

# CQ-TV

MAGAZINE

No. 143

## BRITISH AMATEUR TELEVISION CLUB

AUGUST 1988



**1988  
BATC  
SHOW**



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## MEMBERSHIP

FULL YEAR: £6 or £1.50 for each remaining quarter of the year. All subscriptions fall due on the first of January. Membership application forms are available by sending a stamped addressed envelope to Dave Lawton, whose address may be found on page-2 of this issue.

OVERSEAS MEMBERS are asked to send cheques bearing the name of the banker's London agent. Postage stamps are not acceptable as payment. Overseas airmail is extra - please enquire from Dave Lawton or see the rates list with your last subscription reminder form.

The British Amateur Television Club is affiliated to the Radio Society of Great Britain and has representatives on the committee of the European Amateur Television Working Group.

The BATC is registered under the DATA PROTECTION ACT - all queries to Dave Lawton, and VAT registered - number 468 3863 01.

CQ-TV is produced by the British Amateur Television Club as its official journal and is sent free to all members. It is not for general sale.

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The BATC maintains many pages of news and information associated with amateur television on the Prestel Information Service. Club pages may be found within the ClubSpot section and full details were last published in CQ-TV 134. Copies of the article (two pages) may be obtained from the Publications department.



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CLOSE FOR PRESS DATE FOR THE NOVEMBER ISSUE.....20th September

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# WHO TO WRITE TO

Members of the BATC committee are available to help and advise club members on any ATV related subject. Remember that all such work is done in their spare time so please try to keep such queries to a minimum.

CLUB AFFAIRS; video tape library; technical queries, especially related to handbook projects: TREVOR BROWN G8CJS, 14 Stairfoot Close, Adel, Leeds LS16 8JR. Tel: (0532) 670115

MEMBERS SERVICES - PCB's; components; camera tubes; accessories etc. (other than publications); queries related to such supplies: PETER DELANEY G8KZG, 6 East View Close, Wargrave, Berkshire RG10 8BJ. Tel: (07352) 23121

MEMBERSHIP - Anything to do with membership including new applications; queries and information about new and existing membership; change of address; non-receipt of CQ-TV; subscriptions; membership records; data protection; Prestel: DAVE LAWTON G0ANO, 'Grenehurst', Pinewood Road, High Wycombe, Bucks HP12 4DD. Tel: (0494) 28899

GENERAL CLUB CORRESPONDENCE & LIBRARY - Any general club business. Queries relating to the borrowing or donation of written material. PAUL MARSHALL G8MJW, Fern House, Church Road, Harby, Nottinghamshire NG23 7ED. Tel: (0522) 703348

PUBLICATIONS - Anything related to the supply of BATC publications. CQ-TV back issues and other publications are normally only available if listed on the Publications order form with this issue: IAN PAWSON G81QU, 14 Lilac Avenue, Leicester LE5 1FN. Tel: (0533) 769425

EXHIBITIONS AND RALLIES - also arrangements and information about lectures and talks to clubs; demonstrations etc: SITUATIONS VACANT - any volunteers are asked to contact Trevor Brown.

CLUB LIAISON - and anything of a 'political' nature; co-ordination of ATV repeater licences: GRAHAM SHIRVILLE G3VZV, The Hill Farm, Potsgrove, Milton Keynes, Bucks MK17 9HF. Tel: (0525) 25343

TVI & RADIO INTERFERENCE - problems of this nature to: Les Robotham G8KLH, 38 Ennerdale Avenue, Stanmore, Middx. HA7 2LD. Tel: (01 907) 4219 (not committee).

CQ-TV MAGAZINE - Anything destined for publication in CQ-TV magazine or forthcoming BATC publications. Articles; review items; advertisements; other material; queries on the content of past issues. EDITOR: JOHN WOOD G3YQC, 47 Crick Road, Hillmorton, Rugby CV21 4DU. Tel: (0788) 69447

CONTESTS, CQ-TV ASSISTANT EDITOR - Mike Wooding G6IQM, 5 Ware Orchard, Barby, Nr. Rugby CV23 8UF. Tel: (0788) 890365.

Where possible it is better to telephone your query rather than write. Please do not call at unsocial hours. As a guide, try to call between 6.30 and 9.30pm evenings and not before 11am at weekends.





# EDITORS POSTBAG

## APPLE IIe SSTV SOFTWARE

Dear Ed,

I have been using an Apple IIe computer with software by Chuck Calfo WB4JMD for receiving SSTV pictures. The results have been very disappointing except on strong local signals, and then mainly on large text.

As the software is of 1980 vintage I wondered if any BATC members have some more modern software for the Apple?

I have recently purchased a Digisolve VGP-64 graphics system and would like to hear from any member who has used this system for SSTV reception.

Bill Currie VK3AWC  
P.O. Box 107,  
Mordialloc,  
Vic. 3195,  
AUSTRALIA

## FREE PACKET

Dear Ed,

I notice that packet is creeping into the magazine, especially where communication between members and CQ-TV is concerned.

I have a public domain, ham written packet program for the Commodore-64, with circuit diagram for the interface, which I would be willing to pass on to members for the price of the postage.

The program is of German origin although full English instructions are included. If interested members would state if they do not have a printer then I can enclose separate instructions with the disc.

Please send a blank, formatted disc together with stamped return packaging to:-

Eric Robinson G1AIB,  
38 Ambleside,  
Poolbrook,  
Malvern,  
Worcs WR14 3SE

## EKRAN SATELLITE

Dear Ed,

Does anyone have details of an antenna and pre-amplifiers for receiving the 714MHz EKRAN signals? Also any other information on the transmissions such as; is the signal AM or FM, what spacing is the sound etc.

Thanks for an excellent (in all respects) magazine, it is a credit to all involved.

George Tolley.  
Medical City 2016,  
P.O.Box 9516,  
Jeddah,  
Soudi Arabia.

## LETTER FROM AMERICA

Dear Ed,

I enjoyed very much the visit from Andy Emmerson, 68PTH and Trevor Brown, 68CJS when they were over here recently for the Dayton Hamvention. It's nice to meet the guys after reading so much from them in CQ-TV over the years.

I was extremely interested in their views concerning FM-TV, like they said 'the only people that aren't running FM-TV are those who have not yet tried it'. I got a bit embarrassed at the Hamfest when the discussion about FM-TV turned to how to slope-detect FM on an AM TV set. People were missing the whole point concerning the advantages of running FM. Oh well, I'm sure when they sobered up the next morning they had probably forgotten it all anyway.

I think the BATC was well received and now, with a U.S. representative, I'm sure more people will subscribe. I will be pushing your books and your membership applications at our upcoming local rallies.

Dave Williams WBOZJP,  
St.Louis, Missouri.

### MSX DISC DILEMMA

Dear Ed,

Having recently acquired a Toshiba MSX computer with a view to using the software reviewed in CQ-TV, I have found myself thwarted by a lack of information on getting a disc drive working with it. I would be grateful for details of companies who still support the MSX standard and might be able to supply a DOS and interface. Perhaps someone has the technical details whereby I may make use of one of my existing spare drives. Any information on this subject would be greatly appreciated.

Pat Janes GW1SXU.  
19 Fair View,  
Chepstow,  
Gwent NP6 5BX

### NOT EXACTLY TV.....!

Dear Ed,

Having failed the morse test yet again after a lot of dedicated practice, I have decided to indulge in a spot of self-analysis, and have come to the conclusion that the human brain is like an engine! It can have four cylinders or six, high performance or low, or just mis-fire like mine.

My brain performs very well at times, but at others it distinctly mis-fires. Looking back over my life, I've sometimes surprised myself, and all around me, but when employed in a job which needed all six cylinders firing at once, it was found necessary to ease up on the throttle and change down a gear to avoid blowing a gasket. It is nevertheless disconcerting to find yourself overtaken by a nice, smooth four cylinder job, but on looking behing you can always see a poor little low compression engine struggling along, mis-firing. Unfortunately we can't stop the old engine and have a tinker with the plugs, but, on occasion, usually around three in the morning, we find the old engine firing on all six cylinders.

So PLEASE can someone urge the RSGB to hold a morse test at 3am next Monday morning - I may actually pass then!

Sandy Pimlott G8IDE

### THANKS TO 'STEVE'

Dear Ed,

I would like to say 'thanks' to whoever Steve is who sent the little metal box in a padded envelope. Due to the component ends of the board the note got ripped so I couldn't sort out who had sent it.

After rewinding the coil everything worked fine. Many thanks indeed and sorry to be so long in replying - this is the only way I could think of.

Johnny Brown G3LPB

## NEWS ROUNDUP

### COMMITTEE SHUFFLE

At the BGM held at the Crick show this year, several committee members stood down and some new ones were elected. The Club would like to express its sincere gratitude for their work to those who have departed - Eric Edwards GW8LJJ, Paul Elliott G4MQS, Tom Mitchell G3LMX, Don Reid and Peter Ward G4GYI, and, at the same time offer a warm welcome to new members - Philip Harding, Roy Humphreys G4WTV, Bob Platts G8OZF and Gary Shipton G4CRJ.

The complete committee list may be found on the inside front cover of this issue.

### OFFICER SHUFFLE

In accordance with the Club's constitution the BATC Committee registers the following changes to its hierarchy: Mike Crampton G8DLX has relinquished the Chair and now becomes an ordinary serving committee member. Trevor Brown G8CJS has stepped down as General Secretary and has become Chairman, whilst Paul Marshall G8MJW becomes the new General Secretary. All other posts remain as before and all are detailed on the inside front cover of this issue.

## B&B RAFFLE RESULTS

The raffle held at the Bring & Buy stand at the Crick show was drawn during the afternoon. Two of the prizes have not yet been claimed so here are the winning numbers:

First - Blue ticket 91  
Second - Blue ticket 79  
Third - Pink ticket 96

To claim your prize simply send the ticket to either CQ-TV Editor and it will be despatched to you.

## FREE MONITORS!

A quantity of 19" Prowest solid-state monitors have been donated to the BATC. They are model PM19/1A and are quite large (19" cubed). The monitors are available for collection at the address below and only a nominal charge will be made - this covers the cost of collection from source.

Also available are some manuals for the following: Link DA 280; Tektronix 528 waveform monitor; Tektronix 1480 waveform monitor and Tektronix 1420 vectorscope.

Brian Summers  
29 Perivale Grange,  
Perivale Lane,  
Greenford,  
Middlesex UB6 8TN.  
Tel: 01 998 4739

## CQ-TV COPY

After a very long run of receiving lots of material for CQ-TV - for which very many thanks to all concerned - this issue looked like being a bit thin until some late material arrived in the nick of time.

Perhaps you would put on the thinking caps again and see what you can come up with for future issues please. We mustn't let the page count or quality fall into a decline for the want of copy.

Items, no matter how small, may be sent to either Editor, and advice and help etc. on copy may also be obtained from the same source. (addresses on page-2).

## THANKS MIKE

Mike Crampton GBDLX has been BATC Chairman for many years and has steered the club from a serious decline when he took over to the very strong and healthy organisation we now enjoy. Mike has worked tirelessly for the club over the years and, apart from normal Chairmanship duties, has been largely responsible for organising and manning various BATC stands and exhibits at most major shows and rallies.

Mike has kept a tight reign on committee meetings, never allowing them to degenerate into shouting matches or informal debating sessions(!) and has brought a considerable amount of order and professionalism to the BATC's general administration.

We are pleased that he is staying on as a committee member and hope that he will continue at the hub of the Club for many more years to come - thanks Mike.

## RUGBY REPEATER LICENCED AT LAST

Friday June 10th was a red letter day for the Rugby ATV Repeater Group, because a licence for the operation of their ATV repeater GB3RT was finally granted. The repeater went on the air less than one hour after the RSGB's communication was received. See report elsewhere in this issue.

## ELEKTOR TV SPECIAL ISSUE

The July/August issue of Elektor Electronics has as its main subject Amateur Radio and TV. One of the projects in this issue is a relatively simple to build 24cm GaAs FET ATV converter. A number of ATVers in the Eastern part of Holland have been using this converter with excellent results for over a year now so it should prove a popular project.

## WOOD & DOUGLAS ALIVE AND WELL!

There has been a strong rumour lately that W&D have stopped production of their amateur kits. CQ-TV has been assured that this is NOT the case and the full range of amateur and TV kits - including their excellent 24cm tuner - is still available.

## ATV ON 474GHz!

News has reached the editorial office of a claim for the highest frequency yet worked on ATV.

At 1615 GMT on Friday April 8th 1988 Bob Platts G80ZP achieved a one way fast scan transmission over a distance of 43 centimetres (real DX what!). Ok so here's the crunch: the frequency of the transmission was.....

473,900,000MHz !!!!!!!

or, if you prefer, at a wavelength of 633 nanometres.

The pictures received were P5 and a video bandwidth of approximately 1MHz was obtained with patterning caused by an unknown phenomena. There is every indication that the transmission range can be increased substantially!

The transmitter consists of a Helium Neon laser producing approximately 2mW output using A3F modulation. The receiver employs a BPY438 diode array followed by a LM359 providing 60dB of gain.

## COMPONENT SUPPLIER RETURNS - HAS BFR34A!

Following a move and subsequent expansion, BCD ELECTRONIC SERVICES is moving back into the components market selling mail order to amateurs.

BCD Specialise in RF and video components and carries large stocks of these already, although they are always keen to receive suggestions of items not already stocked.

One transistor widely used in some of the earlier BATC RF projects is the BFR34A. This is becoming increasingly hard to get, however BCD carry adequate stocks of them.

Look out for their advert in this issue. they may be reached at Somerset House, Somerset Street, Hull HU3 3QH. Tel: (0482) 225437.

## ASTEC TVRO TUNER

One or two members have enquired whether it is possible to shift the oscillator within the ASTEC AT1020 tuner head to enable it to cover the top part of the band. Rumour has it that someone has done it but no one knows who, or how!

If anyone can offer suggestions as to how such a modification may be accomplished, the Editor would be pleased to hear so that the information may be made generally available. G3YQC

## AMATEUR TELEVISION BELGIUM

Jose Robat, ON7TP has written to say that he issues a quarterly, photocopied, magazine of amateur TV interest called "ON SCREEN". As well as subscribers in Belgium and neighbouring countries, copies go to interested parties in the U.K.; West Germany; France; Holland; Austria; Italy; and Switzerland. At present the organisation (ATVB) has around 40 members but it has only been in existence for about a year so this should grow rapidly as word spreads. Some copy is translated from CQ-TV as well as other learned journals.

ON7TP is currently the national ATV manager for Belgium, Chairman of ATVB and member of the international European ATV Working Group.

## POITIERS CANCELLED?

It is reported by Marc F3YX that the biennial VHF 'salon' at Poitiers (France) has been called off and will not be revived. This was the premier UHF and ATV event for French amateurs and a favourite outing for others who wanted to mix a rally with a French holiday. If we hear any more we'll let you have the news.

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# ATV CALLING..144.750

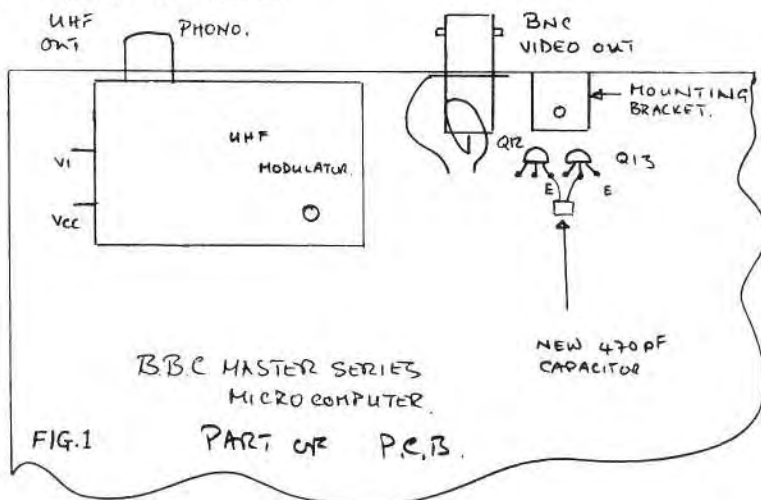
---



# COLOUR ON THE MASTER

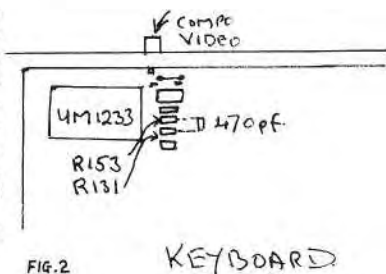
A letter in CQ-TV 142, appealing for details of how to modify a BBC Master computer to produce a composite colour video output prompted two responses.

The first, from George Tolley in Saudi Arabia, suggests that a 470pF capacitor be soldered between the emitter of Q12 and the base of Q13. These transistors are fitted towards the rear of the main PCB next to the UHF modulator and immediately adjacent to one another (see Fig.1) It is quite simple to solder the capacitor to the legs although the deft touch of a fine iron bit, coupled with good eyesight is required.



Roland Humphries GAUKL suggests the following: "Remove the cover and locate the UHF modulator UM1233, this can be found to the top left of the main PCB, close to the video output socket. To the right of the modulator is a column of five resistors, headed by LK16 and two very small capacitors.

Counting from the top, resistors R153 and R131 are the third and fourth in the column. Solder a 470pF capacitor between the EASTERN ends of these two resistors and this will introduce colour to the existing black & white signal".



The above modifications almost certainly simply introduce a colour burst into the black & white composite signal. You may like to consider whether you are always going to require colour on the composite output or not. If you are likely to use a green screen or black & white monitor at anytime then you may find the colour 'crawl' annoying, you should therefore consider adding a small switch to disable the colour.

# THE 1988 BATC SHOW



This year's BATC show was held on April 24th at the Post House Hotel in Crick near Rugby. The organisers got the weather absolutely right and it was bright and sunny all day, although a little chilly in shade.

The attendance was again high this year indicating that the rally is becoming well known and perhaps less in need of expensive publicity. Apart from all the conference rooms within the hotel itself the club had a huge marquee in the grounds which was somewhat bigger than last year, the result was that many more traders could be accommodated. It must be said that generally trade was down a bit on previous years causing some traders to pack up a little early. No explanation can be found for this except that everyone is probably hard up after the long winter! Nevertheless many traders did brisk business and have already booked up for next year.



Because of the extra room in the marquee and the nice weather the outside 'fleamarkets' and boot sales were laid out well and thus drew many people outside as well as in. The overall effect was that there was room to move around and everyone should have been able to see whatever they wanted. Cars again filled all the Hotel parks, then on down the drive, parking on the grass verges and along the road for hundreds of yards either side of the hotel driveway. Hope the walk was worth it for late comers!

There were far too many exhibitors this year for them all to be mentioned separately here so I have picked out a few to act as

'representatives': MICROMAX RF SYSTEMS, their first time this year, put on a good display of their 23 and 13cm aerial products, 2C39 UHF power amplifiers, SHF filters, and microwave components plus some other gear including broadcast TV cameras and equipment. BONEX LTD were there as usual with a fine range of components and modules, these included all the expected Toko products and RF devices. There were some nice test meters, some tools and many project boxes and specially printed short-form catalogues were available on the stand.

There were plenty of traders selling aerials, rotators and new and secondhand amateur radio gear. Typical of these was MET ANTENNAS who also had some very nice Andrews Helix coaxial cable. Another new one was LMW ELECTRONICS who had some very impressive UHF TV transmitters and receivers, a nice 23/24cm power amplifier producing around 40W out for 10mW of drive! Ideal for ATV but probably not cheap. LMW also had some wideband pre-amplifiers and other RF products. Interesting to note that they also stock some of the fancy RF components (devices, glass trimmers, chip components etc) and may be willing to obtain hard-to-get RF components - try them.





The Worthing Group had their usual excellent display and were seen to be doing brisk business in 24cm transmitters, EPROMs, colourisers and various other products. It was nice to see the (newly named) SEVERNSIDE TV GROUP selling their aerials and aerial components. Other groups included the NBTV ASSOCIATION, GB3ET ATV REPEATER GROUP, HOME COUNTIES ATV GROUP, REMOTE IMAGING GROUP, RUGBY ATV REPEATER GROUP and of course the BATC itself. Individual exhibits included those by Grant Dixon G8CGK, Brian Parkin, who flies that super model helicopter with the TV camera and transmitter on it and Steve Mitchell showing off some most interesting 24cm ATV equipment. It was good to see a 3-man Dutch contingent over here and they were led by Paul Veldekamp PA0SON.

There were one or two rather eccentric stands such as one which sold all sorts of knitting wool, wool products and other fancy goods - not a tele amongst it! Still it gave the ladies something to look at. There were several stands selling computers and software plus many with video recorders, radios and various domestic electronic equipment. ASTLEY VIDEO had some nice bits of gear including several cameras and power zoom lenses as well as some nice little monitors. SANDPIPER COMMUNICATIONS showed their usual range of amateur aerials and aerial components and BARENCO again displayed their quite comprehensive range of components for making and rigging aerials of all descriptions.

The Bring-and-Buy stand did brisk business again keeping a full staff pretty busy all day. Much gear was sold and only a relatively small amount returned to owners unsold. The RUGBY ATV REPEATER GROUP did a fine job in organising the stand and the proceeds should be most useful to repeater group funds.



The full (I hope) list of exhibitors is as follows: BATC, Worthing ATV Repeater Group, G8CGK, Sids Promotions, Micromax, LMW Electronics, Bonex Ltd, A Kelly, GB3ET, Severnside TV Group, GB3UD Repeater, Home Counties Group, Steve Mitchell, HS Publications, NBTV Association, Remote Imaging Group, Satalite TV Systems, North Sat Comms, Astley Video, Weirmead, North East Satellite Systems, PLM Communications, Brian Parkin, Hamshack, Marco Trading, Sandpiper Communications, Syon, CM Howes Communications, Linkbrook, A1 Electrical, P Hayward, Barenco, MK Enterprises, Jandek, Kenzen, MFM Supplies, U-May Kit, T Smith, Radiotronics, Chase Surplus, Bring & Buy, Hilton Plant, Northampton Communications, David Jenkins, DX Electronics, P Anvill, Dataphone



Electronics, Ham Radio North West, JMA Electronics, Alan Griffiths, FRG Trading, Computer Junk Shop.

Many thanks to all those who helped to make this event a great success, and especially to General Secretary Trevor Brown for his dedicated hard work.

Photo's by Paul Farmer.



## **STATIC PROTECTION**

There are many semiconductor devices in regular use by amateurs which are static sensitive, and should therefore be handled with caution to avoid their premature destruction. The warning "handle with care" is often given but it is seldom that one comes across actual handling instructions.

The following is from a Hewlett Packard document No. 88-0002 Rev.A and, although it deals specifically with diodes, the precautions are equally applicable to other static sensitive devices.

1. The operator, as well as tweezers, or any other pick-up tool, should be grounded to the test, assembly, or inspection station. This prevents the build-up of static charge which can damage the diode if the charge is allowed to pass through it.
2. All test fixtures should be equipped with a short across the terminals which is disconnected after the diode is inserted.

For leakage measurements where a short across the terminals is not practical, a series resistor may be used. The series resistor ( $\approx 10k$ ) should be physically close to the test terminal. This will prevent discharge through the diode of any charge built up on the capacitance that is present in the fixture, leads, and test equipment. It is also advisable to minimise this capacitance.

3. Spurious pulses generated by test equipment (i.e. contact bounce during switching, induced voltage in the leads, etc.,) must be eliminated.
4. When passing a diode from one operator to another, the receiving operator should grasp the lead held by the passing operator. If the opposite lead is taken there is a possibility of passing the static charge difference between the operators through the diode.
5. All soldering equipment should be transformer isolated from the power line or should be free of leakage.

# A NEW EPROM PROGRAMMER FOR THE SPECTRUM

---

By Trevor Brown G8CJS,

In 'Micro and Television Projects' I presented a design for a simple unit for programming 2716 and 2732 E-Proms from a Spectrum computer. Although the unit was only capable of programming and was not able to support read or verify, it has done sterling work, including programming all the E-Proms available from Members' Services. The new programmer described here will only program larger E-Proms, which are now so inexpensive that they can be considered for most tasks. This design is very simple from a hardware point of view, most of the work being carried out in software.

## HARDWARE

This design uses the very useful 8255PIO interface device. This chip has 24 Input/Output lines and allows much of the work normally carried out in hardware to be passed to software. The circuit is very simple, the prototype having been built on a piece of Vero board in a single evening. The power rails for the unit come from the Spectrum, apart from the programming voltage for the E-Prom, which is +21v for the standard 2732, and +12.6v for 27C128 and 27128A devices. If in doubt try the lower voltage first.

The output enable and programming control input (PGM) are connected via 74LS04 inverters, which have their inputs pulled low by 2.2k resistors. This is, perhaps, the only unusual feature of the hardware. When the PIO is first powered up the three ports default to inputs, the pull-down resistors ensure that the inverter inputs are low, and hence the output enable and PGM are high, which is the safest default position. The PIO is often re-initialised by the programming part of the software in order to reverse the direction of port-A from programming to reading. This change of direction will default the addresses carried by ports-B and C to zero and, were it not for the inverters, the output enable and PGM would also be low, which would cause a data bus clash with a program pulse at address zero. The machine code program will soon move things out of this undesirable default state, but the inverters ensure that the E-PROM data bus is tri-state, and that the programming pulse is high, so problems do not arise.

