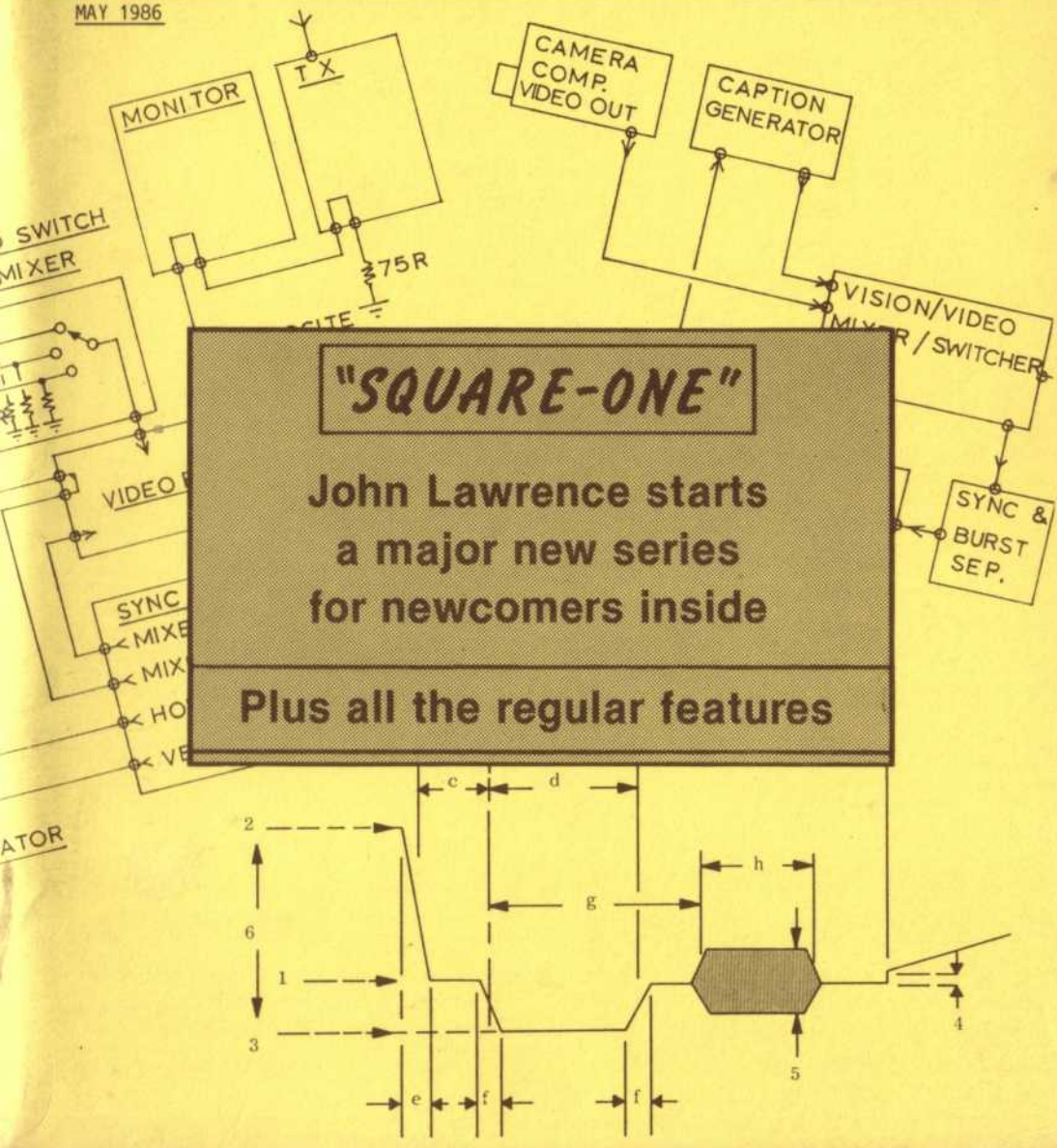
CQ-TV MAGAZINE No. 134

BRITISH AMATEUR TELEVISION CLUB

MAY 1986



"SQUARE-ONE"

John Lawrence starts a major new series for newcomers inside

Plus all the regular features

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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: £5 or £1.25 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. Overseas airmail is extra - please enquire.

