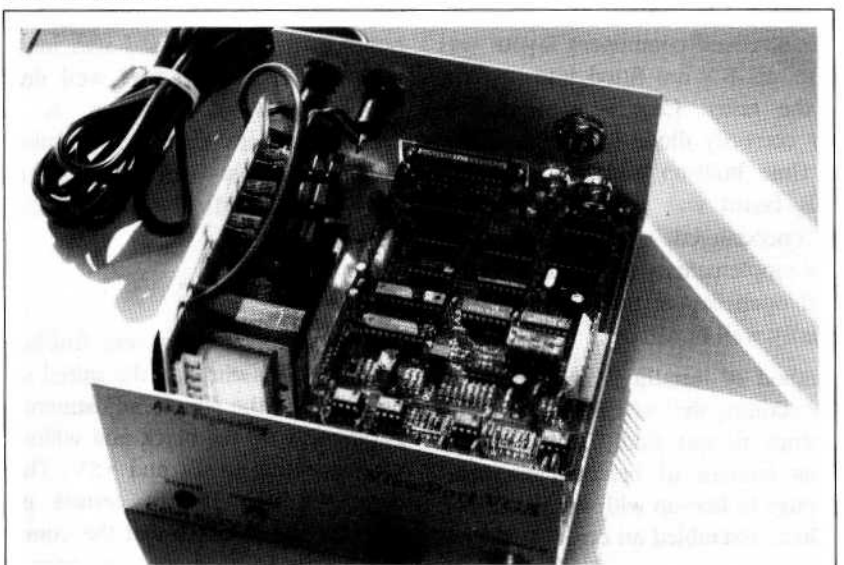
The programme will not run reliably with TSR programmes present, e.g: PC-Tools, Sidekick, etc. Neither will it run with Windows loaded. The DOS file 'MORE' should be added to the 'AUTOEXEC.BAT' file path, so that the picture directories function correctly. It is also recommended that 'ANSI.SYS' is remmed out of the 'CONFIG.SYS' file, to allow the menu screens to assume their intended colour. If this is not done text appears white against a black background, on trial I found that the displays were quite acceptable without this modification.

The software programme comes on a single 5.25'' disk, is not write-protected and can be passed around. It contains a printable dissertation on aspects of the setting-up procedures, helpful notes, comments and addresses.

The programme files are included with the kit, my version being 2.2 (which contained an undeleted private letter to a lady ham!!) and an invitation to send KA2PYJ $12 for registration and updates. There is a file checklist in the documentation so that the actual disk can be verified, one ham had three files missing so it is as well to make sure all is correct at this stage.

THE KIT

The kit forming the basis for this review was the full version ordered from A & A Engineering (a price list appears below) paying by Visa my statement showed a total charge of £117.50; this was inclusive of shipping charge and a 240V transformer, for which there was a small surcharge. After four weeks a substantial, well-packed, box duly arrived labelled ''AMATEUR RADIO PARTS'' ''NO



A partly assmbled unit, the PSU is on the left.

COMMERCIAL VALUE'' and was carried off to the workshop for opening, checking and construction.

The documentation consisted of coloured duplicated sheets with clear unambiguous illustrated instructions, schematics, layouts, pictorial component identification and set-up hints, following these should be well within the ability of any occasional constructor. The components supplied were of superior quality, complete down to the smallest detail of minute ferrite beads and plugs for the mike in and out cables, a generous assortment of nuts, bolts, clips, washers and wire, although the latter was sufficient there was little surplus. It seems important to trim to the lengths given in the assembly sketches.

The single-sided main PCB is of the layered type, no connecting tracks being visible, the plated through holes virtually eliminating the possibility of a dry-joint. The silk-screened component layout was adequate, all ICs are fitted into sockets, as is the relay. Care was needed to identify correctly diode locations. I have in my time built-up hundreds of PCBs and this board was amongst the finest quality encountered, a pleasure to work on. The supplementary PSU board was of standard open copper track construction, but equally well turned-out.

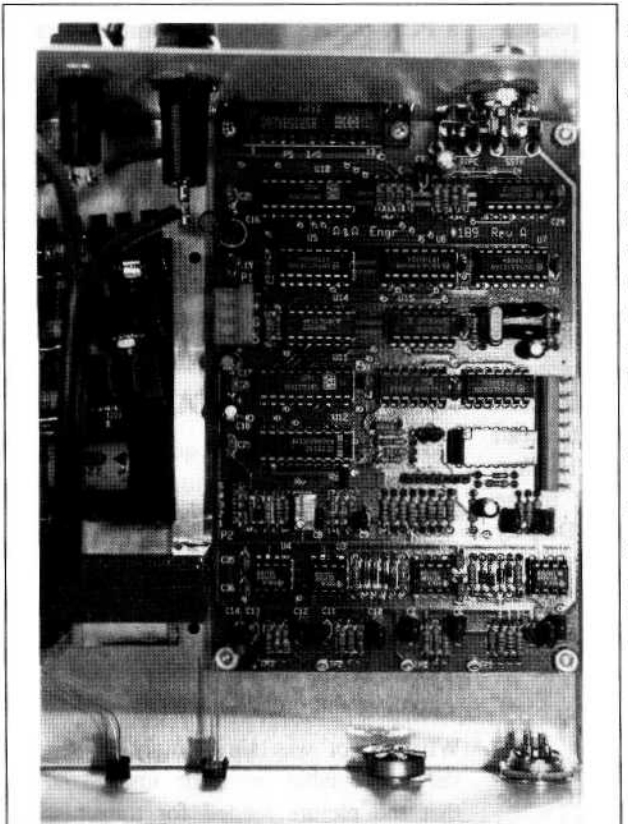
The method of installing the three heatsinks containing the voltage regulators by interference fit was fiddly and needed a judicious amount of bending the heatsink prongs to line-up with the pre-drilled hole. Once assembled an error would not be easy to reverse, correct identification of the regulators needs triple checking before committing the soldering iron. The PSU board supplied stabilised +/-12, and +5 volts and was a snug bracketed fit, this required careful assembly, the tracks being perilously close to the enclosure side. Thoughtfully , a sheet of paxolin insulation with pre-punched holes was included to prevent any likely shorts and although not mentioned in the text its use is obvious.

The enclosure case supplied continued the theme of excellence. Cleanly printed layout both front and rear makes it a visually attractive addition to the shack and with LEDs to indicate power on and transmit status, no further adjustment is required once the mike-gain control is set.

All components were contained in polythene bags, grouped according to use and designation. Construction from start to the completion of setting-up took 10 hours in three sessions. I was impressed with this kit, which was well designed and thought-out. Messers A & A Engineering are to be congratulated in producing a first-class kit, which assembled without difficulty and worked first time!

SETTING-UP

Once the construction was finished and voltage levels checked the initial setting-up involved the simple adjustment to set parameters for the black and white levels corresponding to 0V and +5V. This was done via two 15-turn cermet potentiometers and assumes that the constructor has access to an audio generator giving



The assembled PCBs, test points along the front edge

1200 and 2300Hz. An alternative method is provided in the software in the form of a visual display, which is effected by shorting the SSTV input to the tape output and observing on the monitor. Four frequencies are generated by the software equating to white, grey, black and sync, and are displayed as arrows with adjacent corresponding lines. The potentiometers are then adjusted so that the lines are brought as close to the arrow heads as possible.

A very accurate alignment is possible with this very clever and sophisticated method. An additional on screen check is available by observing changing numeric values which vary according to the setting of the potentiometers. It certainly takes out the hassle from setting up. Once the optimum setting is attained the case can be assembled and screwed down, all further setting-up being done via the software 'SSTV.CFG' file.

THE PROGRAMME

The programme is on a single disk which I copied across to a ViewPort directory on the computer 'C' drive. According to the information, the version supplied to me supported the 32K colour boards now available, but didn't seem to make any discernable difference to the display on my computer fitted with the Pro-Designer 32K Sierradac board. This board is not one of the 32K colour types tested and known to function, so it was not possible to say what difference this might make.

