

# CQ-TV

MAGAZINE  
No. 127

BRITISH AMATEUR TELEVISION CLUB

AUGUST 1984



*CONVENTION REPORT*

**VISION**  
IN THE STUDIO

Largest issue  
**EVER!**

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PLEASE NOTE: If, when writing to a committee member, a reply is required, please enclose a stamped addressed envelope or, in the case of an overseas member, an International Reply Coupon.

## MEMBERSHIP

FULL YEAR: £4 or £1 for each remaining quarter of the year. All subscriptions fall due on the first of January.  
OVERSEAS MEMBERS are asked to send cheques bearing the name of the bankers London agent. Postage stamps are not acceptable as payment.

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.

The British Amateur Television Club is affiliated to the Radio Society of Great Britain.



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CLOSE FOR PRESS DATE FOR THE NOVEMBER ISSUE.....20th September 1984

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# EDITORS POSTBAG

Dear Ed,

I am a new subscriber to your excellent magazine and was particularly interested in the review in issue 125 of the SSTV converter design from G3WCY by G3LPB.

I have recently completed the convertor and can confirm John Brown's opinion that it is an excellent introduction at a very reasonable price to SSTV. Unfortunately, during the construction of my unit, I made some expensive blunders! I use a small portable TV as a monitor and, during attempts to connect the output directly to the video driver stage, I somehow managed to inject about 100v dc. which several of the IC's didn't like at all!

However all is now well and SSTV pictures are coming thick and fast. I would certainly echo the comments made by G8PTH regarding ignorance of band-plans, or maybe it's a 'don't care' attitude. It certainly spoils a lot of fun. What about printing a "dirty list" of those offenders who persistently ignore requests to move over from the SSTV (and other band plan calling frequencies?)

I hope to get my G4 ticket sometime this year and will sit the exam here in Munich - it's a little cheaper than England and easier to obtain an appointment.

More articles on 23cm would be welcome, especially aeriels.\*

Allan Sancto DD5FM (ex G6BWH).  
West Germany.

\* Your wish is my command - see aerial articles in this issue. ED.

Dear ED,

I am just finishing off a new slow-scan system, consisting of a home-built camera (working), a fast-to-slow converter ("Amateur Television" design), slow to fast converter (G3WCY design) and a pattern/frequency generator (G8CGK design - working). Although circumstances prevent me from operating from my digs here, I am frequently operating from 4U1ITU in Geneva, and hope to put my system on the HF bands from there. As far as I know, this has not been done before, so it should excite the country chasers.

Geoff Grayer G3NAQ/HB9APY

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## NEWS ROUNDUP

### CABINET RE-SHUFFLE!

Our Chairman: Mike Crampton G8DLX has recently had a partial re-shuffle within the committee. Following the retirement of Arthur Rix, Brian Summers G8GQS takes over as club Treasurer. The vacant Membership Secretary space is being filled by Dave Lawton G8ANO with assistance from Ian Pawson G8IQU. Tom Mitchell G3LMX is to take over much of the organisation of rallies, exhibitions and shows etc., and CQ-TV mailing is now being handled by George Mayo G8EUF.



## TV REPEATERS

It seems that the bug has bitten. There are several groups known to be considering ATV repeater projects in the foreseeable future.

Two groups have been in touch recently so, if any one is interested in helping in a TV repeater project in Central Scotland, would they please contact:

Norrie Macdonald at 3 Townhill Road, Earnock Estate, Hamilton, Lanarkshire ML3 9UX - tel: 0698 423121 or, anyone for a repeater in Yorkshire please contact: Dave Long G3PTU at 70 Carr Hill Road, Upper Cumberworth, Huddersfield, West Yorkshire - tel: 0484 606506. An agreed site already exists for this one - on top of the Emley Moor TV tower!

## NEW GEAR FOR 24

It was particularly apparent at the BATC convention that an increasing number of firms are catering for the 1.3GHz band.

I particularly noticed JVL ELECTRONICS of 26 Fernhurst Close, Hayling Island, Hampshire PO11 0DT who are at present into aerials and filters. One could hardly fail to see the huge quad loop Yagi on show although smaller models are also made. Other products planned or in production are Alford Slots, filters and aerials for 13cm as well as 10GHz Image Recovery Mixers. It is also worth noting that JVL has semi-rigid coaxial cable available at £1.50 per foot.

SOLENT SCIENTIFIC of 75 Chalk Hill, Southampton has available a UHF FM-TV receiver. This is fully tunable over the domestic UHF TV band and has many advanced features.

Available as a kit or ready built this receiver certainly performed well at the show. A companion 24cm ATV converter is also available as is a 23/24cm FM-TV micro transmitter delivering 10mW out, ideal as a hand portable or driver rig.

## SSTV SYSTEMS

Two computer interface boards for SSTV have recently come to my notice.

The G3LIV and G8UEE board is for receive only using the BBC micro. The board which has just 9 ICs derives its power from the micro via the user port lead, this makes it very convenient to use. Available as a PCB and cassette for self-build or as a finished unit this is a very easy way of getting onto SSTV for BBC micro owners. S.Melvin G8UEE, 2 Salters Court, Gosforth, Newcastle, Tyne & Wear.

AMTEC ELECTRONICS of 25 Wychwood Avenue, Luton LU2 7HT has available a SSTV transceiver system for the 48k Spectrum. This plug-in unit provides full transmit and receive facilities and is available as a ready built unit.

Please include a SAE when requesting details from any of the above companies.

## ATV COLUMNIST WANTED

Feel like earning a bit extra to pay for the 24cm gear. Well, if you have a talent for writing and feel able to commit yourself to a monthly or bi-monthly ATV column, Jim Chalmers, Editor of "Amateur Radio" magazine would very much like to hear from you.

Contact: Jim Chalmers, Sovereign Publications, Sovereign House, Brentwood, Essex CM14 4SE. Tel: 0277 219876

## CQ-TV126 VERTICAL SYNC PROCESSOR

A small slip-up in the above article has been reported: TR3, although drawn correctly as a PNP transistor, should have been marked as a 2N3906 and not as shown. This error was perpetuated from the original A5 mag. article. All the NPN transistors can be 2N3904.

#### A MEMBER IN DISTRESS.....

I have recently bought a LINX personal computer. I would like to be able to generate a set of colour bars on this machine. Having tried the BBC program in CQ-TV 124 I found that my machine wouldn't recognise the GCOL keyword. Does any member know what the corresponding instruction on the Linx would be? I would also like to find a program which generates patterns and testcards, any offers?

Marios E. Colocassides.  
79D Digenis Akritas Avenue,  
P.O.Box 2139,  
Nicosia,  
CYPRUS.

#### AND ANOTHER!

Peter Young Lam Kwong, our newest member in Hong Kong, has written to say that there is a bit of a shortage of like minded enthusiasts in that part of the world. Would anyone in: Hong Kong, Taiwan, Korea, Singapore, Malaysia, the Philipines, Indonesia or anywhere else in the 'area' who is interested in ATV or colour SSTV please contact Peter. He would be happy to hear from them. Peter would also like to hear from anyone who can help him to use his 48k Apple II micro for SSTV.

Mr. Peter Young Lam Kwong,  
385 Nathan Road,  
Ping On Building,  
15th Floor,  
Block 2,  
Kowloon,  
Hong Kong.

#### PLL FM-TV DEMODULATOR

There's at it again! I have received yet more suggestions to improve the performance of the NE564 type FM-TV demodulators featured in various configurations over the last few issues.

The 8.2k resistor at pin 14 of the NE564 may have a 100pF capacitor wired in parallel with it in order

to considerably improve the chroma. This applies to ALL the published circuits.

Designs such as the one in CQ-TV119 (pp39) which use a bipolar transistor amplifier immediately before the NE564 should have the 100-ohm collector load resistor increased to around 1.5k to obtain more gain.

The circuits in both CQ-TV119 and CQ-TV122 (BATC PCB design) should have the 75-ohm resistor (R26) in parallel with the sound series trap removed. This prevents the previous transistor from drawing excessive current but does not seem to effect the performance of the de-emphasis network.

I am grateful to G3VZV for passing on these tips. Perhaps someone would like to produce the 'definitive' version of this popular demodulator incorporating the best of the mods published - so far!

#### CQ-TV

Many thanks to all those who have sent contributions to the magazine. Believe it or not I have so much material that some articles have had to be held over till the next issue.

If your piece is not in this one, don't despair.

No that doesn't mean that I don't want any more! Please keep sending it in. The more the better.

At last I am getting some SSTV articles. How about some practical items and some pictures chaps.

Owing to pressure on space this time, the next part of 'Coaxial Connectors' - dealing with SMB,C and D types - has had to be held over.

Having said all that there is possibly no excuse for keeping the magazine to its normal page count. I agree. You will no doubt have noticed that this issue is even bigger and it is certainly the largest issue of CQ-TV ever.

Perhaps I should call it 'Handbook-3!'

## BATC IN HOLLAND

The BATC are to send four representatives to the National VHF Convention in Holland later this year.

The representatives will not only represent amateur TV on the club stand but will be available for talks as well. They will take a considerable amount of club paraphernalia with them and hope to help revive ATV in that country. The event will be reported in the next issue.

## COPY TYPIST WANTED

As you know the BATC produces handbooks and literature from time to time in order to help its members. Obviously this requires a considerable amount of work and we are looking for some members to help on the production side.

If you feel you could lend a hand and particularly if you have a BBC micro, Trevor Brown would be very pleased to hear from you.

The most immediate requirement is for some copy typists to enter text into a BBC micro using either 'Wordwise' or 'View' word processing systems. The workload would not be very large, especially if it were spread through several people.

If necessary, the club may be able to assist serious members with word processing software.

Please contact Trevor Brown G8CJS, 25 Gainsbro Drive, Adel, Leeds LS16 7PF

## PRESTEL

pages 7 and 54 of the last issue gave the BATC Prestel number as: 8008 2002. This number was a temporary one and has now been superseded by the club's own number: 8008 20020.

We apologise to members for the delay in starting the service proper. We are waiting for Paul Elliott to go on the one-day Prestel course in order to be able to directly input information. The service will come 'on-line' as soon as the necessary arrangements can be made.

## SUMMERFUN CONTEST 1984

It seems that a small error crept into the rules published in CQ-TV 125 (pp 30). It was stated that logs should be mailed not later than June 30th. This should have read May 30th. This gives time for the results to be announced in the following magazine.

Our apologies to anyone who missed out thinking they still had plenty of time. Never mind, there's always the 'International' in September!

## VIDEO FILTERS

A range of filters have recently become available covering all current requirements for both analogue and digital TV processing. The range includes luminance low-pass, chrominance low-pass, luminance/chrominance YUV filter combinations, subcarrier band pass and band stop which are available either in PAL or NTSC. Barr & Stroud Ltd., Melrose House, 4 Savile Row, London W1X 1AF

## NEW NBTVA PRESIDENT

At the 10th annual convention of the Narrow Band Television Association, held at Nottingham on Sunday 29th April 1984, Mr. T.H. (Tony) Bridgewater, the veteran TV engineer who started his career with the Baird company before moving to the BBC, was unanimously elected President for 1984/5.

The outgoing President: Mr. A Meijer, (Holland) was thanked for his work on behalf of the association.

## CQ-TV CLOSING DATE

Would members and advertisers please ensure that ALL copy is with me on or before the closing date printed at the bottom of the 'contents' page in each issue. I quite often get late items and, owing to the short amount of time available between closing and printing, it is certain that I would not be able to get it in in time.

# MODIFICATIONS TO THE G3WCY SSTV SCAN-CONVERTER

By Peter Asquith G4ENA

This article is concerned with the G3WCY slow scan TV system described in Radio Communication magazine for February 1983. Printed circuit boards for that project are available from BATC 'Members Services'.

The design used by G3WCY is a very old one with contributions from both Japan and New Zealand made over the years. The 'WCY version suffers from several problems, the solutions to which are detailed below together with further developments. The sections covered are as follows:-

- A) Frequency to voltage conversion.
- B) Stripe Blanking
- C) Adding memory for colour.
- D) Width control & line sequential colour p.c.b.

## A. FREQUENCY TO VOLTAGE CONVERSION

The existing f-v's convert the incoming frequency to an analogue voltage by passing a limited (square-wave) signal through an active filter to develop an output voltage proportional to frequency. The linearity is dependant on the slope of the filter over the 1.5 to 2.3KHz passband. This voltage is then rectified to drive an Analogue to Digital converter. To remove ripple, much filtering has to be included after the rectifier.

The filtering reduces the response time of the analogue voltage for a given step change in input frequency. Blurring of the picture has to be traded for ripple should a noise-free grey level be required.

The circuit in Fig.1 overcomes this filtering dilemma. It operates on the maximum possible information available at the input, this is the time period between each half-cycle of the sine wave signal.

## CIRCUIT OPERATION

Start with analogue switches in the positions shown.

1C1a is a 3-pole filter which removes unwanted noise above 2.3KHz. 1C1b limits the sine wave and through TR1 generates the timing signal for the analogue switches. TR2 is turned on and a constant current flows into Ca. Ca is first discharged by a short pulse applied to the base of TR4 clamping its collector to 0v, discharging Ca. The voltage on Ca ramps up until the timing signal for the analogue switches changes state. The voltage reached is stored, buffered by 1C1c and fed to the output amplifier 1C1d.





During the memory period (next half cycle) the above process is repeated for Cb. Therefore the output voltage of IC1c represents the half cycle time period of the input signal, being updated every half cycle. This voltage obeys  $1/f$  law so TR6 applies some linearity correction.

IC1d scales the span and zero before driving the A - D converter in the existing scan converter.

RV1 adjusts the constant current charge to Ca and Cb and is set to give zero ripple at the output for a steady input frequency. It is best set at 1.5KHz. The switched capacitor around IC1d reduces noise when receiving a SSTV picture plus QRM.

## B. STRIPE BLANKING

The received picture displays stripes both top and bottom of the slow scan frame. These are due to the short periods when the column counter isn't working. When reaching 128 the counter resets thus displaying the top line of the picture as stripes.

The 'clear' signal to IC28 (pin 12) can be used to blank the display during the waiting periods created by the fast scan timing signals. The 470-ohm variable resistor controls the blanking voltage and must be set to the black level. An oscilloscope is the easiest way to set it correctly. If too low a blanking voltage is applied, then there will be sync problems.

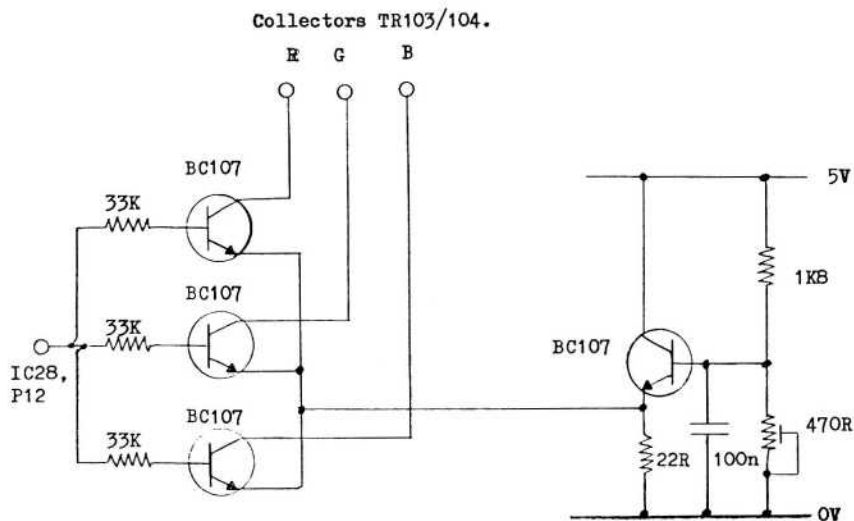
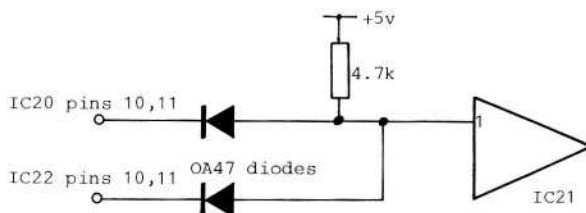


Fig.2

G4ENA STRIPE BLANKING

(Although not part of G4ENA's article, another method of stripe blanking has been received by the Editor and it seems appropriate to include it here.)

The G8KZG method for stripe blanking is to break the connection to IC21 pin 1, joining the cut tracks with an insulated wire link. The now isolated pin 1 is connected as below.



The two diodes and resistor may be quite easily wired to the back of the board.

### C. ADDING MEMORY FOR COLOUR

The solution suggested by G3WCY to receive colour by using three digital boards suffers several problems:

1. Each line length needs to be equal.
2. Each frame position exactly superimposed on the others.
3. High power consumption due to repetitive, redundant, circuitry.

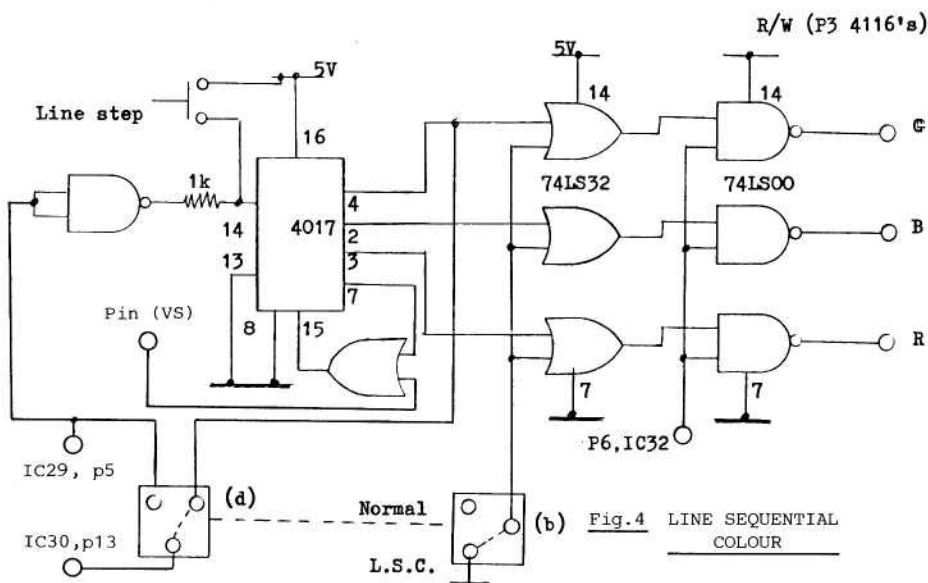
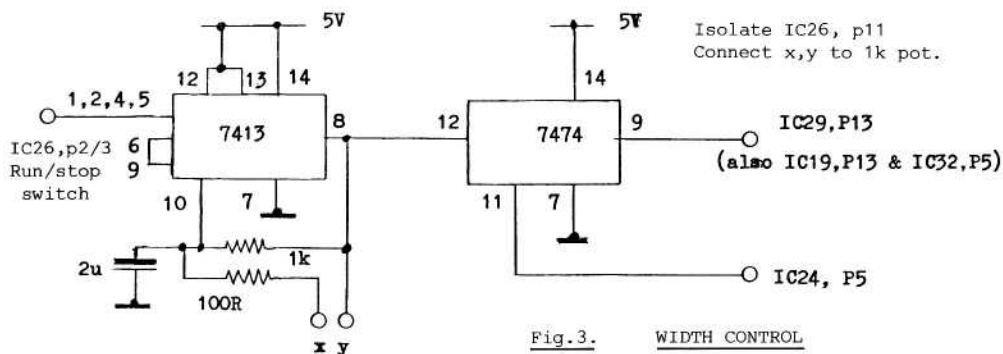
Warm-up drift and overheating prevented ease of operation. By just adding the two extra memories all of these drawbacks are eliminated producing a clear, perfectly registered colour picture.