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 AUGUST 1986 ISSUE.....20th June

EDITORS POSTBAG

Dear Ed,

I have been developing an 11GHz satellite TV receiver for some time now and thought that other members may be interested in my system.
I use a 6ft dish with a 3-stage GaAsFET preamplifier (NE71083-MGF1403-MGF1402) feeding a Mitsubishi FO-UP11KF receiver module. There is also a 30dB IF amplifier (850-1550MHz) located at the dish.
The indoor unit uses an Astec AT1020 tuner and Plessey SL1452 FM demodulator ic at 612MHz. This is followed by a video clamp and a tunable sound IF. FM-TV receivers tuning 500-800MHz (intended for 24cm ATV converter first IFs) give usable results without modification but the inevitable NE564 demodulator is not really capable of handling the 36MHz bandwidth of the satellite signals.
My system produces P5 pictures from ECS1 and, incidentally, good results tuning 1255MHz direct with the addition of a 24cm preamp.
I should be happy to answer any queries which members may have concerning satellite TVRO systems.

Dave Crump, G8GKQ,
8 Ranworth Close,
Swaffham,
Norfolk PE37 7ST
Tel: 0760 23930

Dear Ed,

I am joining the BATC again. I was a member some 17 years ago and I have become interested in ATV again.
Are there any members interested in 10GHz ATV?

Chris Randall, G4RBR,
45 Rushett Close,
Long Ditton,
Surrey KT7 0UT

Dear Ed,

I have a workshop where we repair TV's and VCR's and I wondered if any BATC members, similarly occupied, might like to contact me to exchange views and information.

S.S.Vaid.
5F/66
Nit Faridabad,
India - 121001

Following the item entitled 'Where Are They Now?' in the last issue, I would like to thank the many members who supplied details of some of those mentioned. Below is a letter typical of many received:

Dear Ed,

I received CQ-TV 133 today and the item 'Where Are They Now?' caught my eye.
I am sad to inform you that Harold Jones G5ZT passed away many years ago. In fact I was at his shack in 1969 when I was a coastguard officer at Rame Head in Cornwall, and I was still in contact/QSO a few weeks before I learned he was "silent key".
It was a great loss to all in the Plymouth area, and it was Harold who re-kindled my interest in ATV, although I regret I was not able to go far enough to exchange video with him, mainly because of my irregular watchkeeping/rescue duties.
I transferred from Rame head to Southend Coastguard in 1973, and several years ago I joined the BATC. I am now fairly active on 70cm although I hope to have a dabble at 24cm later on.

Les Gibson, G3RCX

Dear Ed,

Thank you for CQ-TV, it's the only thing that keeps me sane! Where have all the ATVers gone? Have they all gone down the pub to forget the money spent on ATV equipment or do they sit and watch Dallas, Dysentry or the Colbys? Perhaps some of them sit down and build 24cm repeaters, vision mixers and TV transmitters but some of us just like to operate ATV whether it be on 24, 70 or SSTV. So come on lads and lassies, use the frequencies or lose them.

Andy Dunham G6OHM (March Cambs).

Dear Ed,

I regularly use a BBC-B computer in the shack, both on air and for titling onto video tape. Along with many others I am very disappointed with the quality of the composite video signal from the Beeb. Can anyone help me with some information on how I can improve this situation? I know there are various circuits available including the PAL coder in the BATC Handbook (Blue). Does anyone know how to connect it to the Beeb? All letters answered and costs reimbursed.

Ron Bray, G8VEH.
14 Hadlow Way,
Lancing,
West Sussex.

NEWS ROUNDUP

PRESTEL AT LAST

At last three committee members have been able to attend a PRESTEL editing course. They are all now fully geared up and the first pages are on line now. Further details may be found elsewhere in this issue.

WORTHING ATV GROUP AT THE SHOW

The Worthing & District Video Repeater Group will again be well represented at this year's show. Demonstrations of a 5.5/6.0MHz sound board, band scan display processor and a novel video AGC system will take place and it is hoped to have a limited number of kits available for some projects. The popular Worthing 24cm aerial kits will also be on sale. Following requests from BATC members, the group will have an on-the-spot update service to bring older copies of their Spectrum 'ATV PROGRAM' up to the latest version, which includes the new Maidenhead locator system. If you would like your old program updated then bring it along to the show where, for only £2.00, it will be attended to.

NEW COMPUTER FROM W&D

Are Wood & Douglas entering the computer market? Well they HAVE just introduced a Z80 single-board Universal Controller: Designated the SBC16 the unit has been designed to fulfil wide ranging control applications with only changes to the on-card software EPROM. The digital interface controller, type 8255, has facilities for upto 24 lines. These can be configured in groups of four as input or output ports, all are TTL compatible and can be designated active high or low. There is a separate interrupt input to initiate 'JUMP' routines. The programming EPROM can be standard format 2716 or 2732 devices.
Applications include remote control of up to 16 remote TV cameras, control of sixteen functions at each location, either momentary or latching relay closures, simultaneous operation of all 16 functions at any addressed location and single pair communication connection to all locations.
Boards available are the SBC16-T control board programmed for transmit application; SBC16-R control board programmed for receive application; ENC-T control encoder keypad transmit and ENC-R receiver decoder and relay driver.
The unit is similar to TELETRON which is described in the BATC's publication 'Micro and Television Projects'.