I have indicated on the circuit diagram (Fig.1) the port addresses for the 8255 should you wish to use it to interface other projects to your Spectrum. The addresses are in decimal so that Spectrum Basic can be used.

## SOFTWARE

The machine code program which does all the work is too long to reproduce here but a copy of it can be obtained from me at the address shown at the end of the article. The program resides just above basic and the E-Prom data is stored in memory from location 28000. When the software is loaded and run you are presented with the following menu:

LOAD A PROM INTO MEMORY	1
BLOW A 2764 PROM	2
BLOW A 27128 PROM	3
LOOK AT MEMORY	4
ENTER BASIC	5



Fig. 1

Option '1' will load either a 2764 or a 27128 E-PROM into the Spectrum's memory, so that data can be examined using option '4'. A 16k block of data is moved by the software, so if a 2764 (8k) is loaded into memory then the data will repeat after Hex 1FFF. This is not a problem and helps to keep the program simple and small (less than 1k byte).

When the program is first loaded the memory store is filled with logic 1's. This is useful for checking that an E-PROM has been erased and is in fact ready for programming. Insert the E-PROM and select option '2' or '3', depending on the type, (do not switch on the programming voltage Vpp). This is the verify mode, where the E-PROM contents are compared with the contents of the memory store in the Spectrum. If all is well you will be returned to the menu, if not, a failure message will be displayed giving the address at which the first problem occurs. This verify mode only takes a few seconds to check that an E-PROM has been correctly erased and is ready for programming.

To copy an E-PROM plug the master into the socket and select option '1', the contents of the master will now be duplicated in the Spectrum memory store. Replace the master with an erased E-PROM and select the appropriate option '2' or '3'. The E-PROM will be verified as it is being programmed and, should an error occur, a failure message indicating the address of the error will be displayed. The programming voltage Vpp should be switched on before entering this mode and switched off when the menu returns. It may take as long as 15 minutes to program a device depending on the program size. I have not utilised any short-cut algorithms, each byte is read first and the 'blow' operation is skipped if not required.

Option '5' returns the computer to BASIC so that the data in the memory store may be saved or recalled from tape or microdrive. The syntax required is:

for a 2764	SAVE "FILE NAME" CODE 28000,8192
for a 27128	SAVE "FILE NAME" CODE 28000,16384

Microdrives require the extra syntax of:

for a 2764	SAVE "*"m";1;"FILE NAME"CODE 28000,8192
for a 27138	SAVE "*"m";1;"FILE NAME"CODE 28000,16384

Saving files in order to store the data is a good habit to get into as it means that the Spectrum can be switched off during E-PROM changes. This is not a problem if a microdrive is available for quick data storage and retrieval.

Files may be loaded into memory ready for programming by using the syntax:

LOAD "FILE NAME" CODE

or for microdrives      LOAD "\*"m";1;"FILE NAME"CODE

'RUN' will return you to the program from BASIC, 'RUN 40' will clear the memory and load it with FF's.

The only option not on the menu is verify. To check the contents of an E-PROM against memory use the program mode, but do not switch on the Vpp supply. If a failure message does not result then the contents of the E-PROM agree with the contents of the memory which at switch on, or after 'RUN 40' will contain all logic 1's.



## E-PROMS

For those of you not familiar with this means of data storage here are a few notes on E-PROMs: An erased E-PROM contains a logic 1 in all its memory locations. To erase it it must be exposed to ultra violet light of about 2537 Angstroms. This wavelength is readily available from the sort of UV lights used for insect control. Exposure to a small 8 Watt tube at a few inches for 20 minutes will erase the program and leave the E-PROM full of logic 1's (FF's). Erasure can be checked as stated earlier by using the 'look at memory' mode after first loading the contents of the E-PROM into memory. To program the E-PROM the appropriate locations are then changed to logic 0 by the programmer, so that the programmed device contains a series of 1's and 0's which make up the binary words when read out by the processor or logic circuit in which they are to be used.

**WARNING:** Ultraviolet light at these wavelengths is dangerous to the eyes and skin, thus some form of opaque shielding should be used. Ozone can also be produced and inhalation may cause respiratory irritation.

## DEVELOPMENT SYSTEM

This unit works well with the Hisoft Devpac assembler, where source code can be organised to run at any address and assembled under option 16. The object code saved to a microdrive or tape under command 0. The computer can then be loaded with the E-PROM programmer software, the object code loaded to address 28000 and then programmed into the E-PROM. The E-PROM can then be installed into a controller such as Teletron and the program run and tested. NB: To use 2764 devices in Teletron set the 2716/32 link to 2732 and disconnect pin-27 of the E-PROM and reconnect to +5v. This is a correction to the information given with the original design.

For further information or a copy of the program please write enclosing an SAE to:

Trevor Brown, 14 Stairfoot Close, Adel, Leeds 16

## **Narrow Bandwidth TeleVision Association**

The NBTVA, founded in 1975, specialises in the mechanical and low definition aspects of ATV and offers genuine (moving) TV within a basic bandwidth of 6 - 7KHz.

The techniques, basically an updated form of the Baird system, are a unique mixture of mechanics, electronics and optics.

Membership is open world-wide on the basis of a modest yearly subscription (reduced for BATC members) which provides an annual exhibition and quarterly 12-page newsletters, together with other services.

For further details write to: Doug Pitt, 1 Burnwood Drive, Wollaton, Nottingham, NG8 2DJ or telephone Nottingham (0602) 282896.

# TV ON THE AIR

By Andy Emmerson G8PTH

It's time once more for our three-monthly report of what's been happening on the air, plus a roundup of repeater news. First of all the activity news ...

Roland G4UKL is one of our keenest SSTV correspondents (we can always do with more, though!) and hopes to get to the Dayton Hamvention next year. In the meantime he writes from Trevverva (Cornwall) that this year's IVCA international SSTV contest (held at the beginning of April) was heavily contested, with stations from Sweden, Hungary and Yugoslavia leading the field. Results had not been announced at the time of writing, but Roland reckons the first three will come from the countries mentioned. He had reasonable luck in this contest, with some surprising contacts. An hour of much-QRMed two-way colour SSTV was worked via the long path with Stan VK3TE in Melbourne, Australia. He was running an FT-101 barefoot into a mono-band beam. Among other two-way exchanges were ZS6BTD, PY5BYE, 4Z4PR, 8P6DP, JA1HHL, LU5NA, VE1AMA and ZL1ARY. In all 38 countries were worked two-way.

Roland has also added some more remarks about the QRM caused by R/T stations working on the SSTV frequencies and the behaviour of some USA DX net "anchor men". We'll pick these up in a month or two because this is a real problem which won't go away by itself.

Eric Robinson G1AIB sent a welcome letter from Poolbrook, near Malvern in Worcestershire. He writes "I was nominated or volunteered to write to you about what's happening around the Worcs./Glos. borders. Every Friday night at 20.00 local time the 'Three Counties Slow Scan Net' goes on air for about two hours. Frequency is 144.500 MHz. The members at the moment are Leo G3CPG (Malvern), John G3CXI (Bishop's Cleeve), Terry G3TRB (Droitwich), David G3VQC (Worcester), Joe G3CLE (Malvern), Lee G1CBL (Malvern) and myself Eric G1AIB (Malvern).

"Leo and John both use Spectrums and also the G3WCY/G4ENA system. Lee and Joe use Spectrums only. Terry uses a Wraase and David has a Robot. For myself I am receive-only with a CBM-64 (if anyone knows of a transmit/receive program for the Commodore 64 please let me know). In the meantime I am forging ahead with a full-blown G3WCY/G4ENA system and should be up and running by the winter.

"The net exchanges pictures in 8, 16, 24, 32 and 48 second mode, in black and white and colour. A variety of pictures are transmitted and topics discussed. We are always on the lookout for new members to the net and make them welcome. We have been going now for about six months and still going (and growing) strong. In addition to all this activity on Fridays there is also a smaller net operating on Monday evenings, using Spectrums only in what is called Spec-Comms. That is transferring Spectrum machine code over the air and resolving it on-screen. It's just like loading a program off tape but in this case it's off the radio. The idea is to send good quality pictures or screens to each other, and it

works very well. I dare say that some of the readers will not believe that there is life in this neck of the woods but I can assure you we are alive and kicking. Carry on the good column and I look forward to keeping you in touch with what goes on in the Three Counties Slow Scan Net."

### Microwaves

Moving to the fast-scan frequencies, Bob Platts G8OZP (of the GOAVG group) writes from Rolleston-on-Dove, Staffs. about the expanding activity on 3 cm. On 15th May he took his gear to Drum Hill (Derby) and was rewarded with a P5 two-way contact with Dave G8NND on Barr Beacon (Birmingham). On the same day Bob G8VBA had a P1 exchange with Dave over the same path, using a standard Solfan head and Solfan horn. On Sunday 29th May he ventured to Yorkshire from where he had a two-way exchange of pictures again with G8NND. This time the path was 67 km between Maltby, near Rotherham, to Bishop's Wilton on the Yorkshire Wolds. The weather was very poor but the pictures were P5. Later that day he drove on to Rosedale on the North York Moors and again worked a two-way with Dave over the 102 km path back to Maltby. Signals again were P5. After removing the Caissegrain reflector and feedhorn from the dish, Dave found he could even get P0.5 to P1 pictures on open waveguide.

"I had to terminate transmissions very rapidly", continues Dave, "when one of the most horrendous thunderstorms developed very quickly (I must have upset the Gods). Lightning flashed and thunder rolled around the hilltops. I have never got a seven element 2 metre beam down so quickly, got thoroughly soaked and was unsure whether to get in the car, under the car or as far from it as possible. It's a very good pastime, this 3 cm!" Sounds kind of unusual anyway. Bob adds he is QTHR and will help if anyone is looking for a contact or test signals on 10.25 GHz.

### News from abroad ...

Stanislaw Pazur of Warsaw is one of our readers in Poland (I don't suppose there are many of them!). He is very grateful for the magazine, also for some Spectrum software which was kindly donated as a gift by Grant Dixon G8CGK and the GB3VR Repeater Group. The Sinclair Spectrum is a popular computer among radio and electronics enthusiasts, but it is effectively impossible for them to send money out of their country, so they are reliant on gifts.

J. Francalanza 9H1GT lives in Zejtun, Malta and is building a flying spot scanner. The video processing unit is complete and works well; he is now working on the CRT section. The photomultiplier is a 931A and works fine. His job is transmitter engineer with the local broadcasting organisation.

## **U.K. AGENT FOR VHF COMMUNICATIONS MAGAZINE**

Literally as we were about to go to press came the news that Mike Wooding, G6IQM, is to be appointed U.K. agent for VHF COMMUNICATIONS magazine. Mike will handle subscriptions as well as sales orders for kits, boards and components. VHF COMMUNICATIONS's advert appears on page 88 of this issue and Mike's address and phone number is on page 2.

### ... and from back home

John Stopford 88UWS has moved to a more elevated spot between Folkestone and Dover: he looks forward to working French hams on 1255 MHz. At the moment his receiver is with its designer, Marc F3YX for a tweak, then it's all systems go!

And now some special event activity: GB75TV is the callsign of the station being operated over the Saturday and Sunday of the August Bank Holiday weekend. Apparently they tried to get GB75ATV but that had already been claimed by the Home Counties ATV Group for their special event station (25th and 26th June) at the Middlesex Show, near Uxbridge. Anyway GB75TV is being run by the GB3RT (Rugby TV Repeater) team, which means they will probably be active on 24 cm as well as 70. The site is Shenington, an elevated village north-west of Banbury, Oxfordshire. I know the spot and I imagine they will make some good DX contacts from there, so look out for the call on your screen.

### Royal occasion

Other out-of-the-ordinary ATV activity will take place on Friday 15th July, at the opening of the RSGB National Convention (NEC, Birmingham). The ceremony is being performed this year by HRH The Duke of Edinburgh and this very auspicious occasion will be recorded on TV by BATC members. The RSGB asked the BATC if they would be prepared to do this and they did not have to ask twice: it's not often that BATC members get a chance to play "real" television (except the ones who do it for a living!). In the "olden days" the BATC used to mount far more outside broadcast operations - why these have declined I'm not sure. Perhaps it's because lightweight home video apparatus has made it all too easy, but this job at the NEC will have full lighting, proper staging and the "full works". We wish them well.

### Repeater news

South Wales may get its own TV repeater if plans being hatched by Phil Balaam work out. He is looking for support to build a repeater on the Wenvoe mast site, so give him a ring on 0222 - 593456 if you are interested. The Severnside repeater group have offered help and there is a possibility of a 10 GHz link between the two "boxes" if this proves licensable. Already the Severnside (formerly Bristol) repeater has good coverage of some areas across the estuary and Brian GW6BW has joined the committee with the intention of building up the number of Welsh users. The repeater is now running full power from an Alford Slot, covering an area 60 to 70 km across. The group has 50 members and is financially sound.

In Nottingham GB3NV is now licensed and operational: they hope to move to a better site. GB3ET (Emley Moor TV tower in Yorkshire) hopes to receive its licence soon - it should have excellent coverage. GB3TV (Dunstable) is considering a remotely-sited 10 GHz "gateway" to give users in Bletchley and Milton Keynes an alternative way of 'getting in'. Dave G4NJU is engineering director for this novel project.



GB3RT, the Rugby repeater, is on the air at last! The good news came in a phone call at 11.30 GMT on Friday, 3rd June and five minutes later the "box" was on the air. Yes it took all of five minutes because Mike G6IQM, the repeater keeper, had to change the EPROM in the callsign generator from his own call to that of the repeater! Initial reports are good, with more than adequate coverage in most directions. Plans are afoot to move it to the top of a nearby commercial site, which should improve coverage in the directions currently shielded by Badby Hill.

Bath's GB3UT repeater is the sole AM machine in Britain, GB3VI (Hastings) having not yet come on air. A single TX/RX antenna is used, with 4 watts ERP. It has a good site on the university although hilly terrain thereabouts reduces coverage. Most users have home-made equipment and the instigators felt that simple reception on an unmodified TV set was paramount. Credit is given to some very dedicated users. They hope to interlink one day with GB3ZZ in Bristol.

The Stoke repeater GB3UD has been on the air some 14 months now, putting 5 watts to two Alford Slots. Coverage, currently from Wigan to Birmingham, should improve to include Coventry when the site is changed. They have a scheme for chaining through several repeaters, under tone control, once this becomes legal.

GB3HV (High Wycombe) is an odd man out. It is the country's only machine on channel RMT3, because of a 2 gigawatt ERP radar at Heathrow airport. The unique aerial system uses two 45 degree directional beams each for transmit and receive; these have some overlap at the 3 dB point. On receive the antenna picking up the stronger signal switches out the other, to achieve the best signal-to-noise ratio. The beacon mode is not continuous, so that other repeaters can be seen during lifts for example. It achieves a P5 signal at 40 miles and is seen in Aldershot, Guildford, Reigate, Newbury, the South Downs and central London. The team has identified sites in its coverage area where GB3CT, TV and VR can also be received: these would make potential interlink sites, though users would have to select on the audio channel which repeater they wished to be patched through. They have also proposed to the RSGB that they broadcast the GB2RS news (reply awaited) and are working on an on-screen P meter which comes on when you drop carrier.

GB3VR (Brighton, Sussex) has applied for permission to duplicate its output on 13 cm in order to evaluate the band for links. A permanent link between VR and HV is proposed.

Concern is being expressed at the proposed bandplan allocations for packet radio (PR) on 23 cm by ATVers in the London and Home Counties region, an area with the highest activity levels of ATV - and packet radio! The RSGB has proposed that PR should operate on 1240 and 1299 MHz, which you might think are well out of harm's way and should upset no-one. Unfortunately the High Wycombe TV repeater, which serves this area, operates on channel RMT3 and these frequencies are inside the input and output channel passbands. PR is not (generally) affected by ATV but PR shows up as interference on ATV. Ideally some other frequencies can be found for PR, otherwise some proper tests must be conducted to find out how real the interference is and what compromise can be achieved. We don't really want frequency wars in the "vast open spaces" of 23 centimetres.

It is also clear that we now need much better technical co-ordination between the repeater groups. Two urgent tasks must be sorted out. One is allocating time slots for each repeater's beacon mode, so that well-sited users can try to access more than one machine. The other job is to agree link protocols and a common system for networking and remote control.

And that's it again. How about some more reports for next time? Does anyone still use 70 cm or is it entirely dead now? Convince me!

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## **MAINLY SSTV**

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By John Brown G3LPB

This item mainly relates to the Sinclair Spectrum, which seems to be one of the most popular computers in amateur use, and carries on from the piece in the last issue (p30).

The G4ENB system is now in action although, receive wise, it needs a bit more work I feel. The definition is not as good as I would have expected, but still watchable. Transmit wise it is very good indeed and allows all sorts of things to be done, particularly with the supplied screens, which allows data to be inserted on the top of flags, rainbows etc. These can then be saved and used later. It also allows large letters etc. to be generated.

I have also been introduced to the G4IDE 'SCAN' system, which looks to be good. It contains the programs to correctly set it all up, even to using the computer to show the correct settings of the analogue board. The board itself is the R5GB/BATC/G3WCY analogue board, the four outputs of which feed to another board which carries the Spectrum interface. The program also contains a section called 'DESIGN', this allows the user to design his own programs using selected keys. We can trace up pictures using the little drawing cursor and five shades/thicknesses of trace can be used. It seems to be another first-class amateur effort - more later when all has been examined.

I have also had the opportunity to try out a smart program that allows a printer to be used to print out pictures and data from a disc or tape (maybe Microdrive later). The pictures I used were prepared using a digitiser and the quality is excellent, much better than the normal computer pictures (with the Spectrum anyway).

Finally, watch the screws in the plug of the Spectrum power unit, also the plug which fits into the Spectrum power socket. Mine kept crashing leaving a black square and lovely little pixels on the screen. I thought the computer was giving trouble, not so. The screws were NOT TIGHT on the power plug and, due to something or other, played funny tricks. Thanks to Gil and Ted of E&G Electronics for suggesting this cure.

Does anyone know of any SSTV software for MSX machines? If so please write to the BATC Editor with the gen.

# ROBOT SSTV

I have received one or two queries about the paragraph in last issue's 'TV on the Air' column (P27) regarding Robot UK Ltd and their pricing policy. I felt the best way of answering these questions was to find out for myself, so here is what I discovered:

It is NOT true that Robot UK are concentrating more on the commercial side of their activities. Their activities and loyalties have not changed from how they have always been. It IS true that the parent company in the USA concentrate more on the commercial market - but then they always have!

The Robot 1200C is indeed still available, and likely to remain so, until perhaps it is superceded by an even better instrument. Whilst it is true that the Robot 1200C (PAL) was priced at £1395.00 (£1213.00 + VAT) this price was reduced in February this year, in view of the dollar's weakening value, to £1083.00 + VAT. The price therefore which appeared in the last issue was well out of date. In fact at the time of writing (late June), because the dollar has continued to fall, the current price of the 1200C is £996.00 + VAT giving a total of £1145.00.

In considering the question of 'justifying' a UK price against a US one, one should consider the following points:

1. It is not practical to alter UK prices daily, or even weekly, to keep them in step with the US dollar exchange rate. Most firms review prices about every three months or so, which seems reasonable.
2. After currency conversion we have to add a huge 15% for VAT.
3. Certain expenses have to be taken into account such as shipping costs and import duty.

It is important for European consumers to bear in mind that Robot UK Ltd. has its products, which are to PAL standards, available for immediate delivery at East Midlands Airport with full spares and service backing.

Whilst we're at it let's have an update on the radio amateur products currently available:-

'1200C'	High Resolution Colour SSTV Scan Converter.	£1,145.00
'CIM 64'	For interfacing 1200C/450C to Commodore 64	£ 97.75
'800C' KIT	For converting existing 800's to '800C' specification and features.	£ 189.00
'70D' KIT	For converting 70, 70A, 70B & 70C to '70D' specifications and features.	£ 65.00
'256'	For converting 70, 70A & 70C to 256 line mode	£ 25.00

A range of printer cables, 'D' connectors and printer supplies is also available. Prices include VAT and carriage in the U.K. ROBOT (U.K.) Ltd., Building 33, East Midlands Airport, Derby DE7 2SA. Tel: (0332) 812446.

# IN PLACE OF THE TUBE

## Part-3

By Peter Delaney, G8KZG

In parts 1 and 2 we looked at the basic design of the CCD, - a device which converts an optical image into a varying voltage waveform, without the need for scan coils, etc - and ways in which the scan drive pulse sequences might be derived. The circuitry described so far all works from a 5-volt supply. However, the CCD requires to be driven by 10-volt pulses, and requires a suitable video amplifier to follow it. These pieces of circuitry will now be considered.

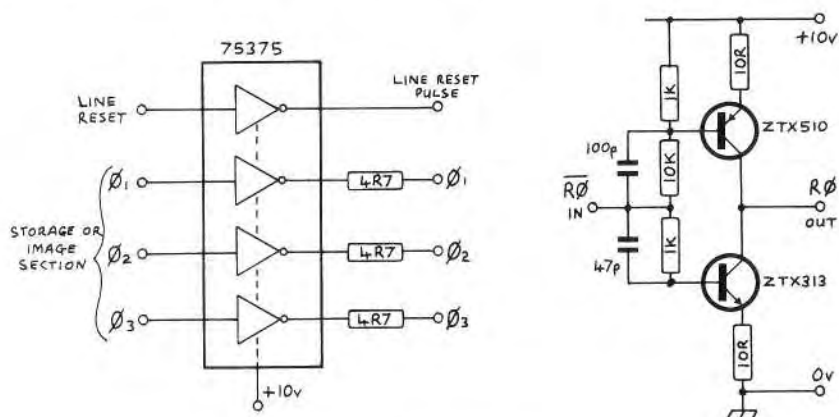


Fig.10

For the storage and image sections the pulse trains can be translated easily to the required level by an interface integrated circuit. This is compatible with TTL signals at its input, but, with a 10V supply to the output stages, can produce pulses of suitable amplitude. The signal needs to be available at a low impedance in order to compensate for the unavoidable capacitance between electrodes corresponding to different phases in the CCD. The pulse shaping, however, makes use of the inherent capacitance of the CCD, which is of the order of 3nF. If an alternative to the suggested circuit is used then a voltage follower is likely to be needed to drive the CCD. For the line readout pulses a TTL gate can be interfaced to the CCD using the discrete transistor inverting buffer in Fig 10. Of course there needs to be a buffer for each pulse sequence, requiring two of the interface i.c.s and three of the discrete circuit in a complete design. Some adjustment to the pulse timings may be needed in order to ensure the shaped pulses overlap satisfactorily. Due to the fairly fast pulses involved in this sort of circuit, a ground plane would probably be preferable, and the CCD and all i.c.s should be adequately decoupled at their supply pins. As an alternative, a set of specialised hybrid circuit packages from EEV can be used - an ESB365090 AA for the image and storage sections and an ESB365089 AA for the line readout pulses.

Having found a way to scan the CCD, attention can now be turned to amplifying and processing the video signal that it produces. The stored charge is passed to a capacitor on the silicon chip, and the resultant voltage passed to the output stage. Of course, the charge from the previous element must first be removed. This is done by a reset pulse - the fourth pulse train in Fig 6 (CQ-TV142 p59). This must return to a 'low' before the third phase of the line readout pulse. The pulse should also be narrow, so that as much time as possible of each cycle is available for the output capacitor to charge up - about 40nS is optimum. The output stage consists of an FET, and a similar FET to which the charge pattern is not passed (the dummy output transistor). If the signals from both of these are applied to the differential inputs of a video amplifier with good common mode rejection, a relatively clean video signal results. The recommended conditions for the output FETs are a supply of 20V, and a load resistor of 3k3. The maximum signal current is of the order of 200nA. This implies a signal voltage of about 660 microvolts, which needs amplifying to 0.7 volts, when terminated in a 75-ohm load. Blanking and sync pulses also need to be added. This can be achieved using the circuit based on the LM733 and MC1445, as suggested in Fig 11. EEV also make hybrid circuit packages for this part of the camera, including one that will conceal blemishes.

In part 4 we will look at a colour capable CCD system, working on similar principles.