Once installed and with the interface connected to the transceiver several menu screens are available. Transmit, Receive, General and a further Options screen. On the review software the following menus were available:-

TRANSMIT: 8, 12, 24, 36 second black and white, 36 and 72 second Robot colour. These are selected via the func-

tion keys. As a bonus it is also possible to transmit in Scottie S1 mode, this does not appear on the menu or in the instructions. A tuning signal can also be sent using the '+' key.

RECEIVE: 8, 12, 24, 36 second black and white and 72 second only Robot colour. S1 and S2 Scottie modes, M1 and M2 G3OQD modes.

ADDITIONAL FUNCTIONS: Grey Scale and colour bars, Alignment tone, Save to Disk, Delete file from disk. Load TGA format, Load PCX format, Load IMG (Gest) format, Load HRZ (Hi-Res) format, Load Custom palette, Image directories. (Two functions viz Display Live Image and Digitise Image are listed but not implemented).

PARAMETER SET-UP: Visual set-up, Oscilloscope, Tuning Indicator, Change Drive, Change Printer path, View Luminance, view R-Y, view B-Y. All pictures have to be pre-prepared in one of 4 formats PCX, TGA, HRZ, IMG. The last two being picture images saved under Hi-RES and GEST. F9 offers a choice of directory listing for any of the formats supported, but this inconveniently disappears when the transmit menu is called up. This challenges your memory when multiple pictures in each format are available, I had to make an aide memoir to avoid continually going back to the directories. Unless you have a Robot 1200c which can be used as a frame-grabber (which defeats the whole purpose of ViewPort) then recourse must be made to preparing PCX format pictures via an art package such as 'PC Paintbrush'. My first attempt at preparing a PCX picture from GIF format was not immediately successful until it was realised that the PCX file also required some additional format scaling to an exact 256x240 size, once that was done picture load and transmit was satisfactorily. To effect the accurate scaling necessary a programme such as 'Alchemy GWS ver.6.1' or 'HiJaak ver.3' is essential. This information is buried in the documentation, which needs careful study.

AND THE TX QUALITY ?

I didn't expect Robot quality on either transmit or receive, indeed ViewPort don't claim to match this standard and I used the best available conditions for initial testing, the local 2m FM SSTV net. As a control to monitor exactly what was being transmitted and received I hooked in the 1200C which slaved both incoming and outgoing signals.

What I got was surprisingly good and very acceptable once the understanding that the picture loaded for transmission and viewed on the computer monitor was not being sent as seen!, i.e: the colours and format when viewed on the computer monitor are comprised of a VGA palette of 256 colours and appear with a pronounced vertical elongation, whereas the picture actually transmitted is in 32K colours with an aspect ratio nearer 4:3 and fully compatible with other scan convertors.

There was a great improvement in both colour rendering and contrast when the transmission was made in Scottie S1 mode, although picture received on the 1200C was sloping by some 15 degrees

top right to bottom left, this would not be the case when received by a similar ViewPort system. All the pictures sent on 2m were received on 1200C convertors with reports of very good stable pictures in all the Robot modes used. A comment made was that had the net not been told they were ViewPort transmissions they would have passed as general Robot mode pictures, except as mentioned the S1 pictures were better in both colour and resolution but sloping.

Since those tests I have had two-way ViewPort QSO with DG0GF on 20m with good pictures received simultaneously on both the computer monitor and 1200C permitting direct comparison, again the superiority of the S1 mode was demonstrable.

RECEIVE

ViewPort has no means of identification of incoming pictures and unless the correct mode is selected at the precise moment the picture signal commences, the image on the PC monitor either begins to scroll prematurely or misses the opening lines. Put more simply, there is no automatic standby to accept an incoming VIS. The vertical interval signal which precedes 1200C transmissions is not recognised by ViewPort, so it is important to know in advance which mode and speed is being used.

The review software did have a basic form of VIS on transmit which triggered a 1200C, but not another ViewPort. Having set the correct mode, I found the resultant pictures very good and although the 8 second B/W occupied only the left quadrant of the monitor it was sharp with good contrast. Superior I thought to the the same picture being received on the Robot!. The colour palette was as good a compromise as could be expected and acceptable, pictures received in M1 and S1 modes appeared more square that usual and did not occupy all the monitor screen. this could possibly be explained by incorrect parameter settings of the SSTV.CFG. This file is supplied with arbitrary settings found to give the best average results. When following the instructions for changing the values in the SSTV.CFG I was unable to make any noticeable difference to the size or shape. This is a facet to which I have to return, for it appears that some computers will need a modicum of fine tuning via this lengthy and enigmatical file.

What I did find irksome when receiving black and white 8 second was the need to activate the appropriate 'F' key to initiate consecutive frames, timing was vital to get a full picture displayed. It was my impression that ViewPort handled noise and QRM very well, equal if not better than the 1200C in Robot mode, and it didn't easily drop out of sync. A facet of picture receive worth mentioning is that colour picture scrolling reaches the bottom of the monitor screen before the end of the incoming transmission, the apparent loss of part of the picture is rectified once transmission is complete and the PC enter key is pressed, a recomposed full image is then displayed.

I saved several received pictures using the F5 save routine and this worked flawlessly, the image being saved in TGA format. All other routines worked smoothly as intended.

WHAT IT CANNOT DO

With only a single memory for both TX and RX images, the exchange of pictures is slowed down, a good line of waffle is needed to fill-in the gap whilst pictures are changed over, and with no provision for the addition of any text it is necessary to anticipate in advance any captions, e.g: a call-sign.

Without a Robot to hand, this has to be done by using an external paint programme and saved in a similar format before going on the air.

An exceptionally good waffler might manage this during a session, this would entail a considerable amount amount of work and the format must be correct.

It is easy to use the 1200C to do this, but again, this defeats the principle of ViewPort.

As previously mentioned, there is no way at present to input directly from a camera or frame-grabber. This looks to be a future important addition.

I loaded stills saved on VCR and a tape-recorder and it was very easy to use a DOS path to load a picture from my disk library.

On transmit there is no indication of the progress of the transmission, the picture being sent is not visible, the only indication is the illumination of a red LED on the front of the interface.

I would have liked to have had some means of knowing the state of the transmission, an expanding line or some other visual indication at the bottom of the monitor display would be useful.

SOURCES

PCBs and Kits: A & A Engineering, 2521 W.LaPalma, Unit K, Anaheim, CA 92801. U.S.A. Telephone: (714) 952-2114; Fax: (714) 952-3280.

Software and technical information: John Montalbano KA2PYJ, 10646 106th Place, Indianapolis, Indiana, 46032, U.S.A.

Price Summary: Blank PCB $19.95; Both board level kits (SSTV and PSU) $129.95; Full kit (Case, Hardware, SSTV and PSU$) 169.95; Complete Assembled and tested unit $229.95; 6ft x 25-pin M to M cable $10.00.

Note: a 20% surcharge is added to these prices for all foreign orders which need special handling arrangements and approximately $5 extra for a suitable 240V transformer, which must be specifically requested. Dependant on how the phrase 'Of No Commercial Value' is interpreted by customs, VAT may or may not be levied on delivery! This could add to the total cost.

CONCLUSION

If you want to get into compatible colour SSTV without having to find the £1500 or so for a basic Robot 1200c and colour monitor, and you already have a PC compatible computer, then ViewPort is one option to fulfil your ambition. An alternative may be close behind.

The quality on transmit is good and it certainly receives a fair picture. The system could expand and improve if KA2PYJ refines and adds to the software and overcomes the oscillator stability obstacle. It does have the ability to make

use of the new 32k graphics board, this is an asset, although not everyone will want to meet the high cost of these boards.

There are limitations, the single picture memory, absence of graphic text facility, VIS pulse and live picture input, but these will not be missed if you have nothing else to begin with, and there are future updates.