The memory board is a copy of the existing memory circuit which can be mounted in multiples directly above the digital board to provide additional black/white or Red, Green and Blue memories for colour reception.

### D. WIDTH CONTROL & LINE SEQUENTIAL COLOUR PCB.

The width control permits the full memory map to be used when receiving SSTV. The existing design only utilises the complete memory when receiving 60Hz generated pictures.

The line sequential colour reception circuit selects each of three memories in turn and loads the respective colour line into its memory, thereby taking 21 seconds to complete a frame. The R.G.B. frames can then be displayed on a R.G.B. monitor. Several suitable conversions for domestic TV's have been published recently in this and other journals.



#### MODIFICATION INSTRUCTIONS

1. Break track from IC32, pin1. (Drives the read/write I/P's 4116's)
2. Break track connecting IC30, pin13 at IC30
3. The push button is only a trial method of line stopping.

(Editors note)

Although G4ENA has prepared printed circuit board artwork for all but the stripe blanking circuit, he is not in a position to sell boards. If there were sufficient demand from members the BATC would be prepared to have these made. If you would like to purchase boards for the above article, please write to Peter Delaney (Members Services) as soon as possible. Please DO NOT send any money at this time.

# BATC 1984 CONVENTION

By John Hirons G6TGT

The club's 17th ATV convention was held this year at a new venue - the Post House hotel near Rugby. The event took place on Sunday May 13th in fine weather, although with a cold wind which nevertheless did little to deter the outside exhibitors.

Having been let down at the last minute by several traders and exhibitors, the larger space was still well filled with interesting goings on. Fortop were there with all their products including several new modules for those wishing to assemble their own gear. This is a departure from Fortop's usual 'finished' products and seems to be finding favour with many. Their latest version TVT1300 1.3GHz FM-TV transmitter drew a lot of interest. A frequency locked 420MHz source which is amplified and tripled in a separate unit (the 1300A) provides a total output of around 10W at 24cm. The units are available separately.

Wood & Douglas displayed their not inconsiderable range of kits and modules, all concerned with UHF and microwave both narrow and wide-band modes. A new 28-page bound catalogue describes the products very nicely and makes the selection of units for particular purposes much easier. The full range of 70cm AM-TV and 24cm/microwave FM-TV products were on show including a 400/1200MHz varactor tripler and a new 1250MHz ATV down converter with a 50MHz IF, suitable for use with their FM IF board. An excellent display as always.



Solent Scientific's 24cm FM-TV handy portable, beautifully shown off by Yvonne Latham of Solent.



GBVBC (C.Right) examines a new piece of 24cm gear on the FORTOP stand. Looking on are Jim McLaverty (R) and the two Steves.

Solent Scientific - a small company new to the ATV scene - showed off their 24cm ATV modular receive system together with a super little 24cm FM-TV transmitter. This may be used either as a 'walk around' portable unit or as the prime mover for feeding larger power amplifiers. The unit certainly worked well as demonstrated by Yvonne who prowled around the exhibition halls sending live pictures back to the stand. (see photograph).

The Worthy Worthing and district team were there with demonstrations from their new ATV repeater. A nice range of ATV related computer software for



GBXEU (L) and G4WTV doing sterling work on the Worthing Repeater Group stand.



Davtrend Ltd demonstrate their new DRAE SSTV system.



G3JVL holds the remarkable long 1.3GHz Q.L.Yagi on the JVL Electronics stand.

the Sinclair Spectrum was being demonstrated and marketed. The nice thing about this stand was that all the proceeds were going to the GB3VR repeater project.

R Withers Communications had a good range of gear on show and it was nice to see the sensible prices. On the stand were some 24cm ATV converters from the CQ-Centre. These were discussed briefly on page 4 of the last CQ-TV. It is nice to see that they actually do exist although little is yet known about their performance.

DRAE - Davtrend Ltd, already well known for their power supplies introduced a new SSTV system which is to be available shortly. The pictures from the unit on display were certainly of excellent quality.

The Microwave committee were represented in the form of JVL Electronics. Mike Walters G3JVL, had some impressive quad loop Yagis for both 24 and 13cm on show. The photograph shows Mike holding an enormous QLY for 24 - although shorter versions are available! The products so far seem to be of very high quality and JVL Electronics will in the future, i'm sure, play a significant part in the future of microwave ATV.

The Narrow Band TV Association had a good display as usual and - always to be relied upon - Jeremy Jago had on show a near-completed 32-line mirror drive NBTV camera. Good demonstrations are always available on this stand which makes it so interesting even to us fast-scanners.

A static display of the Sandpiper Communications 24cm Helical aerial drew considerable interest since this is the first commercially available, truly wideband aerial available for that band.

ALL PHOTOGRAPHS BY G3KXK



PLM Communications were there with lots of secondhand gear and components, as was Stephen Daniels. Some nice bargains in cameras and monitors were to be had here.

The BATC stand was located in the reception area adjacent to all the rooms and facilities. Most of the committee were there and members were able to meet them in very comfortable surroundings.

Brian Parkin G1EGD had a super static display showing his home-brew model helicopter, complete with its 22cc engine, loaded up with a miniature TV camera and 70cm transmitter. Brian has yet to take to the air with the model fully laden but says it should be flying at the next BATC show.

G3ZUD and friends showed off some gear including a nice looking wire-mesh microwave dish aerial for 1.3. The photo shows 'ZUD complete with warm coat (he was the unfortunate near to the door in full blast of the aforementioned cold wind!)

Attracting great interest in the main hall was a colour studio camera. Tracing the cable outside it led of course to Brian Summers' outside broadcast van, now modified for complete colour operation. This van gives many people their first chance to see inside an OB unit.

Outside were the usual clutch of members displaying and selling their wares, always a very popular part of BATC shows.

A fine setting, fine weather, fine exhibits and super facilities proved to be the ingredients of a most enjoyable day out. It can perhaps be summed up in the words of one member: "Why hasn't the show always been held here and how long till the next one?"

Grateful thanks to the organisers especially Paul Elliott, Trevor Brown and Mike Crampton.



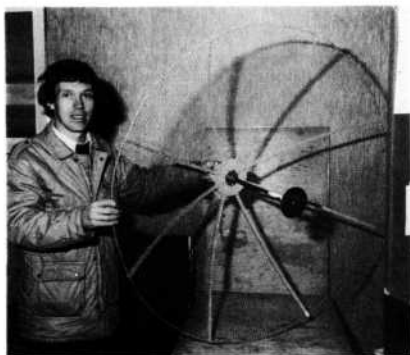
Jeremy Jago demonstrates his 32-line mirror drum camera on the NBTVA stand.



A birds eye view of the BATC stand peddling its wares and dispensing help and advice.



Brian Parkin G1EGD adjusts the focus on his helicopter-borne TV camera.



G3ZUD shows-off his home made 1.3GHz dish aerial



Picking over the 'goodies' in the outside 'flea market'. Why do the girls always look bored?



Fred Starkey of Wood & Douglas points out the features of a new module to G8DIR.



"Hmm... very interesting. Think I'll wait for the last minute reductions."

## MOONBOUNCE ON 24?

F9CH and F6BGR are to attempt a world first in ATV on 1255 MHz moonbounce. With the kind permission of Electricite de France they will use a 10,000 square metres antenna with a calculated gain of 90dB and run 140 watts FM. The antenna is in fact the plane metal reflector of the experimental solar oven near Font Romeu (East Pyrennees) with the dipole in front of the crucible. The solar oven's computer will be programmed to follow the moon instead of the sun. The tests are scheduled to take place between July 9th and July 13th. At that time the moon will be low enough on the horizon (20 to 24 degrees at the meridian) to allow stations to aim the antenna without the need for an elevation rotator. Further information will be carried on the repeaters, on 144.170 +/- 10kHz and on 3670 +/- 10kHz. The above information was received through the kindness of BATC member Maurice F1FVX. The event is due to occur after CQ-TV goes to press but we hope to carry the results on the BATC Newslines (0533-600108), which is always worth a call in any case.

# A 24CM COLINEAR AERIAL

by Roy Humphreys G4WTV

This aerial was demonstrated by its designers at the 1983 Brighton Rally, and we are grateful to Martin Newell G8KOE and Nick Osborne G4JEI for permission to publish this article. A novel feature is the use of a new type of balun transformer using printed stripline technology.

## SIX ELEMENT COLINEAR AERIAL

The aerial comprises six half-wave elements mounted before six reflectors. The construction, dimensions and materials used are given in fig.1. The three pairs of elements are end-fed at high impedance and are cross-wise connected by means of 1.55mm diameter (14 AWG) silver-plated copper wire as shown in fig.1. Since the impedance of each individual half-wave element amounts to approximately 600-700 ohms with this ratio of element thickness to length, an impedance of approximately 200-240 ohms will be present after interconnecting all three pairs of elements. The balanced 200-240 ohms is then transformed to an unbalanced 50-60 ohms in a 4:1 balun transformer, which is connected to the centre pair of elements and is built up using stripline technology in the following manner:-

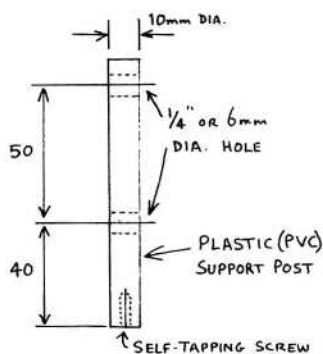
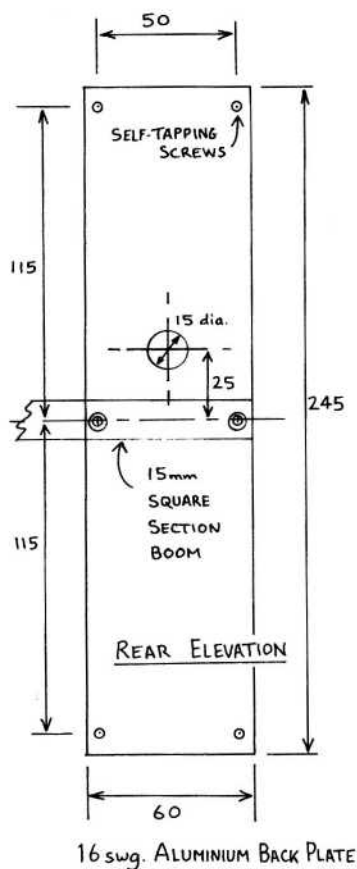
## STRIPLINE BALUN TRANSFORMER

Normally, a balun transformer consists of an electrical half-wave length of co-axial cable. Since such a cable for 24cm would be only 8-9cm in length according to the dielectric used, difficulties can be encountered with conventional cables as it is not possible to bend them in a loop. This means that very thin cable should be used, and only cable with Teflon (PTFE) dielectric provides sufficient stability and low attenuation characteristics. In order to avoid these difficulties, a stripline balun was developed for use with the aerial. The printed circuit board for the balun consists of a U-shaped half-wave 50-ohm stripline, as shown in fig.2. The line shown has a width of 2.5mm and is designed for use with an epoxy glass fibre material with  $\epsilon_r = 5$  and a thickness of 1.5mm. Connection to the centre elements is made with short pieces of 1.5mm diameter silver-plated copper wire. Fig.3 and the photograph show how the low-loss co-axial feeder should be connected to the balun.

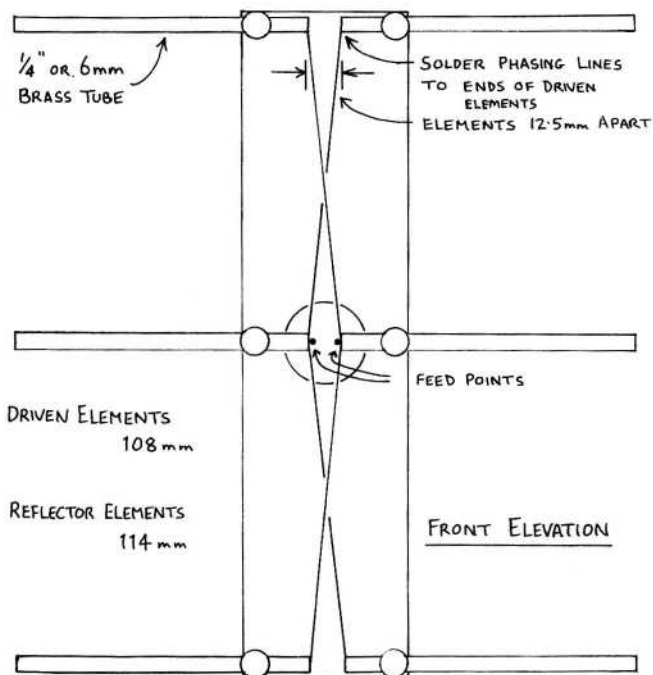
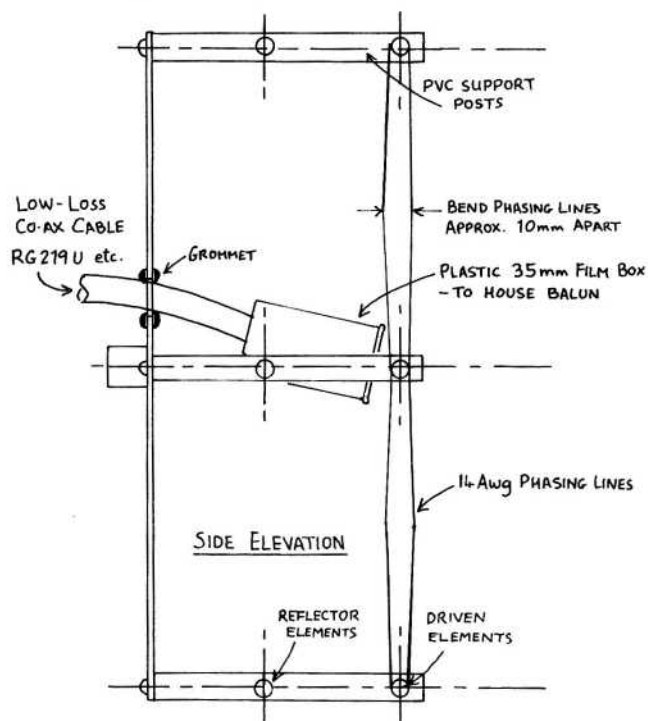
According to measurements made by G8KOE and G4JEI, the aerial described possesses a gain of approximately 10dB over a reference dipole and a horizontal beam width (-3 dB) of 60 degrees. The reflection factor of the aerial when using the stripline balun was acceptable over the whole of the 23cm and 24cm amateur band.

## CONCLUSIONS

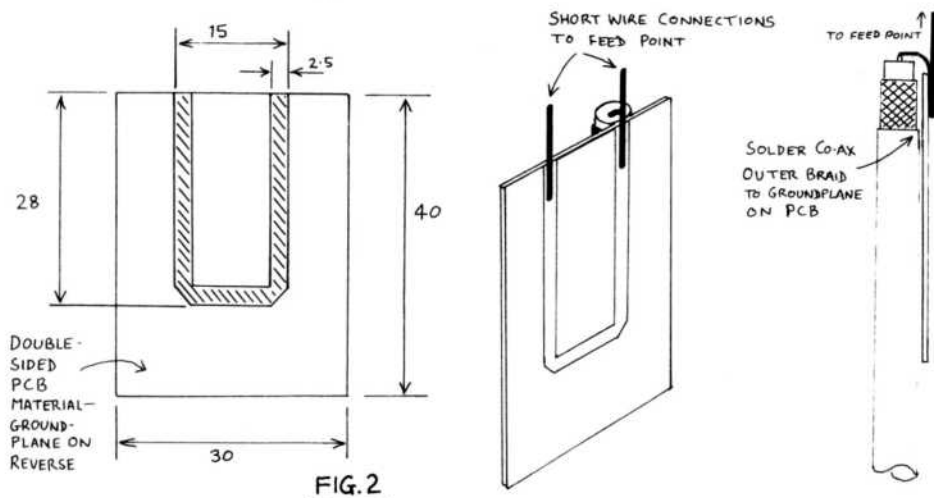
Since the bandwidth of the aerial is greater than that of the 24cm amateur band, it is eminently suitable for ATV transmissions. Aerials of this design have been in use in Worthing and Brighton for some while now, and transmissions at 1235 MHz and 1318 MHz between Worthing and Brighton with power levels of 10W into a varactor multiplier have resulted in P5 pictures. Also pictures from F3YX have been received by the writer at P4 from Paris and F3LP from LeHavre at P3. Indeed, even TV pictures in Band V are received at good strength.



**FIG. 1**



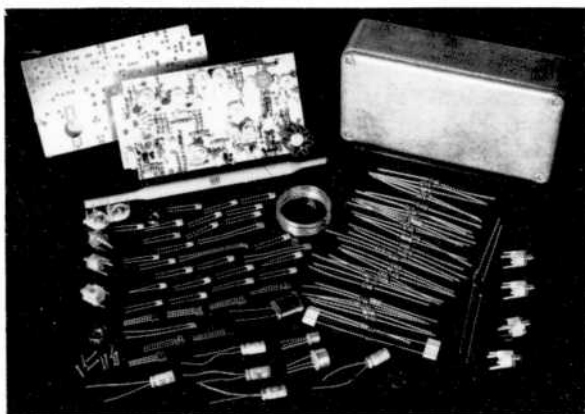
Since Yagi aerials have narrower bandwidth, this colinear is extremely useful for transmitting to and receiving from ATV repeaters. Compared with a conventional Yagi aerial, the picture grade received with this design is approximately P1 - P1.5 down.