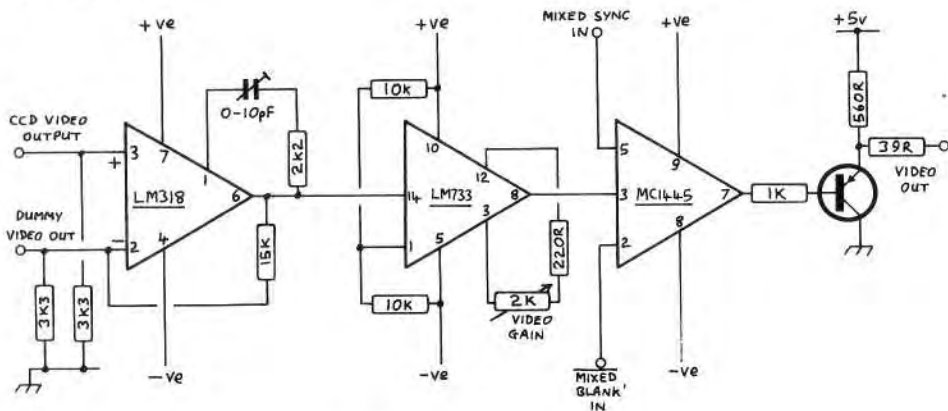


Fig.11

Video amplifier chain

## IN RETROSPECT

SOFTWARE NOTEBOOK NO.9 - CQ-TV 138 (Spectrum dish and horn calculator)

It seems that there has been some printer corruption in the editorial office with this program. Apparently wherever there should have been an up-arrow (↑) there appeared instead a  $\frac{1}{2}$  sign. The offending lines are 100, 116, 210 and 216 and changing these symbols should cure any problems previously experienced. (See also corrections in CQ-TV 140).

Thanks to ON7TP for this one.

# PULSE CROSS FROM AN UNCONVENTIONAL SCART

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By Paul Pitts.

Anyone who has tried to receive distant, noisy TV pictures will be familiar with the attendant problems of line cogging and frizzy verticals. The lower the signal strength the worse the problem becomes. The type of set, or to be more precise the degree of sophistication embodied in the sync separator and line timebase circuits, makes some receivers very much better at resolving a coherent picture in the presence of vast amounts of noise than others.

One satisfactory solution open to the amateur is to introduce clean syncs from a local source into the sync separator. Before you decide that this option is not open to you because you have neither a spare SPG or a separate sync input on your TV set, read on...

Many modern TV's are fitted with a 20-pin SCART or EURO connector and, love them or hate them, they are very useful in this application. The SCART connection system was described in CQ-TV 139 with further information appearing in CQ-TV 140.

The method of connection described here may be a little unconventional but it has helped me unravel many a mystery scrambled satellite signal, devoid of any recognisable sync system. Not only the MAC variants with their cramped circles and dancing digits of stereo sound can be studied in detail, but totally digital communication traffic can be viewed that would otherwise remain unresolvable to the ordinary TV set.



D2 MAC TV signal showing digital word synchronisation.  
Not resolvable on a 'normal' TV set.



Naturally the local sync source needs to be stable and of the same line standard as the incoming signal. However since 525-line 60Hz NTSC signals are quite rare in Europe, even off satellites, a 625-line 50Hz source is the most useful. Since most people can receive at least four domestic TV channels, one of these can be used to supply sync information, thus obviating the need for a dedicated sync generator. The easiest way to do this is to receive the terrestrial channel via a video recorder and use the video output for sync purposes. With a choice of four signals, each of different phase, changing channels has the effect of positioning the pulse cross type of display to optimum.

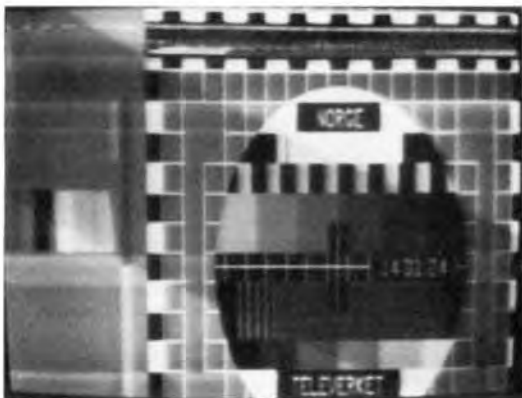
#### THE METHOD

First you will need a SCART plug with all its cheap tinplate pins. Next configure the plug for RGB working, ie, connect a short wire to each of pins 7, 11 and 15 and twist and solder them together INSIDE the plug. The resulting common point now becomes the video input from the weak source, the common goes to any or all of pins 5, 9 and 13 - the RGB grounds. Now wire pins 20 and 17 to the signal and screen respectively with a coaxial cable long enough to reach the nearest terrestrial off-air source (the video recorder's video out). Alternatively it is possible to use the adjacent pin (number 19 - CVBS out) on the SCART connector if you prefer.

Be sure to insert all the unused pins in the plug when you have finished otherwise it may drop out of its socket - these pins provide the necessary retention force. What could be simpler? Only the sync component of the CVBS is used by the CVBS input when RGB mode is selected. The vision is ignored so all you see on the screen, in monochrome of course, is the slowly drifting pulse cross and picture from the weak or noisy signal, but without any of the cogging or frizzy edges.

I use the raw video output from my satellite receiver which is AC coupled via a small value capacitor, this peaks the HF component and attenuates the low frequencies, but nevertheless gives the best results when looking at the digital content of the modern MAC signals.

Remember that this wiring method bridges three 75-ohm terminating resistors so a series resistor around 56-ohms will be required to provide a proper termination. One other advantage of this method of connection is that it kills the auto audio mute facility that most modern sets employ to silence the speaker whenever the line oscillator loses solid lock. It means you can search for sound subcarriers on the incoming picture.



Norwegian test card resolved using the method described above.

# THE REPEATER APPLICATION

By Mike Wooding G6IQM,

As an adjunct to John Wood's series 'Lets Build A Repeater', we decided to include this article giving advice on how to complete the necessary paperwork involved with the licence application. I have used as an example our own application for GB3RT, the Rugby 24cm television Repeater. Obviously each application will be different so this must be considered as a guide only.

The application document is in the form of a questionnaire, and is produced by the RSGB. Supplied with the application document is a 'Guide To Repeater Licensing', a System Specification giving all the parameters to be observed and the Site Clearance Form. All repeater licence applications are processed and vetted by the RSGB before they are passed to the DTI. All repeater licences are held by the RSGB and not the groups concerned. It is also worth reminding everyone that amateur repeaters are built and maintained purely by local groups, who fund the projects from within their groups. Some groups manage to obtain sponsorship from commercial bodies by way of equipment donations and some, particularly the GB3RT group, resort to just plain scrounging!

The questionnaire is split into nine sections and these will be dealt with in turn. The questions appear in the large type face, whilst the answers taken from our application are in italics and any comments or advice is printed using the normal font.

## SECTION 1: REPEATER PROPOSAL.

1.1 State the reasons why you wish to establish the repeater station.

1. *To promote the use of the 1.3GHz amateur television allocation.*
2. *To stimulate amateur television activity in this area.*
3. *To encourage and assist the development and techniques of FM television in the microwave bands.*
4. *To further expand the amateur television repeater network.*

This section is straightforward and I would imagine that these almost standard answers appear on most applications.

## SECTION 2: PERSONNEL AND EXPERTISE.

2.1 Does your group run an existing repeater?

This section is also fairly straightforward and just requires information on the experience of any group with repeaters or PMR equipment etc. Also required is the name and call sign of the repeater manager, technical manager and contact station.

## SECTION 3: EQUIPMENT (GENERAL) AND TEST GEAR.

3.1 If you intend using a ready-built transmitter and/or receiver, give details below. Include an outline of any modifications you

intend carrying out to bring the rig within specification.

*Wood & Douglas 1250DC50 ATV receive converter.*

3.2: Give details of parts of the repeater you intend building yourself (include block diagrams).

1. Transmitter
2. Receiver
3. Logic control
4. Other equipment

*Four block diagrams supplied on separate sheets.*

3.3 What test equipment do you have available?

1. *Hewlett Packard 435A Power meter with 30dB calibrated attenuator and 8481B calibrated power sensor.*
2. *Hewlett Packard 8559A Spectrum Analyser 0.1-21GHz.*
3. *Wiltron 640 RF Analyser DC-1500MHz.*
4. *Hewlett Packard 5342A Microwave frequency counter 0-25GHz.*
5. *Giga GR1100A UHF/SHF Signal generator.*
6. *Tektronix 435 Oscilloscope.*

This section deals with the basic equipment for the repeater and the test gear available to the group. This test gear does not actually have to be owned by members of the group, as long as it is available to them when required. Needless to say, neither John nor myself own most of the gear listed in our application, but it is available to us at our respective work QTH's. The separate sheets referred to in the answer to part-2 give a full explanation of the whole repeater, including the block diagrams as requested. It is our advice that a fairly detailed explanation of the equipment and interconnections be provided, as this will reduce any delays to the application caused by lack of technical information.

#### SECTION 4: THE RECEIVER.

4.1 If you are using a commercial receiver, will it meet the specification unmodified?

*Yes.*

4.2 What checks will be made to ensure that the receiver sensitivity stays within spec' at all times, once the repeater is in service?

1. *Periodic testing by the use of a calibrated signal generator on the receiver input, monitoring the IF signal prior to limiting.*
2. *By using a calibrated remote transmitter and aerial monitoring on the repeater's built-in signal strength meter.*

4.3 How will you ensure that the IF passband and stopband are both within the specification?

*By sweep testing using an RF analyser.*

#### 4.4 How will squelch hysteresis be implemented?

*Squelch will be provided on the intercarrier audio signal. Upon the removal of an accessing signal the repeater will remain in the receive state for 5 seconds. If not re-accessed within this period it will switch to the start of its video and morse-code identification sequence.*

#### 4.5 (1.3GHz groups only) How will you implement the AFC requirement?

*By deriving an AFC signal from the demodulated receiver output which is fed back to a varactor controlled oscillator in the receive converter.*

#### 4.6 How will you check that the spurious emissions from the receiver are within the specification, and cannot affect other users of your site, or those on adjacent sites?

*By periodically checking at the receiver aerial socket, using a spectrum analyser and by using a sensitive RF monitor probe to check for stray radiation from the equipment and cables.*

Not much explanation required here as the answers indicate the information needed. Again, and it cannot be stressed to highly, give as much information as you can. The application is not only scrutinised by the DTI, but is also sent to any interested bodies and co-users of the band. There are delays enough with the processing of the application without there having to be referrals for more technical details.

### SECTION 5: THE TRANSMITTER

#### 5.1 If you are using a commercial transmitter, will it meet the specification unmodified?

*Not applicable*

#### 5.2 How will you check that spurious emissions from the transmitter are within the specification, and cannot affect other users of your site, or those on adjacent sites?

*By periodically checking at the transmitter aerial socket using a spectrum analyser and appropriate attenuators, and by using a sensitive RF monitor probe to check for stray radiation from the equipment and cables.*

#### 5.3 How will you check that the power output will not exceed the maximum permitted?

*By measurement at the transmitter aerial socket with a laboratory grade RF power meter and calibrated 30dB attenuator.*

#### 5.4 How will you check that the transmitter modulation response is within the specification.

- 1. By observation of the transmitted signal on a spectrum analyser.*

2. *By measurement of the video peak voltage applied to the modulating varactor diode. Upon initial testing the peak voltage required to provide signal deviation up to the maximum permitted will have been determined.*

It is important to give plenty of thought to your answers to this and the previous section, you may like to refer to the FM-TV report in CQ-TV 142. Due to John's and my own professions we have available to us facilities not often available to most amateurs. However, the requirement to ascertain the initial frequencies of the TX and RX units and their stability is no different from the requirement of an ordinary amateur licence. A calibrated SHF wavemeter could be used to adequately confirm the transmitter frequency, and then that TX used to calibrate the receiver.

## SECTION 6: FREQUENCY STABILITY.

- 6.1 State how the transmitter and receiver stability will be kept within the specification at all times.

*Receiver - Temperature compensated oscillator in a thermally insulated enclosure, stabilised power supply, continuous operation.*

*Transmitter - Crystal mixer type with low (100MHz) frequency oscillator, temperature compensated in a thermally insulated enclosure, stabilised power supply and continuous operation. Second oscillator crystal controlled.*

- 6.2 What tests will be done to verify that the frequencies of the transmitter and receiver are within the specification at the following times?

- 6.2.1 During initial setting up.

*Receiver - frequency counter on the local oscillator.  
Calibrated signal generator on the receive input frequency.*

*Transmitter - frequency counter on transmit output  
(no modulation).*

- 6.2.2 Under operational conditions.

*Receiver - by remote transmission of a standard video signal from a laboratory calibrated transmitter.*

*Transmitter - by remote receiving of the repeater output signal on a laboratory calibrated television receiver.*

- 6.3 How will you ensure that your frequency measuring equipment is accurate?

*By periodic reference to a Rubidium standard.*

Quite a comprehensive section this, but nevertheless relatively easy to complete. It could probably be said that if you cannot complete this section adequately then you cannot comply with the requirements

of the specification anyway, as far as measuring the various parameters required that is. One might be tempted to say after reading the requirement of 6.3: 'where does it all end!', our only advice is if you have got this far don't give up now!

## SECTION 7: LOGIC CONTROL.

This section covers the operation of the control logic and the outputting of the call sign and idents. As stated on the questionnaire, the mandatory and recommended practices are given in the specification sheets, therefore it would serve no purpose to reproduce our answers here as they must of necessity be the same as the details given in the specification.

## SECTION 8: ANTENNAS AND DUPLEXING.

This section only requires details of the aerial (we can't do with that other term here in the editorial office!) systems, their method of installation and ASL and AGL details. Also information regarding isolation, filtering and feeders is required.

## SECTION 9: DO YOU HAVE ANY QUESTIONS OR COMMENTS?

I will leave any answers that you may have for this section entirely to your own thoughts!!!!

This completes the main questionnaire, the other document that has to be completed is the 'Site Clearance Form'. This document is simple to fill in, requiring details of the proposed location of the repeater including: the address, national grid six-figure reference, aerial AGL and ASL heights, basic equipment details, input and erp powers and details of site co-users (if any). Details are also required of the proposed closedown procedure and the call signs of those stations, at least three, who are able to effect closedown with contact telephone numbers. It is extremely important to give accurate information on this document. It has been known in the past to cause severe hold ups in the progress of applications if this is not the case. A letter of authority from the site owners giving their approval must also accompany the site clearance form.

That's it then, I hope that the information here proves to be useful to those of you in the throes of applying for a licence or setting up a repeater group. Don't be put off by the seemingly impossible requirements, as I hope you will see from the answers we gave in the application for GB3RT, a little forethought and common sense is all that is required. Finally, one last piece of advice, BE PATIENT! The application for GB3RT has just been issued (June 3rd) after having been with the DTI for 16 months, although the licence for GB3NV (Nottingham 24cm FM-ATV repeater on RMT2) was granted in 12 months this is the exception to the rule for 24cm repeaters.

# **AMATEUR TV TEE-SHIRTS**

Now that summer's here you will need some thin cotton Tee-Shirts. What better than a customised one bearing a picture of a modern TV camera and the legend 'AMATEUR TV'? The shirts are white with Royal Blue printing and are available in small, medium and large sizes (state which). Price £4.80 each, inclusive, from Mike Wooding G6IQM, 5 Ware Orchard, Barby, Nr. Rugby CV23 8UF. Cheques payable to 'Rugby TV Repeater Group' please. All proceeds for the upkeep of GB3RT.



# MAGAZINES GALORE

The editors of CQ-TV are very pleased to receive magazines and literature which contain ATV related material. Many magazines are received regularly together with some occasional ones so let's have a look at some recent issues:

VHF COMMUNICATIONS, a super magazine for VHF, UHF and microwave types, always full of very interesting technical articles with excellent backup by way of PC boards, components, kits and some ready-mades etc. MICROWAVE NEWSLETTER from the RSGB; this is invaluable for microwave enthusiasts and comes highly recommended. Not too much on ATV although much of the technical information is applicable to TV as well as phone. BACK-SCATTER is an interesting magazine from the Townsville Amateur Radio Club in Queensland, Australia. This was sent to CQ-TV as a result of a piece we ran in November 1987 by John Allsop, G30GX who described his stay in Townsville and his discovery of the local ATV repeater VK4RAT. The magazine re-printed our article. NBTV, the journal of the Narrow Bandwidth Television Association, is just the job for those interested in early 30-line TV and historical matters. TELERADIO NEWS contains all the latest information for the DX-TV enthusiast as well as technical articles and other valuable material. Der TV AMATEUR is West Germany's answer to CQ-TV, it being the official journal of the AGAF (Arbeitsgemeinschaft Amateurfunkfernsehen), their national ATV club. Text is in German. RADIO & ELECTRONICS WORLD is an excellent general magazine and continues to carry regular items of television interest, including Andy Emmerson's very readable ATV column. PRACTICAL WIRELESS is also a general amateur radio magazine although there is little specifically for the ATV'er in most issues. TELEVISION magazine is superb on the servicing aspect of TV's and video recorders although it has little of other interest in it. ATV gets a number of mentions though in Roger Bunney's DX-TV column. An excellent magazine if you want any TV spares etc.

Members requiring more information on any of the above journals are invited to contact the CQ-TV Editor.

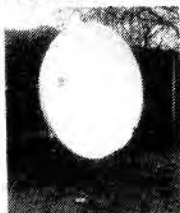
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# BATC AT DAYTON

Trevor Brown G8CJS & Andy Emmerson G8PTH

The USA was first discovered by Christopher Columbus in 1492: for the BATC this discovery came a little later. For a while the club had been thinking of ways of expanding the membership and it occurred to the giant brains of the club that north America was a huge area populated (among others) by ATVers who spoke and could read English. Sure they were already served by "Spec-Com" magazine and the US ATV Society, but their appetite for things ATV might be big enough to stomach a bit more besides. We already had a handful of members in the States and Canada and had advertised the club in "Spec-Com", but there was nothing like taking the product to the market for stimulating volume sales.

And so it came to pass that Trevor Brown G8CJS and Andy Emmerson G8PTH were despatched to the 1988 Dayton Hamvention to drum up a little business. The club would make a contribution to travel expenses and very conveniently we could share a stand with Sue and Don Miller (Wyman Research) who were long-term BATC members and had just offered to act as American representatives for the club. To add to the fun, Steve Mitchell G8JMJ decided he would take his family over to the States at the same time and would give us a hand on the stand. All the omens were fine ...

## First impressions

This is not the place to tell you all about America (you may have got there long before we did anyway, if not you have probably seen so many American TV programmes that you think you know the place anyway!). All we will say is that you must see it for yourself and it's not "just like in the movies". Also, not everything you hear about America and the Americans is a myth: the hospitality is very, very genuine and people are much more talkative, outgoing, less inhibited than over here. When people enjoy themselves they don't things by half measures. Can you imagine talking ATV all day, drinking all evening, talking about ATV some more and then going out for a meal at 1 AM? The next day we



talked over beer and pizza until 3 AM ... Well, it seemed perfectly normal over there!

And Dayton is something else. Most people have heard of the Dayton Hamvention but may not know how big it is. Imagine an exhibition opening at 8 AM and three times the size of the RSGB's national convention at the NEC. Imagine it having a pub that opened at 4.30 AM for the convenience of hams. Imagine a flea market seven acres large that you started walking around at 10 in the morning (it's open from 6 AM!) and finished doing the rounds at five o'clock in the evening. Imagine all the components at half the British price, satellite receivers for #25 complete, Radio Shack (Tandy) having its own marquee and selling off overstocks of current items at two-thirds the normal price. Imagine every conceivable kind of computer hardware and software, at half the British price, and dealers fighting to discount new transceivers at unheard of prices. Yes, Dayton is like you've never seen before.

You see some funny people over there, too. One guy had a workman's yellow "hard hat" with a 70 cm cubical quad mounted atop. More conventional was a "gutter mount" style rubber duck fixed to the side of the baseball cap, which just about everyone wore over there. We decided we would not be seen dead wearing such daft hats but this was a mistake. The sun is deceptively strong over there - the cool breeze disguises the effect of the ultra-violet - but there was no mistaking the effect of seven hours' walking around in brilliant sunshine the next day; we were all as red as a beetroot. Steve suffered in agony for several days!



No need to hang around 'till the pubs open!

### Stamina required

Admission to the Hamvention costs \$10 and the ticket covers Friday through to Sunday. Yes, you need three days to cover this event, it is not just a rally. Inside under cover are the normal trade stands, around 500 in all. Outside is the monster flea market, and there are also six lecture rooms with sessions running almost all the time on subjects ranging from packet radio to weather satellites (including ATV and SSTV of course). It is difficult to assess the attendance at Dayton but the entry ticket included a raffle and ticket numbers called out went up to 33,000. The logistics of getting so many people into (and out of)

the place are frightening. Early birds parked fairly near by, others had to go 10 miles away and take the courtesy bus. Fleets of these buses made regular trips between the Hamvention site and all the hotels: finding the right bus (and a seat) were not very pleasant experiences.



BATC's Trevor Brown G8CJS



BATC member Michael Sheffield ZL1ABS

### Down to business

To justify our trip we had to publicise the BATC and we did this from the safe base of the Wyman Research stand. The visiting BATC sales team numbered four in all: G8CJS, G8JMJ, G8PTH and surprise, surprise - Michael Sheffield ZL1ABS had made the trip all the way from New Zealand, giving the BATC a formidable presence. Don Miller W9NTP and his wife Sue W9YL made us very welcome on the stand (the booth if you're American) and helped us sell BATC books and sign up new members. In turn we helped them sell the various VHF and UHF equipment they dealt in, including some Wood & Douglas gear. (W&D seem to do well with export sales - I heard that the Argentine Air Force had purchased some of their 23 cm FM-TV equipment for weapons control!). Our stand, by the way, was not too distant from some familiar names - LMW Electronics and Microwave Modules were there doing business, and I believe the G-QRP Club were around somewhere. Also not far away was BATC member Tom W6ORG using a hand-portable TV camera and 70 cm ATV rig (Kreepie-Peeple, to use the vernacular) to send pictures of Don's stand back to his own. This may have been industrial espionage at work because both these well-known ATVers ran rival ATV companies (Wyman Research and PC Electronics).



Mike Stone WBOQCD, publisher of 'Spec-Com' magazine, presenting the 1987 'Good Image' award to Bill Brown WB8ELK (R).

Don Miller W9NTP of Wyman Research the BATC's new agent for the U.S.A.

Another essential part of the three day event was talking: Tom W6ORG had thoughtfully got us onto the official Dayton lecture timetable and we were able to present a resume of ATV operation in Europe. The lecture timetable is perhaps an understatement: there were several streams of lectures going on simultaneously and just for the ATV mode there was a whole afternoon of information. Too bad if you wanted to listen to packet or RTTY people as well! Tom W6ORG from L.A. - "the smog capital of the world" - explained that the unhealthy atmosphere there had one advantage, at least for ATVers. The virtually permanent smog created an inversion layer, which gave daily ducting. Imagine that - tropo DX every day! He also explained that NASA (and the FCC - Federal Communications Commission) had given the ATV community blanket permission to re-transmit video from the Space Shuttle. ATV took a high profile in his part of the world, assisting a lot of public service and emergency communications work. This helped ATV achieve a positive and good public image.

Bill Brown WB8ELK described his exploits with an ATV beacon sent aloft in a weather balloon. By studying wind speeds and directions he determined the best time to launch the balloon. Having planned his "expedition" down to the last degree he was rewarded by amazing success. The 1 W video transmitter was seen 290 miles away, while the 100 mW two metre audio beacon was heard in two places 400 miles distant (4,000 miles per watt!). His project is a balloon which would stay in earth orbit for two years - or until



Don's shack is well-equipped by any standard. He works fast, medium and slow-scan with a Red Indian skull as the station mascot. Both he and his wife are keen archeologists.

someone shot it down!

Steve Goode distributed copies of a very detailed study of the possibilities for ATV on the next Space Shuttle flight. Very detailed calculations showed that many options were open and that uplink and downlinking on 70 cm AM were quite feasible (write for copies if interested - send a very large SAE!).

### Serious talking - and drinking and eating

That was the official lecture stream in the Hamvention site proper: it is also the custom for speciality modes have their own shows. Oh no, they don't do things by halves over there. Each mob (sorry, mode) picks a hotel and the keen ones arrange to stay in that hotel. After all there are so many amateurs coming to Dayton (estimated at 30,000 plus) you might as well be among like-minded friends. There tend to be hospitality and workshop sessions in these hotels, too, and for us fast-scanners Mike Stone WBOQCD, publisher of "Spec-Com" magazine, did the business in the Ramada Inn North. Not only did he lay on two nights of ATV chat, there were book sales, as much beer as you could drink and a glamour show thrown in! Admission was one dollar and the drink was at cost price too. What a guy - he really put himself out to make sure everyone had a good time. (He had also booked rooms for us to sleep in this hotel. The rooms were next door to the ATV session - clearly Mike did not intend us to miss anything!)

Not to be outdone, the slow-scanners had their own "do" in the Holiday Inn on Friday night, and to do justice to both modes we agreed to split forces, with Trevor covering the SSTV meeting and Andy the fast-scan workshop. Friday 29th April was the evening when all the top SSTV operators met, including HB9ANT who must have been the only person to come further than me (Trevor) to this gathering.



Formal lectures started with a discussion of the Martin Emmerson G30QD ROM (no, he's not a relation!). This software extends the Robot 1200C's capabilities by interfacing an Atari mouse and providing on-screen drawing facilities. The G30QD software also allows the Robot to run the European standard line or frame sequential colour, without which it would not be possible to interchange colour pictures with the Volker Wraase scan converter.