The kits are fair value even with the foreign surcharge and possibly VAT. If you can handle a low wattage soldering iron and don't mind hunting around for components, buying the bare boards could get you on the air for around £60.

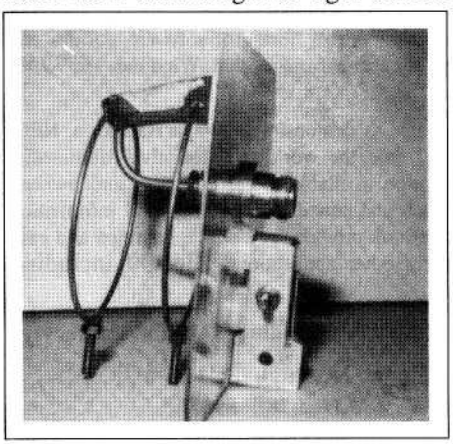
This is an arrangement which works extremely well within its limitations and will satisfy the appetite of budget conscience amateurs and SWL's having access to a PC. Whether it can be developed to a full system only time will tell. Having got so far John Montalbano will certainly be sticking to the task and is to be commended for producing a viable system.

THE VK ANTENNAS QUAD LOOP

Mike Wooding G6IQM

Having had many enquiries from members over the last year or two concerning suitable aerials for 24cm ATV operation I was extremely pleased to be able to conduct this review of the VK Antenna's 20-element Quad Loop Yagi. Those of you who are familiar with the Micromax series of aerials *(insects have antenna, we use aerials!)*, designed and produced by my late friend Fred Smith G6FK, will be pleased to know that the well-proven design is still being produced by VK Antennas. The 20-element aerial is constructed much as the original Micromax version, but with, I am pleased to say, some mechanical improvements.

The driven elements and the feed system are now much more robust as can be seen from the photograph below. The whole assembly is mounted onto the reflecting plate element by means of a bulkhead N-type socket. The feed connection to the two driven elements is made via a short length of rigid coaxial cable and the actual connections to the elements are completely weather-proof sealed by a moulded block of resin (?).



The whole driven assembly is solidly mounted onto the boom by means of a rectangular section clamp around the 15mm square-section boom. The two driven elements are also secured to the boom by brass nuts and bolts, which are soldered to the elements. The remaining eighteen preformed circular elements are also fixed to the pre-drilled boom by the same means of brass nuts and bolts.

The driven element assembly comes pre-painted with blue paint, but the remainder of the aerial is uncoated, and, as VK Antennas suggest, it may be worthwhile to spray/paint the aerial for protection against the elements *(sorry about the pun!)*.

In operation the aerial proved to have a useful amount of gain, in fact comparable to my original Micromax 38-element, but with a slightly reduced directivity and beam width, as one would expect from an aerial with just over half the elements. The bandwidth was certainly wide enough for ATV repeater use across the whole 24cm band without any noticeable losses at either end of the band. All-in-all I can certainly recommend the VK Antennas 20-element quad loop aerial for ATV use.

The aerial is available at a cost of £37.50 including a mast-mounting bracket from: VK Antennas, Four Winds, Walton Hill, Deerhurst, Gloucestershire, GL19 4BT. Tel: 0242 680540.

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For a 40MB IDE hard drive add £150

* COMPONENTS

We can also supply all the individual parts for you to build your own system. Please phone for prices.

* SOFTWARE

Whatever your software requirements are, we can supply them. Whether you want an 'off the shelf' package, or bespoke software specially written for an individual requirement come and talk to us.

* NETWORKS

No problem, all your networking needs fulfilled. Whether it's initial installation, upgrading an existing network or maintanence you require, we will be pleased to help.

All new systems come with one year return to base warranty. All prices are exclusive of delivery and VAT. Delivery is usually one week from receipt of cleared funds. Please phone for for further information.

TV ON THE AIR

Andy Emmerson G8PTH

MORE LIFT SUCCESS

Garry G4CRJ writes from High Wycombe: "During the January lift I saw GB3TV, GB3UD, GB3PV, GB3RT and G4CZJ (Kent manned repeater). I also worked ON6PD, F1EDM, PE1DCD, ON1BTE, ON1AHT and saw the PI6RBL ATV transponder at P4 and also DL4EBB and DC0DO both at P5 - absolutely amazing conditions. By the way, well done on your article in Video Shopper magazine. That should get a few more interested in ATV."

I wondered if anyone would spot that article, Garry. Yes, I hope it gives the hobby a boost.

SLOW-SCAN LIVES

My last remarks on slow-scan TV has had the desired result! Here's a missive from Paul Turner G4IJE in Hertfordshire.

"I would not normally consider replying to provocative statements such as those made in your column recently regarding SSTV activity, but I feel it necessary this time in case some bright spark gets the idea that 144.500MHz is a good place to play packet radio!

"I checked through my log-book and found that during the last 12 months I have had 424 SSTV QSOs, with 32 different stations, all on 144.500MHz. Many of these contacts have been with our local Essex/Herts. net, but several have been made with stations as far away as Dorset, Northants. and North Wales. I feel it important to mention that almost ALL SSTV activity on 144.500 MHz is horizontally polarised. This could easily lead a casual listener with a vertical antenna to conclude that the channel was unoccupied. As you can tell from my experiences, this is far from the case.

"SSTV activity on HF is also at a very high level, possibly the highest for many years. 14.230 MHz is almost permanently occupied with SSTV stations and on many occasions there are several slow scan nets going on either side of that frequency as well.

The afternoon net on 40 metres (around 7.043 MHz) is also very well supported, with sometimes as many as 8 or 9 stations in the group. These include G4GOZ, G4GDZ, G0KSP, EI3CZ, GD4HOX, G3CPG, G0BVS, GM3DJT, GJ4YCR and myself (G4IJE).

The Sunday morning 80 metre net includes G3OQD, G3NOX, G0AZX, G4TUK and G4UKL amongst others.

I would guess that the UK has more active SSTV stations than any other country in Europe, except perhaps for Germany where there are a large number of stations using the German made Wraase equipment, which is less popular in the UK.

NEW MODES

"I feel I must add a few words an the subject of SSTV "standards". The so-called M1 mode developed by Martin Emmerson G3OQD (no relation to G8PTH) has more or less become the world standard for high quality colour SSTV. Contrary to popular belief, its use is not confined to Robot 1200C owners, but is also used by the Amiga AVT system, the Wraase SC-2, a new German Amiga package and by users of my BBC micro/framestore system (no longer available). I am also currently developing a package for the Archimedes series of micros, to be on display at the BATC rally at Harlaxton in May.

"There is absolutely no reason why older micros, such as the Spectrum, should not be used to receive M1 and the other "new modes" as in many ways the programming requirements are less demanding than the older "sync type" modes, such as 8, 16 and 32 seconds etc.

Of course the Spectrum could not display a colour picture but there is no reason why the red, green and blue information should not be combined in the correct ratios to generate an accurate black and white display. I am sure a competent Spectrum machine code programmer could write such software with ease - I did the same thing for the BBC micro.

Having said all this, I would concede the point that stations with older scan converters which are not microprocessor-controlled, will have difficulty receiving the "new modes", although I know of several stations who manage to display most of an M1 frame on their WCY/ENA scan converters.

"I am sure that future generations of SSTV equipment will be designed around IBM PCs and compatibles, especially as the cost of this kind of equipment is falling all the time. Although at present there is no decent package for the PC which supports the new modes, I know that several people in Europe and the USA are working on such systems, and something may be available by the end of this year. I hope that my Archimedes package will also be of interest, although I know that the Archimedes is nowhere near as popular as the ubiquitous PC!"

I am delighted to print Paul's letter in full, indeed I hope we can have details of this Herts. and Essex net for publication. What concerns me is that so few of the call signs mentioned above ever write to CQ-TV or Practical Wireless to say what they are doing. Of course, they are not obliged to but the SSTV mode will never get any publicity if people don't identify themselves. I'm sure nobody wants the SSTV spot frequencies to get over-run by other modes but it could happen if SSTVers hide their light under a bushel.