ATV ON 10GHz

I have been hearing of an increasing number of stations either interested in, or actually working on ATV at 10GHz. Of course what most people want is some practical help and advice so if you are on that band why not write about your equipment and techniques as well as any experiences and send it to CQ-TV. How about some photographs? what about distance records? surely the distance record book for amateur TV on 10G is wide open. When you plan your microwave activities for the coming season please remember CQ-TV.

MORE COPY FOR CQ-TV

I know that CQ-TV has been rather fat of late but at present the material coming in is beginning to dwindle a bit, if it continues the magazines will slim down again. I would like to hear from ANYONE who has anything which may be of interest to others. Please don't think that every article needs to be a multi-page full bloodied technical job; the small single pagers (and half and quarter ones) are just as important. There is little which you could send me which wouldn't find a space in the mag so please get your thinking caps on and get out those pens. If you need any help with putting something together, then please give me a ring during evenings or weekends when I will be pleased to discuss anything at all.

Ed.

NEW BATC BOOK

Owing to the very large influx of new members over the last few years, and ever-mindful of the fact that much of the information previously published in CQ-TV magazine is becoming less available (almost all back issues having been snapped up), the BATC has put together a 100-page book entitled 'Best of CQ-TV'. This volume presents a selection of the best and most requested articles from magazines over the last six years, and the Editors have taken the opportunity to include any corrections, modifications or additional material which has since become available.
The book is ideal for newcomers or those who can't get hold of the earlier magazines and should prove invaluable to members setting-up or operating an ATV station.
Further details are given elsewhere in this issue and books may be ordered on the 'Publications' order form in the centre of CQ-TV. The book will also be on sale from the BATC stand at the Convention in May.

ULTRA PORTABLE TV TRANSMITTER

Recently released on the American market is the Hawkeye VTR-80 video/audio transmitter. A specially designed device to transmit video/audio signals from an infra-red camera; standard consumer/commercial video camera; VCR etc. to a standard (USA) TV set operating on UHF channel 14.
The operational bandwidth of the Hawkeye VTR-80 is 420-520MHz therefore it can be crystalled up for use in the 70cm amateur allocation. Range is quoted as 200ft althougn the use of a high-gain aerial could extend this considerably.
Specifications include: Single channel operation; below 500uV/m RF output at 30 meters; 12v DC operation; AM video and FM audio; video input 1v p-p into 75-Ohms; RF bandwidth 6MHz; weight 1.8lbs.
The unit is priced in the States at $175 and further information may be obtained from: Hawkeye Industries, Inc., 10711 S.W.216 Street, Miami, Florida 33170. (305) 238-6366.

SWINDON RALLY

The Swindon & District Amateur Radio Club will be holding their Radio & Electronics rally on Sunday May 11th, and it is hoped that an amateur TV presence will be in evidence.
Further details from K.Saunders G8SFM on 066689 307 (evenings/weekends) or 0453 810451 ext.231 (office hours).

REPEATER NEWS

The Stoke-on-Trent ATV repeater GB3UD finally went on the air in late January. Its location is Mow Cop in Staffordshire (a super site) and it operates with FM only on channel RMT-2 (1249MHz input and 1318.5MHz output). Although at the time of writing the machine is running on its transmit driver with a power of around 200mW and in manned beacon mode, it is hoped that a power amplifier will shortly be added to boost this to several Watts.
Early reports include P3 from G5KS and G3DFL (Warley - Birmingham), and P1 from G1GST (Dudley - Birmingham), as well as several reports from the Stoke area.
The repeater will be officially opened, as part of a local promo, on April 9th when it is expected to be in full repeat mode.

MC1445 ON ITS WAY?