Don Miller W9NTP then gave a short lecture on possible future developments in the field of SSTV. Main topics were the idea of replacing lines lost in QRM and sound-in-picture systems. Tom Hibben KB9MC and Steve Cupp N9NCT demonstrated the use of a



Commodore 128 to control a Robot 1200C. The hardware is available from Robot and the software is written in BASIC. The results are a very flexible SSTV system with full digital effects and picture manipulation, coupled with disk storage of pictures.

The coffee break is always my favourite spot, where one can give and receive feedback. I managed to come away from this with some very clever 3-D SSTV pictures (screen shots) which needed to be viewed through red and blue glasses. The results were excellent and apparently the work of Clay Abrams K6AEP. W8ASF presented a video tape demonstration of the Australian LM900 in action. This scan converter appears so similar to a Robot I am surprised they are not fighting it out in the high court.

The next demonstration by Mitsubishi of their video phone. This small unit connects to any phone in the world and sends a 96 x 96 pixel picture using 32 levels of grey. The unit is self-contained with its own built-in TV camera and a fast-scan display to compose your image upon. The transmission is 5.5 seconds and uses an AM system. As yet there appears to be no standard for this kind of equipment [it's coming - G8PTH] and none of this equipment is compatible across manufacturers.



The home of Wyman Research and W9NTP

Yours truly (G8CJS) could not let the evening pass without a turn at the lectern. I introduced the "Slow Scan Companion", explained the projects and outlined some of the chapters. I knew this was a smart crowd and they bought lots of books - lucky I had taken a plentiful supply. It was past midnight when the meeting closed and I left for the Ramada Inn and a few ZZzs. But as I thought, the fast scanners had more staying power, their meeting was still going strong and another three hours passed before I managed to power down for the evening!

Flashing back a few hours to 4 PM, Friday's FSTV session opened and was scheduled to finish at 11.30 PM (actual finish 2 AM and then more eating, drinking and talking); Saturday's started an hour later (and finished an hour later, at 3 AM). Apart from the fashion show, there were talks by BATC members, technical lectures, heated arguments (sorry, discussions) over "future mode" versus "ancient modulation" and lots of video replays. Mike made the annual "Good Image" presentation to the amateur who had made the best contribution to raising the profile of ATV (what a good idea!). The trophy is a camera tube (image orthicon actually) on a polished wooden base, with engraved plaque: it was won by Bill WB8ELK for his signal success with the weather balloon TV experiment.

#### Incidental intelligence

In the Flea Market it was a pleasure to meet two of our American members, John KD0LO and Dave WB0ZJP. Dave is the one who produced the ATV picture reporting chart that we all have hanging up in our shacks. Like most of us, he has changed, so perhaps Dave it's time to remake the chart so we can all recognise you. And how about a chart for FM while you're about it?!

We picked up a lot of interesting info about practical ATV operation in the States. In the Midwest the terrain is very flat, which means that what we might consider DX on 70 cm is a daily occurrence - certainly 100 miles is not difficult under flat conditions. During openings (they don't use the word 'lift' there) hookups over 400 miles have been made, even 578 miles with P3 pictures. There is less (TV) activity on 23 cm, though there are 225 aircraft radars across the States which share the band. Dave WBOZJP and John KD0LO said they had had some fun with one of these radars in St Louis, Missouri. It operates alternately on 1297 and 1303 MHz and the receiver tracks the magnetron (which is apt to drift) with a 12 MHz wide receive window. Apparently Dave and John were causing the radar people no little worry until they found out about ATV: apparently the ATV signal appeared on the radar screens as a wedge of blips, looking exactly like a dozen 747s coming right at them!

This duo also had some fun on 2305 MHz ATV. They were troubled by an annoying 60 Hz hum bar on pictures, which annoyed this pair of technical perfectionists. Dave tore apart his power supply, transmitter and camera looking for the cause, while John checked out his receiver. No fault found and it was driving them crazy! The cause suddenly came to light when John's wife put the baby's bottle in the microwave oven to heat it up ... bang, terrific QRM! Yes, the source of the "mains hum" was out-of-band radiation from microwave ovens: apparently the effect is chronic at supper time, and the only safe time to play microwave ATV is after 2 AM! Unless someone is suffering night starvation and gets up for a midnight snack, that is.

The surplus gear in the flea market actually looked useful, unlike so much of the British junk which is really is junk. A lot of the stuff was overstocks and quite modern, such the satellite TV gear which was available in abundance. Fifteen dollars would bring you a receiver - of course it is C band. The local oscillator in the head is tuned by a DC voltage sent by the receiver. The output of the head is then at a 70 MHz IF and is piped down to the receiver. There are some block converter systems around but you have to know what you are buying.



You are probably familiar with the so-called "Videosenders", low power sound and vision transmitters intended to radiate the output of your VCR throughout the house. Well, they're illegal in the States as well and several firms have been caught with very large stocks which they could not shift following FCC interest. Someone twigged that it would be legal to sell them to amateurs and several firms now sell them re-crystalled on 70 cm. What you do with them after that is still a mystery, though.

### Envoi

There's so much more which could be said: the other things we got up to over there but not enough room to say it here. We were privileged to stay in Don and Sue's farmhouse after the show, and this would be a story in itself. No effort was too great for them, while their hospitality will long be remembered. The return trip was uneventful, fortunately. Just as no-one admits to having hangovers, none of us suffered jetlag after our Friday night/Saturday morning flight back to the UK but we did need to sleep a bit more than usual. As we had to go back to work on Monday this was just as well!

Was it all worth it? Of course it was! As far as the visit was concerned, we would rate it extremely successful in terms of cementing international relations, in making an impact on our potential North American market and promoting our style of amateur television. The only snag is that we all want to go back there next year - and how on earth can we afford it?



L to R: Andy Emmerson G8PTH, Trevor Brown G8CJS, Tom Hibden, Steve Mitchell G8MJ and Don Miller W9NTP outside Wyman Research.

(Photo's G8CJS and G8PTH)

# TRADE NEWS

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The HS Publications team (7 Epping Close, Derby, DE3 4HR) have been taking round some new goodies to the rallies this year. Particularly affordable at 50p is a booklet describing DX-TV reception with their D-100 receive converter system. It's called "The World at Your Fingertips", now where have I seen that title before? RSGB bookshop - well nearly. Volume 2 of their DX-TV on Video productions is now ready: it's called "Sporadic E and Tropo" and costs £14.50.

Coombe Products (21 Mill Road, Liss, Hants., GU33 7BD) have some relationship with Electro-Craft who used to advertise on the back of CQ-TV. They have introduced a new range of video accessories aimed fair and square at the serious video enthusiast: highlights of this are a vision mixer, video processor and PAL colouriser each at £199. See their free list for other items. User reports indicate that the gear is expensive (for hobbyists) but good.

Expanding business for LMW Electronics (12 Bidford Road, Braunston, Leicester, LE3 3AE) means that they have moved to larger premises. As well as Toko coils and hard-to-get microwave transistors and bits, they still stock their well-known kits and modules for 23 cm and 13 cm transmitting and receiving. Some microwave video gear is also promised.

The Rediffusion "videobox" (not their own name) is a smartly finished UHF tuner with baseband video and audio outputs: surplus examples can be found at most rallies and hamfests at around £25 (or more!). This year some identical-looking units are on sale as cheap as £3 or £5 for two. It is worth noting that these bargains are translators rather than demodulators: they contain the usual six-channel tuner but the output is RF, in the UHF band. According to one trader, they make a good 70 cm converter/upverter for ATV use.

Finally users of the Atari ST micro will be pleased to know that a SSTV program (receive-only) and interface has been made for them. It's available from J & P Electronics (New Road Complex, New Road, Kidderminster, DY10 1AL). Software costs £10 while the radio interface and leads cost £25. Sounds interesting and the screen shots they have been demonstrating look very good.

## MORE NEW REPEATERS

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No, not in Britain but in the Netherlands. It's certainly possible to contact Holland on 24 cm (G8PTH has proved it!), so you may work through these, or at least see them during the next tropo opening. PI6EHV has an input on 434.25 MHz AM and its output on 1285 MHz FM. Sited in Maarheze, its locator is JO21SK and is PA0SON's own personal project. Height is just 40 metres above sea level. This corrects earlier information. And a new repeater in the Hilversum district - PI6ATV, located at CM67j which is the same as JO22PE. Its input is on 2359 MHz and output 1285 MHz, both FM of course. Hans Holsink PE1CKK looks after this one, and would doubtless be happy to send you a QSL if you manage to see his machine. Thanks to Paul PA0SON for this info.

# A COLOUR BOARD FOR THE CQ-TV129 SYNC PROCESSOR

---

by John Goode

The addition of this small board to the CQ-TV129 Sync Processor allows colour signals to be passed, and if necessary amplified. However, it does not process the colour signal as such - it is not possible to boost the saturation or change hue, as the burst and chroma are passed without changing their relationship. Nevertheless, by being able to boost the level of the overall colour component, it should make it possible to lock to weak colour signals that might otherwise be lost.

The circuit works by simply extracting the chrominance from the incoming signal, amplifying it, and adding it back to the signal after the sync processing has taken place. The circuit is shown in Fig.1, together with the appropriate part of the CQ-TV129 circuit. The prototype was built on a small piece of Veroboard 4" x 1.3", and the layout is not too critical.

Referring to Fig.1, and the diagrams in the original article (CQ-TV129, pp 32-40), the fitting procedure is:-

1. Remove and link through the 22uF capacitor between the video input and the gain pot VR5, as this component is not required.
2. Remove the 0.22uF clamp capacitor and solder connections from there (VR5 slider) to the new board point (A) and from the 330R resistor to point (B). This is the chroma separation circuit.
3. Remove the original 470uF output capacitor, and replace with a 100uF, reversing the polarity. Tr13's emitter resistor (220R) can then be increased to 1K to reduce current consumption. The original output terminal is then connected to point (C) on the colour board so that the chroma can be added back to the reprocessed luminance. A new output amplifier is included on the colour board; its consumption is 12v, 58mA.

If the chroma gain control is mounted on the front panel, it is important to calibrate the control for unity gain, as too much gain on a colour signal that is not low will cause excessive burst amplitude to upset synchronisation, thus defeating the object of the sync processor!

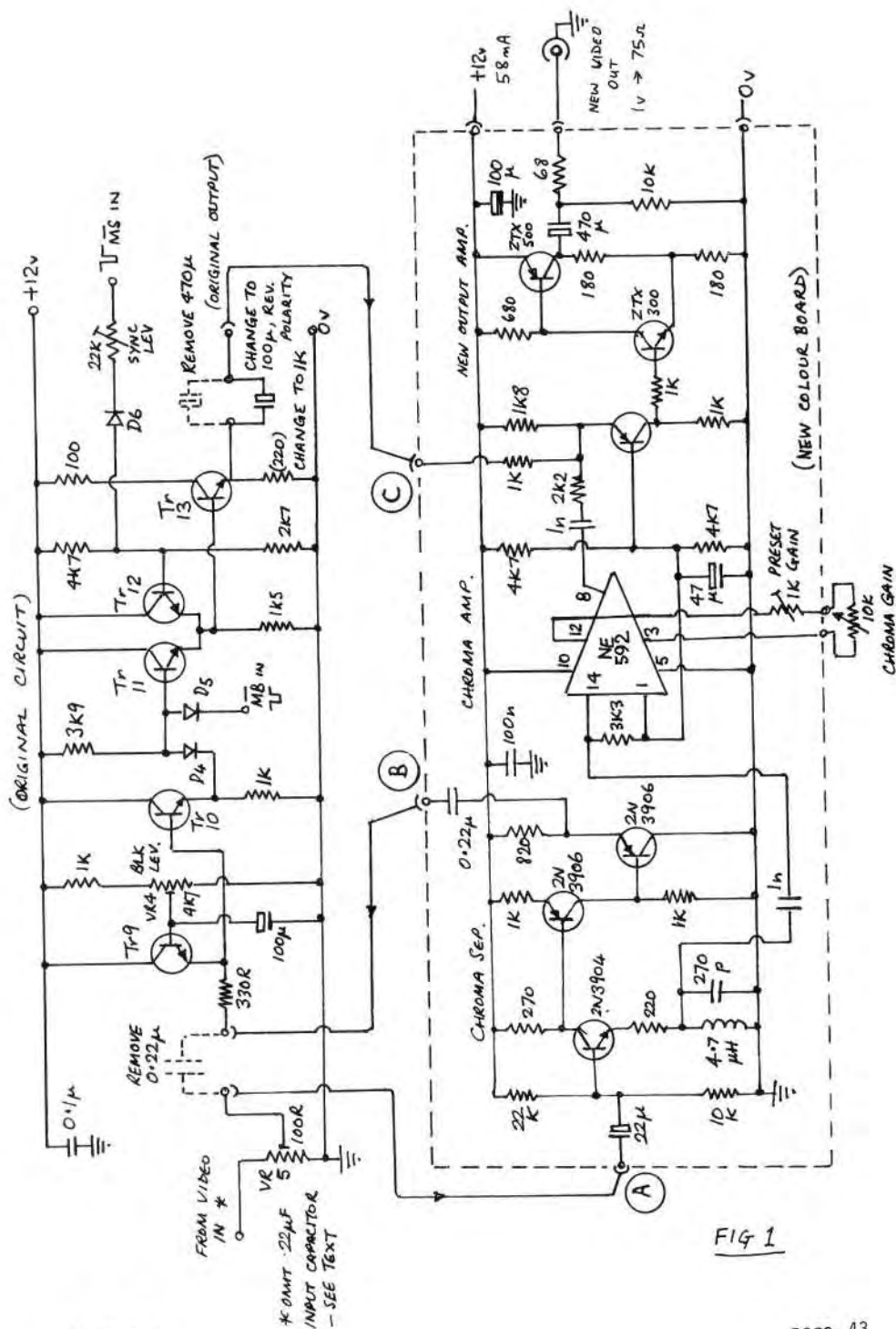
In conclusion, the Editor has asked me to point out that the original design was intended to deal with weak DX signals, and was not intended for reprocessing videotaped signals. This is because the P.L.L. that steers the ZNA134 crystal oscillator was designed for the recovery of weak but stable signals, and therefore does not always respond to the short-term instabilities present in the playback signals of domestic video recorders.

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## ATV WORKING - 10.25GHZ

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# BROADCAST BAND DX-TV RECEPTION

By Garry Smith and Keith Hamer.

Many readers of CQTV will already have successfully resolved signals this season via Sporadic-E and will appreciate its attraction. One of the biggest problems the beginner faces is not knowing which channels are which. Once these can be determined it is possible to identify signals fairly accurately by a process of elimination.

For instance, Russian and Eastern-bloc countries have channel allocations which differ from those of Western Europe. So if you know the position of the incoming signal on the tuning scale at least you can narrow down the various possibilities.

Examining the chart below will give some idea how the various Band I channels relate to one another.

## BANDS I CHANNEL ALLOCATIONS

<u>MHZ</u>					
45	50	55	60	65	70
_____	_____	_____	_____	_____	_____
48.25	55.25	62.25			
B  __E2__	__E3__	__E4__			
49.75					
__E2a__	(Austria only)				
	53.75	62.25			
B (Italian)	__IA__	__IB__			
49.75	59.25				
D  __R1__	__R2__				
	55.75	63.75			
L  __L2__	__L4__				
	60.50				
	__L3__				
	55.25	61.25	67.25		
M  __A2__	__A3__	__A4__			
C*Ph 6m(Amateur)	62 - 72 MHz				
Misc  __	__OIRT FM__				

\*Frequencies refer to vision carriers.

SYSTEM D (6.5 MHz sound spacing): R channels:-  
Russia (TSS), Czechoslovakia (CST), Hungary (MTV), Poland (TVP), Rumania (TVR).

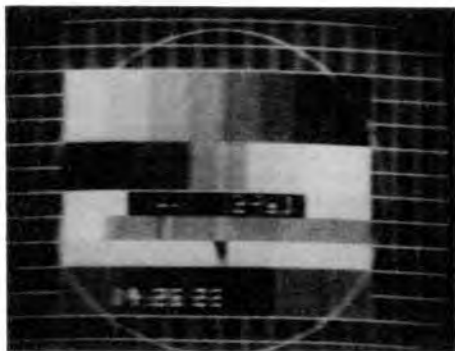
SYSTEM B (5.5 MHz sound spacing): E channels:-  
Norway (NRK), Sweden (SVT), Iceland (RUV), Finland (YLE), Denmark (DR), West Germany (ARD), Spain (TVE), Portugal (RTP), East Germany (DDR:F), Yugoslavia (JRT), Switzerland (+PTT SRG, TSI, SSR) and Austria (ORF).

SYSTEM B: I channels:-  
Italy (RAI).

SYSTEM L (6.5 MHz sound spacing AM, + mod video): L channels:-  
France (Canal Plus) with encrypted broadcasts and positive vision modulation -  
the picture will appear negative on a normal TV.

SYSTEM M (525 lines, 60 Hz field frequency ,4.5 MHz sound spacing): A channels:-  
USA, Canada, Caribbean, South America, and AFN-TV bases in Europe.

Overlapping channels means that a receiving system with good selectivity is desirable; hundreds of DX-ers favour reduced bandwidth IF's for DX reception. Admittedly, on strong signals, h.f. definition is lost but on weak reception a reduced IF bandwidth enhances the received image. Most DX-ers have facilities for reduced and full bandwidth IF's to cater for strong and weak signal reception.



Libyan test card received via  
Sporadic-E in Band III!



Algerian news caption received  
on channel E5 on June 7th.

Now a run down of DX reception conditions since the previous issue of CQTV.

#### **MARCH:**

March was a total disaster so there is no point in dwelling on what little there was. The only highlight was a glimpse of the "RUV ISLAND" PM5544 test card from Iceland on the 3rd, 20th and 28th. In other parts of the world DX reception was more successful. Major Rana Roy of India received Bangkok TV on many dates throughout March via Trans-Equatorial Propagation. The pictures had multiple images and the sound was distorted. On the 9th a Chinese station was identified on channel R1.

#### **APRIL:**

An increase in Band I activity was evident throughout April, much of it via MS (Meteor-Shower) of fairly long duration rather than quick bursts. Sporadic-E did make a brief appearance on the 10th, 15th and 20th but the long-duration openings, which are usually experienced in late April before the main season, did not occur.

#### **MAY:**

The first Sporadic-E opening of any significance showed around 1800 on the 6th when Rumania was seen on R2 with the opening logo followed by the evening news programme "Telejurnal". Other Band I channels soon became active with Italy,

Russia and Spain in at high strength for several hours. At 1950 BST an Arabic programme was noticed on E4, thought to be Tunisia, although conditions from the south-east were good at the time.

Short-skip Sporadic-E DX was in evidence on the 11th with Denmark and NDR on channel E4 -the latter is an elusive West German transmitter at Flensburg. "EastEnders" gets everywhere -there was a report of it on channel E3 with Danish subtitles!

#### Italian Private Stations

An excellent SpE opening occurred on the 15th with Tele-Uno, an Italian private station, on test card on channel 1A. A new private station has been seen using a caption «TELE RADIO» with other words beneath. Unfortunately, the reception has always been too weak and short-lived to decipher it fully.

#### All Greek

Signals from the low-power E3 outlet in Greece have been identified several times during the season. The PM5534 test pattern includes the initials "E.P.T." at the top but watch out for Greek subtitles -there have been a couple of reports. The EPT test pattern at 0745 on May 26th looked over-exposed due to a video fault at the transmitter. Unfortunately by the time it had been corrected, the signal was too weak to record.

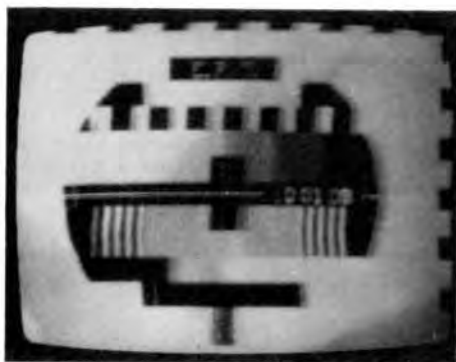
#### Monitoring the FM Band

The FM radio band can become active during Sporadic-E openings and it also indicates an increasing m.u.f. and the possibility of Band III Sporadic-E -more about that later. The FM band also contains an Eastern European TV channel (R5) which is in widespread use particularly in Russia and Rumania. It is extremely difficult to resolve the vision at 93.25 MHz because of the interference from FM stations but it is possible to monitor the sound channel at 99.75 MHz. Doing this paid dividends on the 27th when the Rumanian national anthem was heard during the station opening sequence.

Note that in Russia and certain Eastern-bloc countries the FM band occupies the upper end of Band I between 62 and 72 MHz.



CJCN-TV ch A4 Grand Falls, Newfoundland  
Canada, received at 2345 on June 6th.



The Greek test card received on  
ch E3 with video fault.

## JUNE:

Early June provided what must be record-breaking DX reception. Sporadic-E was virtually non-stop between Saturday 4th and Tuesday 7th with high m.u.f.'s and signals from every direction. Late on the 6th, USA and Canadian signals were received over a large part of the UK on channels A2, A3 and A4. At one stage the m.u.f. rose sufficiently to allow pictures through on channel A5 at 77.25 MHz. This must be a record! The A4 signal was best (P4 quality at times) and was identified as CJCN-TV Grand Falls Newfoundland by an address heard during the adverts and by the "ntv" captions regularly shown. Reception continued well into the early hours and the callsign WTKR-TV was heard from the CBS network (Ch A3) in Norfolk, Virginia and another in South Carolina.

At 0355 EST a strong pop music programme was noted on E2 and assumed to be Spain with extended transmission hours. However, other enthusiasts have confirmed that both the Spanish networks closed down hours earlier.

The most exciting event took place at lunchtime on the 7th with Sporadic-E signals in Band III from North Africa which lasted 90 minutes. Band III Sporadic-E is relatively rare and there are only a couple of reports each season. To add to the excitement, two of the countries received (Algeria and Libya) do not use Band I so this was an extremely lucky opportunity to see them. The transmitters received were as follows:

Algeria: E5 (M. Cid) and E7 (Constantine) identified from the arrival of the Syrian President (this was confirmed by the Syrian Embassy).

Tunisia: E6 (transmitter not known) -identified from the "RTT" FuBK test card.

Libya: E6 (Tripoli) -identified from the test card.

The Algerian reception on E7 was P4 quality at times and lasted some 10-20 minutes. The m.u.f. eventually decreased leaving only the E5 broadcast. Incidentally, good results from the latter signal were obtained even using a 5-element Band III array at 25 feet!

Other June signals include Jordan E3 on the 6th and later the same day a Russian clock +5 hours ahead on R2 at 1800 BST.

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## SEVERNSIDE TELEVISION GROUP

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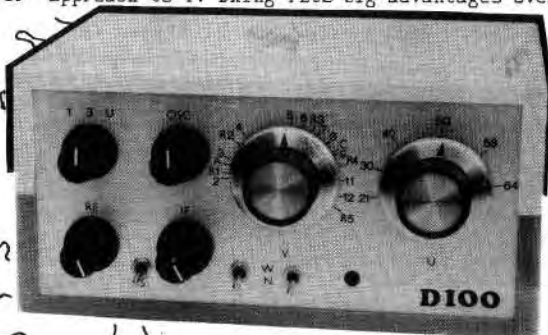
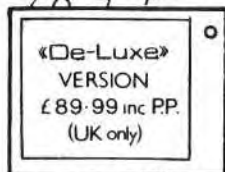
We have received some news recently from Shaun O'Sullivan, G8VPG concerning a change of name for the Bristol FM TV Group. They are now known as the SEVERNSIDE TELEVISION GROUP. This change was made to emphasise that the group, although responsible for building and maintaining the Bristol 24cm FM ATV repeater GB3ZZ, covers an area much wider than Bristol alone. In fact the best report received so far for reception of GB3ZZ was from High Wycombe.

A new line-up for the committee was also announced comprising Roger Worth G4ZQF as Chairman, Ted Halliday G3JMY as Chief Engineer and Secretary Shaun O'Sullivan G8PVG. Taking up the new post of Membership Services is Bryan Collins G4YQR who will be assisted by Phil Smith G1HIA. Ivor Green G1IXF (yes HER husband!) remains as Site Engineer for GB3ZZ and two further new-comers Ken Stevens G4BVK and Brian Kelly GW6GBX also join the committee.

Those of you that join in with the BATC contests will also have encountered the Group under the new callsign belonging to Paul Green G7ATV. They are very active as a contest group on both 70 and 24cm, usually from a rather good site in South Wales, and of course the lovely west country lilt of Viv Green G1IXE may also be heard.

## The Successful Way to DX!

The Sporadic-E season is now in full swing and it makes sense to make the most of it. For serious DX reception the «DE-LUXE» D-100 Converter is the answer, with its "communications receiver" approach to TV-DXing *PLUS* big advantages over using a multi-standard TV set.