Eric GW8LJJ in Barry, Glamorgan sent a cassette with a 5-minute demonstration tape of SSTV. He is keen to spread the word about SSTV and I'll be delighted to lend this tape to anyone who sends a self-addressed label and a 28p stamp.

Send your news etc., for TV On The Air to: Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN1 8PH.

NEW ATV BOOKS - *REVIEW*

Andy Emmerson G8PTH

Five new handbooks on ATV - an event rarer than a tropo lift coinciding with a contest! But it's true, so if you are one of those people who enjoy learning more about ATV, here are some excellent titles to curl up with.

In the past I have remarked on the excellent articles on 24cm amateur television techniques in P5, the newsletter of the Severnside Television Group. Well, their author Shaun O'Sullivan G8VPG has now reprinted them in the form of an A4-format booklet and I can truly say they are required reading if you are involved with this band. Incidentally, back in 1984 I wrote a series of articles covering the same ground in Amateur Radio magazine, and it's remarkable how far techniques have progressed since then.

That was then, this is now and Shaun's **A GUIDE TO 23cm TELEVISION** is an excellent book. In fact I'll go so far as to say it's the book I'd have liked to have written myself. The style is friendly but informative and doesn't overlook the basics; honestly I'd be proud to have written a book to this standard. Starting with the 23cm band-plan, Shaun progresses to cover antennas, cable and connectors, receivers, preamps, transmitters, video sources and repeaters. All common commercial products are mentioned (with contact addresses) and evaluated in a honest and professional manner. A separate chapter summarises the ATV hobby and its other facets.

With just 28 A4 pages and (good) desktop publishing production it might not look good value at £3.60 post-paid - but it is. Every chapter is a gem and few ATV operators will not learn something new from this book, however experienced they are. Make your cheque out to Severnside Television Group: the address is 15 Witney Close, Saltford, Bristol, BS18 3DX.

ATV HANDBUCH (2. Auflage) is the new edition of our German friends' ATV Handbook. Apart from the pictorial cover it looks uncannily like the BATC's new handbook (reviewed below) and has the same A5 format. Page count is 128 and the text has been produced by dot-matrix DTP quite legibly (though the actual print quality is pretty grim in places). Some display advertisements for ATV suppliers are an interesting innovation and probably helped contain the price at 19 marks (about £6).

The text is in German, though many of the diagrams and tables will be intelligible to English readers, and of course circuits and PCB layouts are universal. A reference section at the back covers professional TV technology, while the rest relates to amateur television. Much

of the content is similar to other ATV books, though the RF side is developed more than in the BATC book. Unique items are maps of ATV repeaters in Europe and Germany, plus a chapter on SATV. SATV, a German invention, is narrow-band TV, using the normal 625 lines but with video frequency restricted to 1MHz maximum. This could have useful application now that the 70cm band is getting more crowded.

CCD chip cameras and home video systems get a good covering, as do 3cm techniques and test-gear for ATV. Useful chapterettes cover mobile ATV and getting press coverage for the hobby, and the book is well rounded. A few of the historical discourses seem rather irrelevant and I think the editors did use a spelling checker for it has turned nomograms into monograms! To the price of DM19 you must add DM5 for postage, and you can order the book from AGAF, Beethovenstr. 3, W-5840 Schwerte, Germany.

Back to the English language now for two American books on ATV. Both are good, even indispensable, but they are totally different! Or are they? Let's see.

ATV SECRETS FOR ASPIRING ATVERS (Volume 1) is from the ATV Quarterly stable and is edited by Henry Ruh KB9FO. A smart full-colour cover encloses 60 pages with advertisements, cartoons, photos and chapters on the basics of ATV. The editorial style is friendly yet authorative, although it must be said this has the look and feel of a magazine special rather than a handbook (which is probably intentional). The price is $9.98, worthwhile for newcomers to the hobby. A second volume is expected shortly.

AMATEUR TELEVISION WORKBOOK, assembled by Mike Stone WB0QCD, is from the rival publishing house of Spec-Com magazine and is co-sponsored by ham radio gear manufacturers AEA. A plainer cover and spiral binding are the wraps around 168 pages, which include a number of advertisements for AEA products. Several chapters are in fact reprints of magazine articles (good ones, you'll be pleased to know!) and the rest of the workbook also has a magaziney feel. Some of the cartoons look familiar and some photos are definitely identical, which is not surprising really. The editorial content is of high quality and very readable. The price is around $15, which makes it very good value for money. Additional pages will be issued to update the book.

Which is the better of the two? Neither, they are both extremely good and recommended - what a pity the postage makes buying them by mail from the USA rather pricey.

I suppose I had to keep **AN INTRODUCTION TO AMATEUR TELEVISION** back until last as it is published by the BATC itself. This A5-format paperback sells for the very reasonable price of £5. For a long time there has been a need for a truly up-to-date beginner's guide to ATV and this is it.

Just over 150 pages cover the principles of television, setting up a station, contest operation, frequencies and video sources. Separate chapters describe 70cm and 24cm practice, also video switchers, call-sign generators and using computers in the shack. Full details are given of a modules which can be built into a remote-controlled ATV station, as well as construction of a TV repeater controlled by a low-cost Spectrum computer.

This is a very useful book and I have only a few gripes. It is a shame that 3cm TV is not covered, as I think that 10 GHz will have taken over as the prime ATV band by the end of this decade. The section on using PCs in the studio barely scratch the surface of the subject and do not mention the wealth of captioning and effects software now on the market. An index would have improved the book and it is a shame that the words were not run through a spelling checker! (**they were, several times!!! ... Mike**). That said, there is no better book than this on the subject, it is nicely printed and it is excellent value. You can get it for £6 post-paid from BATC Publications, 14 Lilac Avenue, Leicester, LE5 1FN.

DAYTON DIGEST

Andy Emmerson G8PTH

Well, yes, I did make my pilgrimage to Dayton once more. And as usual there was plenty to interest the ATVer, from goodies in the fleamarket (discarded professional video gear and even a World War II airborne TV transmitter!) to the organised events.

In the latter category there was a lecture stream on ATV at the Hamfest itself (Bob G8OZP told disbelieving Americans about our progress on 10GHz) plus two hospitality evenings provided by the two rival commercial ATV magazines. These latter were most pleasant events of drinking and informal presentations lasting to midnight and beyond. They weren't cheap to lay on, yet the hams who partook were remarkably ungenerous with their donations afterwards!

The fact that there's only one Monopolies Commission may be seen as anti-competitive by some folk, and a bit of rivalry does wonders in the amateur radio magazine field for instance.

It seems a shame, however, that the publishers of the two American ATV magazines are still slugging it out in a circulation war that is costing them dearly and apparently indulging in a "dirty tricks" battle that doesn't reflect credit on either side. Both have released ATV handbooks that complement (but do not compliment) each other.

GOODIES GALORE

The Hamvention covers the whole gamut of amateur radio and computing and there were loads of other novelties to catch the eye (and tempt the wallet). I brought back some PC software (not much this year) and noticed that one stand was selling "Smutware" - at least they were honest and there was a pretty foxy-looking lady behind the table! No, I didn't buy any... Also loads of PD stuff on CD-ROM (mostly boring stuff you'd never find a use for, I'll warrant!) and zillions of Windows icons but I'm not into Windows.

How about a ground co-operative antenna? It's an HF antenna you lay on the ground or bury. I thought this was a joke but the manufacturer said it was the "HF antenna of choice" in the Desert Storm operation, as any other antenna would have given away the surveillance detachments' position. I did buy an FM trap, a nifty gadget that you stick in your antenna feedline. This puts a 30dB notch filter between 88 and 108MHz, yet causes only 1dB insertion loss at 130dB. Ideal for scanner users, ham radio operators and even TV viewers who, like me, suffer intermods from a strong local Band II transmitter.