## FORTOP TV TRANSMITTER KIT

If you read the back cover of your CQ-TV (and if not, why not?) you will have seen the advertisements for Fortop's new transmitter kit. Well, this is what it looks like ... you get all components to build a 250mW video transmitter, including a crystal to put you on 437 MHz, away from the FM repeaters. You just add connectors and paint.

A nice touch is the genuine Radiospares twiddling stick: as well as tweaking capacitors it also serves as a former for winding the two sizes of coil used in the transmitter! A well designed product, incorporating an extremely nice sync clamp circuit which ensures that your signal is fully modulated by the syncs at all times. Price 134.45 including post and packing (see Fortop advertisements).





# CONTEST NEWS

## SUMMER FUN CONTEST - MAY 84 RESULTS

The results of this contest are shown below and congratulations to the Bristol TV Group for their win over G8DIR and G4CRJ. It is interesting to note that these 3 stations were located in Wiltshire, Shropshire and Buckinghamshire respectively, and that we also had entries from the Sheffield area and also of course from GM4BVU, with 2 other stations at least operating portable in Scotland. All this activity outside the South East corner is particularly pleasing to see.

Generally both the radio and weather conditions were described as average to awful but most entrants seemed to enjoy themselves. One particularly interesting observation was received from G8MNY in that he finds that a narrow band sound receiver and also a narrow band width (1 Mhz) TV Receiver are a great help for finding and resolving the weaker stations particularly in the presence of local QRM.

### DATE FOR THE DIARY

The winter cumulatives will be held on the following 4 nights early in the New Year.

Jan 17 & 25 - Feb 2 & 10. 1985

Will all other contest and events organisers please note so as to avoid clashes.

<u>POSITION</u>	<u>CALLSIGN</u>	<u>CONTACTS</u>	<u>LOCATOR</u>	<u>PWR</u>	<u>ANT</u>	<u>DX</u>
1	G8GLQ/P	20/2577	YL70a	100	MBM88	G8MNY-143K
2	G8DIR/P	16/2338	YM48f	40	P18	G4JQP-134K
3	G4CRJ	20/2073	ZL37h	150	MBM88	G6MPE-98K
4	G4RNA	18/1501	ZN43b	-	-	G4RPD-112K
5	G8MNY	18/1244	ZL60a	150	19T	G8GLQ/P-140K
6	G5KN/P	12/1154	ZM54j	40	21T	G60HM-96K
7	G8WBO/P	13/714	YK10a	20	14	G8CA1P-70K
8	G6CEZ	14/636	YK10a	10	MBM28	G4JQP-56K
9	GM4BVU	16/550	XP20e	60	MBM88	GM3RVK-89K
10	G4VTD	12/546	ZL50d	100	19T	G4VAT/A-56K
11	G8VPG	6/210	YL58C	10	19T	G8GLQ/P-33K
12	G4LDR/P	3/118	YL80e	1	HB9CV	G8CMQ-51K

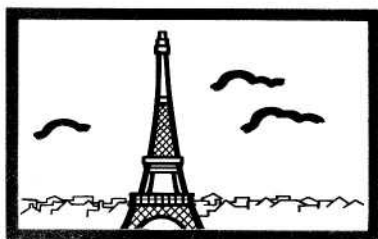
Check Log G4VLK - ZN64C - Thanks !

### 23/24CMS

1	G4CRJ	2/592	ZL37h	0.01/FM	JVL	G8LES-78K
2	G4VTD	1/152	ZL49e	2/FM	F9FT	G8LES-19K

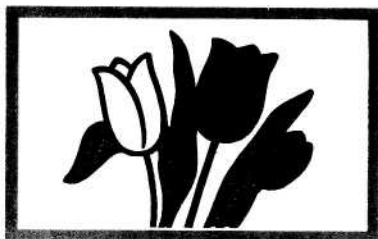


GERMANY



FRANCE

## ***INTERNATIONAL ATV CONTEST 1984***



HOLLAND

### SECTION A: TRANSMIT/RECEIVE STATIONS.

DATE: 8/9th September 1984

TIME: 1800gmt Saturday - 1200gmt Sunday

BANDS: 432, 1260, 10,000MHz

SCORING: 2 points per kilometre for each two-way QSO . 1 point per kilometre for each one-way QSO.

#### EXCHANGES:

- 1) Code group consisting of four non-sequential digits individually chosen by each entrant, eg: 1865 or 9732. THIS CODE GROUP MUST BE EXCHANGED ON VIDEO ONLY.
- 2) Call, QTH locator, report, serial number starting at 001. This data is to be exchanged via video or, if necessary, by sound.

ENTRIES: Must include log sheets recording all the above information together with your full postal address, locator, code-group used and station details and be mailed not later than 30th September 1984 to: G.Shirville G3VZV. 18 Church End, Milton Bryan, Milton Keynes, Bucks MK17 9HR.

NOTES. Multi-operator stations may only use one callsign. QSO's via repeaters do not count. Please keep ALL video transmissions as brief as possible and QSY from the calling channels when contact has been established.

### SECTION B: RECEIVE ONLY STATIONS.

The same rules are applied as above. Please note; entrants in section B may not "give" points to those in section A.

# BRIGHTEN UP YOUR IMAGE

## Part 3



### gm4bvuv calling

By Norrie Macdonald GM4BVU

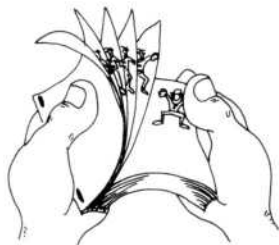
If you were to read "Moviemaker" magazine(1) - billed as 'the video and cine monthly', - a constant dialogue seems to take place in the letters column about cine-v-video. Now we must view this from a somewhat unique standpoint, as unlike "cine buffs" we can actually radiate our productions, and not rely on a projector and screen.

The two main advantages of working with movie film are:-

- 1) The film camera is much more portable than the VCR/Camera described as "portable" in the video magazines; "transportable" yes!!! Maybe the VHS-C and much heralded 8mm video standard will more evenly match cine and video.
- 2) Film provides total editing flexibility, productions of quality.

Now this series is not an in-depth guide to actual programme preparation, the libraries are filled with good books on that subject such as 'The All-in-one Cine Book' by Paul Petzold and 'Cine-Craft' by J.David Beal, both published by Focal Press; but I reckon that despite the relatively high cost of film stock, there is a place for it in an ATV shack, unless the sole interest is in RF, construction and so on.

This is where film animation comes in, as yet another branch of the visual arts which the keen amateur TV enthusiast can use to his advantage. Again this specialist subject is well covered in the libraries, but let me draw your attention to 'Animator's Newsletter' published four times a year by Filmcraft, 13 Ringway Road, St.Albans, Herts AL2 2RE for £3.50.



Now I must be honest here and say that while I have shot quite a bit of super-8 film, and have bought an animation rostrum, recent activity on the domestic house decorating front means I have not actually done this yet myself..., but I think animation is a super way of providing moving titles and "visual Jingles" to spice up ATV transmissions.

The investment required is in a rostrum, (not a cheap item but can be home-constructed fairly easily), a light box for cell preparation, an editor, a splicer and some lights; not forgetting a movie camera with single frame operation.

You would obviously not animate for a one-off showing, it's too much effort, but it would be great for a station ident and the like, and it taxes your artistic and innovative thinking.



Before leaving film, let me provide you with a few other thoughts: Best results are to be obtained by projecting film on a screen naturally, where the rich colours and dynamic contrast range of film shows clearly. Although our TV transmitters and amplifiers are not to broadcast specifications, nevertheless the better the signal to start with then the better the viewer sees it. I plan to have my film stock, after editing, transferred on a professional Rank Cintel machine to VHS cassette for replay. This can be done by many professional agencies such as Magnetic Film Services Ltd., 80/82 Wardour Street, London W1V 3LF.

Incidentally, such houses can also provide copies of standard-8 to super-8 and indeed a baffling range of conversion combinations.

But all this brings us from the fascinating world of movies back to video tape, and this has a major advantage: Cuing.

And so to cuing. Well, the beauty of today's VCR's is that you can quickly search the tape to find the bit you want and use 'freeze-frame' once you get there. The technique I use is as follows:-

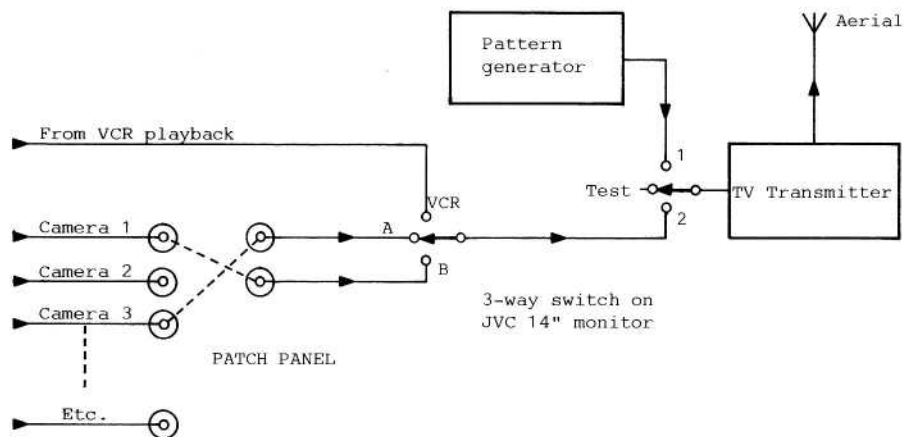
First index all your tapes using the tape counter then, before going on the air for a session, decide which items you plan to use and spool to the relevant counter settings on as many separate tapes as you can. To assist in this I use each tape for one type of material thus:-

- Tape 1....Shack recorded programmes.
- 2....Outside broadcasts.
- 3....Incoming (received) pictures.
- 4....35mm film slides.
- 5....Tape swapping material.
- 6....1983 holiday sequences.
- 7....Computer graphics.
- 8....Portable station recordings.
- 9....Super-8 movie films.

Now here's the crux: There's no point in having all this usable material if you can't find the bit you want in a hurry. Example..."I'm going to Ardgartan caravan park this weekend". "Oh, I've not been to that one". "OK, let me show you what it's like"....(short pause), roll VCR.

So good cuing is important for slick operation, but so to is switching the sources on line. Now the pro's use a vision mixer, and several good designs for amateur use have appeared in the mag, especially John Goode's excellent circuits in CQ-TV's 115, 116 and 118. So far I have not managed to afford this project so let me explain how I do it at the moment:

The patch panel...yes, nothing more sophisticated than a 16swg aluminium panel with Belling-Lee sockets (cheap) on it. All shack sources appear on the panel where a co-ax U-link is used to connect the INs to the OUTs.



By using the patch system, and the A & B inputs of the station monitor in conjunction with the three-way switch on the MTV435 transmitter, it is easily possible to arrange all changes of sources to be done by flicking a switch...OK, so it's not synchronous! Some day, some day.

Well this concludes the series. I hope my efforts to enrich the viewers' image of ATV has inspired you to go beyond the computerised still caption so typical of the average station. Any queries? Get in touch and I'll try to answer them, with the Editors' permission, in these pages. Meantime be creative.....

(Norrie Macdonald. 3 Townhill Road, Earnock Estate, Hamilton, Lanarkshire ML3 9UX. Tel:0698 423121).

(1) 'Moviemaker' magazine is available on subscription from: MAP Publications Ltd., Wolsey House, Wolsey Road, Hemel Hempstead, Herts HP2 4SS. Or from bookstalls.



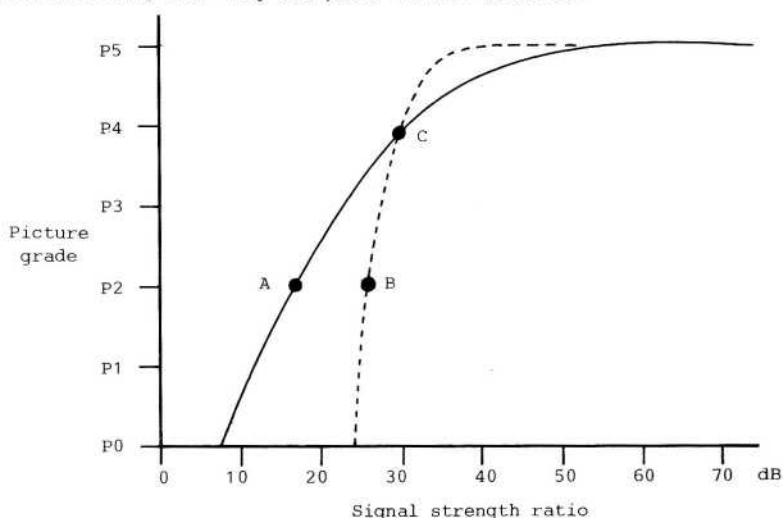
# 70 & 24 WHAT IS THE DIFFERENCE?

By Allan Latham G8CMQ

Many of you with considerable experience of 70cm AM TV will now be thinking about 24cm MD (Medium Definition)-FMTV. Before taking the plunge you probably like to have a good idea what you will achieve compared to 70.

I have detailed here my own experiences and observations and hope that others will also make known their own results. Such information, especially at this relatively early period in the use of 24 for ATV, will be particularly useful in building up a total picture of the band, this will assist everyone concerned in the future.

Under normal tropospheric conditions the path loss will be worse on 24 than on 70 to an extent which depends on terrain and local obstructions (trees, houses etc). The predictions shown below are for average paths. Experience indicates that for very good - line of sight - paths, 24 will fare better than predicted but, over very bad paths it will be worse.



Take a look at the graph. The solid line is my estimate of picture grade-vs-signal strength for AM transmissions on 70. The dotted line is my estimate for medium deviation FM transmissions on 24. To interpret this look at point 'A'. If you are receiving a P2 picture from a station on 70 then you need to find a 13dB improvement (eg: more transmitter power, bigger aerials, less feeder loss etc) to bring this up to P4 (point 'C'). Now look at point 'B'. To receive this station on 24 at P2 you will need to find an overall 8dB more than on 70. This is likely to be done by increasing aerial gain. However you will see that a further increase of only 5dB will raise the signal to P4.

Let's see what this means in practice.

70cm Situation:-	Transmit power..10W psp	= 10dBW
	TX Aerial.....MBM48	= 14dBd
	TX Feeder.....	= -2dB
	RX Noise Figure.....	= -2dB
	RX Feeder.....	= -2dB
	RX Aerial.....	= 14dBd
	OVERALL TOTAL	= <u>32dB</u>

Assume that this is the situation under which you get a P2 picture (point 'A').

To get the same grade on 24 you will need +8dB more than this. To get a P4 on 24 or 70 you will need +13dB.

24cm Situation (to get P2)	TX Power.....8W FM	= 9dBW
	TX Aerial...Q.Loop Yagi	= 20dBd
	TX Feeder.....	= -3dB
	RX Noise Figure.....	= -3dB
	RX Feeder.....	= -3dB
	RX Aerial.....	= 20dBd
	OVERALL TOTAL	= <u>40dB</u>

This set up is no more difficult to achieve than that for 70cm.

70cm Situation (to get P4)	TX Power.....50W psp	= 17dBW
	TX Aerial.....MBM88	= 16dBd
	TX Feeder.....	= -2dB
	RX Noise Figure.....	= -2dB
	RX Feeder (masthead amp)	= 0dB
	RX Aerial.....	= 16dBd
	OVERALL TOTAL	= <u>45dB</u>

24cm Situation (to get P4)	TX Power.....10W FM	= 10dBW
	TX Aerial.....	= 20dBd
	TX Feeder.....	= -3dB
	RX Noise Figure.....	= -2dB
	RX Feeder (masthead amp)	= 0dB
	RX Aerial.....	= 20dBd
	OVERALL TOTAL	= <u>45dB</u>

You can now readily appreciate that to get the 70cm picture up to P5 needs several times the legal power and/or something like Goonhilly in the back garden. Getting 24cm up to P5 is possible by simply adding a single 2C39 power amplifier to the last situation to deliver upwards of 40W to the aerial.

All the above predictions ignore the effect of QRM on the picture quality. It is my experience that 70cm is usually interference limited because of the high level of 70cm narrow-band activity: (DX repeater working, excess power for local repeater access and OSCAR). Most of these can be coped with by IF

filtering but this ruins picture quality. 24cm is largely free of QRM unless, that is, you live within range of a 23cm Radar station. In any case the highly directive aerials used on 24 often keeps this to a minimum.

The quality of FM pictures received on 24 is likely to be better than the AM ones on 70 since there are no linearity problems with the transmitter.

The chances of causing TVI with MD-FM television are all but nil. Everyone I know who runs more than a few watts on 70 has had to cure at least one case of TVI.

### CONCLUSION

If you get P4 or P5 from a station on 70 then you will do just as well (power-for-power) on 24 or, if lower power is used, you can make up the difference with more aerial gain. Picture quality on 24 will be much better and is likely to be QRM free. If you only get P1/P2 pictures it will not be so easy on 24. 24cm therefore should be the band and mode of choice for local TV. It is better than 70 in these circumstances. 70cm AM should be the band and mode of choice over more difficult paths, although the long distance performance of 24cm has yet to be established

The technology to get on 24cm FM is already here and several manufacturers have available equipment for that band. Aerials are becoming available but be sure to get a broad-band one or you may not be able to receive the repeater outputs. The same of course applies to pre-amplifiers.

You should have a lot of fun being one of the pioneers on 24cm MD-FM TV and in a few years I expect this to be the usual band and mode that people think of when they talk about ATV. See you on 24.

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## NEW PUBLICITY MAN

Due to the rapid expansion of the club and the high level of interest in television by the hobbyist, the committee have felt it necessary to appoint a Publicity Officer to handle all aspects of advertising and promotion concerned with amateur TV and the BATC.

We are pleased to announce that Norrie Macdonald GM4BVU has been co-opted onto the committee and has already assumed these duties.

We would like to wish Norrie every success in this very important job and hope that the club and amateur television will continue to move forwards as a result.

An advertising campaign has started in many TV and electronics related magazines and much more 'awareness' material is planned. Any correspondence on publicity related subjects may be addressed to Norrie Macdonald at 3 Townhill Road, Earnock Estate, Hamilton, Lanarkshire ML3 9UX. Tel: 0698 423121

# IN THE STUDIO

## Part 1

By John Goode.

### INTRODUCTION

This is the first of what will (hopefully) be a series of articles outlining small studio video practice where this is relevant to amateur television. Subjects to be covered will include standard levels and impedances, signal origination, distribution, synchronisation and mixing. (It is possible that other areas may be covered as the series develops).