- **MULTI-SYSTEM SOUND**      ■ **VHF-UHF -COVERS BANDS I, II, III, UHF and ATV BAND**
- The «DE-LUXE» D-100 CONVERTER SYSTEM has been specially designed to satisfy the requirements of virtually every DX TV enthusiast from the absolute beginner to the more advanced. It has at least one important advantage over a multi-standard TV -ITS SWITCHABLE I.F. BANDWIDTHS.
- We shouldn't need to tell you that **A REDUCTION IN I.F. BANDWIDTH IS ESSENTIAL** when attempting to resolve extremely weak stations under difficult conditions. It improves selectivity too. Selectivity, to put it bluntly, is how effectively a receiver system will home in on the wanted signal and reject unwanted ones on adjacent frequencies. Consequently a useful separation is possible when signals are present on adjacent DX channels only 1.5 MHz apart, such as E2 and R1 or IA and E3.
- Also, the «DE-LUXE» version of the D-100 is able to resolve sound *irrespective of the vision I.F. bandwidth selected.*
- Its Band II coverage allows extra channels from Russia, certain Eastern-bloc countries, Italy and Albania -also Band III coverage extends well below E5 to Moroccan channels M4 and M5 (just in case!).
- The «DE-LUXE» D-100 will also resolve French (System L) signals using a normal TV and many radios -please send 18p stamp for leaflet with further details.
- The «DE-LUXE» D-100 simply plugs into the aerial socket of a normal TV set for vision reception and connects to the whip aerial of an FM radio for the sound.
- Each unit comes complete with operating instructions containing a useful TV systems map with channel relationship plan for Bands I, II and III.
- We can also supply **AERIALS FOR SPORADIC-E DX RECEPTION** in Bands I and II -or just the appropriate hardware if you wish to construct your own.  
Please send 18p stamp for details.

# HS PUBLICATIONS

7 EPPING CLOSE

DERBY DE3 4HR

ENGLAND



## SPECIAL EVENT STATION OPERATING ATV

### AUGUST BANK HOLIDAY

The GB3RT group (yes its them again!) in conjunction with the Wordsley Amateur Radio Club (G4WRA) will be operating an ATV special event station over the August bank holiday weekend. The dates of the event are Saturday the 27th and Sunday the 28th of August. The projected times of operation will be from 1200 local on Saturday to 1800 local on Sunday.

The venue for the station is Hill Farm, Shenington, Nr.Banbury, Oxon. The QRA locator is IO92GB and the location is approximately 700ft ASL.

Bands operated using ATV will be 70cm and 24cm. Phone stations will also be operating on 2m (ATV talkback), 70cm and possibly 23cm. All stations contacted during the weekend will receive QSL cards, and all ATV stations worked will receive a BATC certificate marking the event.

The call sign of the station will be:

**GB75TV**

which as you can see is in honour of the 75th birthday of the RSGB(!!!)

OK then, lets treat this as an extra contest and have everybody operating sometime over that weekend and fill our call-book.

Further information regarding this event can be obtained from Mike Wooding at the usual address shown on page-2.

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### NEW BATC AWARDS MANAGER

In response to our plea for help in the last magazine I am pleased to inform you that we have a new Awards Manager.

In future please send all claims for Awards to, or request information from:

BOBB WEBB G8VBA, 'NITHSDALE', 78 STATION ROAD, ROLLESTON-on-DOVE, BURTON-on-TRENT, STAFFS. DE13 9AB. Telephone: Burton (0283) 814582.

If telephoning please remember our request that you do so between the hours of 6.30 and 9.30pm and not before 11am at weekends.

For details of the BATC Award please see the appropriate page elsewhere in this magazine.

# SATELLITE TV NEWS

The French and German DBS satellites are having problems once again, and no one wants to accept responsibility. The manufacturers are blaming the launch and others are blaming the manufacturers, planners and designers of the hardware. No doubt they will sort themselves out by the time ASTRA is launched.

I hear that the American Shuttle is close to a launch date - hooray!

As I mentioned in the last issue, beware of fixed mode decoders. Premiere's official decoders have been severely criticized because of poor video quality, and I have certainly seen pirate decoders doing a better job. Maybe with all the complaints they have received Premier may change policy and go clear again. However, as also mentioned, other channels have decided to follow in their footsteps and both Screen Sport and Children's Channel are considering scrambling.

Gef.

## **D.B.S.**

This article first appeared in the April 1988 edition of the IBA Engineering Bulletin, and we thank the editors for their permission to reproduce it here.

Direct broadcasting by satellite is due to begin in October 1989. This is when the IBA's franchise holder, British Satellite Broadcasting, plans to launch its four new national television services on three channels in the 11.7 to 12.5 GHz DBS band. The high power signals will be available throughout the United Kingdom, receivable on very small dishes of about 30 to 45 centimetres in diameter.

The satellite is due to be launched in August next year. The transmission will use the D-MAC standard, which was developed by the IBA, and gives better picture quality than the PAL system.

There will be four new high-quality programme channels: NOW, a news and current affairs service including major events and sports from around the world; GALAXY, a light entertainment channel with serials, quizzes and shows; ZIG-ZAG, which during the day will show entertainment for the young, while in the evening the same transmission channel will be used for SCREEN, a subscription movie channel planned to include recent film releases.

One of the questions we are asked is whether equipment currently used to pick-up low-power communications satellites will be suitable for DBS. The present systems involve the use of cumbersome dishes, typically about 1.5 metres in diameter, and receive programmes primarily intended for cable networks. Some systems are motorised to receive more than one satellite. If used for DBS this type of dish would certainly pick-up more than enough signal, provided it were pointing in the right direction. However, very few of the present 'Low Noise Block Converters' (LNB's) would be suitable. The LNB converts the microwave frequencies received by the dish down to more manageable frequencies; to a standard IF in the range 950 to 1,750 MHz. It is these lower frequencies that are fed to the indoor satellite receiver.

The low and medium power satellites operate in fixed satellite service (FSS) communications bands and use different frequencies to DBS. Most transmit between 10.9 and 11.7 GHz. There is also another FSS band from 12.5 to 12.75 GHz and this requires a different LNB.

The DBS band, 11.7 to 12.5 GHz, is between the two FSS bands and an LNB designed for one of the FSS bands will not be suitable for DBS.

The type of polarisation is also different. While it tends to be linear in the FSS band, it will be circular for DBS. A linearly polarised feed would pick-up circularly polarised signals, but with a 3dB loss and with less protection against interference.

However, even with a dish and LNB capable of picking up signals, the necessary D-MAC decoders are not yet available. It is also important to realise that many of the low power, and generally low budget, satellite channels that can be received free of charge in PAL now, do intend to scramble, almost certainly using D-MAC.

On some satellite receivers it may be possible to add a MAC decoder later. But the fact remains that the customer who buys satellite equipment now, will eventually have to spend more money, whether it is for DBS or to be able to carry on watching some of the satellite channels available now. A further fact to bear in mind is that the cost of a complete system for DBS, including a small dish, satellite tuner and D-MAC decoder could be as low as £200 to £300 by the time BSB begins its programmes in October 1989.

## **DIGITAL SPECTRUM**

By M.Perry GBAXX,

A recent addition to my shack was a unit called a 'Data Skip Videoface'. This unit is an add-on to the Spectrum computer and allows you to digitise any PAL fast scan video source and save it onto whatever storage medium is in use.

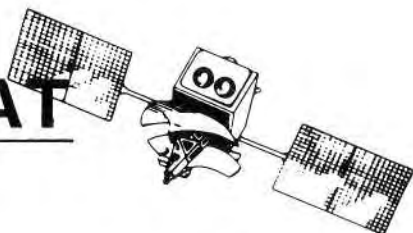
The unit plugs into the Spectrum expansion port and also has a socket for other equipment to be plugged into the computer simultaneously. Any monochrome or colour fast-scan source can then be fed into the interface and the resultant digitised picture displayed on the screen and/or stored onto tape or whatever. These screens can be recalled and used as a video source for your slow-scan or fast-scan television station.

Unfortunately, or at least as I have found with the system I use, it is not possible to use the digitiser in conjunction with another program. Thus, it does not appear possible to use the unit to provide 'live' digitised pictures for immediate transmission, rather they have to be digitised and stored, and then the SSTV program or whatever loaded in and the screens recalled.

The unit is available ex-stock and can be ordered from:

ROMANTIC ROBOT UK Ltd,  
54 DEANS CROFT AVENUE,  
LONDON NW9 8EN  
Tel: 01 200 8870

# SATELLITE CHAT



By Paul R. van Rossum

Perhaps the best way to start this section is with an apology: I am most likely one of the least knowledgeable people where electrotechnical matters are concerned, in the BATC. My aim in joining, some years ago, was to get more technical information where DX-ing and satellite television are concerned.

My background: I am 35 years old, married (my wife is, or better was American), twin daughters aged 14, just completed my law studies, and am technically speaking unemployed. In the hobby sphere my history is simple: Have always been interested in AM/SW radio, but this interest suddenly became acute when I moved to California in 1972. The complete lack of objective news on matters of world affairs in the US made the purchase of a Shortwave radio set a matter of first priority. Soon spoiled by good reception of stations like BBC World Service, Radio Nederland and Deutsche Welle I soon wanted more; better SW sets came and went, and DX-ing and QSL-collecting became main occupations. This continued while living in Germany, some five years later.

Back in Holland I joined the Benelux-DX-Club, for which I soon ended up as chief-editor in '79. Through this contacts were made with the national and international broadcasters, and a year later I was asked to fill the spot as a free lance technical editor for AVRO-bode and TeleVizier, two intertwined publications similar to the British TV-times. Main occupation was to answer mail about reception difficulties and to write the weekly column "Op de kortegolf" (= "on shortwave").

This way I got in early contact with manufacturers/resale outlets of satellite equipment; my "real-life" experiences with satellite equipment now cover about three years, and over that time I've got acquainted with a lot of different equipment set-ups, both through own try-outs and through helping others in setting up their installation.

From reading the membership-ads (which often are very revealing when you wonder who's doing what!) I know there must be a substantial number of members actively involved in satellite reception. Nothing of this, however, can be seen when looking at the previous editions of "Satellite TV News". Now I realize that those who already have "things in order" aren't always interested in sharing their knowledge with others; especially time can be a limiting factor.

In this section I will attempt to inform you as completely as possible of all information, known to me. If you find mistakes, or simply "know better" please let me know in the interest of all. I'm also somewhat on a dead-end street on some questions of a purely technical nature. Where applicable, I'll list them; any reaction, however small, will be most appreciated!

I'd like to start this first section with a description of a satellite receiver which I found to be of superior performance. The name most certainly will (or should) ring a bell among the true ham-radio enthusiast: Drake. They stopped (unfortunately!) with the production of ham radio gear, and threw themselves upon the US TVRO market some years ago. At the beginning of this year the first copies of a receiver, made for the European market rolled off the production line: the Drake 4240 System.

### The Drake 4240 System.

The system consists of two basic units; the ESR4240E earth station receiver, and a matching "power unit", the APS4240E Antenna positioner. The latter is not, like with most products, a second box on the shelf, but sort of a large transformer-unit one would stow away in a hall-closet or some other out-of-the-way place, in line to the dish. It is fully operated by the lightweight receiver situated in the living room, or wherever one chooses to watch programmes via satellite.

Those, familiar with satellite television know, that the way presently satellite signals are transferred to the living room is by so called "block-conversion". The signals, for instance those from 10950 - 11700 MHz as they are received from most satellites in Europe momentarily, are amplified, and directly converted to a much lower range, from 950 through 1700 MHz. This is done because the losses through cable length on those frequencies would be too high, thus leaving too little signal for proper reception.

### channel-selection.

A receiver for the European market therefore has a reception range of 950 through 1750 MHz. Hereby rather important is the read-out of a receiver: the coarser the scale, the harder it gets to find back weaker stations. Especially when the dish positioning might not be perfect. Now it's of course a hard thing to know where to put the mark when the industry hasn't agreed upon any kind of channeling; unlike the channel system on our UHF band a satellite operator may decide upon the use of any frequency he likes. For us maniacs, of course, we would prefer a receiver with digital frequency readout. One cannot blame the manufacturer, who's aim is to present an attractive and simple looking machine, for not meeting this demand.

For a compromise, Drake introduced a 97 channel system, which I hereby reprint. The channels are all 8 or 9 MHz. wide, and thus offer an acceptable matrix to work by. Each channel is subdivided while tuning; in several segments, thus making it possible to fine-tune exactly on each station, also the weaker ones.

And hereby I come to my first suggestion: As Eutelsat, Intelsat and others each use their own way of numbering transponders and channels, I think for the sake of easy reference it might be smart to use this 97 channel system for reporting purposes. I have no direct access to any official sources like Intelsat to get a hold of exact frequencies, and thus it would make much more sense to report that for instance on Channel 22 H (horizontal polarization) a testpattern is radiated from the Intelsat V f2 on 1° West. If the exact frequency is known we can of course always include it between brackets.

# ESR 4240E Specifications

## RF

Input Frequency	950-1750 MHz
Input Impedance	75 Ohms
Image Rejection	> 20 db
Input Signal Level	-60 to -25 dbm
L.O. Leakage	> -60 dbm (at input connector)
2nd IF Frequency	70 MHz
2nd IF Bandwidth	22 MHz/30 MHz SAW FILTER (programmable)
Threshold	< 8 db C/N

Frequency Control (synthesized)

Continuous Tuning 950-1750 MHz

50 Channel Storage Capability . . . Channels 1-45 accessed from front panel of ESR4240E or RT4240E  
Channels 46-50 accessed from RT4240E only (parental control)

AFC Defeat . . . Any program channel may be Fine Tuned from the RT4240E

## Video

Video Output (Filtered and Clamped)

Format	PAL-B/PAL-G
De-Emphasis	CCIR Rec. 405, 625 Lines
Output Impedance	75 Ohms
Frequency Response	20 Hz to 5.0 MHz
Dispersion Removal	.40 db Typical
Output Level	1 V p-p Nominal (adjustable)

Composite Video Output (De-Emphasized, Unclamped, Unfiltered)

Format	PAL-B/PAL-G
De-Emphasis	CCIR Rec. 405, 625 Lines
Output Impedance	75 Ohms
Output Level	1 V p-p Nominal (adjustable)
Frequency Response	20 Hz to 9.0 MHz

Decoder Output (Unclamped, Unfiltered, Non-De-Emphasized)

Format	MAC
Output Impedance	75 Ohms
Output Level	1 V p-p Nominal (adjustable)
Frequency Response	15 Hz to > 9 MHz

## Audio Performance

Signal Format	FM Modulation
Bandwidth	900 KHz, 400 KHz, and 150 KHz (programmable)

De-Emphasis	.50 uS, J-17 (programmable)
Subcarrier Frequency	5.0 to 9.0 MHz
Audio Frequency Response	20 Hz to 20 KHz
Audio Output Impedance	Less than 1000 Ohms
Audio Output Level	.0 dbm Nominal at Maximum Volume (programmable)

## RF Modulator

Output Frequency	Channel 36
Output Level	75 dbuV Typically

## Power

Primary Power	208-250 VAC, 230 VAC, 50Hz nominal, 165 mA
Power to LNB	16.5 VDC nominal, 200 mA maximum (via IF coax and/or rear panel terminal)
Polarizer Output	.5 VDC nominal, 500 mA maximum for 10 seconds (servo motor type)

## Actuator Interface

Two-Way communications link via IF coax for APS-4240E  
Alternate interface on rear panel for APS-24E

## Operating Environment

Temperature Range	+ 10 C to + 35 C
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## Mechanical

Size	6.4cm H x 35.6cm W x 29cm D
Weight	4 Kg

# APS 4240E Remote Antenna Positioner Specifications

## Power

Primary Power:	208-250 VAC, 230 VAC, 50 Hz nominal, 300 mA
LNB/AUX Power:	16.5 VDC, 500 mA Max total from three outputs.
Polarizer + 5 Output:	5VDC nominal, 500 mA Max. for 10 sec.

## Actuator Interface

Motor Drive:	Full Speed Output: 34.5 VDC @ 1.0 AMP 32 VDC @ 1.5 AMP Reduced Speed Output: 29 VDC @ 1.0 AMP 24 VDC @ 1.5 AMP
Sensor	+5: Nominal +5 VDC supply for POT, Optical or Hall Effect Max. output is 20 mA
Signal In Compatibility:	Pulse Type: Reed Relay, Microswitch, Optical Disk, or Hall Effect POT Type: 1 KOHM to 10 KOHM

## Operating Environment

Temperature Range	-10 C to + 45 C
	20% to 80% Relative Humidity

## Mechanical

Size	6.4cm H x 21cm W x 25.4cm D
Weight	2.2 Kg



### audio.

Back to the receiver. It offers the use of two video, and three audio bandwidths. Whereas the video bandwidths offer relatively little change, the audio bandwidths are of major importance. They give a choice between 900, 400 and 150 kHz. The latter is absolutely essential for an undisturbed reception of radio programmes like BBC World Service, Deutschlandfunk, Starsat Radio, Cable One, Radio 10 and Radio Nova, just to mention the

most important ones of the moment. Many cheaper types of receivers do not offer this narrow bandwidth. Result is a very noisy audio, seemingly caused by lack of signal. In reality one just amplifies a lot of noise along with the desired signal. At this point, however, I must also point out the first drawback of the Drake receiver: Although most of the above mentioned programmes are broadcast in stereo (by broadcasting the left and the right channel separately), the Drake receiver only tunes one audio channel. This way one is forced to listen to either the right or the left channel, rather than enjoying the stereo signal at hand. For a shoestring-operation it is acceptable, but since the Drake is both in quality and price a "state-of-the-arts" product it's hard to understand why this feature was not incorporated. I surely hope that they'll think of some add-on option, making this possible after all. Normal bandwidth is the 400 kHz setting, the wide 900 kHz is there for high-fidelity reproduction when the signals received are well saturated.

The audio tuning can take place in two ways: by manually setting the video-audio distance (freely selectable between 5 and 8.5 MHz) or by using one of the four preset distances (6.50 - 6.60 - 6.65 or 5.80 MHz). Specially when weaker signals are involved, the manual tuning is the best one; often you can get it a little more "on the dot" than the presets do.

Another important matter to note, is that the three audio filters (at least in my copy) aren't exactly equally centered. Thus when changing from "narrow" to "normal" a slight retuning is necessary when receiving weaker stations. The audio-deemphasis control makes a choice between the Normal (50µ/75µ) and J-17 standard. The latter one is important when receiving RAI-Uno, the Italian first network via ECS-1.

### video.

The video bandwidth selection is very typical for most commercially available products, yet I'm not too convinced of it's sense so far. At the one hand, even when employing the "wide" bandwidth, some channels like RAI-Italy and TV-5 France keep giving "sparklies" in the brightest colours. A brief correspondence with RAI followed; I was told that in order to get perfect reception I needed to employ a receiver which could cover the entire 36 MHz. At the other end, in many publications it is shown that one can improve a somewhat poor reception by limiting bandwidth. The 21 MHz bandwidth, however, seems to do very little in this field.

Pictures in Steven Birkill's handbook "STTI's International Satellite TV Reception Guidebook" and in the World Satellite Almanac show great enhancements using bandwidths of 12 MHz or less. Surely, however, such bandwidths would deteriorate overall colour-picture quality so much that only the hobbyist would find pleasure watching it. My conclusion so far would be that perhaps a 36/25 MHz bandwidth choice might be a better one to have.



### memory.

When operating a receiver of this kind, it is very useful to be able to programme more than just the exact frequency for each desired channel. Different audio channels, but also reversed video or even differing volume levels between the tuned channels can make tuning a rather bothersome matter. In this receiver all relevant functions are stored, along with the desired frequency. These functions are:

- the chosen video frequency,
- the video bandwidth
- video positive/negative,
- the matching audio frequency,
- audio bandwidth,
- audio deemphasis,
- audio volume,
- dish position,
- polarizer Horiz/Vert.
- polarizer skew
- Choice of 2 LNC's (where applicable).

With this combination one can truly speak of armchair-operation. Here, however there is a second major drawback: There are only 50 channels that can be programmed. Seems a lot, but when you realize that each radio channel requires a separate channel, even when the transponder remains the same, you'll see that the frequencies are used up before you know it! Stations like SAT-1 carry three different radio services; when you want to receive them all the one transponder occupies four preset positions.

The remote-control does allow for full operation of the programmed channels, as well as changes in the antenna positioner (actuator). Once on the set you set the switch for modifying the memory you can use the fine tune option to slowly scan the band. (fast scanning is available on the set itself). The receiver display then shows the Drake-channel numbers, making it easy to know where you are "on the dial".

The last five of the fifty channels can only be accessed by remote control. This is meant as sort of "protection"; in the US parents are rather concerned that their children might see nudity or "worse" on the TV screen in their absence. So they only need to hide their remote control and hope the kids aren't smart enough to retune a memory channel within reach. I think in most European countries this would be an unrequired option. (personally I'd love to bar all programmes in which people are battered or murdered, but the I'm afraid then I'd need most of the 50 channels to be made inaccessible!)

### On screen display.

Another luxury is the "on-screen" display. All the information about what's stored on a preset channel is shown for a number of seconds on screen (audio and skew functions can be recalled separately). Normally, this information can be switched off by pressing the RECALL button on the remote control for five seconds. However, this on-screen information remains permanently there when searching for new channels. This means:

1. There are always remnants of signal visible through the "snow"; they are what's left of the "on-screen" information when no video carrier is there to support it. So it's very hard to discover weak activity such as Intelsat's, or unidentified signals.
2. One is forced to always "store" a channel in the memory of the set before being able to watch it. Without having stored it the on-screen information won't leave, thus covering a large part of the screen.

Performance: general hints what to look for in a receiver.

Buying a ready-made TVRO installation is no cheap venture.

Especially as most components are imported prices tend to be way higher than in the US. Also the fact that we're in a relatively new market means that one can hardly speak of "sale items" to look for.

In such circumstances one tends to look for the cheapest possible option. Having had experiences with a lot of different receivers (NEC, SATCOM, Anderson Scientific, just to mention the most important ones) I should point out that spending that "little extra" for a top receiver pays off. The main areas of difference are:

1. Improved sensitivity. (For instance: the Drake receiver was the first in the line which allowed me to watch a snowy but stabilized picture of all Gorizont video transponders.
2. No drift. It's the first receiver I use that doesn't require retuning after a warm-up period.
3. Detailed storage of settings: This allowed me to find extremely weak transponders, such as Libya and Nigeria by first "blind-store" them on frequency. (Once found, one of course needs to fine-tune and store again.) Especially when you work with a dish without polar mount and actuator this is extremely important; without this facility it can take hours to find the satellite.
4. Again, the audio bandwidth combined with high sensitivity. The Intersputnik channels of Gorizont carry (weak) audio. Something I never knew before as the pictures I did see with home-brew equipment always appeared completely muted. The advantages when receiving secondary audio (radio) I already mentioned. Luckily many more brands of receivers do deliver good audio nowadays.
5. A very helpful tool is also a terminal for a voltage meter on the receiver. With this one can reach an optimum when directing the dish at a given satellite. With some brands one (for instance Anderson's ST2010) it is quite easy to construct such a terminal; the 4240 provides one ready-made. Of course, you can put a monitor next to the dish, but it isn't easy to find that optimal spot: a perfect small screen B&W picture often doesn't show those last few sparkles visible on a large colour screen.

Antenna positioning.

This is an option which I haven't yet worked with: the actuator I ordered so far hasn't arrived, and also I haven't settled yet on a final dish. I've had some contacts with a representative of Wineguard (they produce good looking mesh dishes) but my experiences with mesh dishes for far weren't too impressive where Ku-Band reception is concerned. Last year I found two

different makes of US-made mesh dishes (diameter 1,80 m) to be performing like 1,20 m. solid ones. If anyone has more positive experiences, I'd be happy to hear about them!

For the technicians I'll reprint the technical data here: note the many options for actuator control. Also quite interesting is the system, created for multiple receiver use. The enclosed scheme shows the set-up. It does, however mean, that no 70 MHz signal is readily available, as with some systems.

\*\*\*\*\*

Well, this was it for the first issue of this section. Next time I will produce a (hopefully complete) list of present channel occupation, in any case of Ku-Band satellites and USSR C-band activity, with some illustrations where applicable. I am amazed at the slowness with which the ECS-4 is filling up. The transponders were sold about half a year ago, but so far TVE and NRK are the only permanent users so far... I hope that Astra and ECS-5 won't suffer the same lethargy (if august/september launches are successful, anyway. Please direct any correspondence to me as follows:

Paul R. van Rossum  
P.O.Box 266  
6500 AG Nijmegen.  
The Netherlands.

#### REQUEST FOR TECHNICAL ADVICE:

---

Can anyone advice me on a scheme how to reduce video bandwidth drastically, thus improving very weak video signals such as received from Intelsat when using a 11-ft dish? (Steve Birkill mentions in his book "STTI's International Satellite TV Reception Guidebook" using a NE 561B or similar NE 560B to narrow video bandwidth to 3 MHz!)