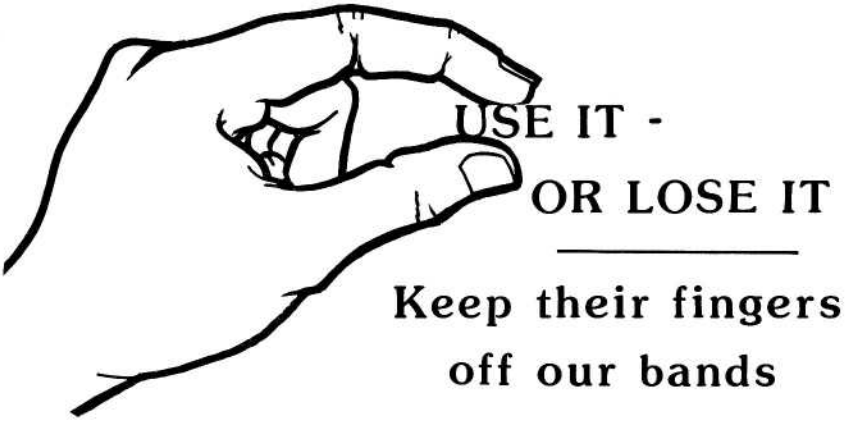
Peter Delaney has advised that the MC1445 chips, widely used in John Goode's articles, is becoming a little hard to get, possibly indicating a cessation in manufacturing. Members who foresee a future requirement for these chips are advised to obtain them soon - just in case.

FOREIGN CURRENCY

When sending money to any department of the BATC, overseas members are asked please to send either an International Money Order or a cheque bearing the name of a UK banker's agent. The occasional member finds neither of these methods suitable however and sends instead local currency. Although this method is frowned upon by the authorities, please bear in mind that the club invariably loses money on an exchange transaction through a bank. For example; one recent transaction involving Spanish currency cost an extra £1 stirling. Would overseas members therefore please include sufficient currency to compensate for these charges.

NBTVA MEETING

BATC members are welcome at the 12th annual meeting of the NBTVA.
This will take place on Saturday 26th April at the Trent Polytechnic in Clifton, near Nottingham. From the M1 the A453 from junction 24 leads to the college. The entrance is on the left hand side of the road, shortly after a "Clifton Village" sign. The exhibition is usually well established by noon, officially opening at 10am.
Please wear your BATC and callsign badges.



New series for beginners

SQUARE ONE

Part-1

By John Lawrence GW3JGA.

This is a new series of articles catering particularly for the beginner who is trying to connect together various items of commercial or home built video equipment and to set up an Amateur TV station.

THE TELEVISION VIDEO SIGNAL.

For broadcasting purposes, the television signal is specified in great detail, with limits and tolerances, so that one piece of equipment can be guaranteed to work with another. Amateur Television tends to follow the technical specifications and trends of professional television albeit at a somewhat relaxed and less stringent level - but still more than adequate to give very acceptable results and quite capable of working with most items of 'professional grade' TV equipment.

The television video signal is produced in a camera or other picture source by a sequential scanning process. In sequential scanning, the camera examines each element of the scene in turn, line-by-line, and gives an electrical output determined by the tonal value of each particular element. When the last element has been examined, the camera's scanning returns to the first element and the cycle is repeated indefinitely.

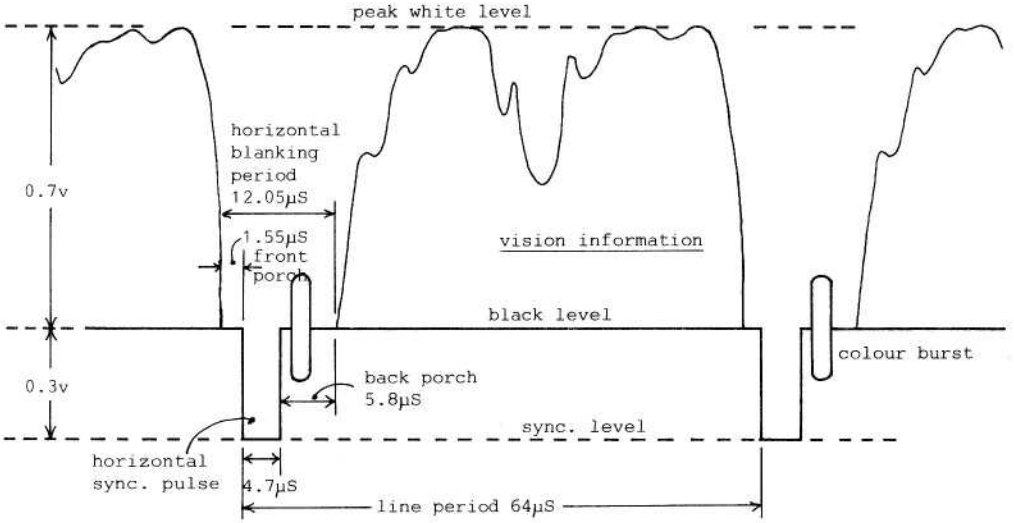


Fig.1 COMPOSITE VIDEO WAVEFORM

At the receiving end of the link, the spot on the screen of the receiver is following exactly the scanning movements of that at the transmitting end and varying in brightness in sympathy with the brightness of the elements in the

scene. In order that the receiver knows when to end a horizontal scanning line and start a new one, a synchronising signal (horizontal sync pulse) is included at the correct point in the video signal and both the camera and receiver commence a new line together. Similarly, after scanning line-by-line down the picture, a synchronising signal (vertical sync signal) is included to ensure that the camera and receiver end one vertical 'field' scan and start a new one together. The effect on a receiver, which has not been synchronised with the incoming signal, is the appearance of diagonal black bars (horizontal fault) or black horizontal bar drifting or flickering vertically (vertical fault).