MORE NOVELTIES

"The Enforcer stops speeders dead in their tracks - hottest gadget to hit the automotive market since the 1970 CB invasion." What on earth is it? Well, this palm-sized radar transmitter simulates police radar up to one mile. Simply aim and watch the brake lights come on. Drivers slow down and look for police but never find them! Not bad for $50, especially if you are troubled by speeding cars in your residential neighbourhood, though you could probably make one yourself for a tenner by retuning a Solfan head to just above 10.5 GHz.

Tiny cameras for video use were being snapped up at $285, and buy were they tiny!?! Smaller than a pack of cigarettes and ideal for peepy-creepy operation or desk-top videophones. The lens is hardly larger than a big LED and you can also buy the same CCD chip camera built into a smoke detector or other household objects. Pretty subversive, huh? A similar camera built into a small box with a low power ATV transmitter costs $500 and one was demonstrated at the ATVQ "ATV party". PC Electronics is selling it and has named it the "handy-lookie"!

Talking of videophones, AT&T in the States has released a domestic videophone very comparable with the one being sold by Amstrad and BT in Britain. It was suggested that the narrow-band TV signals produced by these devices - or the new digital video compression systems being developed for business television could form the basis of a new worldwide amateur video standard. Offering more "motion" than SSTV, this kind of signal would be suitable for transmitting by amateur satellite - if people can agree a worldwide standard.

TRANSMITTER CHOICE

Still on the transmit side, a company called Bestlink Corporation has taken over the 70cm transmitter range of TD

Systems. Bestlink is related to the Best outfit who are well known here for satellite receivers and are said to be producing their amateur range in Hong Kong. However smart these product may look, they still produce a double sideband signal, which is considered a bit anti-social if you don't use an effective vestigial sideband filter. These filters are sold in the USA by two firms and very nice they are - and expensive as well, as you would expect for a huge lump of precision-crafted brass.

AEA were making a lot of noise about the merits of their 70cm vestigial sideband transmitter. Its output is a rather modest 1 watt peak sync power and the masthead power amplifier they sell operates only in class AB and probably restores the shaved-off sideband. The performance figures they publish are pretty meaningless in this respect, and everyone is awaiting a proper review of this product before endorsing it.

Nicest ATV product (for me) was a text superimposition module for putting idents, callsigns or numerical information onto a video signal. This tiny board could be adjusted for our 625 line video and costs $175. Because the text is a graphic image you can have your own artwork scanned into its memory.

Slow-scan is another world as far as I am concerned but I must say the SSTV fraternity made an excellent job of publicising their chosen mode. The SSTV hospitality evening was well attended and they put out a lot of informative colour literature on slow-scan.

COMPUTER-ASSISTED VIDEO

Remember that old TV Times commercial - I never knew there was so much in it? Well, the same applies to Avid, The Amiga-Video Journal. I picked up a copy in Tower Records, Chicago and was stunned by the near-broadcast standard accessories available for this computer.

Starting with a 19'' rackmount Professional Video Chassis, the products range from an internal timebase corrector to a complete video and audio routing system operating under the Amiga's control. Broadcast-quality maps, titling fonts and pictorial backgrounds are offered in profusion, together with dozens of add-ons for the Video Toaster all with desperately catchy names!

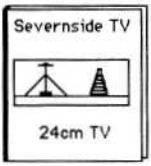
Now these products don't exactly have pocket-money prices but they do mean that a self-employed professional has a chance to build a studio and make a living, producing the same kind of results that hitherto only big outfits could muster. Of course you also need the creative flair and artistic ability, but this is understood.

Up to now the Amiga has made all the running but over in the States at least the IBM PC is fighting back. You can of course now get output converters which will turn VGA graphics into NTSC (or PAL) video, and genlocks are also available. Some very tasty software has been released lately and I have ordered some demo disks.

Severnside Television Group

A Guide to 23 cm Television

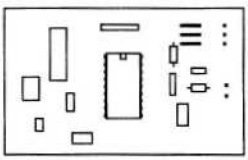
The complete beginners guide to setting up a 23cm ATV station.. Everything you need to know in simple terms. Written by the STG club secretary, Shaun O'Sullivan.



Price £3.00

+ 60p p&p

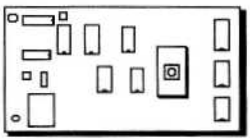
RGB to PAL Encoders



Our latest offering is ready built and aligned RGB encoder. It accepts 1Vpp ANALOGUE RGB and SYNC and gives 1Vpp composite PAL encoded video (75ohm) Suitable for converting a computer RGB output for transmission. Can be configured for TTL level RGB Based on the SONY CX1145 chip. All circuits and connection details supplied.

Price £32.00 inc p&p

Colour Test Card Generator



New!! The STG now offers a ready built and tested TEST CARD GENERATOR. Displaying up to 4 test cards ready programmed with your CALLSIGN and QTH. The cards cycle automatically or can be manually displayed. The output is 1 vpp PAL comp. COLOUR. Please supply your CALLSIGN and QTH with order.

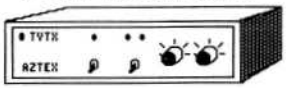
Price £75.00 + £1.50 p&p

Severnside Television Group

15 Witney Close Saltford Bristol BS18 3DX
(0225 873098) after 7pm & weekends
Please allow 28 days for delivery

Aztex Electronics

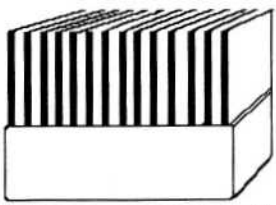
24 cm Transmitters



This state of the art FMTV transmitter gives a solid 2.5 W on either of the two switchable channels,1249 & 1255 MHz. This ready assembled and tested unit accepts both line and mic inputs for intercarrier sound and front panel audio and video gain controls are provided. See CQTV 150 for review.

Price £245.00 + £5.00 p&p

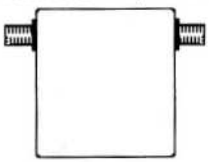
24cm Power Amplifiers



A 20 Watt PA using the SC1040 module is now available to accompany the AZTEX TX

Price £150.00 + £5.00 p&p

24 cm Pre-amplifiers



This GaAsFET pre-amp offers a gain of 17db with a noise figure of only 1db. Designed to go between the RX antenna and your receiver The gain is flat across the 23/24cm band but has an 8db roll-off at around 700MHz to help reduce broadcast TVI. A highly stable deign based on the ATF10135 GaAsFET utilises SMT components and is boxed and aligned. NB the device does not contain RF switching.

Price £52.00 + £1.50 p&p

AZTEX Electronics

Ken Stevens G4BVK 20 Coberley Footshill Rd
Hanham Bristol BS15 2ES (0272 677005)
SAE for full details. Delivery is 28 days.

THE WORTHING AND DISTRICT VIDEO REPEATER GROUP

GB3VR ATV REPEATER BRIGHTON

1W FM-TV 24cm TRANSMITTER THIS TRANSMITTER GENERATES ITS SIGNAL DIRECTLY AT THE WANTED FREQUENCY WHICH MAY BE SET ANYWHERE IN THE BAND. ON-BOARD INTERCARRIER SOUND AND FIXED PRE-EMPHASIS ARE STANDARD FEATURES. THE KIT INCLUDES THE DIECAST BOX AND COSTS £80.00

23/24cm ATV CONVERTER THIS UNIT BLOCK CONVERTS THE 1.3GHz TO THE DOMESTIC UHF TV BAND. USE THIS KIT WITH A STANDARD TV TUNER AND BATC IF PCB, FOR A COMPLETE FM RX SYSTEM. APPLICATION NOTES INCLUDED. £40.00 INC DI-CAST BOX.