### STANDARD LEVELS

Standard levels for both video and pulse distribution are defined as being measured when the source is correctly matched into the standard impedance of 75-ohms. Consider Fig.1, which shows the equivalent circuit of a correctly matched source and load. This consists of a source of E.M.F. ( $E_s$ ), in series with a resistance  $R_s$ , representing the source impedance. This is connected to  $R_L$ , the load, which, for correct matching, should be equal to  $R_s$ .

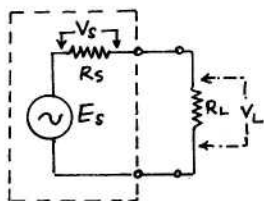


Fig.1 IMPEDANCE MATCHING

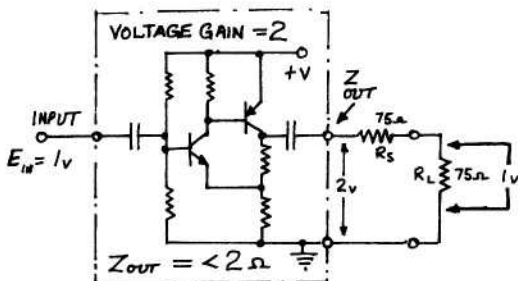


Fig.2 ACTUAL CIRCUIT

It can be seen that  $R_s$  and  $R_L$  form a 2:1 potential divider across  $E_s$ , and so if one volt of signal is required across  $R_L$ , the signal voltage  $E_s$  must be double this, 2 volts. Also, for the source impedance to be equal to  $R_s$ , the signal source  $E_s$  must theoretically have zero output impedance - in practice a value of a few ohms will be satisfactory.

Fig.2 shows a practical realisation of Fig.1. In order to give a correctly matched 1-volt signal across 75-ohms an amplifier with a gain of 2 and a very low output impedance is required to feed the potential divider  $R_s$  and  $R_L$ .

If the source is now fed into a load that is much greater than 75-ohms, virtually all of the signal ( $E_s$ ) will be developed across  $R_L$ , and to all intents and purposes the signal will be double that when correctly loaded. The output is then said to be "unterminated".

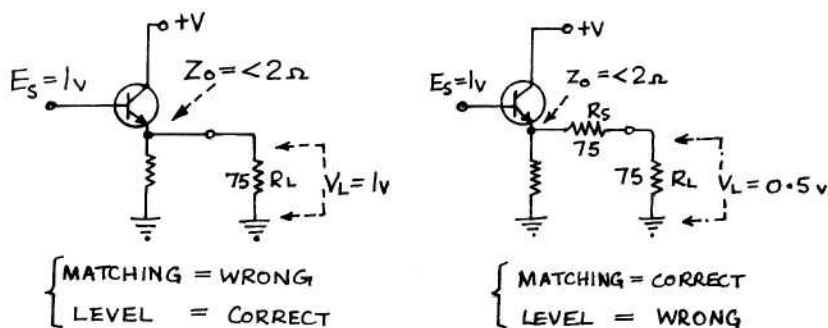


Fig.3 EMITTER FOLLOWER

It IS possible to feed from very low impedances directly into  $R_L$  without a 'build-up' resistor ( $R_s$ ), (see Fig.3). Although this will give the correct level across 75-ohms without the necessity for a voltage gain of 2, it is incorrect as the source and load are not matched, and reflections could occur (particularly when feeding long cables). I do not propose to go into transmission-line theory in this article, but this is the criterion that should apply to all video and pulse matching.

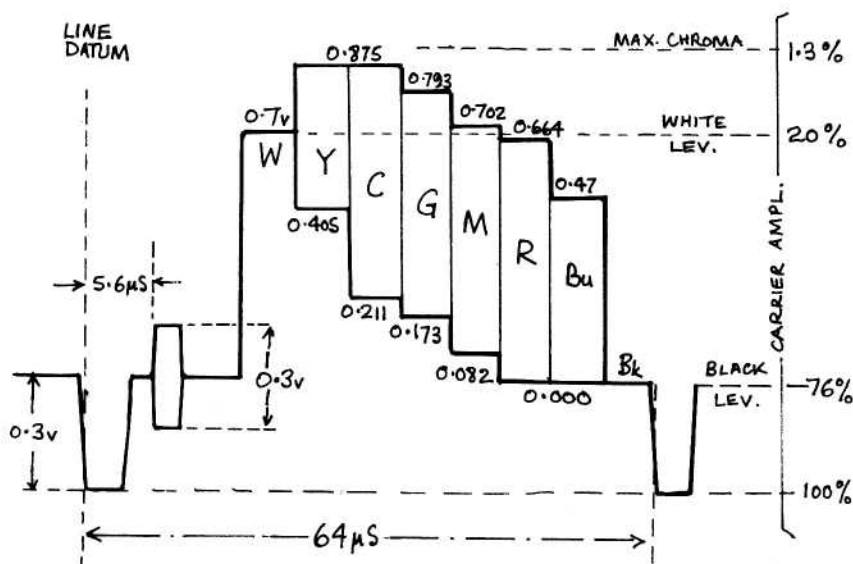


Fig.4 95% COLOUR BARS

## VIDEO LEVELS

The standard levels for the UK PAL composite colour signal is shown in Fig.4, together with carrier-amplitude values for broadcast transmitters. The signal illustrated is the 95% saturated colour bars as radiated by the BBC. This is at the normal level adopted in studios - 1-volt peak-to-peak, 700mV picture, 300mV syncs. When viewing this signal on a 'scope or waveform monitor notice that the burst and syncs should be of equal amplitude - this is a quick check for any H.F. attenuation.

When distributing colour signals in their R.G.B. form the norm is for the signals to be non-composite, with syncs distributed separately giving a 4-wire system. See Fig.5(a). The video signals are therefore 700mV p-p, syncs are normally 2-volts p-p, negative-going, (all into 75-ohms, as above). However, two variations on this standard do exist, and they are:-

(1) In order to have a 3-wire system, 300mV sync can be added to the Green signal, giving R=700mV; G=1 volt; B=700mV. See Fig.5(b).

(2) With the increasing use of micro-computers, RGB + syncs distributed at TTL level is becoming widely used (mainly for connecting computers to RGB monitors). However, this system is not correctly impedance-matched, and should not be fed down cables longer than about 18".

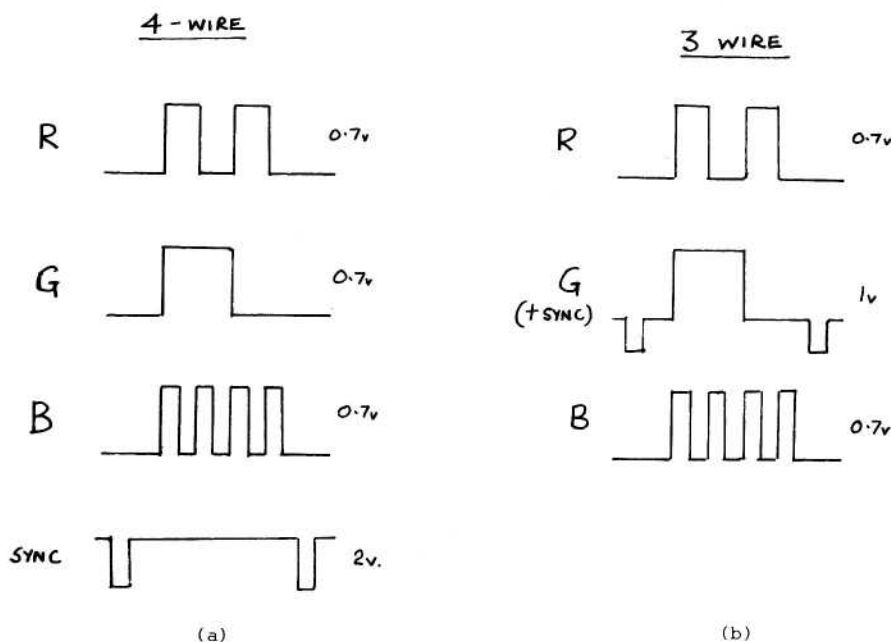


Fig.5 R.G.B. FORMATS

## VIDEO DISTRIBUTION AMPLIFIERS

V.D.A.'s should have the capability of driving several mutually isolated 75-ohm outputs, all correctly terminated. The input impedance should be high enough to allow several (say 10) inputs to be paralleled across 75-ohms without measurably dropping the signal level. Figs 6, 7 & 8 show examples.

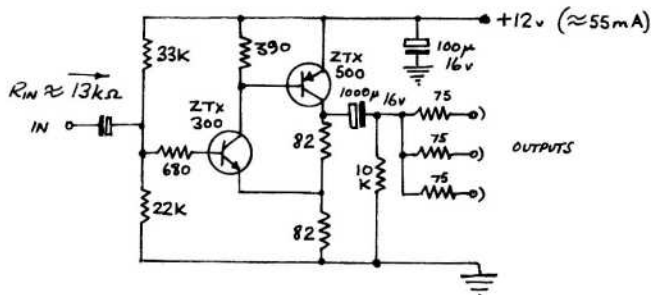


Fig.6 SIMPLE V.D.A. (SINGLE RAIL SUPPLY)

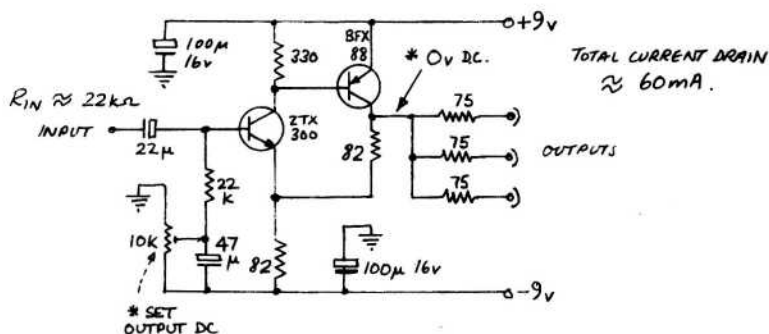


Fig.7 SIMPLE DUAL SUPPLY V.D.A.

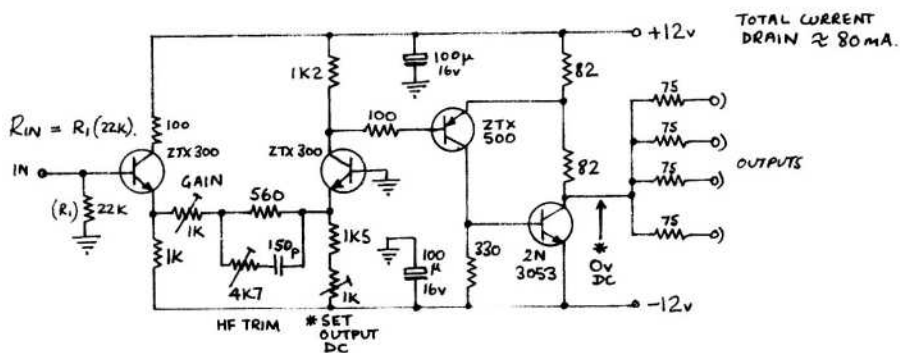


Fig.8 VARIABLE GAIN, DC-COUPLED V.D.A.

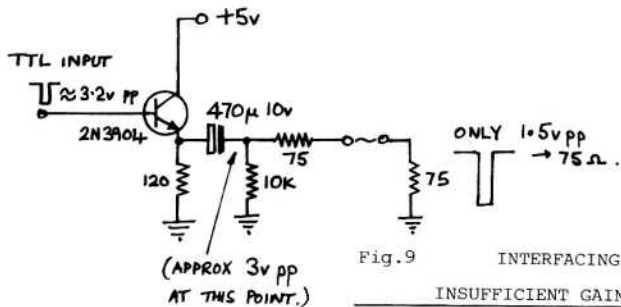
## STANDARD PULSE LEVELS

Distribution of pulses within television studios is, for the most part, standardised at 2-volts p-p into 75-ohms, although in some cases a level of 4-volts into 75-ohms is adopted. To add further to the confusion, there are some SPG's that give 2-volts out for all pulses except the PAL squarewave, which is a 1-volt signal. Generally speaking, however, most pulse amplifiers and sync generators are standardising on 2-volt pulses.

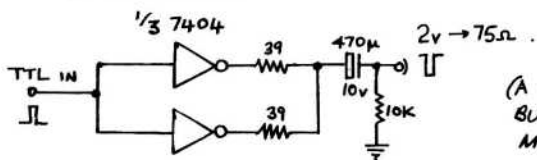
Most sync-generators in use today use TTL i.c.'s in the pulse-forming circuits.

This leads to the need for circuits to interface from TTL to 75-ohm driving capability. Simply hanging an emitter-follower on to the TTL output is not really good enough, as TTL level is approximately 3.2 volts. If the load is correctly matched using  $R_s$  and  $R_L$ , the voltage across  $R_L$  will only be about 1.5 volts. Omitting  $R_s$  will double the level, but then the source impedance will be incorrect, (see Fig.9). Some alternative suggestions are shown in Fig.10.

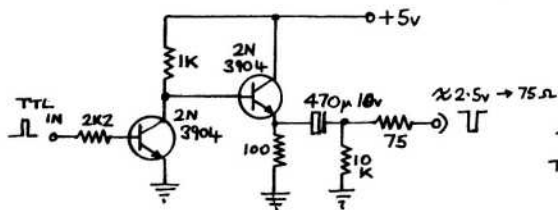
Fig.11 shows a pulse distribution amplifier (PDA) suitable for feeding 2 or 4-volt pulses into 75-ohms.



### (a) USING 7404.



### (b) WITH A +5V RAIL ONLY



### (c) WITH A -9V RAIL

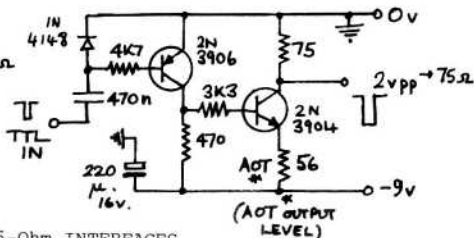
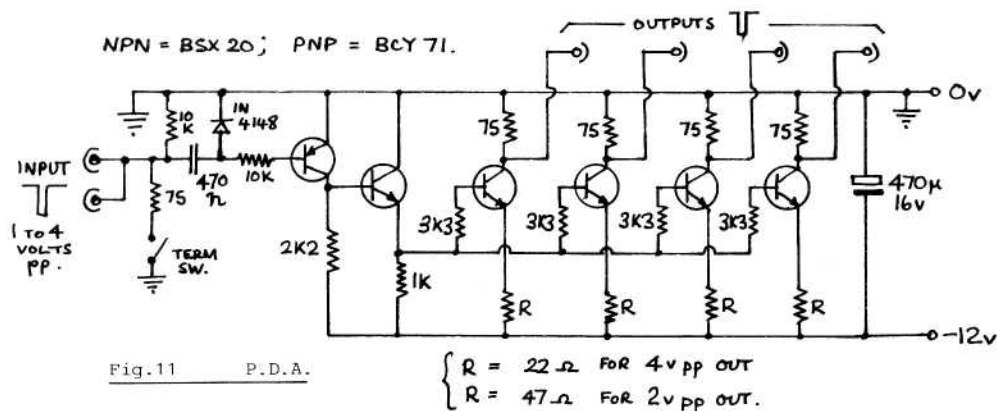


Fig.10

SOME TTL TO 75-Ohm INTERFACES

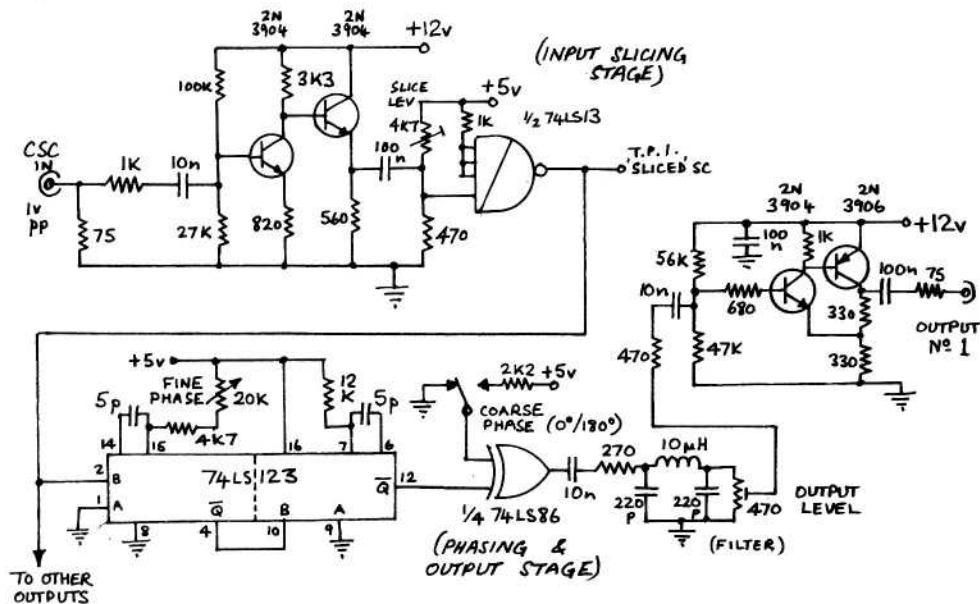




### DISTRIBUTING SUBCARRIER

The standard level for distributing colour subcarrier (CSC) is 1-volt p-p into 75-ohms. When routing subcarrier to the various colour sources within a studio complex it is necessary to be able to adjust the phase of each feed independently, to compensate for different signal-path lengths when the encoded colour signals are mixed or wiped together.

A distribution amplifier suitable for CSC phasing is shown in Fig.12. This works by converting the CSC into a TTL signal, using monostables for phase adjustment, and then re-converting to a sinewave by filtering. This design is more stable, and requires less switching, than the circuit I described in CQ-TV 122.



## DISTRIBUTING PULSES

The preferred method of distributing the six SPG pulses is to use a multiple output PDA for each type of pulse. Because these pulses are sometimes given different names, I shall list them below:-

L.D. = Line Drive (Horizontal Drive or Trigger)

F.D. = Field Drive (Vertical Drive or Trigger)

M.B. = Mixed Blanking (Composite Blanking)

M.S. = Mixed Syncs. (Composite Syncs.)