The video signal, when it is first generated, consists of only picture information and is usually known as raw or 'non-composite' video. When the horizontal and vertical synchronising signals are added, the processed signal becomes 'composite video'. This is the type of video signal produced by a home video camera or video tape recorder, and is the video signal required by an ATV transmitter.

THE COMPOSITE VIDEO WAVEFORM.

A representation of the composite video waveform is shown in Fig.1. This is really a graph showing the video signal voltage varying with time, along one scanning line, and is the type of trace an oscilloscope would display when connected to a composite video signal. (Typical settings on the oscilloscope might be Y = 0.2v/cm, X = 10uS/cm). The synchronising information is contained in the lower 0.3 volts of the signal, below the black level, and the video (picture) information is contained in the upper 0.7 volts of the signal, up to the peak white level. This is best illustrated by Fig.2 where the video information comprises a grey-scale pattern ranging from black level at the left through various shades of grey to white level on the right.

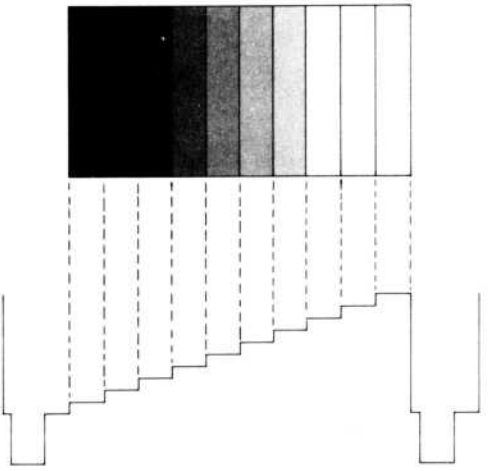


Fig.2 'STAIRCASE' WAVEFORM

The block diagram of a basic ATV station using a single picture source (camera with composite video output) is shown in Fig.3.

OTHER SIGNAL SOURCES.

From the comments made already it is clear that to produce a steady picture, the receiver must be synchronised with the camera or other picture source. So long as only one picture source is in use this presents no practical difficulty. However, if two or more picture sources are in use then these must be synchronised with one another or switching between sources will cause the received picture to 'roll', as it loses synchronisation, and fading or mixing between pictures will be impossible.