TWO CHANNEL PLL THIS NEWLY DESIGNED TWO CHANNEL PHASE LOCKED LOOP WILL IMPROVE THE OVERALL STABILITY OF THE SOLENT 1WATT TRANSMITTER. TWO CRYSTAL LOCKED CHANNELS, AND A THIRD FREE RUNNING TUNING POSITION ARE AVAILABLE. KIT PRICE ONLY £30.00. CRYSTALS FOR THE PLL ON CHANNELS RMT1, 2, 3 OR SIMPLEX 1255MHz £7.00 EACH. OTHER FREQUENCIES TO ORDER.

VIDEO AGC KIT. THIS UNIT ACCEPTS A COMPOSITE VIDEO SIGNAL IN THE RANGE 0.15 TO 2V p-p AND OUTPUTS A CONSTANT 1V p-p ACROSS 75-OHMS. THIS UNIQUE AMATEUR DESIGN IS A MUST FOR TV STATIONS AND REPEATERS. £16.00 EACH.

EXPANSION BOARDS FOR THE CIRKIT CROPREADY TEST CARD GENERATOR BOTH 2 AND 8-WAY EXPANSION BOARDS ARE AVAILABLE ENABLING THE SELECTION, BY S/POLE SWITCH OR BCD, OF EXTRA EPROM PATTERNS. PRICE: 2-WAY £7 & 8-WAY £18.

EPROM SERVICE FOR THE CIRKIT TEST CARD GENERATOR. A FAST RELIABLE SERVICE WITH A RANGE OF DESIGNS INCLUDING BATC, IBA LOOK-ALIKE, EBU TYPES 1 & 2 TEST CARDS, CONTEST NUMBERS, TEXT, GREY SCALE PLUS MANY MORE. THESE EPROMS ARE TO THE FULL SYSTEM I STANDARD. SAE FOR FURTHER DETAILS OR TEL. GEOFF ON (0903) 32161 (7 TO 8pm). PRICE: £6.50 PER CHIP. PLEASE STATE B/W OR COLOUR WHEN ORDERING.

COLOURISER KIT FOR THE CIRKIT TEST CARD GENERATOR. BY THE ADDITION OF THIS KIT, THIS POPULAR ELECTRONIC TEST CARD CAN BE UPGRADED TO PRODUCE COLOUR IN ANY GREY SCALE AREA, ON EXISTING OR NEW EPROMS. AN IMPROVED DESIGN TO THE CIRCUIT DESCRIBED IN CQ-TV 139. PRICE £20.00.

THE 'NEW ATV' PROGRAM FOR THE 48K SPECTRUM. THIS VERSION HAS OVER 60 COMMANDS, WHICH INCLUDE 7 TESTCARDS, MEMOPAD, CLOCK WITH ALARM, MAPS, TONES, LOCATOR CALC (OLD & NEW), FLAG, X-HATCH, VARIOUS SIZE TEXT PRINTING PLUS A DISK TRANSFER COMMAND AND MUCH MUCH MORE. ALL THIS FOR ONLY £6.00. OPUS DISK VERSION £8.00. A MUST FOR ALL SPECTRUM OWNERS.

BBC AMATEUR TELEVISION PROGRAM FOR THE BBC MODEL 'B' AND MASTER. PROGRAM INCLUDES 8 TESTCARDS, MAIDENHEAD LOCATOR SYSTEM, VARIOUS MESSAGE PADS, PLUS MANY MORE FEATURES. AVAILABLE ON 80 TRACK DISC OR 40 TRACK D/SIDED DISC, FOR ONLY £8.50. SEND NAME LOCATOR AND CALLSIGN WHEN ORDERING.

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Copy should be sent to the Editor at 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF before 20th September. Tel/Fax: 0788 890365.

FOR SALE

PANASONIC NV-180E PORTABLE VHS, with slide-in mains PSU and battery, £250. Postage at cost. TEST CARD VIDEOS FOR SALE: 55 minute video presentation made for the BATC "The Development of the TV Test Card". Andrew Emmerson interviews George Hersee, designer of Test Card F. Lots of old test cards included. And also ... "Exotic TV Idents", which covers East Germany, USSR, Poland, Czechoslovakia, Estonia and Romania and other exotic locations such as Mongolia, Libya, Algeria, New York, "BBC London". Plus many west European countries, as well as satellite channels. In all there are over 80 test cards, station idents, news programmes and start-of-day recordings, lasting 49 minutes in all. Explanatory captions describe each segment and the recordings were made in a TV studio "somewhere in Eastern Europe". Both tapes are VHS/PAL and cost £9.99 including postage. Please allow 14 days for delivery. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604 844130.

"405 Alive" magazine, now in its fourth successful year, covering 405-line technology and programming from the 30s to the 80s. Subscribers find it irresistible! Four 64-page issues for £12 or have a sample copy for £3.00 post paid. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH.

PYE MK3 3" IMAGE ORTHICON CAMERA CHANNEL. Circa 1955 comprises Camera head, Lenses one of which is 24" focal length, cable, CCU, PSU, Spare IO tube, Handbooks, and some history. At the time of writing I have not seen this camera but it is my understanding that it is essentially complete and could be made to work. This camera is now quite rare and has been donated to the BATC. The proceeds of the sale will go to club funds. Please contact Brian Summers. Tel: 081 998 4739.

FOR SALE: Obsolete tape! People requiring cassette tapes for Technicolor 1/4" and Philips 1500, 1700 and V2000 VCRs should contact Stephen Albrow, Globe Video Services, 192 Castelnau, London, SW13 9DH.

PANASONIC MX10 MIXER/EFFECTS UNIT with framestore synchroniser, good working order, I have upgraded to an S-VHS model! ... £500. IKEGAMI CTC-4500 MONOCHROME SURVEILLANCE CAMERA, modified to lock line and field drives or mixed syncs, D.S.K. caption camera for the above mixer, c/w lens ... £30. CRT X-Y DISPLAY in case, 70mm tube, working; build your own oscilloscope, spectrum analyser, etc. ... £30. Carriage extra. David Wilson, Milton Keynes (0908) 665106.

FORTOP TVT435 70cm ATV transmitter ... £80. FORTOP TVC435/40 70cm ATV upconverter ... £24. FORTOP TVD100 video demodulator ... £15. FORTOP TVT1300 ATV 24cm ATV transmitter ... £85. FORTOP TVC1265/40 24cm downconverter ... £30. W&D 1250DC50 24cm downconverter ... £40. LMW 1296PP4 24cm preamp ... £30. Hitachi colour camera ... £150. Hitachi B&W camera ... £50. MICROVITEC B&W monitor ... £30. B&W monitor ... £30. VIDEO SWITCHING UNIT 2in-10out ... £20. JVC GXN5E NEWVICON COLOUR camera ... £100. RVE SWITCHING UNIT CS2 ... £20. JVC TV/MONITOR CX610GB ... £200. John Staden G4TFN. Tel: 0533 832717.

VALVES, 4CX250BM, brand new, distributors price around £90 + VAT, one dozen for sale, STC brand, only ... £40 each or £399 for the lot. EX-equipment 4CX250B with bases (untested) for ... £20 a pair. CATHODE RAY TUBES for sale, over 30 different types mainly in ones or twos, bargain prices from £5 each, please telephone or phone with your wants. MUSA "U" LINKS (new or as new) ... £1 each or £9 per dozen. Various items of ex-BBC and ex-IBA TV, VIDEO and AUDIO gear, 19" rack mounting, etc., far too much to list so callers and cash and carry only, please phone for an appointment to view. It is all very cheap to clear. EMI 2001 SPARES (a few boxfuls left) ... £30 the lot. Old (collectors??) 405-LINE EQUIPMENT. Very low-loss coax, solid copper tape sheath, ideal for 1.2 GHz work, fantastic bargain at ... £1 per metre. A huge quantity of mainly modern components(capacitors, resistors, semiconductors, etc.) to fill a 4' x 3' trailer (at least 50000 items) , only ... £40 the lot. RARE and VINTAGE VALVES, many thousands available, please ask for a quote. A pair of DA100 audio output valves, new and boxed ... offers. Back issues of CQ-TV, last eight years, offers for the whole or part. Single and double-sided copper clad PC BOARD, perfect, about 50kg, some pieces up to 1 square foot ... offers for whole or part. Ex-IBA 4 channel TV TRANSMITTER, a few parts cannibalised, but much of it there and comes with a thick manual, diagrams, etc., lots of useful bits, 50W UHF, valve, complete with EHT, PSU, circulators, etc., bargain, first ... £99. All of the above prices are for cash and carry collection from Birmingham. Postage and delivery possible at cost. Tel: 021 472 3688 or write to: Ken Bailey, Unit 9, 16-20 George Street, Balsall heath, Birmingham, B12 9RG.