While I'm at it, I might as well mention the other matters for which I'm hoping to find a solution. Perhaps one of you might know more and is willing to share this info with us:

1. C-MAC transmissions are reportedly used by Sweden and Norway. However, when watching Norwegian TV (for instance on ECS-4) one can straighten out the picture, thus getting color bars, audio noise and a very narrow B&W picture right next to one another. When, however, we look at broadcasts like those of SVT 1 and 2 (Intelsat V f2 at 1° West) or TV3 (Intelsat VA f11 at 27½° West) we see totally unintelligible rubbish. Can anyone tell why?? Can anyone tell who manufactures decoders for these standards?
2. Does anyone have any information how to separate and process the audio information from Sound-in-Sync systems, such as used by EBU (ECS-2) and Soviet Union (CT-2 by Gorizont 9 at 53° East)?
3. Can anyone help me to scheme's to overcome scrambling activities, such as undertaken by Premiere and Filmnet? If the scheme's are subject to forms of copyright, or you don't want them published for other reasons, please tell; of course such wishes must be respected.

# TELEVISION RECEIVER FIELD STRENGTH INDICATOR

By Ralph Berres DF6WU,

The following article first appeared in the Summer 2/1987 issue (volume 19) of VHF Communications Magazine, and we would like to thank the Editors for their permission to reproduce it here.

An item of equipment that could be very useful for the TV amateur is a received level indicator. Not wishing to mount a moving coil type of meter into the television cabinet I designed this unit, which superimposes a moving column of light along the top of the screen. The length of this column is dependant upon the strength of the incoming signal.

## FUNCTIONAL DESCRIPTION

As may be seen from the circuit diagram of Fig.1 there is nothing very difficult about the practical realisation of this circuit. The transistor T1 together with potentiometer P1 form a constant current source, which charges capacitor C1. The charging time is controlled by P1 and lies in the region of 60µs. The capacitor C1 is discharged by transistor T2 during the period of every line pulse. This produces a saw-tooth wave which is synchronised to line frequency, and the amplitude of which is dependant upon the charging current - the latter being controlled by P1.

The diodes D3 and D4 prevent the saw-tooth wave from reaching zero volts, because otherwise the following operational amplifier OP1 will receive a voltage overload at its input terminals.

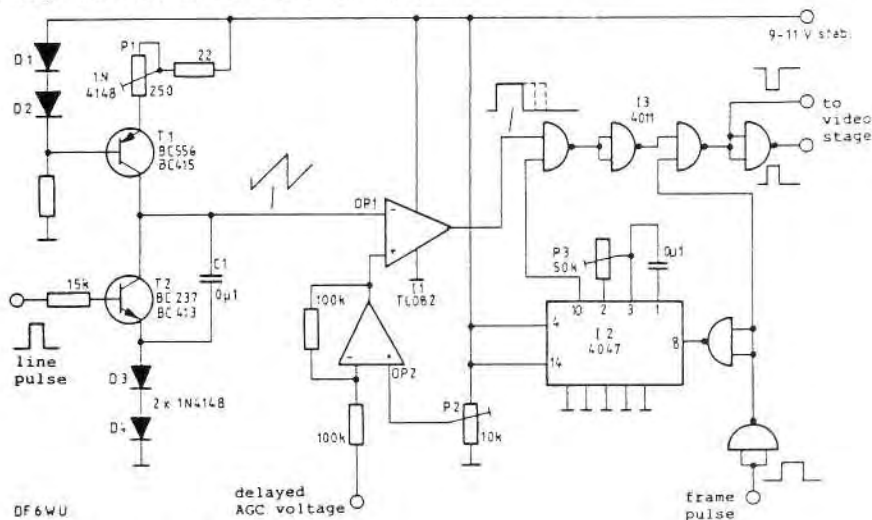
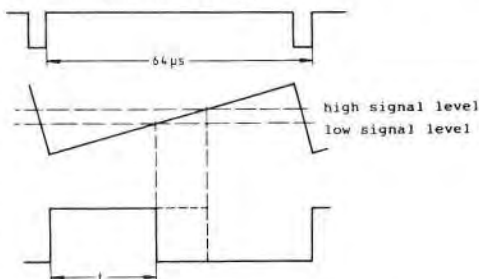


Fig. 1: TV receiver field-strength indicator



The AGC voltage of a television tuner is, in general, 6 to 9 volts in the absence of signal, and reduces with increasing signal strength. For our purposes this behaviour must be reversed and that is accomplished by OP2, which is connected as an adder. The potentiometer P2 at its non-inverted input controls the scaling value of the AGC control voltage.

The inverted AGC voltage is then taken to OP1 which is used as a comparator. When the AGC voltage at any instant is more positive than the saw-tooth wave, the output of the comparator goes directly to the potential of the positive rail +Vb. The length of time it stays at this potential is dependant upon the AGC voltage which, in turn, is dependant upon the incoming signal strength. This sequence is repeated for the duration of line time (Fig.2) at line frequency.



**Fig. 2:**  
The signal control voltage, saw-tooth wave and the variable duration pulse derived from them

In order that half of the screen, from top to bottom, does not 'white out' the incoming signal must, in some way, be connected with the frame pulse. For this purpose a C-MOS type 4047 mono-stable trigger is used. Its output pulse duration is controlled by P3, this being the control for the width of the moving column of light indicator. This signal is now gated with the column-length signal in the 4011 NAND gate.

The following gating with the frame pulse is intended to prevent TV sets having automatic brilliance control from throwing the colour symmetry out of balance. The gating produces a white line for each colour during the vertical blanking time, it also ensures that the moving column only starts at the end of the frame pulse.

### INSTALLATION AND ADJUSTMENT

The few components employed are loaded quite simply onto a piece of vero-board and connected up. The main problem is the determination of suitable circuit interface points which will accomodate the board without causing any deterioration to the rest of the picture. Unfortunately, no specific instructions can be given here as there are simply too many basically different circuit concepts.

In my own set I used the 'sandcastle' pulse to derive the line pulse. Difficulties can occur if the picture blanking pulse is used since it is not possible to blank brilliance and black at the same time. In this case it is recommended to delay the line pulse by a further 5μs using the simple gate delay circuit of Fig.3.

The frame pulse can be obtained from the limiter which, at the same time, is used for the synchronisation of the vertical deflection. The accompanying spurious pulses are rendered harmless by the second gate.

After the module has been completed and successfully connected into the TV circuitry P1 and P2 are turned to mid-position and P3 to maximum. The TV set is then switched on and a very strong signal tuned in. The indicator column

of light should be visible. With an oscilloscope connected to the output of the unit a pulse should be visible whose width is a function of the received signal.

The length of the column is now adjusted with P1 such that it nearly reaches the right-hand edge of the screen. The signal is removed and P2 adjusted until the column is now nearly at the left-hand edge of the screen. These two potentiometers should be readjusted until the column moves satisfactorily from extreme left to extreme right with no and full signals respectively. Finally, the column width is set by P3.

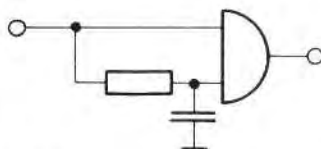


Fig. 3: 5µs delay circuit. R = 10 KΩ, C = 470 pF

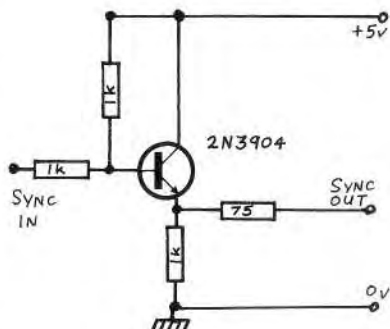
## MONITORING THE ROBOT 1200C

This snippet of useful information came to us from Trevor Brown G8CJS after he managed to sort out a snag with another member's slow-scan system - the Robot 1200C.

The sync output from the Robot is at TTL level and does not take too kindly to being fed into a low impedance load. Most monitors, however, require a sync input at a fairly high level and sourced from 75-ohms. The solution is to add the simple emitter follower buffer circuit shown below. This will allow the TTL output from the 1200C to see a high impedance load and allow the monitor to be fed with high level pulses from a 75-ohm source.

Another problem encountered at the same time was that although the buffer allowed the sync pulses through, the monitor would still not lock correctly. The problem proved to be coming from the Robot, in fact the sync pulses were inverted - positive going instead of negative. On inspection it was found that there is a selectable wire link inside the 1200C and that in this case it was connected to the position marked 'POS' and not 'NEG'.

The strap is labelled 'J4' and is located at the rear of the cabinet under the 'Level' control. Changing this over cured the sync problem.



# CQ-TV AWARD

This award is available to both transmitting and receiving enthusiasts, in any part of the world, whether they are members of the BATC or not.

The award is for contacts made using fast-scan high definition television systems only.

## TRANSMITTING AWARD

For pictures transmitted which have been successfully identified by another station, claim 2-points per kilometer; if the contact becomes a successful two-way exchange of pictures, then 10 bonus points may be claimed by each station regardless of distance. For contacts on the 1.3GHz band or above, points are doubled.

## RECEIVING AWARD

For any picture positively identified - claim for a one-way contact. Otherwise rules are as for transmitting.

## POINTS

The award is divided into five grades: For the Bronze - 1,000 points, for the Silver - 5,000 points, for the Gold - 10,000 points and for the Diamond - 100,000 points.

Points already gained for an existing award may be added in when applying for a higher grade.

## CONTACTS

A station may be worked once only per day for the purpose of this award. It is quite possible for it to be gained by working the same station many times. Contacts through TV repeaters do not count.

## THE AWARD

Upon qualification for the Bronze award, a certificate will be issued together with a Bronze seal; the certificate may be up-graded later with Silver and Gold seals. The Diamond award is in the form of a specially made trophy.

## APPLICATIONS

Applications should include log details consisting of call sign, date of QSO, band, location of the station worked and points claimed. Contacts made from other than the home station should be clearly marked. QSL cards are not required, but the application should be checked and signed by either a licenced amateur or a BATC member.

CERTIFICATE APPLICATIONS SHOULD INCLUDE A LARGE (12" x 8.5") STAMPED ADDRESSED ENVELOPE. For upgrade seals an ordinary SAE should be enclosed.

Applications should be made to the Awards Manager: Bob Webb G8VBA, 78 Station Road, Rolleston-on-Dove, Burton-on-Trent Staffs. DE13 9AB. Tel: (0283) 814582

THE BRITISH AMATEUR TELEVISION CLUB

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 DECEMBER 1987

	<u>1987</u>	<u>1986</u>
<u>INCOME</u>		
Subscriptions	13182.91	10382.99
Members services	1642.45	135.34
Publications	1182.55	1932.78
Advertising	907.35	501.00
Building Society interest	825.73	683.19
Miscellaneous	0.90	64.70
Exhibitions	1430.00	749.50
Donations	99.24	200.10
Postages	190.79	800.77
	<hr/>	<hr/>
	19461.92	15450.37
 <u>Less:</u>		
 <u>EXPENDITURE</u>		
CQ.TV printing	7296.76	6356.74
CQ.TV postage	3322.51	2809.86
General office expenses	869.73	822.31
General postages	464.83	1244.25
RSGB affiliation fee	11.10	9.90
Committee members expenses	112.20	377.60
Exhibitions	1175.65	836.04
Advertising	304.37	104.08
Insurance and awards	81.50	299.99
Depreciation	65.43	399.07
Prestel	-	32.32
Miscellaneous expenses	197.64	-
Accountancy	165.00	172.50
European Amateur Television Working Group	-	1000.00
	<hr/>	<hr/>
	14066.72	14464.66
 <u>EXCESS OF INCOME OVER EXPENDITURE</u>		
<u>FOR THE YEAR</u>	£5395.20	£ 985.71
	<hr/>	<hr/>

THE BRITISH AMATEUR TELEVISION CLUB

BALANCE SHEET AT 31 DECEMBER 1987

	<u>1987</u>	<u>1986</u>
<u>FIXED ASSETS</u>		
Office machinery		
Additions	65.43	399.07
Less: Depreciation	<u>65.43</u>	<u>399.07</u>
	-	-
<u>CURRENT ASSETS</u>		
Stocks - members services	3335.29	2800.00
- publications	2878.83	2928.77
Midshires Building Society- deposit account	14885.20	17059.47
Lloyds Bank Plc- current account	2735.00	226.75
postage account	380.42	-
Cash in hand	<u>-</u>	<u>100.00</u>
	24214.74	23114.99

Less:

CURRENT LIABILITIES

Creditors and accrued charges	907.00	1172.50
Subscriptions received in advance	<u>1471.00</u>	<u>5500.95</u>
	2378.00	6673.45
	£21836.74	£16441.54
	=====	=====

Represented by:

ACCUMULATED FUND

Balance brought forward	16441.54	15455.83
<u>Add:</u>		
Surplus of income over expenditure for the year	<u>5395.20</u>	<u>985.71</u>
	£21836.74	£16441.54
	=====	=====

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.

**RN Store + Co**

Chartered Accountants  
18 April 1988

# THE PHILIPS MSX-2 MICRO

By John Borrington G6XMG,

Having recently purchased a Philips NMS8280 MSX-2 home computer I felt that you may be interested in the superb capabilities afforded to the TV amateur. I believe that out of all the computers available at present this must be the ultimate for an ATV station.

The machine has all the features found on the Pioneer PX7 computer, which has itself an impressive video capability. However, the Philips machine has many more options, including the facility to digitise a video signal sourced from any source and store that digitised picture on disc. The video can be from any source providing a standard composite signal, such as the shack camera or a VCR. This facility alone makes, to my mind, this computer something special, as, to do this with other machines generally available requires the addition of extra software and external hardware.

The graphics software that comes with the computer has so many icon driven menu options that I have not had time to experiment with them all as yet, but I will mention a few that I have managed to use. The effects I have produced are very impressive and include superimpose, video fade and mix and audio fade and mix. The fade and mix options can be effected either by use of the manual sliders on the front of the machine, or under software control from the graphics program.

Available from the main menu are a further seven sub-menus with eighteen options available in each.

The seven sub-menus are as follows:

- 1) Drawing geometric figures.
- 2) Hand drawing and colour effects.
- 3) Selecting pen and brush.
- 4) Text and text handling.
- 5) Animating objects.
- 6) Video functions.
- 7) Screen and input/output functions.

I could continue writing several pages about this piece of equipment and the facilities available, but just by looking at the reproductions included of the menu options it can be seen that the capabilities are almost endless. The computer and further information is available from Anglosoft, 142 Woodway Lane, Walsgrave, Coventry.

The basic specifications of the Philips NMS8280 are listed below:

MAIN PROCESSOR	-----	Z80A	3.5MHz
VIDEO PROCESSOR	----	YM938	
RAM	-----	128k USER/128k VIDEO	
RESOLUTION	-----	MAXIMUM 512 x 212 PIXELS	
TEXT	-----	24 LINES OF 80 CHARACTERS	
COLOURS	-----	512 AVAILABLE	
SPRITES	-----	256 AVAILABLE	
8-OCTAVE SOUND GENERATOR		(3 TONES SIMULTANEOUSLY)	
MICROSOFT BASIC INTERPRETER			



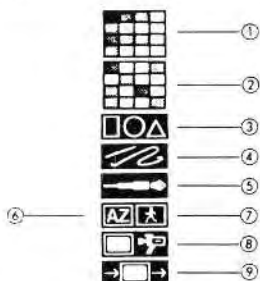
The following lists detail the various functions found on the Philips NMS 8280 MSX-2 computer:-

#### THE FUNCTION KEYS

<b>F1</b>	Retracts last design activity.
<b>F2</b>	Menu on/off screen. (Same as right-hand action button mouse.)
<b>F3</b>	Menu left/right.
<b>F4</b>	Continue with the previous animation sequence.
<b>F5</b>	Start/stop animation.
<b>F6</b>	Cursor on/off screen.
<b>F7</b>	Neutralise superimpose image.
<b>F8</b>	Superimpose mode on/off.
<b>F9</b>	Activate/de-activate video mix.
<b>F10</b>	Start kaleidoscope.
<b>ESC</b>	Stop execution computer functions.
<b>SPACE</b>	Activate functions. (Same as left-hand action button mouse.)
<b>RETURN</b>	To enter typewritten" text.

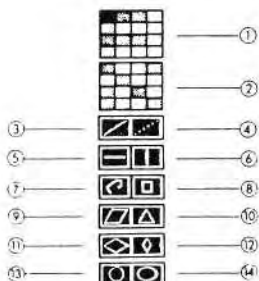
#### ACTION BUTTONS (mouse)

Left-hand	Activate function (as SPACEBAR).
Right-hand	Menu on/off screen (as F2 ).



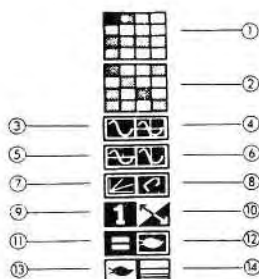
#### THE MAIN MENU

1. Main colour pallet.
2. Sub-colour pallet.
3. Drawing geometric figures.
4. Hand drawing & colour effects.
5. Selecting pen & brush.
6. Text & text handling.
7. Animating objects.
8. Video functions.
9. Screen & in/out functions.



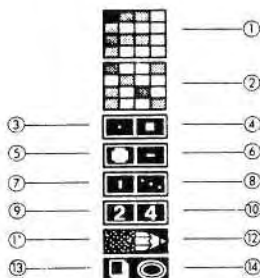
#### DRAWING GEOMETRIC FIGURES

1. Main colour pallet.
2. Sub-colour pallet.
3. Straight line.
4. Dotted straight line.
5. Horizontal line.
6. Vertical line.
7. Connected straight lines.
8. Rectangles.
9. Parallelograms.
10. Triangles.
11. Standard rhombs.
12. Variable rhombs.
13. Circles.
14. Ellipses.



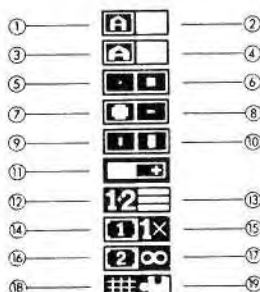
#### HAND DRAWING & COLOUR EFFECTS

1. Main colour pallet.
2. Sub-colour pallet.
3. Free-hand drawing.
4. Four-sided symmetrical drawing.
5. Horizontally symmetrical drawing.
6. Vertically symmetrical drawing.
7. Fan-line effect.
8. Connected straight lines.
9. Monochroming.
10. Colour reversing.
11. Colour equalising.
12. Paint-in.
13. Solid paint-in.
14. Graduated paint-in.



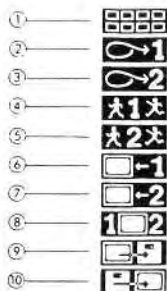
#### SELECTING PEN & BRUSH

1. Main colour pallet.
2. Sub-colour pallet.
3. Fine line.
4. Medium bold line.
5. Bold line.
6. Horizontally bold calligraphic.
7. Vertically bold calligraphic.
8. 3-line calligraphic.
9. 2-colour line.
10. 4-colour line.
11. Spray effect.
12. Sketch/mix effect.
13. Drop-shadow.
14. Contour line.



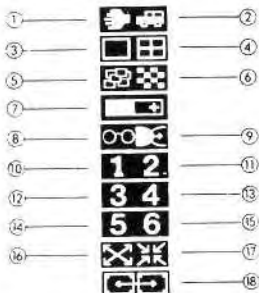
#### TEXT & TEXT HANDLING

1. Standard characters.
2. Standard characters (uniform background).
3. Enhanced characters.
4. Enhanced characters (uniform background).
5. Light.
6. Medium bold.
7. Bold.
8. Extended.
9. Condensed.
10. Bold condensed.
11. Timer bar.
12. Prepare for pop-in & fade-in text.
13. Prepare for scrolling text.
14. Start pop-in text.
15. Start text scroll.
16. Start fade-in text.
17. Start continuing scroll.
18. Grid-pattern.
19. Jigsaw puzzle pattern.



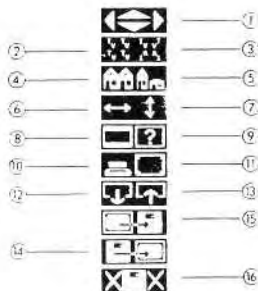
#### ANIMATING OBJECTS

1. Define objects.
2. Routing object 1.
3. Routing object 2.
4. Set sequence 1.
5. Set sequence 2.
6. Playback Object 1.
7. Playback Object 2.
8. Playback Object 1 & 2.
9. Load animation sequence from diskette.
10. Save animation sequence on diskette.



#### VIDEO FUNCTIONS

1. Manual image digitization.
2. Automatic image digitization.
3. Single image digitization.
4. Quadruple image digitization.
5. Random series image digitization.
6. Mosaic effect.
7. Timer bar.
8. Soft-focussing.
9. Computer-to-computer wipe.
10. Bar wipe.
11. Random block wipe.
12. Up/down curtain wipe.
13. Left/right curtain wipe.
14. Upward curtain wipe.
15. Spray effect wipe.
16. Opening wipe.
17. Closing wipe.
18. Transition wipe (closing and opening).



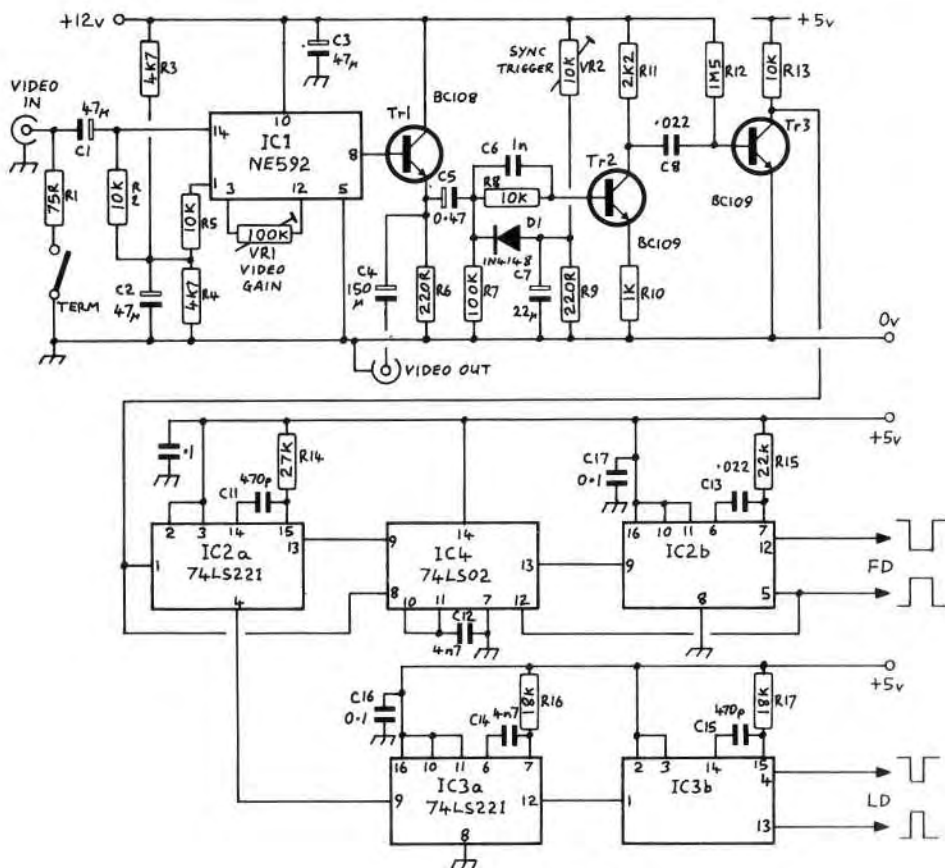
#### SCREEN & INPUT/OUTPUT FUNCTIONS

1. Screen adjustment.
2. Multiplying images.
3. Multiplying images (symmetrically).
4. Duplicating images.
5. Transforming images.
6. Mirroring images (horizontally).
7. Mirroring images (vertically).
8. Change border colour.
9. Colour search.
10. Start printer.
11. Clear screen.
12. Recording design sequence.
13. Playback design sequence.
14. Load file from diskette.
15. Save file on diskette.
16. Remove file from diskette.

# A MONITOR INTERFACE

By Bill Moore G8DTT

A few weeks ago a television monitor came into my possession which had been taken out of a computer terminal. Unlike most video monitors this set required separate line and frame sync inputs at TTL levels, and a video input of between 2.5 and 4 volts. After looking through several back issues of CQ-TV for suitable interface circuitry, and not finding anything suitable, I designed and built the following circuit, which has the following advantages:



1) It will accept almost any composite video signal up to 2 volts peak-to-peak.

2) Positive and negative going line sync pulses available at a constant duration of 4.7uS.

3) Positive and negative going frame pulses of 160uS duration uninterrupted by line pulses. These pulses are delayed by approximately 5.5uS due to their being detected in the composite video signal by looking for pulses longer than 5.5uS. (The more usual method is to charge a capacitor to a predetermined level by the long frame pulses.)

4) By carrying out minor changes to the circuitry the unit can handle negative going video.

5) The unit is powered off the 12 volt rail within the monitor.

### CIRCUIT DESCRIPTION

The video input to IC1 is via C1 and may be terminated if by switching in R1. The gain of IC1 is adjusted by VR1 to produce the required video output level of up to 4 volts p-p.