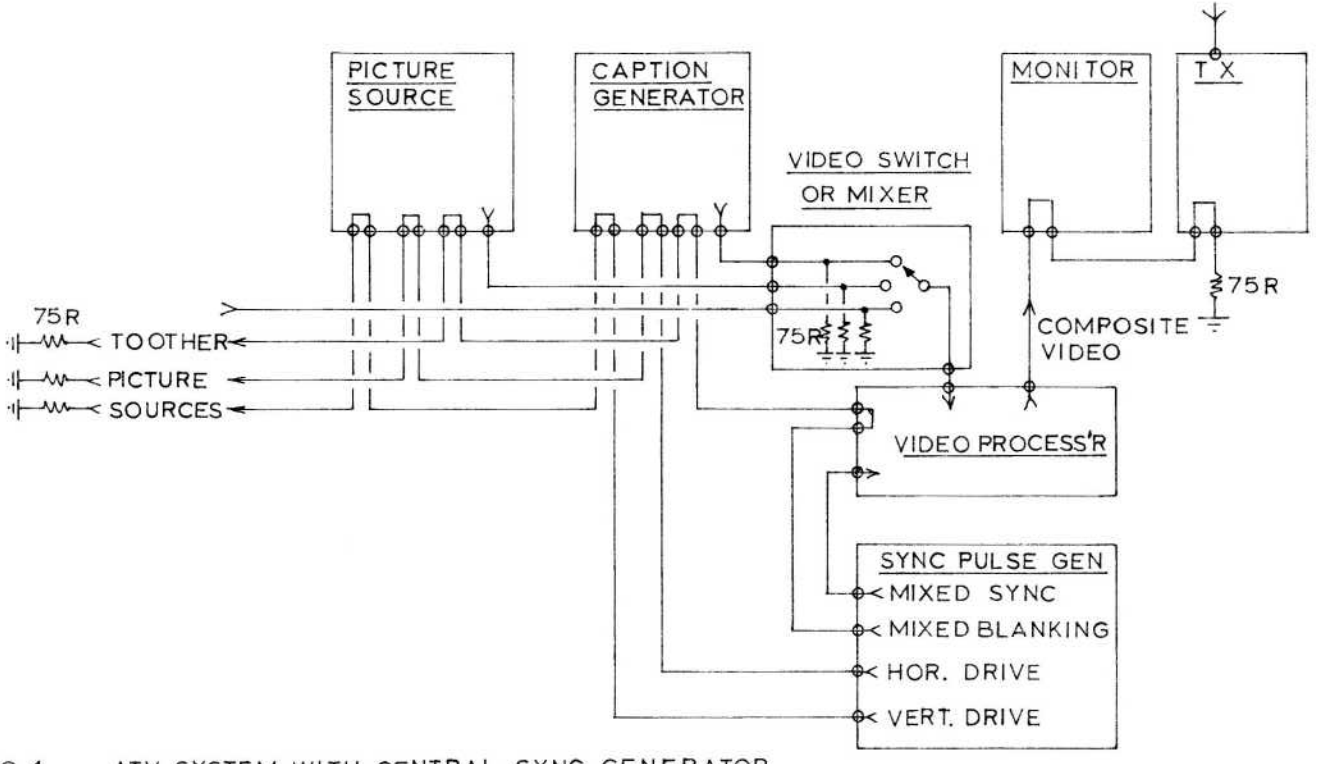


FIG.4. ATV SYSTEM WITH CENTRAL SYNC GENERATOR

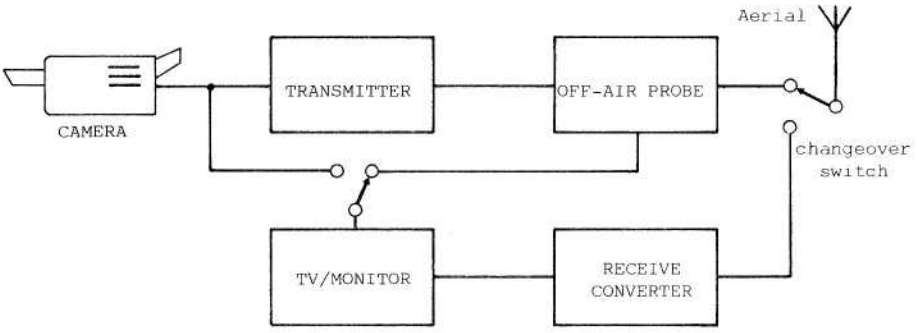


Fig.3 BLOCK DIAGRAM OF A SIMPLE AMATEUR TV STATION

In the 'good old days' of 405 line monochrome TV, when most amateur stations were 'home brewed', the system followed broadcasting practice and consisted of a central Sync Pulse Generator (SPG) which provided 4 types of pulse outputs for synchronising the picture sources and processing the video signal. Two of these, Horizontal Drive (HD) and Vertical Drive (VD), (also known as Line Drive (LD) and Field Drive (FD)) were fed to, and synchronised, all the signal sources, camera, flying spot scanner, caption generator etc. The raw non-composite video signals were then switched or faded before being fed to the Processing Amplifier where they were blanked using the Mixed Blanking signal (MB). The Mixed Sync (MS) synchronising signal was then added, to form the Composite Video Signal. A typical arrangement is shown in Fig.4, you will notice that a large number of interconnecting cables are required.

SPECIFICATION FOR U.K. SYSTEM I TELEVISION TRANSMISSIONS

Number of lines per picture	625
Interlace	2:1
Aspect ratio	4:3
Line frequency	15.625KHz
Field frequency	50Hz
Colour subcarrier frequency	4.43361875MHz
Video bandwidth	5.5MHz
Sound subcarrier frequency	5.9996MHz
Channel bandwidth	8MHz
Upper sideband width	5.5MHz
Lower sideband width	1.25MHz
Vision carrier modulation	Amplitude (AM)
Sound carrier modulation	Frequency (FM)
Modulation sense	Negative (95% amp = sync)

NOTE: The above specification is that used for AM transmission. When transmitting television using FM some parts of the specification will change.