ROBOT 1200C COLOUR SSTV UNIT in mint condition (unmodified) together with G3OQD EPROMs (various) and oscillator unit, manuals/boxed together with Microvitec 1435 analogue/ TTL/composite monitor and cables ... £995. WOOD & DOUGLAS 1250DC50 24cm DOWNCONVERTER (new) ... £80. W&D VIDIF (kit) ... £43. TRIO TS-940S HF TRANSCEIVER (with AT-940 internal automatic aerial tuner) plus SP-940 external speaker and LF-30A filter, all brand new and unused (yes brand new and unused!) ... £1575 the lot. KANTRONICS KAM Packet/Amtor HF/VHF ports, latest V5.0 EPROM, boxed/manual, etc. ... £200. Tel: Paul G4XHF (QTHR) 0622 696437 (work); 0293 515201 (home).

AMIGA COMPUTER GENLOCK, model Rendale 8802. This unit is brand new and never used due to abandoned project. Add titles and graphics to video productions ... £150 ono. CITIZEN 120D PRINTER INTERFACE model S2/BIP to use Citizen printers with Commodore computers, brand new ... £25. John Crawshaw. Tel: 0253 594381.

LENSES. Various good-quality "C" mount lenses, 1" to 4" focal length, nothing over £20. Tell me what you need. Mains-powered VIDEO DISTRIBUTION AMPLIFIER, compact modern commercial unit (7 x 5 x 2") £5, post £2 extra or collect. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604-84413

0.BBC "BD" Issue COMPUTER, c/w disc interface, serial and parallel ports, tape and disc ports, RF and video out (mono or colour), RGB output, user I/O port, etc. ... £150. SIDEWAYS ROM/RAM, Aries B12 for BBC, 12 ROM sockets and 16k of sideways RAM, fits inside BBC case ... £25. DISC DRIVE, Cumana single-sided 80/40 track c/w PSU ... £50. Philips CM8533 COLOUR MONITOR, RGB, video, sound ... £150. Philips 7502 MONO MONITOR, 12" green screen ... £60. Taxan/Kaga DOT MATRIX PRINTER, modes include NLQ ... £125. Box of 10 discs, ideal for the above disc drive ... £5. As a package with the colour monitor ... £450. As a package with the mono monitor ... £370. As a complete package with both monitors ... £500. Also available but only as part of one of the above packages, Akhter double-sided DISC DRIVE 40/80 track, add £50 to any of the above package deals. Acorn ELECTRON computer, PSU, tape port, RF, RGB, video (mono or colour) ... £20. Acorn DATA RECORDER for BBC or Electron ... £10. Electron and tape deck package ... £25. Mick Curran G4ITF. Tel: 0705 386184.

California Microwave C-Band HEMT LNB and SCALER FEED, 950-1450 IF output ... £60. 1.8m DISH, no mount ... £50. 1.8m DISH with base mount ... £75. 1.2m DISH, ex-Navy, machined from solid casting, very high quality ... £40. Bob Platts. Tel: 0283 40742.

Fortop TVT435R 70cm ATV TRANSCEIVER, 2 switched video inputs, 435 and 437 MHz outputs, 12 Watts RF ... £85. MML 432/100 Microwave Modules 70cm 100 Watt LINEAR AMPLIFIER ... £225. Barry Keedy G6LIC. Tel: 0924 822605 (after 6pm or weekends).

TOP-NOTCH 70cm TRANSMITTER SET-UP. Fortop TVT435 (pos/neg modulation, two freqs); EDL-432 50-watt 2C39BA linear amplifier (and it IS linear!), with blower, spare HT transformer and spare tube; solid brass 3-element interdigital filter, Fortop TVD100 video demodulator; Marconi peak sync-reading power meter (50 watts); 2 RS coax relays. Will sell as one lot at reasonable price, offers invited. All equipment well treated and maintained. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604-844130.

TEST CARD VIDEOS FOR SALE: 55 minute video presentation made for the BATC "The Development of the TV Test Card". Andrew Emmerson interviews George Hersee, designer of Test Card F. Lots of old test cards included.

And also ... "Exotic TV Idents", from many old Communist countries and other exotic locations. In all there are over 80 test cards, station idents, news programmes and start-of-day recordings, lasting 49 minutes in all. Explanatory captions describe each segment and the recordings were made in a TV studio "somewhere in Eastern Europe". Both tapes are VHS/PAL and cost £9.99 each including postage. Please allow 14 days for delivery. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604-844130.

LOOKING FOR UNUSUAL OR HARD-TO-FIND CONNECTORS OR LEADS for your video camera, computer or VCR? NICAM, ATARI, SEGA, etc.. Try A.R. Communications on 0302-321066 Monday to Fridays 10 until 6. Access and Visa accepted.

6- row AUDIO JACKFIELD ... £50. Marconi picture/waveform monitor ... £80. 3 off Tandberg series 15.25" AUDIO RECORDERS ... £30 each. Sony VISION MIXER SEG200P ... £50. Sony MD1200P SYNC + COLOUR BAR GENERATOR ... £50. Sony DXC1200P COLOUR CAMERA including cable ... £50. Vitel 16-channel VISION MIXER ... £300. Jeremy Power G1WVK. Tel: 0442 871386.

MEMBERS' SERVICES SALE EXTENDED!: (for a limited period), the special offers detailed in Market Place in issue 157, page 92, continue to be available at discount prices (excepting the Teletron project - now sold out).

Portable U-MATIC RECORDER, Sony VO-3800P complete with AC-3000P AC adaptor/charger ... £150. U-MATIC CASSETTES, 20 minutes and 10 minutes ... £1 each. Paul Phippin G6FRA, 69 Chesterton Avenue, Harpenden, Hertfordshire, AL5 5SU. Tel/Fax: 0582 468957.

JUKO 'TINY' XT COMPUTER, as new ... £225. Worthing 1W FM TV 24cm TRANSMITTER, built and working ... £70. 9'' B&W MONITOR, video and mains in, little used ... £30. GREEN SCREEN MONITOR, video and mains in ... £20. NICAM DECODER, uncased ... £30. two Cherry QWERTY parallel ASCII KEYBOARDS, incased ... £5 each. Several new cased UHF MODULATORS, vision and sound, JVC, RF-PIE ... £4 each. All items with manuals or data, plus post at cost. Trevor Lumb, 2 Briarwood Avenue, Bury St.Edmunds, Suffolk, IP33 3QF. Tel: 0284 754318.