Sync pulses are extracted from the composite signal by sampling the waveform via C5 and passing it to transistor TR2. This transistor must be biased to work in a linear mode in order to prevent distortion of the waveform at the emitter of TR1. The circuitry at the base of TR2 clamps the bottom of the sync pulses to the voltage set by VR2. The signal is then passed to an amplifier TR3 which, due to its high gain, acts as a switch and separates the composite waveform presenting only sync pulses at its output.

The composite sync output from TR3 is fed to IC2a and IC4. IC2a is half of a dual monostable multivibrator which is timed to give an output pulse of 5uS duration and gated with the input in IC4. The output of the gate will only change when the sync input goes low for longer than 5.5uS (ie: during frame pulses). This is then used to trigger the frame pulse generator IC2b. C12 suppresses any spurious triggering of IC2b due to the propagation delay of IC2a. The output from IC2a is a string of 5uS pulses which occur each time the composite sync goes low. This occurs during every line sync pulse and also during the half-line pulses appearing during the frame sync pulse. IC3a eliminates the half-line pulses and IC3b times the line output pulse.

IC timing:- IC2a 5uS, IC2b 160uS, IC3a 35uS, IC3b 4.7uS.

Notes: 1) If the circuit is to be used with a guaranteed input of 1v p-p, IC1 may be omitted and VR2 replaced by a 10k fixed resistor.

2) If you require only a composite sync output, IC's 2, 3 and 4 may be omitted and the output taken from the collector of TR3 and buffered to suit your needs.

Before you rush out and buy that cheap monitor in the local junk shop, ensure that the video input hasn't any TTL chips in line before being fed to the CRT. The video amplifier described here is not suitable for feeding TTL IC's and may even cause damage to them.

# CONTEST NEWS

By Mike Wooding G6IQM,

It seems that no sooner have I written the copy for contest news than it's time to do it again, Tempus Fugit and all that I suppose. Many thanks for all the kind comments I received at the convention, they really are appreciated, generally all we get in the mail is complaints etc. To those of you who supported the bring-and-buy stall thanks from the GB3RT group for your helping once again to make it successful, I hope you got a bargain! I am attempting to deal with the comments raised at the BGM concerning contest dates in RadCom, although I am still up against a brick wall at HQ!

SLOW-SCAN CONTEST NOVEMBER 13th 0001-2359 hrs LOCAL TIME

So as not to be accused of lack of advertisement and forewarning this year, please don't forget this contest which is to be held on the above date. It will run in conjunction with the Autumn Vision contest. I hope this year to promote a lot more activity, but this can only be achieved with your help. I particularly wish to involve non-U.K. stations and make the contest into a truly international event. I have written to several prominent SSTV'ers asking for advice etc. but, as usual, I have received no replies, even from those who made critical comment on their entries last year! What I need is constructive criticism (if that is what you must do) and help, not just negative comment. Right then, the way you can help is to let all the SSTV stations you work know about the contest. I shall be informing all the U.K. magazines of the event and also many foreign ones in the hope that they will publicise it.

The rules are the same as for FSTV contests with the following amendments:

The use of a four figure code to confirm identification is not mandatory. Correct identification is left to the discretion of the operators, thus alleviating the problem many SSTV stations have concerning character generation.

There are two separate sections, HF and VHF. Scoring in both sections remains the same at 1 point per kilometer for a one-way contact and 2 points/km for a two-way.

That's it then, please let's have a better turn out than the last two years or we may consider scrapping the contest altogether.

## WINTER CUMULATIVE 88

Unfortunately due to working commitments I was only able to participate in the last two sessions of the contest. The note I made in my log for the Saturday and Sunday remind me that the weather was, as usual, pretty rough:

'Saturday - Wx started reasonable but deteriorated drastically to rain and gale force winds.'



'Sunday - Wx disgusting, rain and fog, with more rain and even more fog!'

Conditions on these two nights were, consequently, not very good, to say the least, reading from my log again for the Sunday:

'Severe QSB at times on 70 - 2m very strange!'

However, my 1W of 24cm (at that time still suffering problems with my ageing 2C39A linear!) surprised me by reaching Geoff G3DFL, 55km away at a picture strength P4.

There was a reasonable amount of activity on 70 and 24cm, although I must admit that I felt there were a lot less stations working this year compared to previous contests. Some comments confirm this:

John G4MNY reported that the usual plethora of London stations was missing and that activity was down on previous years.

Geoff G3NAQ also reported a lack of stations. Also, due to an aerial problem, his operating was curtailed on the third session, and he was unable to operate at all on the last.

A plaintive cry from Dave G8GKQ in Swaffam, Norfolk again lamenting the lack of activity, and also that no one beams towards that part of the country (unless the continent is coming in Dave!).

Thus, the concensus of opinion is that we need more stations participating in contests. I hear on the air again and again stations complaining about the lack of activity, particularly on 70cm, yet they apparently cannot be bothered themselves! So, come on then, let's have a larger turnout next time, join us and have some fun participating in the Gentlemanly ATV contests.

Owing to the lack of entries only a couple of amusing comments to bore you with!

Philip G4LIR of the G0AVG/P group reckons that on the Sunday it was like 'operating in rice pudding'.

John G4ZJY - 'conditions get worse for contests, please order a lift for the next one'...*I would like to John, perhaps if we get a new contest manager we might get better conditions as well!*

#### SPRING VISION 88

The first of the joint European contest this, but I am afraid that I have had no reported exchanges across the water. This is not altogether too surprising as, once again, conditions were not particularly good, with severe long QSB on 2m at times with corresponding affects on 70cm. 24cm was generally limited to 'local' contacts with very little in the way of distances worked.

Yet more complaints of reduced activity from most of those who entered, so come on and join us contest idiots, you might be pleasantly entertained for a few hours. Another way of looking at contests is that at least they can give a good indication as to how

well your station is operating, but more importantly they help to show the powers-that-be that we are using our bands. Hence the maxim that often appears in the magazine 'use it or lose it'.

The usual round-up of your comments:

John G4MNY reports - 'we still had to have a 3kW gas fire on as the new PA is not yet complete'

John G4ZJY - 'Very sociable hours for a contest'...What's this John, do you mean to say I have got something right at last?

Dave G8GKQ still wonders where you all are!

*This snippet I heard whilst waiting on the side for a contact; Des G3NNG operating the G3PIA/P station working George G4EUF...'Could you switch it off one or two times please George?...OK Des, any good?...No, we didn't see you, but it gave you something to do whilst we were looking.'!*

## RESULTS

Double congratulations to Gary G4CRJ for his wins on both 70 and 24cm in the Winter Cumulative. Just to prove that he is there and does enter, commiserations to Dave G8GKQ for not winning on 24cm!

### WINTER CUMULATIVE 88 70cm

Pos'n	Call	Points	QSO'S	Best Dx	@	Km
1	G4CRJ	6953	54	G4GCO		242
2	G4ZJY	6634	69	G4CRJ		166
3	G8MNY	5379	54	G4DVN		234
4	G3NNG	5047	39	G4DVN		157
5	G0AVG/P	5015	38	G8MNY		174
6	G4VTD	3771	37	G8GKQ		148
7	G3NAQ	2784	34	G4ZJY		153
8	G8ONX	2454	26	G4CRJ		99
9	G6IQM	1492	16	G0AVG/P		90
10	G6HMS	1307	26	G4CRJ		176
11	G4JNU	1248	17	G8MNY		65
12	G8GKQ	1218	5	G4CRJ		155
13	G8XMF	914	18	G8MNY		86
14	G2BMT	553	10	G8MNY		37

### WINTER CUMULATIVE 88 24cm

Pos'n	Call	Points	QSO'S	Best Dx	@	Km
1	G4CRJ	1856	20	G3NNG		58
2	G3NNG	1371	14	G4VTD		113
3	G4VTD	1019	16	G3NNG		113
4	G3YQC	452	9	G6YKC		69
5	G6IQM	366	6	G3DFL		55
6	G4JNU	342	7	G8LES		38
7	G8GKQ	0	0			

They were out again in force in Wales, but once again the winners flag drops in the 70cm race for the GW8LIR team of Andy, Ron and Fred - congratulations again lads. John G4MNY just pipped the G3PIA/P team at the post winning the 24cm section, with yours truly a poorer third!

# SPRING VISION 88 24cm

Pos'n	Call	Points	QSO'S	Best Dx	@	Km
1	GW8LIR/P	7666	39	G8MNY/P	287	
2	GW7ATG/P	6342	33	G8MNY/P	245	
3	G8MNY/P	3162	21	GW8LIR/P	287	
4	G7ATV/P	2703	26	G8GKQ	247	
5	G3PIA/P	2237	20	G8GKQ	195	
6	G4VTD	2163	13	GW8LIR/P	277	
7	G6SKO	2012	21	GW7ATG/P	152	
8	G0HOV	1483	16	G4CRJ	199	
9	G6IQM	1378	13	GW8LIR/P	151	
10	G7AVU	1296	15	G8LIR/P	161	
11	G8ONX	1157	13	GW8LIR/P	132	
12	G4AGE	1029	13	GW7ATG/P	167	
13	G8GKQ	798	4	G7ATV/P	247	

# SPRING VISION 88 24cm

Pos'n	Call	Points	QSO'S	Best Dx	@	Km
1	G8MNY/P	564	7	G3PIA/P	110	
2	G3PIA/P	552	4	G1GST	114	
3	G6IQM	378	7	G1GST	66	
4	G7ATV/P	356	10	G3PIA/P	58	
5	G4VTD	202	4	G4CRJ	57	
6	G8ONX	187	6	G4EUF	34	
7	G0HOV	101	6	G4EUF	37	
8	G8GKQ	0	2			

The address for information, entry forms, log sheets and contest entries is shown below. Please remember to enclose an A4 size SAE when requesting the above, or if wanting contest certificates. Remember, every contest entry is awarded a BATC certificate if you send an A4 SAE.

MIKE WOODING G6IQM, 5 WARE ORCHARD, BARBY, Nr.RUGBY, WRKS, CV23 8UF.

Forthcoming contests:

IARU ATV  
1800/GMT SATURDAY SEPT 10th  
to 1200/GMT SUNDAY SEPT 11th  
FSTV ALL BANDS

SLOW-SCAN & AUTUMN VISION  
0001 TO 2359 HRS LOCAL  
SUNDAY NOVEMBER 13th  
SSTV ALL BANDS HF & VHF  
FSTV ALL BANDS

# BOARDS FOR THE CQ-TV134 PAL CODER

By Pete Carliell

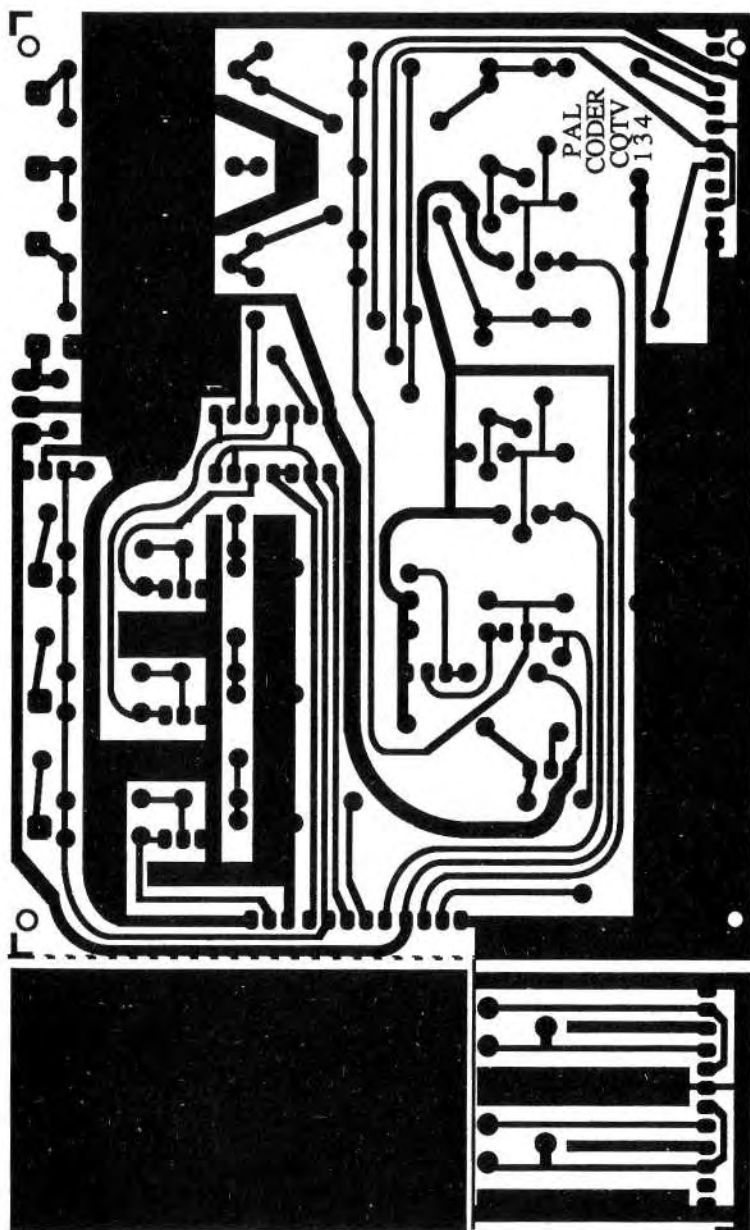
The PAL coder design by John Goode which was described in CQ-TV 134 works very well, however I have made a few small improvements and alterations which I shall describe first.

1. IC5 is now a 74LS86, making it the same type as IC4.
2. The syncs are now injected BEFORE the luminance delay so that they keep the correct timing relative to the rest of the output waveform.
3. Transistors Q5, Q6, Q10 and Q11 are now BC107. After much effort this was the only way I could find to prevent the 'matrix & filter' stages from oscillating (at around 300MHz!).
4. The base bias resistors for Q16, Q17 and Q18 have been reduced by a factor of ten to 2.7k. This stops the pulse buffer stages from widening the pulses.
5. R63 is increased to 620-ohms and the chroma level control reduced to 1k. Reducing the gain of IC3 allows IC2 to work at a lower gain and avoid clipping of 100% saturation colours. The reduced chrominance signal is compensated by reducing RV8.
6. C31 is redundant and has been omitted (it was only in parallel with C20).
7. The luminance delay circuit shown has been avoided. It gave only about 100nS delay - not enough - and attenuated H.F. luminance considerably (although only above 3MHz or so). A new delay line has been designed (the 'PJC') although the PC board caters for a ready-made alternative. This is the Philips DL270, a 270nS delay with 900-ohm impedance. It is available from Maplin electronics and sounds similar to the Bonex component mentioned in the original text. If a 'PJC' home-made delay line is used then R16 and R17 should be 51-ohms, and R25 910-ohms. If the DL270 is used then make R16 and R17 both 910-ohms with R25 remaining as specified. The one drawback to the DL270 is a little H.F. loss. To compensate this the PC board has provision for an 'adjust-on-test' capacitor (C49), in parallel with R22, to boost the HF gain of IC1.

## CONSTRUCTION NOTES

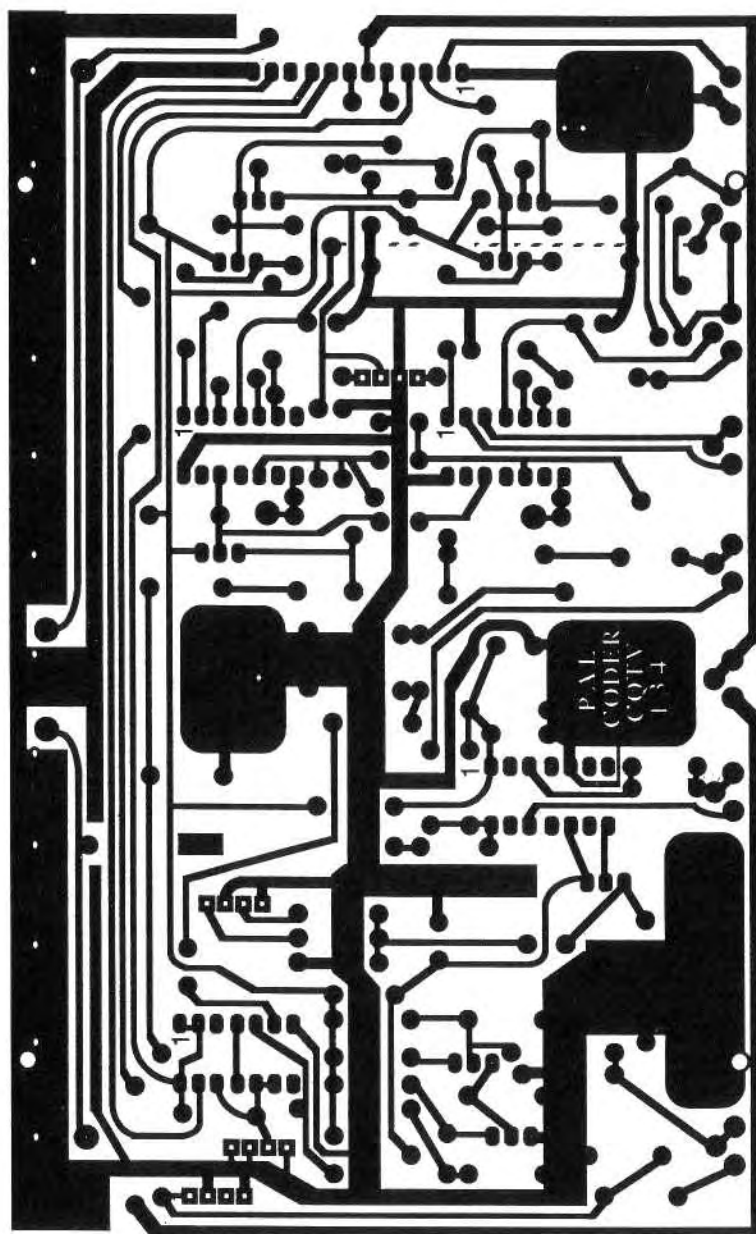
Full size (161mm x 100mm) printed circuit board layouts are reproduced in Fig's 1 and 2 and the component plans in Fig's 3 and 4 respectively. These boards correspond to Fig's 2 and 1 main circuit diagrams. Further details of connectors and suchlike may be found in the simplified layouts shown in Fig's 5 and 6. The multi-pin connectors (PL1, 2 and 3) are known as 'Wafercon' connectors and are 0.1" pitch. Board mounted plugs are fitted to the PCB and appropriate free sockets used to connect the cables to the plugs.

The two boards are ideally fitted in one of the grey & white plastic Vero boxes (7" x 5" x 2.5"). Board-2 lies in the base with Board-1 (after having the sub board cut off) in the lid. With the sub board plugged onto board-1 all presets (except 'slice level') line up along the front panel.



PAL CODER - BOARD-1 (actual size)

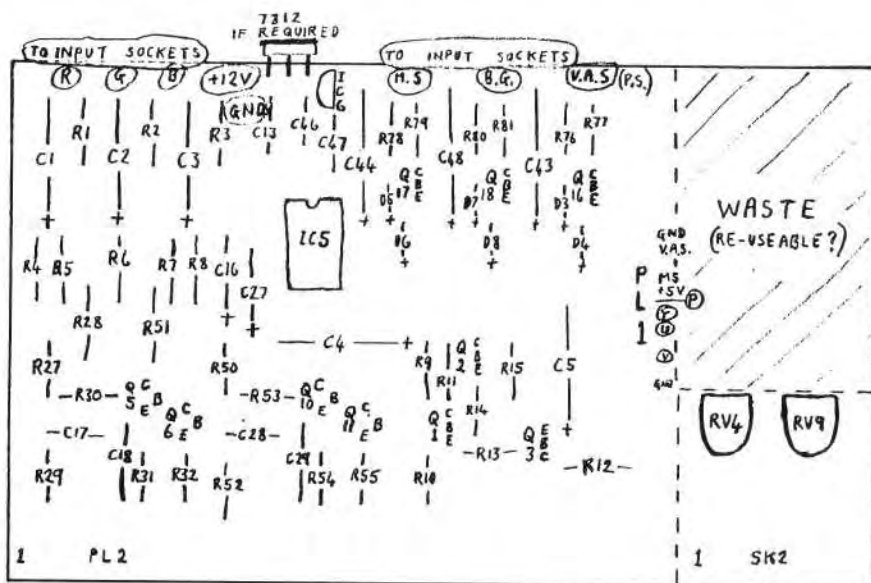
Fig.1



PAL CODER - BOARD-2 (actual size)

Fig. 2

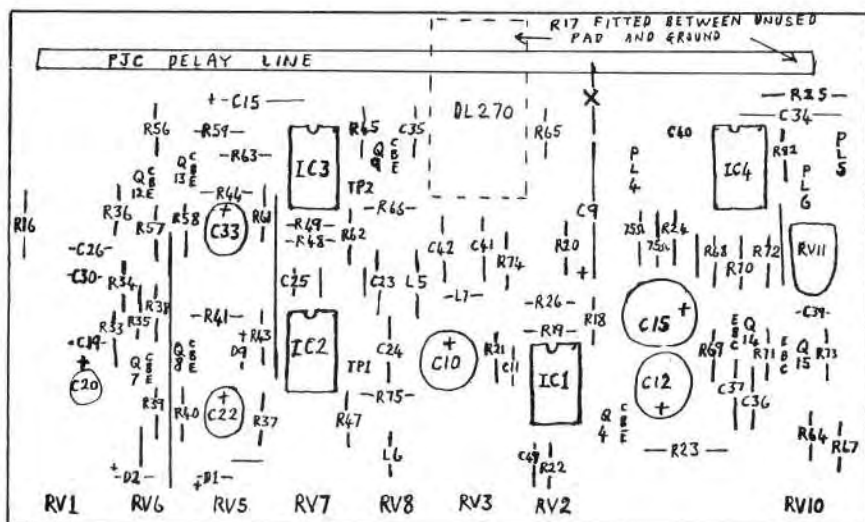




BOARD 1

1. Cut along dotted lines.
2. If the 7812 regulator is not required then link across its outer pins.

Fig.3



BOARD 2

With the 'PJC' delay line, 'x' is a link on the UNDERSIDE of the board. With the DL270, 'x' is the negative lead of C9.

Fig.4



The back panel should stay with the lid as most sockets wire to board-1 - as does the power input. The 12-way board-to-board connection is on a direct pin-1 to pin-1 basis. If made about 5 or 6" long it allows the base and lid of the box to be hinged side by side for maintenance. Fig.7 shows a suggested back panel layout.

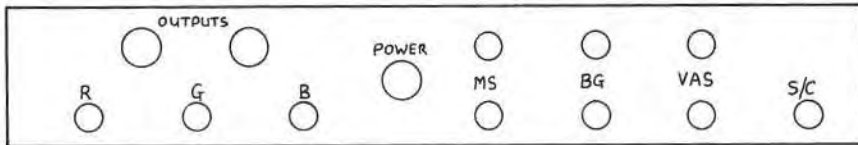


Fig.7

Suggested back panel

An optional 7812 regulator is available on Board 1. There is a waste portion of that board which may be cut out if desired. RV9 and RV4 (board-2) are fitted onto a sub board.

#### THE 'PJC' HIGH QUALITY DELAY LINE

A 6" length of  $\frac{1}{4}$ " diameter dowel has two holes drilled 5.5" apart, to take long wire-wrap type pins. These form the mounting and connection points. Approximately 26swg enamelled copper wire is wound on forming taps at  $\frac{1}{2}$ " intervals, with 17 turns close wound between each tap. Ten 470pF and two 270pF polystyrene capacitors complete the line. Fig.8 shows a partly wound line. The line's impedance seems to be roughly 50-ohms and the delay is nearly 200nS.

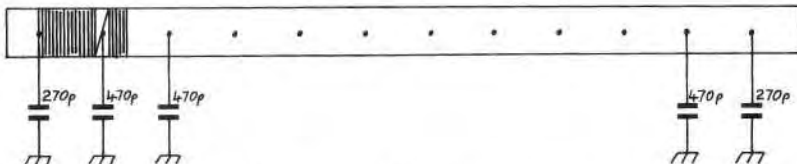


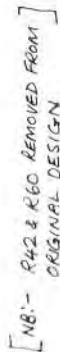
Fig.8

The 'PJC' high quality delay line

If the waveform at C9 has small overshoots then trim R16 which should be 51-ohms for this line.

For the sake of completeness modified versions of the original circuits are also reproduced here. The original components list will need a little modification to cater for the component changes detailed earlier.

## **SSTV FREQUENCY – 144.5MHZ**





# HAPPY THIRD BIRTHDAY EATWG

---

Andy Emmerson G8PTH

The annual meeting of EATWG (the European Amateur Television Working Group) took place over the weekend 18th/19th June in Friedrichshafen, on Lake Constance in Germany. This coincided with "Ham Radio", Germany's equivalent of our RSGB national amateur radio exhibition. If this wasn't enough, it was also the twentieth birthday of AGAF, the German ATV club and the 10th anniversary of Busreferat (a special TV, fax and RTTY sub-group of DARC, the German national radio club).

As yours truly is chairman of EATWG I should have been there but it was not possible to make it this year. Instead I had to send a written report in my place and it seemed to be a good idea to take a searching look at where ATV has got to - and where it is going.