B.G. = Burst Gate (Burst Flag)

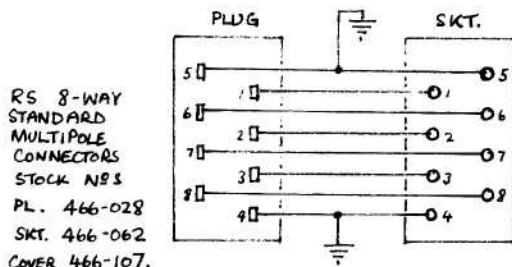
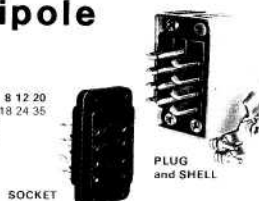
P.S. = PAL Squarewave (PAL Switch, Video Axis Switch)

Although in a large system using six PDA's is best, in a smaller set-up it is possible to distribute the pulses by looping-through at high impedance, with only the end of the chain terminated. This works quite well for up to about half a dozen pieces of equipment. This method is greatly facilitated by using multi-way cable and connectors for the six pulses. Fig.13 shows wiring for employing RS standard multipole 8-way connectors as used on Electrocraft Studio Equipment. I have adopted these connectors on my home-brew designs. By having a looped plug and socket on each unit, and then terminating the chain with a dummy plug with 6 - 75-ohm resistors in it, the number of PDA's required in a given system can be drastically reduced.

## **standard multipole**

Fig.13 SPG MULTIPOLE WIRING

No. of  
ways 4 8 12 20  
W. 13 18 24 35  
H. 35  
D. 41



<u>PINNING</u>	
1. MB	5. GND.
2. BG	6. MS
3. FD	7. PS
4. GND.	8. LD.

**NB:- ALL EQUIPMENT FITTED THUS MUST HAVE HIGH-IMPEDANCE PULSE INPUTS TO PERMIT 'LOOPED' WORKING.**

## 'BLACK & BURST'

Most colour SPG's have, in addition to the six standard pulses and subcarrier, an output known as 'Black & Burst' or 'Colour Black'. This consists of the M.S. signal combined with an internally generated colour burst, as shown in Fig.14. (It is equivalent to the output of a colour vision mixer when faded to black).

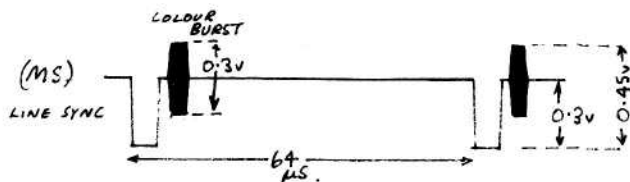


Fig.14 'BLACK & BURST' WAVEFORM

The reason this signal is provided is because most modern cameras and other signal sources are synchronised by genlocking their internal sync-generators, and the black & burst signal is designed for this purpose. The advantage is that sources can be synchronised to the SPG using only a single wire.

A circuit for a colour black generator that can be added to any SPG that provides CSC, BG, PS and MS is shown in Fig.15. It's a design I used when upgrading Arthur Critchley's original 'CQ-TV SPG' circuit to colour.

Lastly, in Figs. 16, 17 and 18, I have shown the timings of the SPG waveforms according to CCIR System I, the UK standard.

## CCIR SYSTEM I (REF 1)

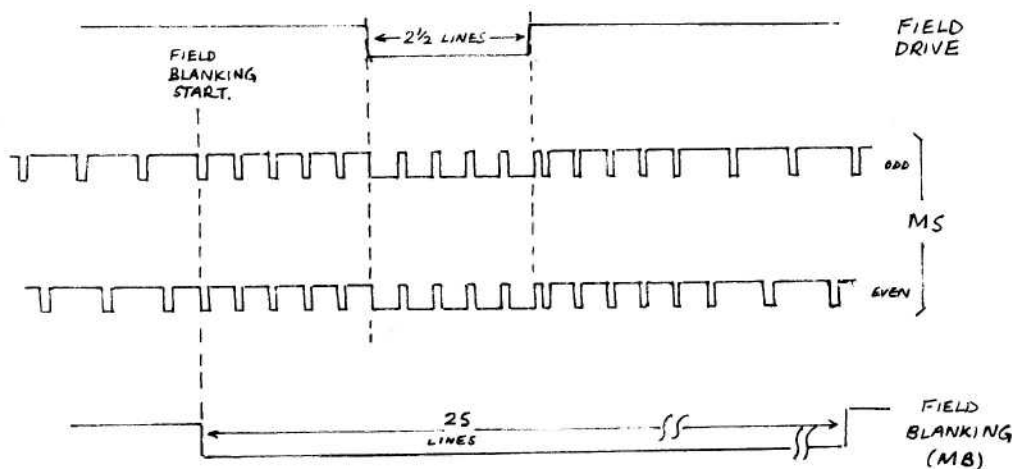


Fig.17 FIELD RATE TIMINGS



# CCIR SYSTEM I

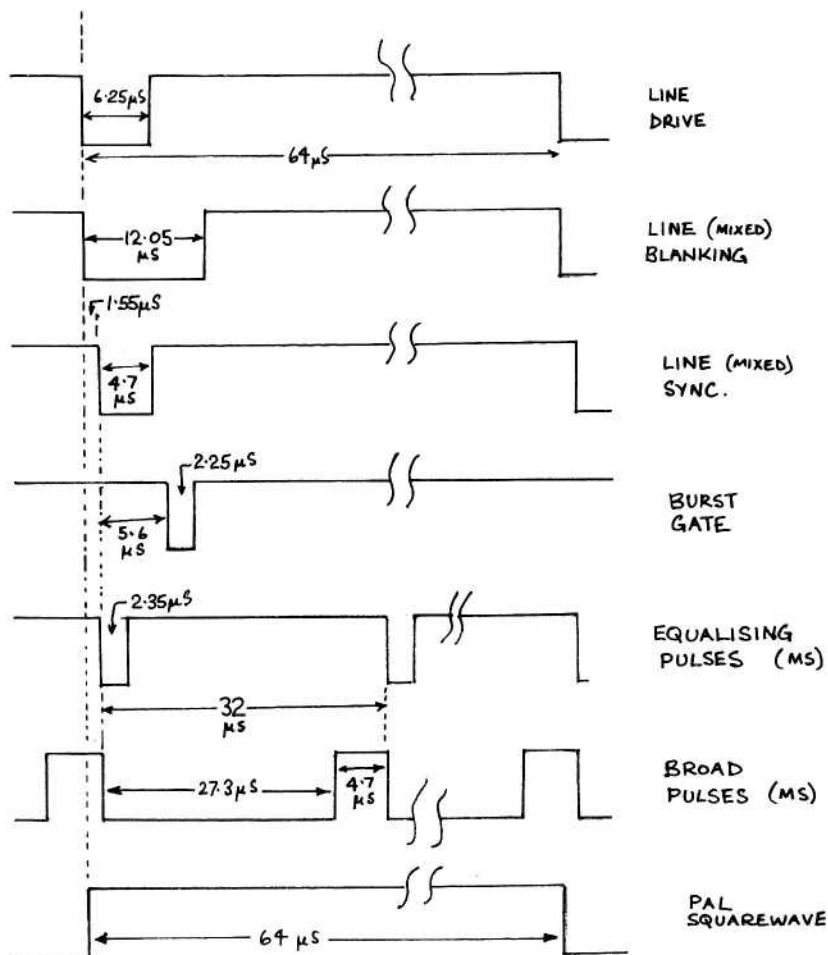


Fig.16 LINE TIMINGS

## BURST BLANKING

The colour burst should be blanked for 9 lines during the field blanking period. In the full PAL specification the start of the burst blanking occurs half a line earlier on each successive field for a period of 4 fields, returning on the fifth field to the same position as the first field.

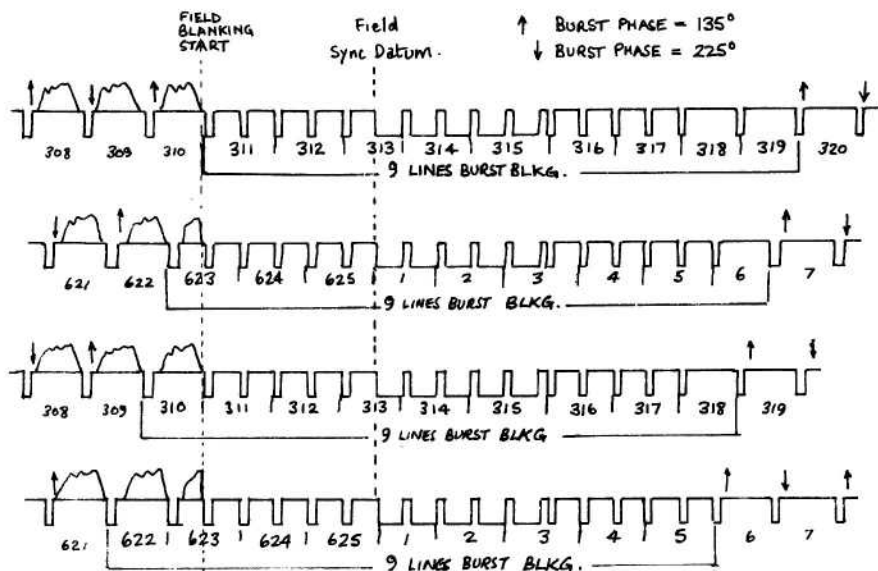


Fig.18 BRUCH BURST-BLANKING (ref.1)

This sequence ensures that all fields begin and end with bursts of the same phase (135°), and is known as 'Bruch Blanking' (after the developer of the PAL system, Dr Walter Bruch). Although the Bruch blanking sequence is not essential for amateur TV, there are some early Sony Trinitron receivers still in use that rely on the Bruch sequence to lock the colour decoder circuits. This was done in order to avoid infringing PAL patents, as in the early seventies Sony had no PAL licence. The burst blanking sequence is shown in Fig.18.

In part two of the series we will look at studio colour cameras.

REFERENCE:- I.B.A. Technical Review Part II - Technical Reference Book.  
(available from I.B.A., Crawley Court, Winchester.)

**WINDER REMINDER REMINDER REMINDER REMINDER**

**INTERNATIONAL ATV CONTEST**

**8/9 SEPTEMBER**

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This list supercedes all previous ones.

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	*HB1 & 2 = Handbooks.TVA = TV For Amateurs			
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	AMATEUR TELEVISION HANDBOOK vol.2 by T.Brown G8CJS (155gm)	£2.00	0.40	
	TV FOR AMATEURS by J.Wood G3YQC (85gm)	£1.50	0.25	
	CQ-TV BACK ISSUES. The following issues are still available although stocks of some are low. Please circle those required.			
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ENGLAND

## BRITISH AMATEUR TELEVISION CLUB CONSTITUTION

1. The club shall be known as the British Amateur Television Club.
2. Membership of the club shall be open to anyone interested in amateur television in the British Isles or abroad.
3. The club shall be affiliated to the R.S.G.B.
4. A group may affiliate to the club by paying a subscription as one member; the affiliated group then shall have one vote and be entitled to all benefits as if it were one member.
5. A membership fee of £5.00 per annum, or other such sum determined by the committee and approved by a general meeting of the club shall be charged, and this shall become due on the 1st of January each year. If a member does not pay the subscription, then after three months his membership shall cease.
6. The accounts shall be audited every two years by an independent auditor who shall be appointed by the committee. The accounts shall be presented to the biennial general meeting.
7. The committee of the club shall consist of not more than twenty elected members. All such members shall be unpaid. From these the committee will select a Chairman, Secretary, Treasurer, Editor and Membership Secretary, together with any other officers the committee shall deem necessary. All officers and committee members having been in office for two sessions (i.e. approximately four years) must retire, but shall be eligible for re-election. The committee shall have the power to co-opt members of the club to serve as officers or as committee members. All such co-opted members shall be required to retire at the next ordinary general meeting, but shall be eligible for election. A minimum of half of the elected members shall retire at each ordinary general meeting.
8. Officers and members of the committee may act in any matter which has received the approval of three of the Officers of the committee. The use of the name of the club shall be solely at the discretion of the committee.
9. A president shall be appointed by the committee; such President to hold office for not more than four years; retiring Presidents are to be listed as past Presidents of the club.
10. General meetings of the club shall be held biennially at one of the conventions which shall be organised from time to time by the committee, at intervals of not more than three years.
11. An extraordinary general meeting may be called by twelve members provided they give three months notice in writing stating the agenda to the Secretary. Such extraordinary general meetings shall be held in London and will discuss no other business. The cost of such a meeting being borne by the members demanding it and not by the club.
12. All resolutions at the general meeting shall be carried by a two-thirds majority of those present. A quorum shall comprise thirty ordinary members apart from the committee. Only members whose subscriptions are paid may vote at a general meeting.
13. A resolution for the dissolution of the club may only be made at regular biennial or extraordinary general meeting and shall require a three-quarters majority of those present. Any assets of the club on dissolution shall be distributed among the members who have currently paid their subscription.

At this years BATC convention some ammendments were formally made to the club constitution.

In order that members may be kept informed of such changes and that those who were at the general meeting may check their accuracy, the complete revised constitution is printed opposite.

Any query concerning this document should ba addressed to the General Secretary, Trevor Brown G8CJS. at 25 Gainsbro Drive, Adel, Leeds LS165 7PF.



## **JOHN LOGI BAIRD - REMEMBERED**

This year saw the 50th anniversary of the termination of Baird's contract with the BBC to supply and operate his 30-line TV system. The contract ran for five years and commenced in 1929, however 30-line transmissions went out for a further year and a half and finally ended in September 1935. It was in January 1935 that the BBC defined its high resolution standard, and later that year they started their 405-line transmissions from Alexandra Palace in London.

To mark the occasion the BBC wrote to everyone they could find who was involved in TV during that early period including those who just had receivers (not very many in those days). Around a hundred replies were received and they were all invited to the BBC's Pebble Mill studios in Birmingham where part of the "Pebble Mill at One" programme was to be devoted to the anniversary.

In the event more that 60 people attended and included Baird's original assistant Ben Clapp - now 89 years old - and Leslie Mitchell who was the leading male announcer, first for the Baird TV system and then for the BBC's 405-line service. He later left the BBC and became the voice behind the British Movietone News films. Also there were Tom Douglas G3BA and Doug Byrne, a licenced radio amateur, much involved with the RSGB and who runs the National Wireless Museum on the Isle of Wight.

Several members of the BATC were there including Grant Dixon - a member almost from the start who has held most of the major posts within the club and has only recently retired from the committee, and Doug Pitt - Chairman of the Narrow Band Television Association.

The programme went out on Friday March the 30th and, apart from the usual interviews, included a demonstration of a Baird 30-line televisor which had been built by apprentices from the Plessey Radar establishment on the Isle of Wight. I am bound to say though that the demonstration was far from typical and certainly failed to show how good those early TV pictures could be.

To mark the occasion, each person who replied to the BBC's letter received a commemorative medallion in a presentation case.

# TV ON THE AIR

By Andy Emmerson GBPTH

Well here we are back again - they say time flies when you're enjoying yourself and time has certainly flown since I last dipped into the file of your letters. It really does not seem long ago, but a new batch of correspondence has come in, so let's get on with it.



Starting as ever with seventy centimetres the first letter comes from GBPX in Oxford who is constructing several items. He says he has just built the 'TV for Amateurs' RF probe ... I just wish some other people would! Then they could put out properly modulated signals instead of an all video and no syncs mess that nobody can lock on their receivers. It's these power meters that are to blame; some people cannot bring themselves to believe that less indicated power out means a

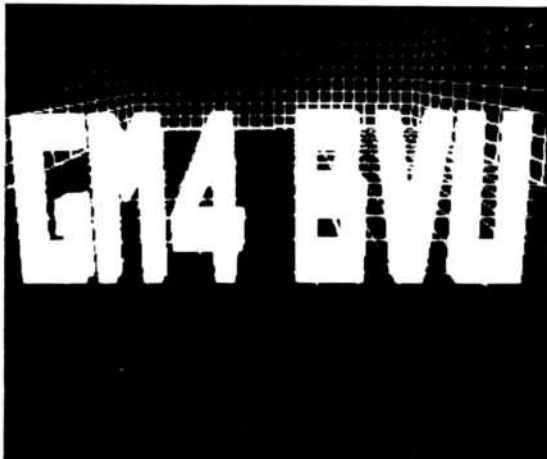
better signal at the other end! Oh well, back to the plot ... Jeff has also made up the Practical Wireless upconverter and is now attacking a 2C39 linear. He also has a Spectrum computer and says the "Worthing" testcard tape is 'really fabulous'. Indeed it is and if you haven't got one yet send off your £5.50 to GBXEU (qthr) and support the Worthing video repeater project into the bargain.

One of two letters from Maurice F1FVX, a BATC member, points out that many French stations cannot use 144.750 for ATV talkback. This frequency is used as the input of the Vernon repeater (halfway between Paris and Rouen). Instead French stations use 144.170 plus or minus 20 kHz, FM when conditions are normal and SSB then things get lively!

Norrie GM4BVU sent in some nice pix from his qth in Hamilton, Lanarks. All were created on the BBC micro and the one I have chosen is a very colourful

3-D effect - it's a shame you can only see it in black and white. The display is animated, with colours changeable at the flick of a key. Perhaps next time you'll send us the program Norrie!

He also made a P2 contact both ways with G4WVI in Whitley Bay recently, quite a long hop. Conditions must have been good because colleague GM6AOR got a P3 report from WVI with just 3.5 watts! New stations in Scotland include Mark GM4OMT in Grangemouth, Ken GM6KDN in Airdrie (rx) and Bill GM4WTS, also RX only in Airdrie.



Another batch of reception reports in the Netherlands has arrived from BDXC member Arthur Milliken. Noted at Beemster (2nd - 5th December) were G3UMF, G6CUQ, G6YLG, G6LIC, G4DVZ, G8LKW, G6HMS, G3VPC, G6XMG, G4SRF, G6LMG, G4RKP, G6YDI, G4CRT, G3DFL and GU8FB0. In February G3TOZ was seen in Geldermalsen. Well done all of you!



More and more people are 'at it' on 24, and with the growing number of kits to help you transmit and receive signals there is little excuse for not joining in. Stations newly active include John G8UWS in Folkestone and Nick G4IMO near Southend on Sea; both are using the F3YX design of transceiver. Although this design is now somewhat dated it has some good points, as Ian G4VTD (ex-G8CQE) pointed out. By using a

Foster-Seeley discriminator the F3YX receiver can receive at lower levels of signal than the phase-locked loop designs can manage. At the present moment Marc F3YX is redesigning the transceiver to use some of the newer ICs on the market.