The advent of the UK Television Standard changing to 625 line Colour and the fact that today's TV Amateur wants to use his domestic video recorder, colour camera and home computer as signal sources has caused quite serious connecting and operating difficulties. The main difficulty is that each of these video sources is generating its own independent composite video signal, including

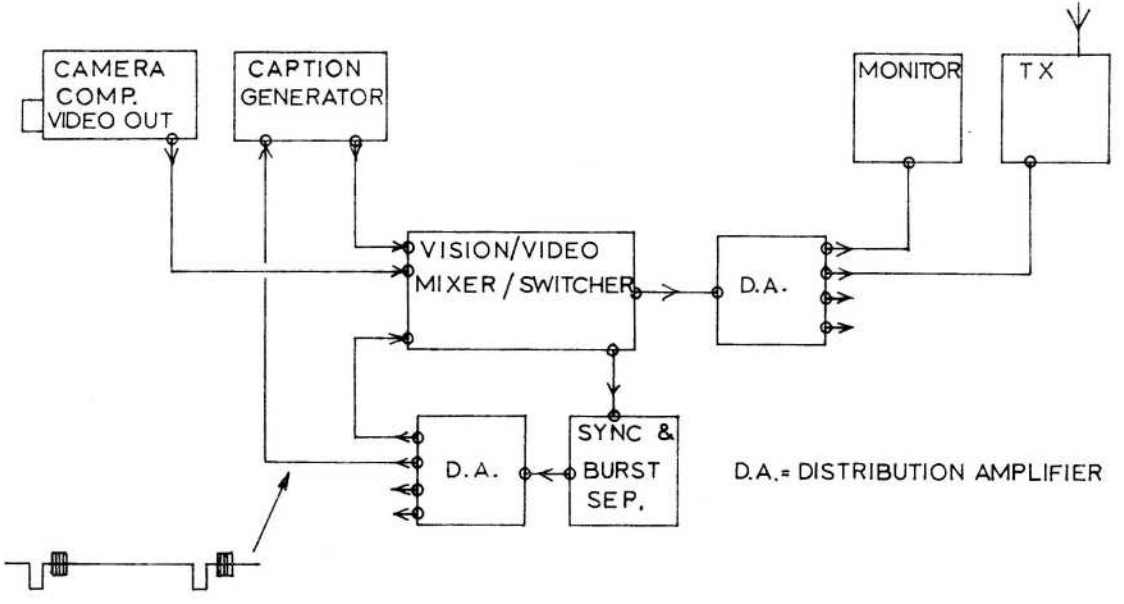


FIG. 5.

ATV SYSTEM WITH BLACK & BURST SYNCHRONISING

synchronising signals, and whilst each will give a satisfactory picture when individually connected to a TV monitor or receiver, the video signals and resultant pictures are not synchronised with each other. By "synchronised with each other" we mean that the line-by-line scanning of all the pictures must be taking place at exactly the same point and at the same instant in every picture source, so that when the signals from two or more picture sources are mixed, faded or superimposed, all the pictures will register exactly with no rolling, half picture or black bars in sight.

The station caption/call-sign generator (or microcomputer) is a good example of a picture source which MUST be synchronised with the picture being shown before the call-sign can be successfully inserted in the outgoing transmission. It should be pointed out that some commercial cameras do have a 'Sync Input' or 'Slave' facility and some home computers can be modified internally to allow external synchronisation. There is of course the added problem of synchronising colour pictures, but this will be dealt with later.

To synchronise one picture source from another, it is necessary to separate the synchronising part of the composite video signal from the 'master' signal source and apply this signal to the synchronising input ('External Sync Input') of the slaved signal source. The concept of slave synchronising or locking is increasingly used professionally and the principle has a lot to commend it to the TV amateur for use in his shack. A suggested arrangement for ATV is shown in Fig.5. and will be discussed in more detail in Part 2.

Part 2: Cables, Terminations and Distribution Amplifiers.
Black and Burst Synchronising for ATV.

NEW FM-TV MODULES

By Ron VanSittart G6GHP
with additional material by the Editor.

Two new modules intended for the TVRO (Television Receive Only) market have recently been announced by the firm of Astec Europe, perhaps best known for their range of RF modulators widely used in home computers etc. These modules are:

AT 1020 TVRO tuner head and

AT 3010 TVRO IF/demodulator.

both modules are housed in tinplate boxes with removable top and bottom covers, rather like large versions of their other modules or even varicap TV tuners. The tuner head is tunable between 950 and 1450MHz, has a fixed IF output at 612MHz, features a typical conversion gain of 36dB, incorporates an external gain control facility and even has a built-in -256 prescaler for an external synthesiser or frequency readout system.

As you can see the 24cm amateur TV band falls very nicely within the tuner's passband making it an ideal candidate for investigation for amateur use. At the time of writing (early March) CQ-TV magazine has been promised a pair of

units for evaluation purposes, however G6GHP beat us to it and the practical results contained in this article come from that source. Ron would like to express thanks to Mr. Rob Nicholls of Astec Europe for making the units available.