GENLOCK ADAPTOR FOR IBM XT comprises Paradise EGA card and gen- lock unit. PAL in RGB or PAL out, with software, etc., ... £125.00. Rack of 8 PYE VIDEO DISTRIBUTION AMPLIFIERS 6 o/ps each amp, BNC connections ... L30. BBC CROSSHATCH GEN ... £5.00. Plainton VIDEO QUADRANT FADER ... £3.00. Marconi precision NTSC SUBCARRIER OSC 3.579545 in high quality oven ... £L5.00. AUTOCUE 804 VT CLOCK (clockwork) ... £15.00. 35mm FILM of Marconi test card resolution chart No.1, unused and sealed ... £L10.00. 80ns tapped DELAY LINES 75 ohms ... 3 for £5.00. ZOOM LENS, 10:1, servo amps, controls etc., for TV88 mount, Image Orthicon format (35mm) circa 1965, Two wooden travelling cases, in good condition ... £60.00. Matthey MLW618B VIDEO FILTER 3dB point 6.63Mhz. BNC in/out orange diecast box as new ... £8.00. TIME CODE GENERATOR type 304 and reader type 104 by ''Rapco'' smart units, LED and Liquid crystal displays of Hours, Minutes and seconds, Working order, not EBU compatible ... £65.00. LabGear 7056 TV TUNER AND TELETEXT ADAPTOR, with remote control handset, video, sound and RF outputs, Teak? case ... £35.00. Marconi Transmitter VIDEO PROCESSING UNIT, control of gain, sync, black level, pre-distortion etc. No circuit details ... £10. Set of BBC Natlock equipment, Osc, Tone unit, Control, SPG units and change over unit, Pulse Delays and buffer amps. Standard PAL pulse outputs ... offers. BBC 6dB or 15dB video DAs 8 for ... £15.00. BBC Stab amp units ... £10. Large quantity of BBC white units destined for the skip! unless wanted, enquiries please. Home built television from early 50's using ex radar tube. PSU for Pye Mk3 IO camera. Spare yoke for Marconi MK3 camera. CCU for EMI 203. Short length of MK4B camera cable. Brian Summers G8GQS. Tel: 081 998 4739.

Barco 20'' COLOUR MONITORS CTVM2/55 composite/RGB in. One in good working order ... £100; one needing attention ... £60. 2 off 26'' Barco MONITORS for spares (same boards as 20'' model) ... £20 each or £160 the lot. AT COMPUTER CASE, full size ... £20. Mono VIDEO CARD ... £10. 12'' amber screen MONITOR, 12V, TTL ... £25. Wray 40£ f8 TV CAMERA LENS ... £20. Sony 1810 U-MATIC RECORDER/PLAYER, 2 off ... £100 each. Sony 1210 U-MATIC PLAYER ... £30. Philips 9-channel AUDIO MIXER LDH4511 ... £35. Sony V88 Video-8 CAMCORDER, working but needs slight attention ... £250. Exchange any of the above for a portable 24cm TV TX and RX, or video editing machines, or 16mm film equipment. Steve Holdsworth, 15 Wycombe View, Flackwell Heath, Buckinghamshire. Tel: 0628 527295.

CROPREDY TEST CARD PROGRAM: A program for any PC compatible computer that allows you to design test cards for the Cropredy testcard generator. All you need is a PC/XT/AT with an EGA or VGA display card and monitor, plus a mouse. The output is a binary file, ready for programming into an EPROM. There are two versions available. A demonstration version which is free, and the full blown version which costs £10.00 plus a minimum donation of £5.00 to your favourite ATV repeater group. (The demo version just has the SAVE function disabled). Call Chris Smith (G1FEF) on 0767-313292 for full details, or write to: 107 Hitchin Street, Biggleswade, BEDS. SG18 8BL. If you want the demo version, send me a disc with return postage and I'll copy it for you. For the full version send a cheque for £10.00 made out to 'C.P.Smith' state which disc size you require and also how much and to which group you made the donation.

1.8m Alcoa prime focus SATTELITE DISH, polar mount and extender panels to give approx 2.7m ... Any offers. 6' hefty radio link DISH (no stand or feed) ... free to a good home. Dynamco double beam (switched) OSCILLOSCOPE 35 MHz, with circuits, working ... £75 ono. Ken Hodges G6TDG. Tel: 021 475 4037.

EXCHANGE & WANTED

WANTED: BATC people ARE marvellous. Many thanks to Albert G4DHO who sent me some goodies. His address is not in the call book so this is the only way I can say thank you! Andy Emmerson G8PTH.

WANTED: Ex-broadcast camera/viable channel. Also camera head and mount. Any item, any vintage considered. Serious cash offered. Contact: Dicky Howett, 23 Micawber Way, Chelmsford, Essex, CM1 4UG. Tel: 0245 441811.

WANTED: Any information on the SALORA Mk.2 Satellite receiver, if possible how to reduce the bandwidth. Andy Dunham G6OHM. Tel: 0354 693791 (after 2.30pm).

WANTED: I'm now looking for a monochrome industrial or broadcast vision mixer/effects generator, the older the better (maker and line standard not important). All letters answered, as they say! And I also need a 19'' pulse distribution amplifier (any sort): any ideas? Andy Emmerson, 71 Falcutt Way, Northampton, NN2 8PH (0604-844130).

WANTED: Dish and LNB for Bush 1000. Tom Williams, 26 Aston Avenue, Winsford, Cheshire, CW7 2HX.

WANTED: Help! Can anyone lend (or copy for) me the manual for the Marconi BD889, alias V6120, alias 5390 8.5'' picture monitor. Costs refunded. Andy Emmerson, 71 Falcutt Way, Northampton, NN2 8PH (0604-844130).

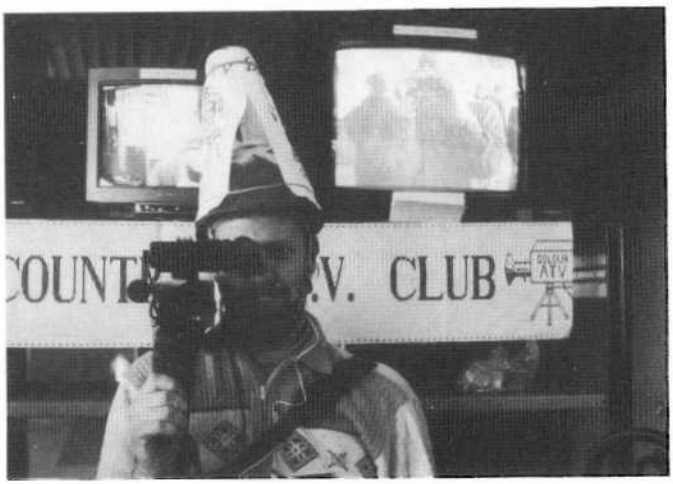
WANTED: Old camera tubes and similar devices - old non-functioning tubes, related data, or information, etc. - for historic collection. Especially welcome would be an EMI 9831 Vidicon or Ebitron, 1.5'' Vidicons, or an Orthicon. Thanks to all those friends who have donated redundant tubes to preservation. Please contact: Peter Delaney, 6 East View Close, Wargrave, Berkshire. Tel: 0734 403121.

WANTED: Circuit for Aston time code reader ''TD20''. Circuit for Marconi Inst. TM9692. PSU mounting rails for Marconi Mk8 camera PSU. Working rain covers for Mk8 camera. Brimar M17/15W 7'' viewfinder tube. XLR round 3-pin panel mounting sockets, must be in good condition, urgently wanted for restoration of OB Van termination panel. Quality Master waveform monitor. Broadcast off air check RX. 1U high. Sony Highband edit suite (not BVU200) WHY. Pye, EMI, and Marconi television product catalogues for 1950 - 1970 for research for article/book. Brian Summers G8GQS. Tel: 081 998 4739.

WANTED: In order to complete a project I require to source I.S.E.P. card and 'wired' backplane connectors, as used on earlier BATC projects. I also require access to Handbook 2 (revised edition) for technical information on ZN134 S.P.G. (details of PCB that was prepared). Should anyone be able to assist please contact Colin Stirling GM8MOI. Tel: work 041 954 9601; home 041 632 9960.

WANTED: Address of graveyard for solar-cell powered calculators. Also, cheap but functioning tripod for lightweight TV camera. Doug Pitt. Tel: 0602 282896

THE HOME COUNTIES GROUP



AND HIM AGAIN

ALSO AT SANDOWN

AT HOME WITH ARTHUR C. CLARKE BATC PRESIDENT

THE CQ-TV PRODUCTION DESK

G8MNY's ANALYSER CQ-TV 157