I too am now equipped for this band; after earlier false starts I am using the Sandpiper helical aerial and am very pleased with it. Reflected power is minimal and the broad bandwidth is a great blessing. Allan G8CMQ writes from Southampton that new recruits to the band are Eddy G4PXH and Dave G6GXG in Romsey. Nick G4WHO (ex-G8MCQ) can put a good few watts from Wimborne, achieving a P4 with Allan and P5 with Syd G4JQU over a 30 mile path. Norman G6GNS has joined with some of the experiments, including tripling 70cm AM up to 1308 MHz which works surprisingly well if you set up the tx and tripler for it.

Allan continues "On the May day holiday I went down to Havant to see Pete G6RSV and his tv-dx gear. I took a few little bits and pieces: 10mW tx, converter and receiver. After seeing the dx-tv we tried a little walkabout with the QRP 23 cm - cameraman in the garden and viewers indoors. Anyway, who should we see in the picture but Hadrian G6XGH and Nigel G1DSO coming round to see what I was up to.

"I think it was Hadrian's idea ... 'too good an opportunity to miss'. We took the 23 cm gear over to Nigel's QTH 100 yards away and Hadrian operated the camera and 10mW tx. Nigel patched the video onto 70 cm and several stations in the Portsmouth and Chichester areas were able to watch as our roving cameraman filmed the surrounding area. Results were excellent and about 100 yards range was possible. A delightful time was had by all and made a talking point on the net that evening. Those who missed it were a little disappointed and I expect it has created some enthusiasm for 23 cm." (Diplomatically Allan did not mention in this letter that he is selling these mini transmitters and other goodies, but you can send him a SAE to find out - Allan Latham, 75 Chalk Hill, Southampton.)

Maurice F1FVX says it was a pity that no-one but G6AIW and G8KOE were around on 28.12.83 to receive his 1255 MHz signals from his Paris suburb. They, it seems, were wised up to the 144.17 frequency! Finally the strange but true section ... Garry G4CRJ in High Wycombe has been playing around with a 24cm oscillator and managed to get a P4 report with just this and a BFR96S linear



from Mike G8LES, 25 miles away! So there you are - two transistors and you're off! He also got a P2 report from G6HVQ also in Thames Ditton, and gave P4 reports to both stations (the latter is AM).

A couple of items picked up at the RSGB convention at Birmingham. Peter G4LXC (ex G8EIM) is constructing for 24 in Harrow Weald and SM6CVE reports that several Swedish stations are active on 24, including Helmer SM6CCD. What system they are using is not clear. To the BATC event at the Post House Crick Dave G8GKQ/DA4DG brought his 24 cm receive system. This made an interesting talking point for people who like to discuss the merits of different systems. Dave has TV gear for 70 and 24 cm and is normally in Germany. From time to time he is back in the UK and operates from Penge.

## SSTV

There has been no slow-scan activity during the last three months. Perhaps in the flurry of activity earlier this year everybody overdid things!

At this stage I thought I would just throw in a hint: if like me you aim to keep your equipment in showroom condition - it makes it more resaleable - there is nothing more annoying than a small scratch to the paint finish. Black sprayed diecast boxes seem particularly prone to getting scratched and it's boring getting out black paint and a small brush just for this little job. But if you visit your local hobby shop where they sell plastic kits for aircraft and so on you will find they sell 'felt pens' filled with enamel paint instead of ink. These are great for touching up small blemishes and are available in a number of colours. Price is just under a pound.

So there we are: thanks for your letters. I always enjoy reading them and printing your news even if I don't get a chance to reply to you personally. Let me have more news for next time and send it to me at 71 Falcutt Way, Northampton, NN2 8PH. Many thanks - Andy Emmerson, G8PTH.

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# 1984 GENERAL MEETING

The biennial general meeting of the British Amateur Television Club took place on May 13th 1984 at the Post House hotel near Rugby as part of the club's convention.

Around a hundred people attended the meeting which was chaired by Mike Crampton G8DLX.

The meeting opened at 11.10am.

In the Chairman's report Mr Crampton summed up the major events over the last two years. Of particular note were the facts that CQ-TV magazine had grown considerably under its present Editor; the club had sent representatives to both the IARU Region-1 conference in Sicily and the AGAF convention in Bremen, West Germany; and that five ATV repeaters had been licenced in the 1.3GHz band this year.

The audited accounts were described by Mr.Rix (G3RYF) who detailed the main transactions within the last period.

Proposals for certain ammendments to the club constitution were made and discussed by the meeting. The ammendments were duly voted in favour and are now incorporated in the revised club constitution, (published elsewhere in this issue).

Mr.Rix G3RYF, Mr.Elmer G8EUP and Mr.Surtees G8OVX retired from the committee and did not seek re-election. The meeting expressed its thanks to these members for their past services.

Messrs Watson, Lawton G8ANO, Reid, Pawson G81QU, Lawrence GW3JGA, Wood G3YQC and Cox G8HUA retired as required in rule 7 and were re-elected. Messrs Tom Mitchell G3LMX, Peter Ward G4GYI, George Mayo G4EUF and Andy Emmerson G8PTH were elected to fill the remaining vacancies on the committee.

The meeting closed with the presentation of an engraved plaque to Arthur Rix in appreciation of his excellent service to the club in the most difficult of posts: Treasurer. Arthur is wished every happiness in his retirement and the hope that he will continue to remain active in ATV for many years to come.



Mike Crampton delivers his Chairman's Report to the meeting.



The Chairman presents an engraved plaque to Arthur Rix - the retiring club Treasurer.

The presentation of the first 'Grant Dixon' award, for the best article to appear in CQ-TV during the last two years, was made to John Goode for his excellent article in CQ-TV124 entitled 'Quality Video from the BBC Micro'. Grant Dixon himself made the presentation which consisted of an engraved plaque. John's name will also be entered on the club's large shield (shown in the photograph) which will hold the names of all recipients of the award and will be displayed at club functions.

(PHOTO'S BY DERYK WILLIS G3XXKX)



Grant Dixon (L) presents his award to John Goode.

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# A SIMPLE S.P.G.

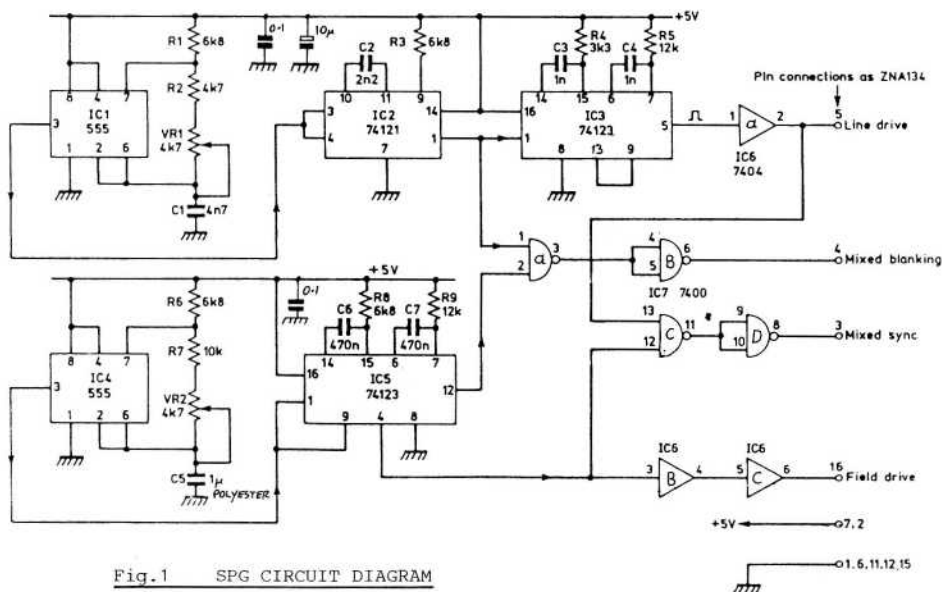
By Dennis Anderson G6YBC

Upon looking around recently at designs for a station sync pulse generator, I was most interested in the single chip SPG described by GW3JGA and GW8PBX in Volume 2 of the BATC Handbook. Then I found that the ZNA134 cost £24! It was quickly back to the drawing board.

I came across a simple SPG design by Malcolm Burrell in the August 1979 issue of 'Television' magazine, which was designed as a direct replacement for the ZNA1 chip. The complete article is reproduced below - with grateful thanks to John Reddihough, 'Television's' Editor - together with some additional colour material of my own.

Obviously with such a design one can not expect the specifications to be as accurate as that obtained from the Ferranti IC, nevertheless the unit appears to be quite adequate for station use.

"Synchronizing pulses are essential to TV as we know it, providing the timing references to keep the transmitter and receiver scanning in step. Most of the cheaper closed-circuit TV cameras which provide a video-frequency output generate their own sync pulses internally and cannot always be adapted to run from an external sync source to facilitate picture mixing or provide, with other equipment, special effects.



To provide sync pulses to the full broadcast specification using conventional techniques would involve a very complicated circuit indeed. The ZNA134 sync pulse generator i.c. is widely used in equipment and particularly in constructional projects because of its simplicity. It's expensive however, and it was felt that a cheaper alternative would be welcomed by many constructors, so this random interlace unit has been produced which employs the minimum number of cheap components. The resultant pulse timings may be a little more approximate, and a single, broad field sync pulse is generated instead of the usual chain with equalising pulses. With care however good results should be obtained.

Note that the outputs of the basic circuit are at TTL level and are not designed to drive 75-ohm loads. It can feed a few unterminated 75-ohm loads for experimental purposes, but if terminated lines are to be used the arrangement shown in Fig.2 is suggested. This involves the use of additional gates to buffer the outputs and provide the necessary current drive. (see also John Goode's article in this issue - ED).

The circuit of the basic sync pulse generator is shown in Fig.1 IC1 is a 555 timer i.c. which produces a squarewave output with a mark-space ratio of about 1:1 at 15kHz. VR1 enables the frequency to be adjusted. This i.c. drives the monostable IC2 (74121) which produces the line flyback blanking pulse. One output line from this goes to the NAND gate IC7a, where it is mixed with the field flyback blanking pulse to give a mixed blanking signal. The other output line goes to pin 1 of IC3 to trigger one of the monostables in this dual-monostable i.c. This gives the front porch timing to trigger the second monostable in the chip the output at pin 5 being the line drive pulse. This is fed to the unit's line drive output via the inverter IC6a. The output from IC6a is also fed to the NAND gate IC7c where it is mixed with the field sync pulses to give the mixed syncs signal.

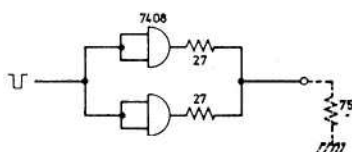


Fig. 2: Suggested interface circuit for driving 75Ω loads.

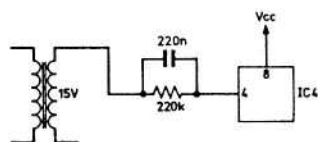


Fig. 3: Suggested mains locking circuit.

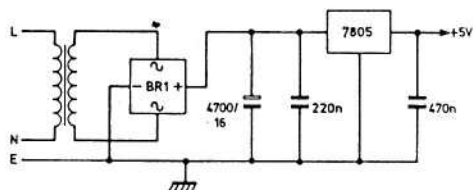


Fig. 4: Suitable mains power supply for the SPG.

Another 555 timer, IC4, operating at 50Hz, is used in the field sync section. VR2 provides frequency adjustment. The output triggers both monostables in IC5. One of these monostables provides the field drive pulse, the other the field flyback blanking pulse.

To set up the unit, view the outputs using a monitor or alternatively, drive a known good video source. Set VR1 for correct horizontal locking, then VR2 for vertical lock. Some receivers may show some ripple on the raster; adjust VR2 so that this is as slow as possible.

If mains locking is desired IC4 can be triggered from the 15v a.c. on the secondary of the mains transformer using the circuit shown in Fig.3. This will eliminate any moving ripple in the pictures.

The unit can be constructed on Veroboard or on a PCB. Note that the unit is designed as a plug in replacement for the ZNA134 in the colour pattern generator (May-July 1979) and previous projects - the simple test card generator (May-June 1978) and diagnostic pattern generator (August-September 1978 issues of 'Television magazine')."

Wishing to use the circuit to drive the Handbook-1 PAL colour coder, I constructed the circuit in Fig.5 from Handbook Vol.2. This circuit provides the necessary PAL Switch and Burst Gate signals.

I have not carried out any comparisons between this design and the ZNA134 system, however the unit works well in my shack.

My thanks to Malcolm Burrell for the original article, to John Reddihough for permission to reproduce it and to Frank Wood G8NSE for his help in the research and setting-up.

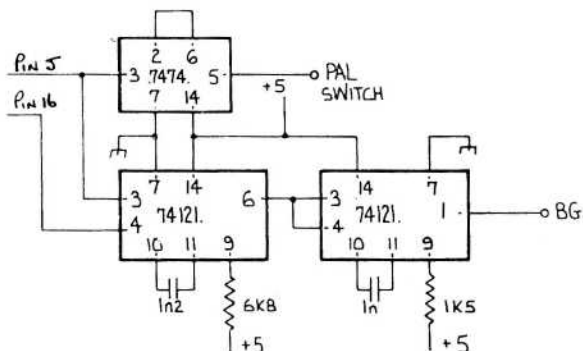


Fig.5 PROVIDING THE COLOUR PULSES

# International Amateur Radio Union

## Region-1 Conference Cefalu, N.Sicily

I was the only observer attached to the RSGB delegation, but the French delegation included F9UP who is a very committed, and active, microwave TV operator from Dijon, and one of the Finnish representatives OH2BEW - who is interested also in microwave - has joined the BATC.

The complicated situation concerning the use of the 432MHz band for both ATV as well as narrow-band communications was discussed at length together with the implications of the interference from Syledis.

Generally the Scandinavian countries were 'anti' ATV on 70cm, but this may be partly conditioned by the fact that in those countries the band is only between 432 and 438MHz. The German national society was however also of the opinion that ATV and 70cm are not compatible, but this view was countered by the French, Belgians, Dutch and of course the UK.

The outcome of many hours discussions (primarily concerning the RB repeater system versus the RU system - not directly ATV) is that the conference did not make any recommendations at all in respect to ATV on 70cm.

During the conference the French announced, and had noted, their proposed repeater system which employs 1.6MHz separation between inputs and outputs but is based between 430 and 432MHz and is therefore the most compatible system possible with respect to ATV.

The French had however also asked for special permission to operate repeaters with inputs below 145MHz. This idea was roundly condemned with a recommendation that in Europe there should be no FM repeaters having input or output frequencies between 144 and 145MHz.

Finally, although not directly related to TV, I would report that it was agreed that with affect from 1st January 1985 the official IARU locator system will be the "Maidenhead/GM4ANB" system. We will obviously adopt this method from that date for our own contests.

### CONCLUSION:

I think that it proved useful to have an "ATV person" at the conference so that our existence was made rather more obvious and we were able to deliver BATC "propaganda" to all the delegates.

In the next few years there will no doubt be further changes to the 70cm repeater systems in the UK and the rest of Europe, and Syledis may or may not still be with us. I would expect therefore that the 70cm band will still be a subject of considerable discussion at the next conference to be held in three years time in Holland, and that we should therefore keep a careful eye on the situation leading up thereto.

Finally, There were some suggestions that licensing authorities were of the view that the amateur microwave allocations could be reduced to only "a megahertz or so". I think it is therefore essential that we encourage and fully publicise all ATV microwave activity (13cm and up) and also, at the same time, consider some draft band-plans for ATV activity on those frequencies, so that the current and potential use of these bands is not overlooked.

Graham P Shirville G3VZV. BATC Committee.

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## From 'down under.....'

### THE ATVer

by Tony Marsden G6JAT

It's good to be able to report the welcome return of the Australian magazine "The ATVer", published for the South Australian Amateur Television Group by Ray Foxwell VK5ZEF.

This latest issue clearly represents a great deal of work on Ray's part, and he is to be congratulated for putting together a varied collection of interesting articles, including numerous practical circuits, many of them his own designs. In this issue, all the circuits are concerned with video, and include a sync regeneration unit which derives sync, blanking, VAS, burst gate and drives from composite video; a two-input video switcher designed for remote switching via the signal cable; a video enhancer for use when tape copying; a single chip colour SPG based on an IC used in some Japanese domestic colour cameras; a passive 5 MHz low-pass 75 ohm video filter; and a high quality video distribution amplifier. Further articles give information on matching techniques for co-axial cables of different impedances, and some useful observations on antenna gain considerations. Three whole pages are usefully devoted to a comprehensive table comparing dBm, power and volts into various impedances.

All in all, then, quite a meaty little magazine, and I for one shall be looking forward with anticipation to the next issue. Anyone wanting further information or with contributions for the magazine should contact the Editor as follows:

RAY FOXWELL VK5ZEF  
Editor, 'The ATVer'  
Unit 7/15 Byron Street  
Glenelg  
South Australia 5045

Telephone 2951419

# A BURST-LOCKED SUBCARRIER OSCILLATOR

---

by Chris Short G8GLQ

This circuit provides a colour subcarrier source that can be locked to any stable (i.e. crystal-controlled) source of composite video to enable the use of colour genlock with the CQ-TV Project 100 sync. pulse generator. It produces a reset signal for the SPG PAL ident (V-axis switch) and also a 4 x subcarrier feed for the Project 100 Pattern Generator and the SPG subcarrier offset/locking system described in CQ-TV 103.

The 4 x subcarrier burst-locked oscillator is a modified version of that used in the pattern generator. Simple switches are provided to control the subcarrier locking and VAS reset, and the subcarrier phase can be varied over 360 degrees to enable correct colour phasing. When not genlocked, the BLO control voltage is clamped to hold the oscillator on the nominal subcarrier frequency, so that it can continue to operate as a subcarrier source.

Normally both the subcarrier circuit and the SPG are locked to the reference video (note that a sync. separator is required for the SPG reference sync. input), but with some more sophisticated control logic it should be possible to revert to operating the SPG directly from the BLO (via the offset/locking circuit) once initial line and field lock has been achieved, assuming the use of a 'broadcast' reference.

## CIRCUIT DESCRIPTION

TR1 buffers the reference video input, and TR2 is the gated burst amplifier, providing about 4 - 5 v p-p burst to the phase detector D1 - D4. TR3 & TR4 generate the burst gating pulses from the reference video syncs. TR5 & TR6 amplify the d.c. error signal, the required time-constant being provided by the 2u2/ 1k2 RC network. When the subcarrier genlock is switched off, TR7 clamps the VCO to a nominal +6v d.c.