## The year in review

Most of the progress in the world of amateur television in Europe has been subtle, rather than dramatic. Contact between member organisations of EATWG has increased: BATC, AGAF and the Belgian ATV group are circulating their magazines between one another. It was particularly pleasant to hear that France is represented at this year's meeting. For my part, I have written to the IARU, to ATV managers and amateurs in all countries with known ATV activity to tell them about EATWG. Response, however, has been disappointing with only one reply. This was from a Swedish ATVer, who said ATV activity in his country was minimal but that he would act as a contact. This indicates to me that we have probably made all the connections we can do in Europe and can truly claim to represent the European ATV movement. What is more, I believe that we are doing as much as we can for ATV and, apart from AMSAT, we are the best-organised speciality-mode of amateur radio in Europe.

## The future

Does this give reason for complacency? Unfortunately not! If the trends in continental Europe are the same as in Britain, the magical growth era of ATV is over. Amateur radio altogether has stopped expanding in terms of numbers of people involved, if not in decline, and the only area where interest is growing fast is data transmission, in other words packet radio. This does not sound good for ATV.

What is worse is the risk of increased QRM to ATV from packet radio operators. So far this is not a problem in Britain, though I hear it is in Germany and the Netherlands. This can only get worse, because the interest in packet radio is growing all the time and many packet radio operators display little radio knowledge.



They may be experts in data matters but many have no awareness of (or interest in) bandplans and reserved frequencies, nor do they listen on a channel before transmitting. By no means all packet radio people are like this, but sufficient are to cause a threat to ATV. (Apologies to you good guys!).

We must educate all radio amateurs of the importance of sharing our valuable resource thoughtfully. We must make more people aware that ATV is fun and the most fully rewarding branch of our radio hobby. This won't happen by itself - we must make ATV more interesting to others, explain what we are doing and encourage them to join in our particular hobby. More repeaters with more user facilities are the most dramatic way of demonstrating this. I hope you can think of ideas too. As for avoiding packet radio QRM, I fear the only solution is to 'move to higher bands' - this may not please everyone but it may be the only way to escape PR!

I know I can expect you to come up with other practical ideas, and I look forward to receiving them!

#### Contact with USATVS

An important outcome of our visit to Dayton was meeting Mike Stone WB0QCD, chairman of USATVS, the United States ATV Society. I'm pleased to say that we got on very well together. Mike shares our interests and outlook, and his members face many problems similar to ours. Packet radio is becoming the dominant mode in America also, and there are similar problems of frequency shortage on 70 cm (30 Mhz is not enough where there are lots of hams!). On the other hand, there is little radar QRM on 23 cm and in any case they have a 902-928 MHz band which is even better for ATV exploitation than 23 cm. ATVers have "made friends" with packet radio operators and some ATV repeaters have links enabling them to display packet radio activity.

Following this meeting, we have promised to improve contacts between ATVers in north America and Europe. I have told you before that I have a vision of a World ATV Working Group: it would not be difficult to make this a reality now.

#### Videotape exchange

At Dayton Mike presented us with a superb videotape entitled "Hello Europe". This is a long tape demonstrating the very best of ATV operation in the USA and I will send you a copy as soon as we have converted it from NTSC to PAL. The sincerity and effort that went into this tape is really impressive!

We Europeans are honour-bound to send a tape back - I wonder if we can send an even better tape! It will be difficult but I think we can do it ... Obviously a lot of organisation would be involved, but we amateurs are no strangers to hard work, and this would certainly be a worthwhile project. Many ATVers in Europe will not speak English and will make their tapes in their own language, but ATV is a universal language and I think this will add to the fun rather than detract from it. We can always provide a written translation. The

finished tape will make a superb publicity film for ATV, also a very useful 'documentary' to put in the ATV archives generally - in other words, an ambitious but very worthwhile project.

So please start making your videotape: if it is to be ready for next year's Dayton Hamvention you should start now! Each country should aim to provide 30 minutes' material, in PAL and preferably on U-Matic or 1 inch tape. Please send your contributions to Trevor Brown G8CJS (QTHR) - Trevor will edit the tapes and arrange professional conversion to NTSC.

Once again, I am sorry that the BATC could not be present at this year's EATWG meeting but we look forward to seeing our European ATV colleagues again next year.

## **MICROMAX RF SYSTEMS**

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### 23/24cm LOOP YAGI AERIALS

Single 39-element £60.00, Double 39-element c/w power divider £165.00. Complete with mounting frames - bandwidth suitable for amateur TV.

### 23/24cm 2C39 VALVE CAVITY POWER AMPLIFIERS

Supplied less valve but complete with cooling fan, filament transformer, bias network and base plate. Single valve PA, 50-Watts output £100.00. Twin valve PA, 120-Watts output £180.

(All above reviewed in CQ-TV140)

### 23/24cm INTERDIGITAL BANDPASS FILTERS

3-pole, adjustable from 1250 to 1320MHz. N-type or BNC connectors £35 inc. postage.

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Non-calibrated in-line devices for tuning PA stages. Complete with panel meter, useful from 2m to 13cm £30.00.

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A comprehensive range of high-grade used monitors, cameras, pan/tilt heads and accessories. Also a wide range of used measuring equipment including RF power meters, Racal frequency meters, Fluke digital multimeters etc.

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70cm AERIALS	P&P	GAIN dBd	BOOM LENGTH	READY MADE	DIY PARTS
Fibreglass colinear	£2:00	5.0	5'0"	£25:00	-
12 element Yagi	£3:00	14.0	6'0"	£12:00	-
17element Yagi	£4:00	15.0	8'0"	£18:00	£14:00
24element Yagi	£4:00	17.0	10'0"	£25:00	£19:00
Double Delta	£4:00	16.0	4'6"	£35:00	-
8 turn helical	£4:00	13.0dBd	5'0"	£35:00	-
12 element crossed Yagi	£4:00	14.0	6'0"	£22:00	-
<u>23/24cm AERIALS</u>					
20 turn Helical	£4:00	17.0dBd	4'0"	£33:00	-
PARADELTA	£5:00	18.0	3'x2'x12"	£40:00	-
6'6" PARABOLIC DISH (mesh)	£9:00	25.5dBd	6'6"	£95:00	-
18 element Parabeam	£4:00	15.0	5'0"	£45:00	-
Lots of others: 2-Metres, 4-Metres, 6-Metres, P.M.R., Weather satellite etc. Any frequency to order. FIBREGLASS BOOMS, TUBES RODS: 3/8" tube: £1. per Metre, 1/2" rod: £2., 3/4" tube: £2:50., 1-1/2" tube: £5., 1-3/4" tube: £6. Aluminium tubes, spares, element holders etc.					
<u>SEND S.A.E. FOR LISTS.</u>					

## TEST CARD TAPE COMPLETED

The development of the television test card has been the cherished research project of one or two people in the BATC - it is also the title of a 55 minute video production that is now ready.

Filmed by professionals, this tape presents the story of the TV test card in Britain, from the early efforts labelled A and B, through the well-loved Test Card C to the colour patterns of the present day. The story is told by George Hersee, who for many years developed test cards for the BBC. In case you didn't know, it is his daughter Carol who is featured on Test Card F (she's not a little girl any more!) and George spills the beans on how this and many other well-known test cards were designed and made. Included in the presentation are many old test cards you probably haven't seen for years - and quite a few newer ones too, as well as some foreign examples and some which were never seen outside the BBC.

We expect many members (and non-members) will want their own copy of this tape, and the BATC will be arranging its distribution on a cost-only basis, so you will be able to afford it! Watch out for details in the next issue of CQ-TV ...

**New UK  
agent...**  
**see page 17**



VHF COMMUNICATIONS magazine is published four time per year and is available from; Verlag UKW-Berichte, Terry Bittan OHG, Subscription Service, P.O.Box 80, D-8523 Baierdorf, West Germany. Payment at £9.50 may be made by personal cheque or a banker's cheque for DM24.00. Payment may also be made by ACCESS, VISA (and their variations) credit cards.

## **SPECIALIST 'THEME' COLLECTIONS**

VHF COMMUNICATIONS has collected together selected articles on a common topic for the convenience of specialists. One such 'theme' is on amateur television.

There are nine selected articles from VHF COMMUNICATIONS in a blue binder at the very favourable price of;

**DM 29.50 (including postage)**

There are approximately 90 pages of detailed constructional descriptions of all the modules necessary for the construction of a 70cm band, AM-TV transmitter and colour test pattern generator, together with worthwhile information on the subject matter.

This is only one example from a total of 24 theme collections listed in the table below.

Every collection comprises nine to eleven VHF COMMUNICATIONS articles in a blue binder. As well as the subject articles, each collection contains almost 500 pages of interesting publications carefully selected from VHF COMMUNICATIONS.

- |  |   |
|--|---|
| 1. ANTENNAS: Fundamentals                        | 13. HF POWER MEASUREMENTS                       |
| 2. ANTENNAS FOR 2m and 70cm                      | 14. SHORTWAVE AND IF CIRCUITS                   |
| 3. ANTENNAS for 23cm and 13cm                    | 15. MINI RADIO DIRECTION FINDER for 2m and 70cm |
| 4. MICROWAVE ANTENNAS                            | 16. CONVERTERS AND PRE-AMPS FOR 2m and 70cm     |
| 5. AMATEUR TELEVISION (ATV)                      | 17. CONVERTERS AND PRE-AMPS for 23cm and 13cm   |
| 6. CRYSTAL OSCILLATORS: X0's and VX0's           | 18. TRANSVERTERS AND PA's for 2m                |
| 7. VFO's   | 19. TRANSVERTERS AND PA's for 70cm              |
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| 9. RF AND AF FILTERS                             | 21. CIRCUITS FOR 9cm and 6cm                    |
| 10. FREQUENCY COUNTERS AND DIVIDERS              | 22. 10GHz TECHNOLOGY Part-1                     |
| 11. NOISE FIGURE AND NOISE-SPECTRUM MEASUREMENTS | 23. 10GHz TECHNOLOGY Part-2                     |
| 12. SIMPLE TEST EQUIPMENT                        | 24. FM EQUIPMENT FOR 3cm and 1.5cm              |

**BCD ELECTRONIC SERVICES**

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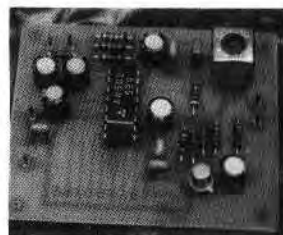
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THIS UNIT BLOCK CONVERTS THE 1.36GHz BAND TO THE DOMESTIC UHF TV  
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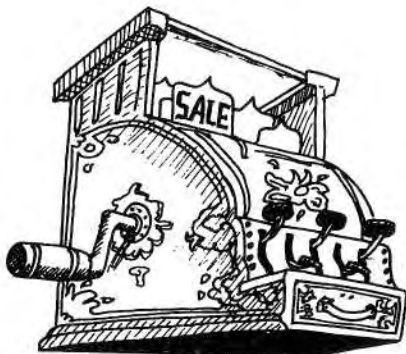
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Copy should be sent to the Editor at 47 Crick Road, Hillmorton, Rugby CV21 4DU. Tel: (0788) 69447 before 20th September.

## FOR SALE

TWO No.10" long persistence ex-RADAR CRT's, information available...£20 each or £35 pair.

Sandy Pimlott G8IDE, 58 Queens Road, West Park, Hr.St. Budeaux, Plymouth, Devon. Tel: (0752) 363607 anytime.

TWO 9" Black & White monitors in a single case, 75-Ohm in/out, PL259 (UHF) connectors...£60 the pair. SCARAB SSTV INTERFACE, also RTTY interface, both with software for BBC computer...£15 each.

Keith Miles G1OTO, 99 Kerrick Road, Mapperley, Nottingham NG3 6EZ. Tel: (0602) 503312.

B&W TV DIGITAL FRAME STORE, 4-bit (16 levels) but possible to mod. for 6-bit (64 levels). Built from ETI magazine September 1986 with commercial PCB. Many features including on-board SPG or external genlock, real-time digitisation, effects, freeze frame etc. Fully working in smart cabinet with all documentation...£80. PAIR OF 70cm ITT STARPHONE HANDPORTABLES, both in perfect working order, in net cases and crystallised for 434.475MHz (simplex). Complete with multi battery charger, (working OK but meter movement U/S), several batteries, RF test adapter jig, RF output monitor detector, one leather case, some spares including filters, UHF inductor assy's, cases etc. Full service manual (copy)...£50. 70cm ATV TRANSMITTER by PC Electronics. 12W+ peak sync output, uses MHW710 power module, supplied as transmitter board and PA module (not cased), c/w sync stretcher and video LP filter if required, circuits and information...£35. MICROWAVE MODULES narrow-band 1296MHz receive converter. 28-30MHz IF, excellent condition having been little used. Earlier version without pre-amplifier...£20. SMART BLUE 19" RACK CABINET, 26" high, on casters, top venting, equipment runners - ideal for TV transmitter installation...£8. Would consider exchanging any of the above for modern video fader/mixer. All items carriage extra or buyers collect.

John Wood G3YQC, 47 Crick Road, Hillmorton, Rugby CV21 4DU. Tel: (0788) 69447.

IBM 5110 COMPUTER, with four 8" disc drives, commercial printer, software, manuals etc., 6-years old and in working order...£250.  
PHILIPS PC2000 PORTABLE COMPUTER with twin 5.25" floppy disc drives, software (including Wordstar, dBase, Communications package etc), manuals, 4-years old...£250.  
Barry Trigger G6IKQ, 2 Stocking Lane, Shennington, Banbury, Oxon OX15 6NF. Tel: (0295) 87684

A LIMITED QUANTITY of Mullard BGY22 hybrid amplifier modules, 300 to 500MHz, 50mW in for 2.5W out at 12v...£20 each.  
Mike Wooding G6IQM, 5 Ware Orchard, Barby, Nr.Rugby CV23 8UF. Tel: (0788) 890365.

AUDIO TAPE OF BRITISH TV STATION IDENTs - BBC, many defunct ITV stations, etc, etc. Supplied on quality C-60 cassette with notes, for £5 post paid. Money back if not satisfied! Please allow two weeks for delivery. Send now to Andy Emmerson, 71 Falcutt Way, Northampton, NN2 8PH.

WOOD & DOUGLAS SCT-2 sound subcarrier transmit modulator - new...£10.  
BACK ISSUES of CQ-TV, No.107 onwards, also VHF Communications magazines. Enquire for your wants.  
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EX-BBC EQUIPMENT: VIDEO distribution amplifiers, type AM4/520, 6dB gain, 6 outputs at 1v into 75-ohms, suitable for colour or mono 625-line. TYPE AM4/519, identical specification but with adjustment for propagation time (preset to 13ns). TYPE AM4/518, 6 outputs, 0dB gain. TYPE AM4/517, as 518 but not quite as good spec. (still broadcast quality though and ideal for amateur use). TYPE AM4/512, 3 outputs, 0dB gain, for coded colour signals on 405/525/625 lines. All amplifiers supplied with data sheets, circuits, servicing and alignment instructions...£8.00 each inc. postage. RGB VIDEO distribution amplifier, really 3 amp's in one module. 3 outputs for each channel, 6dB gain +/- only 0.05dB. One only with data...£15 inc. postage. SAWTOOTH and lift generator, type GE4/506, designed to provide a video test waveform of sawtooth or black level or white level or variable lift, selected by switch on front panel. There are also knobs for sync amplitude and sawtooth amplitude. One only with data...£15 inc. postage. PULSE delay network. Internally adjustable to provide a delay of up to 1.3uS in about 70ns steps. 3 available with data at £5 each or all three for £12 inc. postage. POWER SUPPLY units Type PS2/13F, two separate and isolated 12v DC outputs at 0.5A each, smoothed and regulated to 5mV ripple. One only with data...£5 inc. postage. TYPE PS2/505 to supply -14v at 300mA and +9v at 200mA, ripple less than 0.2mV. One only with data...£5 inc. postage. AUDIO JACKFIELDS, ex-19" racks, row of 20 mounted jacks for £4 inc. postage. Several available, discount if you take 4 or more - please enquire. LOADS of video coax, multicore cable, 19" rack hardware, multicore connectors of many different types, odd switch panels etc. These items are too varied and numerous to list and are being sold at very cheap prices to callers.  
Ken Bailey, c/o KENZEN, 1435 Pershore Road, Stirchley, Birmingham B30 2JL. Tel: 021 472 3688 (answerphone).

HORIZONTAL APERTURE CORRECTOR (Handbook-1 project), built but less delay cable...£7. VISCOUNT 1107 3-input professional vidion mixer, internal/external keying, up to 63 wipe patterns, compact size, with technical handbook and capable of expansion...£250. David Wilson, 7 Massie Close, Willen Park, Milton Keynes, Bucks MK15 9HG. Tel: (0908) 665106.

19" STYLE free-standing case with 5v & 12v PSU and PCBs. Obviously a Z80-based computer, the panels have lots of 74LS chips plus Z80 series in sockets. Back panel fitted with lots of 'D' connectors etc. Also separate keyboard...£10. DISC DRIVES 5.25" half-height, Shugart type should suit BBC etc but no guarantee!...£5 each. VIC20 computer with special VIC disc drive unit. VIC PSU missing so not tested but appears OK...£20. TANDY TRS80 MkII, twin built-in disc drive and monitor plus spare panels...£25. ZX81 COMPUTER...£5. MODEM - acoustic 1200/75...£5. TANDY TRS80 colour computer...£10. Would swap any of the above for old 405-line TV's, old Television magazines, valves, radios etc.

Bob Brookes, Wyche-Way, 43 Tagwell Road, Droitwich, WR9 7AQ or phone (0905) 773345 between 8.00 and 10.00pm for a dignified haggle.

SHIBADEN FF107 viewfinder camera, complete with CCU, DA's, cables, handbook etc...£60. SONY C7-UB Betamax recorder, with tapes...£70. Tony Lawes G3GFM, "Ansdell", Meadow Way, Gt. Bookham, Surrey KT23 3NY. Tel: (0372) 54813.

WRAASE SC1 SSTV converter, frame sequential colour, 24/48 sec, modified for 48/96 quasi mode. B/W 8/16/32 sec, FAX TX/RX, Comp. colour camera snatch - Wraase mod...£550. Eric Cockerill G4GOZ, 6 Richmond Avenue, Barnoldswick, Colne, Lancs BB8 5JB. Tel: (0282) 813530.

SONY AV3620CE video recorder, with tapes and carry case, excellent condition but has a video fault. Also another machine for spares. Any takers? G.W.Brind G4CMU, 26 Grange Meadow, Banstead, Surrey. Tel: (0737) 354497

EMI 2001 spares for sale:- CAMERA PSU chassis, zoom amplifier chassis, remains OCF, focus and zoom preset box, yoke, head amplifiers, box of assorted PCBs, remains of viewfinder, Vol.1 handbook, camera rain cover, lens hoods. Will haggle over prices. BBC PULSE DAs, 8 in rack frame...£16 one. RINTOUL vertical aperture corrector, 1U high...£40. MARCONI sound distribution amplifiers, 3 in 3U rackframe...£15. MARCONI sine squared pulse and bar generator...£15. COX BOX control panel, (matches Cox unit sold at BATC Convention - will purchaser please contact me). PAL DECODER, new production prototype - features:- single chip plus sync separator circuit, 75-ohm RGB and sync outputs, needs 12v dc and a box. 4x6" PCB (has small number of corrected artwork errors) professionally made and in working order...£30.

Paul Marshall Tel: (0522) 703348 or Brian Summers Tel: 01 998 4739.

FERROGRAPH tape recorder, excellent performance, including spares, tapes and manual...£50. PHILIPS LDH51 1" vidicon camera, little used tube and very good picture, including circuit etc...£30. EMI SURVEYOR 1" vidicon camera, with two spare tubes (new), fully working, including circuit etc...£30. HITACHI 9" video monitor, fully working and with good tube, including circuit etc...£30.  
David Elmer, 608 Wollaton Road, Nottingham NG8 2AA. Tel: (0602) 283704.

COMEX TVRO system, video and UHF outputs, S-meter, Polarotor, STS LNB, Scalar feed horn and 1.6 metre GRP dish complete with polar mount...£525 o.n.o.  
P. Staniforth, 10 Hazel Avenue, Skelton Wood, Leeds LS14 2HW. Tel: (0532) 732468.

## WANTED

16mm BELL & HOWELL G.S.A.P. gun camera, 50ft Kodak magazine load, 12-24v operation, W/W-2 ex-government surplus item. ALSO WANTED other 16mm cameras and lenses W.H.Y?  
John GYST, 25 Brecon Close, Melksham, Wiltshire SN12 7RZ. Tel: (0225) 706795

SOLENT MINI FM-TV 24cm transmitter (signal source) wanted.  
Andy Dunham G6OHM, 24 Slade Way, Chatteris, Cambridge PE16 600. Tel: Chatteris 3791 (after 2.30pm).

AD-ONS FOR SPECTRUM wanted. Have 12v solid-state receiver on RB2, Ferguson TX10 audio/video interface, Ferguson TX100 Peritel kit (in/out all modes).  
John Brown G3LPB, 45 Marlborough Avenue, Falmouth, Cornwall TR11 4HS.

OLD CAMERA TUBES, (and similar imaging devices) of various type and age, for collection. Tubes that are not operable, or have burn marks ARE suitable for our use! Please contact either Peter Delaney G8KZG, 6 East View Close, Wargrave, Berks. Tel (073522) 3121 or John Wood G3YQC, 47 Crick Rd, Hillmorton Rugby, Warks CV21 4DU. Tel (0788) 68447

SERVICE MANUAL/CIRCUITS wanted to buy or borrow for the following:- BARCO CM3200 series colour monitor model CM2632. METRIX GX972A colour test signal generator (same as Decca/Korting 82512). All expenses paid.  
David Moore, 13 Whitehill Court, Berkhamsted, Herts HP4 2PS Tel: (04427) 76270

SONY HVS200P effects generator with HVM100CE matching camera. WG16 waveguide to N-type transition. HEWLETT PACKARD 478A thermistor mount and cable for HP432A power meter.  
Paul Bruchel G8FNA, Old Smithy, Morwenstow, Bude, Cornwall EX23 9SG. Tel: (028 883) 522.

405-LINE camera wanted. Prefer with RF modulator and built-in SPG but W.H.Y?

Dave G1UEF, 55 Jenner Road, London N16 7RB. Could collect.

9" or 10" ROUND CRT wanted to fit 1950's TV, also valve equipment or bits, indicator unit, No.19 set? Will collect from your attic!

Bob Brookes, Wyche-Way, 43 Tagwell Road, Droitwich, WR9 7AQ or phone (0905) 773345 between 8.00 and 10.00pm

CIRCUIT DIAGRAM, service manual or any information on JVC portable colour VTR model PV4800E. INFORMATION AND CIRCUITRY whereby I can separate R,G,B and sync from a composite colour camera output - all help welcome, all expenses paid.

Mike North EI7CL, 135 Downpatrick Road, Dublin 12. Tel: 01/54 22 63 (after 1800Hrs).

MAINS ADAPTOR for National Panasonic WV3085 B&W video camera.

J. McCormack, Holt Cottage, Dene Road, Didsbury, Manchester M20 8ST. Tel: 061 445 9482.

INSTRUCTION and service manuals for Olympus tuner/timer VR-202 and portable VCR VC-101, to buy or borrow.

Chris Maxwell G8MKT, 24 Jensen, Tamworth, Staffs B77 2RH. Tel: (0827) 285949

NTSC/PAL TRANSCODER wanted. Telephone Mr. Hofling and reverse the charges. Call: AUSTRALIA (area code 89) Tel: 276747.

PULSE & BAR test generator in working order wanted.

David Elmer, 608 Wollaton Road, Nottingham NG8 2AA. Tel: (0602) 283704.

SONY KV1810 receiver/monitor wanted, any condition considered, complete or otherwise. Am looking for the 'P.R.' PCB and the 'V.H.' PCB. W.H.Y?

George Mayo G4EUF, 'Carlton House', Broad Lane, Markfield, Leics. LE6 0TB. Tel: (0530) 242378.

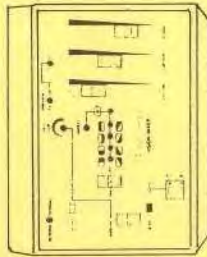
ROBOT 1200 or any other SSTV equipment wanted.

Brian Robinson G4ZEK, 9 Stammers Road, Colchester, Essex Tel: (0206) 851343

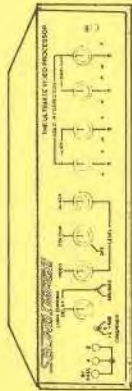


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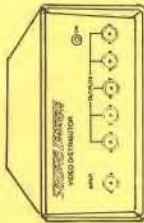
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**Vision Mixer**  
A+B, Key, Caption  
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Inputs with at  
least 30 Effects  
£199 + £2.50 p&p Total £201.50



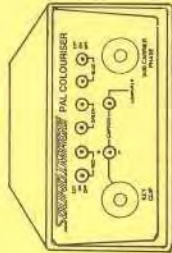
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