The VCO circuit is the same as that used in the P100 Pattern Generator using a 17.734475 MHz crystal, with the addition of a varicap diode to provide voltage control. IC1 amplifies and buffers the output, giving a 4 x s/c TTL output for the offset/locking circuit and pattern generator. IC2 divides this down to subcarrier frequency for the rest of the circuit. IC8a provides the VCO reference signal for the phase detector.

D1 & D2 of the phase detector provide a low-level square wave output at half line frequency in step with the line-by-line  $\pm 45$  degree swing of the burst phase. This is amplified by IC3 and sampled about 0v by comparator IC4 to provide TTL PAL ident or square wave (VAS) derived from the reference video. This is buffered by IC7a to provide a feed for a possible s/c lock indicator (not described in this article). The ident signal is used to produce reset pulses for the SPG (from IC7b), which are gated to allow reset only during field blanking by IC7c and the 1k5/47n time constant. Closing S3 inhibits the ident reset system completely.







IC 6a and b in conjunction with IC7d and S1 allow selection of either phase of subcarrier (Q or NOT Q, i.e. 0 or 180 degrees) and IC5a with VR1 offers fine adjustment of s/c phase over more than 180 degrees by introducing a variable delay. IC5b restores the 50/50 mark/space ratio with a period of half a subcarrier cycle. The high-Q tuned circuit at 4.43MHz, L2/VC2, produces a sinusoidal signal from the squarewave output of IC5b. TR9 buffers the tuned circuit and TR10 provides the low impedance output of subcarrier at the standard level of 1v p-p into 75-ohms.

The circuit requires well-stabilised supplies of +12v, -12v and +5v.

For greater stability and accuracy when in the free-running mode, the oscillator could perhaps be housed in a proportional control oven such as described in the ATV Handbook Vol.1 pp 92-93.

#### SETTING UP

Apply composite video to the subcarrier circuit input (loop through), and to the SPG reference sync. input (pin 1) via a sync. separator. Enable the SPG genlock (genlock control pin 2 high) so that the SPG locks up. 'Scope TR2 collector and adjust L1 for maximum burst amplitude (approx 4-5 v p-p). Switch off s/c lock (S2 closed) and adjust VC1 so that the BLO runs at nominal s/c frequency. Open S2, and the subcarrier should lock up (nominal control volts at TR6 collector = 6.v d.c.).

'Scope the subcarrier output, adjust VC2 for maximum amplitude consistent with best (sinusoidal) waveform, then set the output level at 1v p-p into a 75-ohm load with VR2. By the combined use of S1 and VR1, it should now be possible to set up correct chroma phase between the internal and genlock reference sources. Check that with S3 open, SPG ident (VAS) always resets to correct phase upon genlocking.

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## **TELEVISION HANDBOOK**

### **for the amateur**

**by Biagio Presti**

The BATC has a small quantity of this excellent handbook from America. Having 96 pages the book includes chapters on: TELEVISION SYSTEM FUNDAMENTALS, SPECIAL CIRCUITS AND PRINCIPLES, COLOUR TV PRINCIPLES, CONSTRUCTION PROJECTS (including 70cm transmit and receive systems), a useful 'CHARTS & TABLES' section completes the lineup.

**£3.25 (inc)**

From: BATC Publications, 14 Lilac Avenue, Leicester, LE5 1FN.

WHILE STOCKS LAST!

# 1.3GHZ NOTES

Andy Emmerson, G8PTH (Also G8CJS, DC0DA, DC6MR, PA0SON).

One of the points noted at our embryonic European TV working group in Bremen in April was the importance of compatible standards. As 24 cm ATV gets going, we have an ideal opportunity to achieve some harmony with uniform standards.

The choice of frequencies cannot be fixed internationally, if only because of the need to avoid local radar interference problems (which seem to be acute in some parts of Holland and Germany). Commonly used simplex frequencies are 1252 (Germany), 1255 (France) and 1275 MHz (Netherlands and Germany).

Britain, France and Holland are agreed that modulation should be positive, i.e. syncs low in frequency and peak white high. The Germans agreed to change to this convention. While FM sidebands 'go on for ever' it was agreed that an occupied bandwidth of 11 MHz was sensible, the centre of the occupied band being counted as the nominal frequency. Audio subcarrier is 5.5 MHz in all countries but our own - I can see no earthly reason for sticking with 6 MHz here. The ceramic filters for 5.5 are cheaper than 6.0 and there is no need for notional compatibility with AM television, since we do not use AM converters. By going to 5.5 we can reduce the occupied bandwidth slightly and, when the band opens, have a chance of making a full sound and vision contact. How about it then?

Finally, Egbert DD9QP offered an interesting table at the German convention. I think it speaks for itself.

MODULATION INDEX*	SIGNAL/NOISE GAIN OF FM OVER AM
0.3	-3.75
0.48	0.0
0.7	3.6
1.0	6.7
2.0	12.7
3.0	16.2
4.0	18.7
5.0	20.6
6.0	22.3
7.0	23.6
8.0	24.7
9.0	25.8

(\* modulation index is equal to the deviation divided by the highest video frequency.)

This is a classic log. curve - note how the improvement tails off above a modulation index of 3.

# THE CONVENTION - A MEMBERS' EYE VIEW

You always read only the 'official' report of BATC shows and conventions. This time, just for a change, now that you have digested it, let's hear how a member (of many years standing in the BATC) saw it....

I spent practically all day at the BATC convention talking to members. I didn't appreciate what a wide variety of people we had from all walks of life in our club.

All of them were keen and interested in information of all kinds, even if it was sometimes (by their own admission) "above their heads". Nevertheless they said it would store away for future reference.

I was surprised at the large number of people working on 24cm and pleased to hear their comments on reception reports. All said, with well designed equipment, results were as good as 70cm. The only problems that seemed to appear were those of the high-power radar transmissions that would operate the AGC and turn the sound off. I reckon a suitable filter in the front end would clear most of the problems.

In relation to FM against AM, most said FM was better above a certain signal strength but below that level sync was OK but tails would appear over the picture completely destroying the quality. (there are several answers to that one - keep taking CQ-TV to find them. ED)

Most people said they came because they wanted to update their equipment and pick up some useful bargains, and next year could we encourage people to bring along more useful 'junk'.

Someone turned up with a nice box of  $\frac{3}{4}$ " Vidicons, these were quickly snapped up as were lots and lots of excellent cameras that were on show and in a short time were in the backs of cars. I can look forward to super pictures arriving at the other end in the near future.

The trade stands were of a very high standard and I think all were well satisfied with their days work. The Wood & Douglas Microwave exhibit gave a lot of people room for thought and I think this is the way things are going to be in the future.

I found the Worthing Repeater group the most interesting of the lot. I found their treasurer Mr. Stephens most helpful and the information I obtained from him really opened my eyes. I have been in the TV trade all my life and I thought I knew most things that were going on, however I am never too old to learn. That's what 'self-training' is all about.

The chap that turned up with the radio controlled helicopter gave me considerable food for thought, with a colour camera fitted what a wonderful tool for people in the construction industry. Fly up a factory chimney and take photo's from the screen, what fantastic possibilities and what a wonderful idea - good luck to him.

Then there was the fellow who came from Australia. He was telling me of the 32-line pictures he had been watching in his area and how good he thought the pictures were.

Then another chap I met told me of a MECHANICAL scanning system that produced excellent pictures using 1,500 lines. Yes 1,500 lines using a laser system. Where will it all end?

Then Doug Pitt and Jeremy Jago were as keen as ever. What a beautiful effort on your mirror drum system. A credit to all.

What made my day was the chap with the test card on his jumper (knitted by his wife). I hope someone took a picture, and I hope the Editor gets it. How keen can you get?

What a lovely weekend. Where else could you sit and talk and talk and meet so many people in search of knowledge?

One thing I nearly forgot. Every person I met, on asking them what they thought of CQ-TV, said how much it had improved. Nice clear type, very high standard of information. Definately the best book of its type in the land, and very cheap. And who do we have to thank?, all the people who help produce the magazine and most of all your very own Editor. Thank you John.

All the best

Cyril Chivers.

Well now you're embarrassing me! How kind people are - well done team. (ED)



THE IMPRESSIVE LOOKING SHACK OF G6SKO

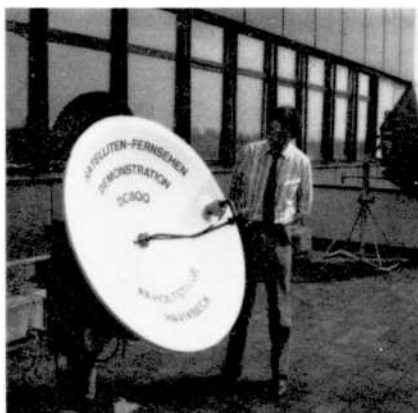
# W.GERMAN ATV CONVENTION

A REPORT BY ANDY EMMERSON G8PTH

Yes, another convention report, but this time from across the water in Germany. For a number of years the German ATV club (AGAF) and the BATC have exchanged publications, but contact has not gone much further than that, which is silly when you consider we both share common goals and interests. Like us, the German club holds an annual convention and this year the BATC decided it was high time we made ourselves known and paid a visit. Two volunteers, Trevor Brown G8CJS and Andy Emmerson G8PTH, offered their services and were despatched to Bremen as ambassadors of the BATC.

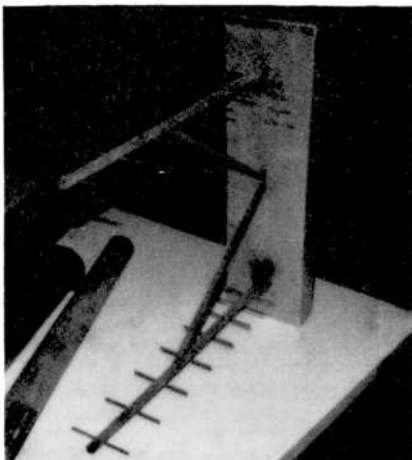
The date of the convention was Sunday 15th April, and we were favoured with superb weather for this weekend. The flight to Bremen went fine and we were delighted to find transport and an English speaking host waiting for us at Bremen. In fact the German club excelled itself in hospitality - everything from transport to hotel rooms was laid on, and we were thus able to enjoy every minute of our all too short stay without having to worry about domestic arrangements.

Bremen is one of the Hansa ports of north Germany with a medieval town centre, which we glimpsed briefly. The venue for the convention, however, was the modern university - in a building which also holds the local ATV repeater. (I must just mention that this repeater has some unusual features in that it monitors for incoming signals using an omnidirectional aerial and when accessed it will fire up and identify itself. At the same time it switches the receiver in turn to each of four yagis spaced 90 degrees apart to determine the strongest direction. After this it stays on that antenna (for input) for the session. Presumably the yagis are fairly short so that the beamwidth approaches 90 degrees.)



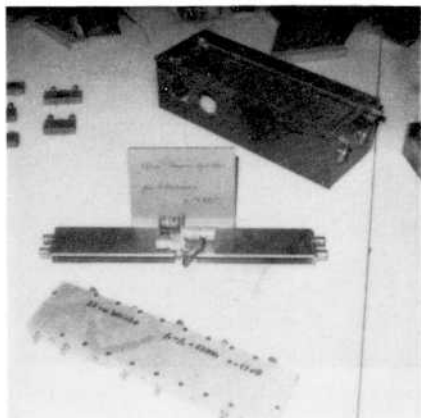
A comprehensive lecture programme lasting from 10 am to 5 pm had been arranged, with topics ranging from FM-ATV and 24 cm modules to repeater construction and satellites, both Russian 4 GHz and Meteosat. The lectures were of a very high standard, with video tape and slide illustrations.

Before we set out we guessed that the convention might be different from our British operations, and this turned out to be true. Commercial activities are not permitted, so there was no flea market. On the other hand there was a superb demonstration of members' constructions and this put our own shows to shame. The Germans have developed home-brewing almost to an artform, and well-nigh every project looked like a set-piece out of 'VHF Communications'.



Trevor enthused over beautifully machined 10 GHz horns with Gunn diodes incorporated, while I swooned at superbly machined and plated 4 tube (2C39A) PAs for 24 cm. Also on show were all manner of yagi antennas for all frequencies, many made out of hobby brass tubing and looking deceptively simple to copy. There were also several combiners to link vision and audio transmitters into a common aerial, and some beautifully machined filters.

Obviously there was 'black box' equipment there too; the Germans tend to excell in RF matters and pay little attention to the video side. We saw plenty of expensive looking colour cameras and VCRs - no electronic test cards or old black and white surveillance cameras! This may have something to do with different priorities or perhaps with a higher standard of living. (All the homebrew projects were made of new components and instrument cases - no surplus re-used.)



The AGAF had a club sales stand where they sold magazines, handbooks and stickers, and they kindly allowed us to sell some of our wares as well. As a result we got rid of no small number of magazines, books and stickers, and even signed up a few members. The German club is somewhat smaller than ours - around 850 members - but nearly 200 turned up to the convention.

At 5 o'clock the convention turned into an AGM and various topics of interest discussed. How to deal with members who did not renew their subs? Should double points be scored in contests for mobile TV contacts?

What if both stations are mobile? Is it even legal? Does the vehicle have to be moving to count? Unfortunately we had to absent ourselves to get back to the airport on time, so we could not sit this one out.

Without a doubt we found the experience most enjoyable and illuminating. We were made to feel most welcome right from the start and I believe our visit achieved real progress in international cooperation for ATV. A Dutch contingent was also present and we all swapped addresses and phone numbers in order to consult each other on matters of common interest, such as coexistence with other users of the 70 cm band. We also agreed to set up a European TV working group for standards; we now have a start in Germany, Britain and the Netherlands, and must establish links with other countries too.

To sum up, it was a pleasure to fly the BATC flag at our first international event in recent years. I hope that AGAF members will be able to visit us in due course and we shall all descend on the Dutch at their VHF convention this autumn!

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## **GB3TV - ON THE AIR**

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The 'Luton' repeater - GB3TV - located on the Dunstable Downs went on the air at 1800gmt on May 17th 1984. It is reported to be working well in full repeater mode and, so far, there is a fair bit of activity each evening. 144.75MHz is monitored for "viewers calls" which are most welcome. The repeater unfortunately does not have a full beacon mode, however it does come up briefly every fifteen minutes or so with a station identification when not in use. The repeater will be in use between 8 and 10pm every Wednesday evening especially to help those trying to contact it for the first time. Anyone wishing to give a reception report may address it to: Arthur Turner G4CPE, 318 Sundon Park Road, Luton, Beds., and anyone wishing to make a sked with a repeater 'local' may contact Graham Shirville G3VZV on 052 525 343 (evenings).

The two photo's taken off-air from the repeater were taken by G3VZV. The test card is in colour.





# CIRCUIT NOTEBOOK

## No.40

---

by John Lawrence GW3JGA

### PORTABLE 50Hz SUPPLY

This portable 50Hz 'mains' supply may be used for powering, from 12v.d.c., one of the mains-only type TV cameras in which the field scan is generated from the 50Hz mains waveform.

The 50Hz supply frequency is derived from a crystal oscillator and divider chain. The crystal frequency of 3.2768 MHz, when divided by 2<sup>11</sup>6, gives a final frequency of 50 Hz. In the circuit, the oscillator IC1a is followed by a buffer stage IC1b feeding IC2 (4020) which provides a frequency division of 2<sup>14</sup>. IC3a and IC3b each divide by two giving the final output frequency of 50Hz.

By suitable gating in IC4a and IC4b a 3:1 mark-space ratio is obtained for each half cycle of the output waveform so avoiding switching transient problems at cross-over. A drive signal of 0 and 180 degrees appears at 'x' and 'y'.

The push-pull output stage consists of a standard 12 volt mains transformer used in reverse as a step-up transformer with a centre-tapped primary winding. Each half of the 'primary' winding is driven on alternate half-cycles by Tr1, Tr2 and Tr3, Tr4. The combined transformer 'secondary' and load inductance is tuned by C3 and C4 for optimum efficiency and waveform shape. The output voltage (Avo 8, 250v range) is 200v.a.c., mainly due to using a 'standard' transformer rather than a specially wound one. It may be necessary, therefore, to adjust the mains input tap on the camera to 200v. More output power (but not voltage) may be obtained by using higher gain output stage transistors and uprating the transformer.

Protection against the battery being reversed is provided by the idiot diode D4. Start-up delay and protection against damage to the output stage in the event of the oscillator failing is provided by D1, R2, C6, and R3.



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## BATC NEWS HOTLINE

'PHONE LEICESTER (0533) 600108







# ROOM AT THE TOP

By Trevor Brown G8CJS

Early morning. Through dreams of the burnt out MHW710, the wasted trip to Zulu Oscar square and the disasters of the Summerfun contest came a strange ringing sound. Being the smart type I soon traced it to the bedside telephone. It was not yet 8 O'clock on Monday morning.

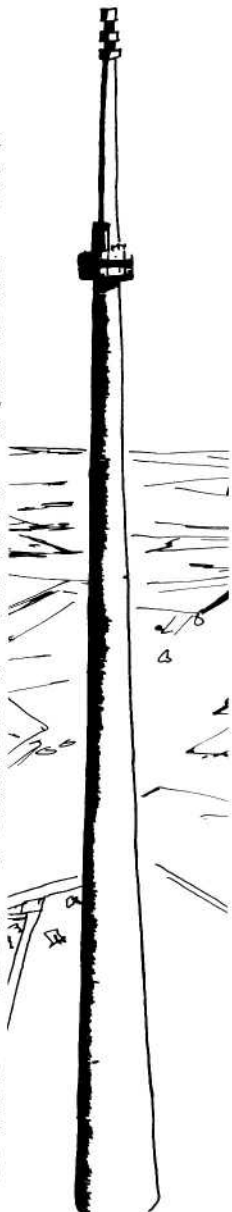
"Yeah". I said irritably, "'Sheffield Star' here" came an annoying 'fresh as a daisy' voice. "Do you know anything about this amateur television stuff?" "Possibly" I said, stalling, "Well one of our guys has been picking up pirate TV pictures of a chap with a funny hats award and a 1250ft ASL caption. Could you run him to ground so that we can do a story and take some action photo's?" (All this before 8 O'clock). "OK" I said, "for only twice my normal fee plus expenses I'll have a go".

After several cups of coffee and many phone calls I had exhausted all possible leads. This guy didn't seem to be on the CQ-TV mailing list (obviously some sort of idiot). The big break came when I found the fellow who had sold our mystery man some TV gear. I phoned my client, gave him the good news, hung up and pondered about the chances of working the price of a new MHW710 into my expenses.

I thought that was that. Not a chance. Later in the week came that familiar ringing sound. "'Yorkshire Television', do you know anything about this story in the Sheffield Star?" They had obviously done their homework so I answered in the affirmative. "Would it be possible to run live amateur television pictures into our Friday news programme 'Calendar'?" I tried to give this one the run-around - he didn't know my PA was burnt out - but he wasn't taking 'no' for an answer. He pointed me to a room on top of the 850ft Emley Moor TV mast and left me to it.

Thursday found me reluctantly riding the lift skywards to the top of the world clutching my entire ATV station and a Yagi. The lift jarred to a stop and I stumbled into a circular room with a view that makes the average penthouse seem like a basement.

I commandeered the telephone, (I see Busby made it first), and rounded up a few local TV hams. Pictures from G4EKD in Chesterfield were a washout, made worse by some strange patterning which I traced to the GB3EM 70cm beacon that lived in the same room. I pulled its plugs, (sorry RSGB), still no go with Chesterfield. However G6LIC and G3PTU pounded in.



I phoned the producer and put him wise to the situation, he was very keen and promised to lay-on a links team for Friday to connect this room at the top back to his studio.

Friday found me again riding the lift to the heavens, more confident this time and dreaming of stardom. I passed the video lead across to the links team and punched up my colour bars complete with G8CJS logo. (Handbook-1 character generator, Handbook-2 colouriser and P100 SPG). The phone buzzed and control said it looked good.

The crucial time was fast approaching. ITN news at 5.45 finished and 'Calendar' took to the air. By this time the adrenalin was pumping as I realised there was no going back. I grabbed my hand mike and SU19 sprang to life. G6LIC took his cues and his pictures leapt onto the screen. The interviewer quizzed him via their off-air sound which crackled in his earpiece.

Six-million viewers were watching the output of my ATV station. Would the Handbook-1 vision switcher hold together? It's at times like these that silly things pass through your head. All I could think of was how could I claim all those points for the CQ-TV award and it's a pity this wasn't the summerfun contest!

The programme continued with recorded pictures of G4EKD in Chesterfield - the news team had been in action filming him the previous day. The phone buzzed. Could I find another station to close the programme? I grabbed my hand mic again and found G3PTU. The by-now slick performance was repeated and those six-million saw G3PTU in action answering daft questions put to him by the YTV people. The programme eventually came to an end and I got to say those magic words: "G8CJS to all stations; it's a wrap" (If you're going to be a superstar you might at least get used to the jargon).

After putting GB3EM back on the air and trailing an assortment of leads behind I rode the lift back down to terra firma. As I piled into the car I thought "funny old week. You start off being woken in the middle of the night (!) and end up being a superstar. Did it really happen?"

YES IT REALLY DID.



Control position in the shack of F3YX.

# USER REPORT

## THREE GEMS FOR 24

Compiled by John Wood G3YQC

Now that the 24cm band has started to become popular amongst TV enthusiasts, several manufacturers have begun to turn their attention towards this potentially lucrative market.

To equip my own station I have recently acquired three typical pieces of equipment and this short article describes some of my experiences with them over the last few months.

### WOOD & DOUGLAS UFM01 430MHz MASTER OSCILLATOR

This oscillator module provides a drive source suitable for varactor or valve multiplication to the 1.3GHz band. It has a built-in FM-TV modulator producing more than 2MHz deviation when driven with a 1v p-p composite video signal.

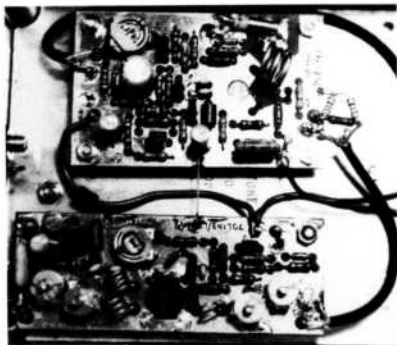
The quoted specification is as follows:-

Tuneable Frequency Range	: 390 - 440MHz
Power Output	: 50mW nominal
Deviation	: + 2MHz (sync to peak white)
Video Bandwidth	: 1% droop @ 4.43MHz (95% of sidebands -60dB @ 12MHz)
Drift	: 1KHz/min after 5-mins from switch-on
Supply Voltage	: 12v nominal @ 70mA

My order was received by return of post and was well packed and supplied with adequate documentation including the circuit diagram. In my case the 4 rivets required for earth plane bonding around the oscillator circuit were omitted. However short pieces of 16swg copper wire served the purpose.

As one expects from W&D products everything fitted together nicely, although some care was needed in fitting the miniature trimmer capacitor. Instructions and diagrams were clear and easy to follow.

The oscillator worked first time and I could verify the tuning range by monitoring the output on an ATV converter and domestic TV tuner.



Photograph shows the oscillator at the top with a 70lin3/LT linear amplifier below.

Note the 3dB resistive pad to the right of the oscillator module.

The unit was installed in a diecast box and connected to a 70LIN3-LT 70cm linear amplifier module, which not only brings the signal level up to around 0.5W but more importantly acts as a buffer between the amplifier and multiplier or amplifier stages. It is quite important to use a linear amplifier for this purpose and the one specified is especially recommended. I used a 3dB resistive pad between the two modules - as suggested in the instructions - which helped to achieve optimum stability and also ensured a proper resistive termination for the oscillator.

On test, frequency stability was slightly better than the specification and spectral purity was good. The unit was surprisingly tolerant of supply voltage variations, although only well regulated supplies should be used. Modulation was excellent and exhibited no visible deterioration of colour. Pre-emphasis is not included on the modulator neither is provision for adding 6MHz sound. The instructions give some suggestions for adding emphasis, and sound is best added as a 6MHz FM signal to the video before being applied to the modulator input.

This unit forms the basis on one of my 24cm ATV transmitters. A W&D 10W 70cm FM power amplifier brings the RF level up to around 14W which is fed to a Microwave Modules 23cm varactor tripler. The resulting 5-Watts drives a 2C39 PA whose output is around 40-Watts.

I strongly recommend this oscillator as a straightforward and economical way of generating a 24cm FM-TV signal.

#### FORTOP TVT1300 24cm ATV TRANSMITTER

At the moment the TVT1300 has to be the 'Rolls Royce' of transmitters for 24. The unit is completely self-contained, well designed and engineered and has all the facilities needed for complete operation in the band.

The quoted specification is as follows:-

Power output	: 2.5-Watts typical
Mode	: Frequency Modulated TV
Pre-emphasis	: CCIR specification
Video Input	: 0.5v - 2v into 75-ohms
Audio Input	: 5mV (min)
Sound Subcarrier Freq.	: 6 MHz
Power Requirements	: 12 - 13.8v @ 1.25A
Size	: 190 x 120 x 160mm
Weight	: 1500 grams

The transmitter is supplied complete with installation and operating instructions, a BNC coax plug (RF), (qty 2) UHF coax plugs (video), a 3.5mm jack plug (mic) and a 5-pin screwed type power and control plug. Although the front panel has a switch for two carrier frequencies, the transmitter is supplied with one crystal only (1255 MHz or as requested). I tried fitting a second crystal to give a final frequency 15 MHz above that supplied but found that circuit bandwidth reduced the output to an unacceptable level. A shift of around 5 MHz or so would probably be OK especially if the transmitter could be aligned halfway between the two.



Front panel controls may be seen in the photograph. The back panel includes a 50-ohm BNC socket for RF output, two UHF sockets for videos 1 and 2, a 5-pin power and control socket, 3.5mm mic socket and a spare BNC socket which may be used for additions such as an RF monitor probe.

Frequency stability was measured at less than 2.5KHz per minute after 5-minutes warm-up from cold. RF output was 2.4 Watts and a spectrum analyser showed the second harmonic to be 45dB down with all others better than 60dB down. The unit was put on 'soak' test for thirty minutes into a 50-ohm resistive load, during which the power output dropped by 0.1W. The diecast cabinet only became mildly warm.

It was not possible to accurately measure the deviation, however with 1v p-p composite video applied and the deviation control set to mid position, the resulting signal, when received using a PLL demodulator whose passband had been set to 15MHz at -3dB, the deviation appeared to be about optimum. One may conclude then that the deviation at that setting was of the order of 5 to 6MHz. Since all modulation disappeared when the control was turned fully anti-clockwise, the range available would seem to be just right.

The normal/invert video control could be useful for working French stations. Pre-emphasis seems to produce the required effect and the audio quality is reported as being "very nice".

I have used the transmitter for many hours now and found it to be stable and reliable in every respect. There is never any need to 'fiddle' with the controls which makes it ideal for my use. The 2.4W output power level is adequate to drive my 2C39 PA to full output.

This unit, although at first glance appearing to be somewhat expensive, in fact represents very good value for money. The full spec. facilities incorporated, together with the high quality of construction and presentation, and a useful power output makes it a good proposition for the serious 24cm TVer. If you were to try to make one yourself, you would see what I mean! Highly recommended.

#### SANDPIPER COMMUNICATIONS 1.3GHz HELIX

I mentioned this new aerial in the last issue having, at the time, only just bought it. Since then Sandpiper have made one or two alterations to the design making it even better.

The photograph shows the aerial as it was displayed at the BATC convention and illustrates the general construction.

The published specification is as follows:

Design frequency : 1297MHz (centre)  
Number of turns : 20\*  
Gain : 17 dBi  
Boom Length : 51"  
Bandwidth @ -3dB : + 50MHz (approx)  
Feed Impedance : 50 Ohms (nominal)

\* Other lengths available



The first aerial which I received came in separate parts which needed assembling - a straightforward job. The second one came completely assembled.

The aerial is made from plastic covered copper tubing mounted on a solid fibreglass boom. The reflector is of pressed construction with a rolled edge and is also plastic coated against environmental attack. The output socket fitted to the reflector is 50-ohm N-type. A metal tube projects from a purpose-turned 'bell' flange at the rear of the reflector onto which the mast clamp (supplied) fits.

Unfortunately I do not have facilities for measuring the performance of aerials therefore the majority of tests were subjective and on occasion a matter of interpretation.

The feed impedance was measured at around 62-ohms on the first and 58-ohms on the second. This may be adjusted by altering the distance of the first turn from the reflector. Facilities for accurately measuring VSWR were not available although a 'domestic' bridge showed it to be just over 1.2:1, however this was measured at the shack end and could not be relied upon. Judging by general performance and by the indications on the PA meters I conclude that the VSWR is satisfactory and certainly no worse than other aerials tried.

The only way I have of judging gain is to carry out 'on air' comparison tests

against other aeralis. The only one available so far has been the 24cm Tonna. A test was set up with 68VBC over an obstructed 35-mile path. a 15/15 J-Beam was used for receiving and the Tonna and helix for transmitting. A transmission was first made with the Tonna and a video recording made. The helix was substituted and another recording made. When the two recordings were played back in sequence, there was a noticeable improvement when using the helix. It must be remembered that with a helix at only one end of the link the theoretical cross-polar attenuation will be at least 3dB, therefore one can conclude that the Helix seems to have more than 3dB gain over the Tonna. Moreover the beamwidth of the helix was noticeably wider making aerial alignment much easier. The same test was conducted twice with identical results.

The above test was carried out near the design frequency of the Tonna so, in common with most Yagi style aeralis one could expect a considerable fall-off of performance if the operating frequency were altered more than a very few MHz. The helix however, with its 100MHz bandwidth should perform well over the entire 1.3GHz band making TV repeater working possible with a single aerial - not to mention the 23cm phone band.

The nose weight - when mounted as recommended - seems a little heavy although the manufacturer is making an effort to reduce it. Although this form of mounting is entirely suitable I have used a 'U' bracket (similar to those used on domestic 'long' aeralis) with pieces of plastic rod pushed in the ends to keep the metal bracket well clear of the helix. Using this method it is possible to mount the aerial centrally on top of a stub mast giving a more even weight distribution.

So far I am very pleased with the aerial and can certainly recommend it. I personally think that time will show this type of aerial to be best suited to the rather unusual requirements of amateur TV.

Now that there is a considerable amount of commercially built equipment for ATV on the market, CQ-TV would very much like to feature more test or user reports - good or bad - so that others may be guided in their choice of equipment. If you would like to compile such a report or discuss a piece of equipment with the Editor, please feel free to do so. (address on inside front cover).



G6CEZ/P (with junior op)  
at Win Green Hill near  
Shaftesbury during the  
May SUMMERFUN contest.



# Introducing the 'SQUELIX'

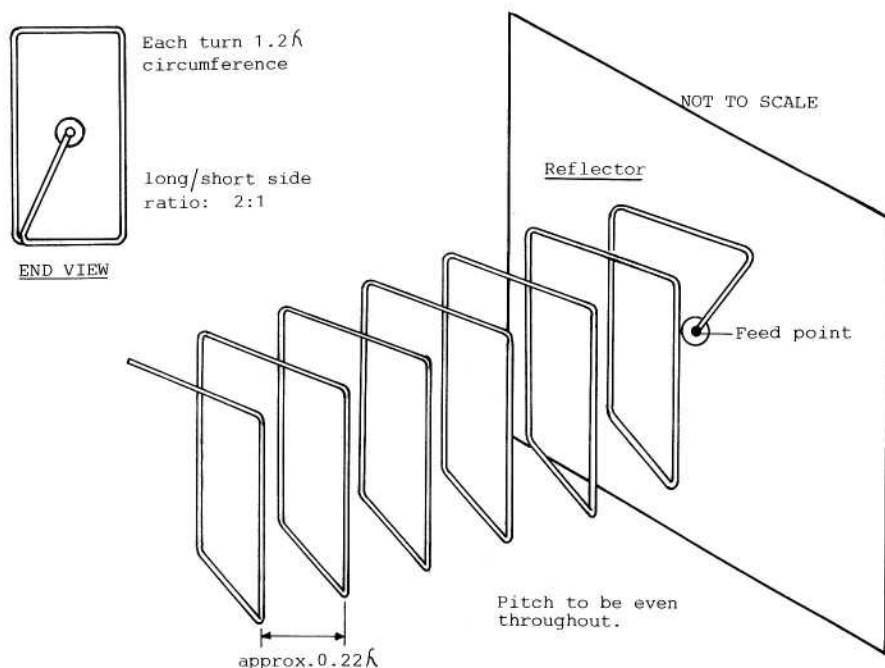
By D.J.Long G3PTU

Conventional helical aerials radiate circularly polarised waves, therefore their effective gain will be reduced by around 3dB when receiving planar polarised signals.

Such a helix is constructed in corkscrew fashion however, in this design, the active element is fashioned with square sides of 2:1 ratio. Placing the longest side of the element vertically will result in the aerial polarisation being horizontal.

The feed impedance on my experimental model appears to be approximately that of the conventional helix - 140-ohms, therefore a 0.25 wave length of 70-ohm coaxial cable should be employed as an impedance transformer to 50-ohms. However it may be possible to achieve this transformation by laying the first quarter turn or so close (but not touching) to the backplane reflector and feeding the aerial directly with 50-ohm coax.

I have made two of these aerials using the copper-plated inner conductor from scrap 'Foamflex' 1" diameter coaxial cable, both of which seem to work well.



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## FOR SALE

### \*\*\* OUTSIDE BROADCAST VAN \*\*\*

THE BATC has been asked to find a home for an OB van. It is approximately 24ft long and has little or no equipment in it. Interested parties should contact Brian Summers on 0427 3940 on Friday or Saturday evenings only.

SPECTRUM ATV PROGRAM now available on ZX Microdrive cartridge at £10.50p including postage. (see ad. CQ-TV126)

R.Stephens, 'Toftwood', Mill Lane, High Salvington, Worthing, West Sussex.

SPECIAL OFFER to BATC members. Schrader tunable masthead pre-amplifier. Channels 17 to 69. 1.4 - 1.9dB noise figure, nominal 30dB gain. Price, including power/tuning supply unit: £29. plus £1.70 postage.

Van Reysen. 28 Pemberton Road, E. Molesey, Surrey. Tel: 01 979 7380 or 01 546 8513

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David Wilson, 4 Harkness Close, Bletchley, Milton Keynes, Bucks MK2 3NB  
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WOOD & DOUGLAS 70cm ATV transceiver comprising 0.5W TX, up-converter (output ch36), 3SK88 pre-amp, band pass filter and PIN diode aerial switch. All built and working £65 the lot. ITC CTC4000 video camera. Very low light capability, very nice picture and no tube marks. Composite video output, mains lock and internal sync (good for portable use). Supplied with 16mm Tamron lens £40. ono. TWO SPECTRUM 48k computers with PSU, leads, hundreds of pounds worth of games etc. All vgc £165. ono. Data recorder to suit - as new £20. ATV PROGRAM for Sinclair Spectrum (see recent ad's), £4.00 or free with above. WANTED IC202S or similar, 70cm TX-RX (Palm IV etc), anything for RTTY. Absolutely anything considered. w.h.y?  
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ODD AERIALS SECTION: Jaybeam professional 106 MHz end fed dipole still available, £15. Also a 1500 MHz shrouded yagi £20 and a professional midband groundplane £15.  
Andy Emmerson, G8PTH. Northampton (0604) 844130.

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FOR CONRAC colour monitor - A high-voltage box; module (106057) and 150/200v power supply module (106058). Also mains transformer for Solartron CD1400 oscilloscope. Robin Dakin. 8 Baddow Hall Crescent, Great Baddow, Chelmsford, Essex CM2 7BY

MONITORS AND CAMERAS wanted. Also 70cm transmitter and aerials. Signal generator, any other associated equipment to enable me to start transmitting on 70cm. If you can help with anything please contact George Lee G1EEX. 6 Hoyle Gardens, South Oxley, Watford, Herts WD1 6LG. Tel: 01 421 1506

INFORMATION on the JVC AX88 video camera. Also wanted 8-pin male connector and 6-pin male connector for Sony CV-2100-ACE video recorder. Geo Davies G2FXA. 19 California Close, Stockton-on-Tees, Cleveland TS18 1PQ

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ATV CONVERTER wanted. Ken Purser G6HZG. 182 Booth Road, Collindale, London NW9. Tel: 01 205 1184 (evenings)

#### HELP OFFERED AND WANTED:

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COLOUR ADAPTOR module CLP-ICE wanted for Sony EV310CE videocorder.  
Bob Robson GW8AGI, 47 Thornhill Way, Rogerstone, Newport, Gwent NP1 9FS.  
Tel: 0633 892182

SONY CFC colour frequency converter model CFC-100. VIDEO HEAD assembly for National Panasonic open-reel VTR model: NV3020. NTSC signal encoder.  
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I HAVE NEED of a CRT type 1374Q or equivalent. Also te matching base and Mu-metal shield. If you know of a source please contact Peter Delaney G8KZG, 6 East View Close, Wargrave, Berks. Tel: Wargrave 3121.



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