The IF frequency of 612MHz falls conveniently within the domestic TV UHF tuning range therefore anyone who already has a FM-TV system based on a varicap tuner will find this unit of particular value; being able to tune the converter rather than the TV tuner should considerably reduce the likelihood of domestic broadcast stations breaking through the system. It has also been found that the AT 1020 seems not to suffer from broadcast breakthrough, even when two pre-amplifiers (uncased) preceded the module. Other converters driven in this way invariably produced a band which was virtually unusable.

The IF/demodulator is a little gem. It accepts the 612MHz input from the tuner, filters, amplifies, limits and demodulates it using one of the latest single chip quadrature demodulators. The baseband video output is up to around 3v (depending on the deviation of the received signal) into an impedance of around 1k.

The unit incorporates two filters (SAW); the wide-band one being 24MHz whilst the narrow one is 18MHz - ideal for 'decent' quality amateur pictures. Other features include a signal strength meter drive output and a signal sense output.

The tuner requires +5v, +12v (for switching) and +18v whilst the demodulator requires just +18v dc.

G6GHP has used the two modulas in conjunction with the 'Custom Video Board' from CQ-TV132 and the tunable sound demodulator from the same issue. results were very encouraging although weak signals tended to appear weaker due to the fact that deviation levels are relatively low owing to the restrictions of the PLL demodulators used so far. When the deviation is turned up a bit results are sparkling (this has also been confirmed by another amateur in Northampton who says the results on amateur TV are superb). Using these units a station 16 miles distant was received at P5 video with fully quieting audio.

As stated earlier the BATC has yet to try out these units but it is hoped that this can be done before the next issue and, provided the expected results are achieved, a printed circuit 'mother board' containing positions for both modules, video output circuitry, control circuits, power regulators and (possibly) an on-board sound demodulator will be developed. Boards will be available from Members Services.

CQ-TV realises that among member's first questions will be "where can I buy them and how much do they cost?" We're ahead of you on that one and have arranged for COMEX SYSTEMS Ltd., of Comet House, Unit 4, Bath Lane, Leicester (tel: 0533 25084) to stock the units and retail them in 'one-off' quantities. Prces are AT1020 tuner; £30.25 plus VAT, and the AT3010 demodulator; £47.00 plus VAT. Special 'F' coaxial connectors are used at the RF input and these are also available at 0.50p each. £1.50 post and packing should be added to all UK orders. COMEX SYSTEMS Ltd will be present at the BATC rally in May and will have the modules on sale there. Astec Europe supply to the manufacturing industry only so please do not address queries to them.

Full details will follow as soon as they are available.

NEW RELEASE

NOW, AT LAST, THE VERY BEST ARTICLES FROM THE LAST SIX YEARS OF CQ-TV MAGAZINE HAVE BEEN BROUGHT TOGETHER IN ONE SUPER VOLUME.

One hundred pages giving complete (and in some cases updated and modified) details of projects like: 70cm and 24cm receive converters; 24cm GaAsFET amplifier; FM-receive IF; 70cm TV transmitters; 70cm RF amplifiers: FM-TV generator; Power indicators; 1.3GHz valve PA; Interdigital 24cm filter; colour vision mixing; ABC colour mixer; grey scale generator; pretty colour generator; sync separator; colour box; video filter; TV alarm; specialist power supplies; video relay; 24cm mini aerial plus others too numerous to mention.

Now you can stop hunting through mag's for that article or, if you are new to the club, catch up on the best projects. Ideal for beginners and old hands alike.

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ON SALE NOW FROM BATC PUBLICATIONS AND ALSO AT THE BATC RALLY AT CRICK ON 4th MAY.

A 70 OR 24CM PA

By Peter Johnson, G4LXC

This power amplifier, although designed for the 1.3GHz band, is also suitable for use at 70cm after some simple modifications. The unit is based on the Mullard BLV93 transistor which has a rating of 10W peak and a power gain of better than 6dB at 24cm. This design can be used with all modes of emmission - SSB, NBFM, CW, AM or FM-TV. A drive level of <2W is required and the 2W figure should not be exceeded.

CIRCUIT DESCRIPTION

Fig.1 shows the complete circuit diagram. Drive is applied to L1, a printed stripline whose characteristic impedance is 50-ohms, and transferred to L2 via C1. C1 enables the correct application of the drive signal to the input tuned circuit; a Pi network consisting of L2, C2 and C3 which is resonated at the wanted frequency, the signal is then applied to the base of Tr1. A potential divider base bias network produces the correct dc level which is applied to Tr1's base via RFC-1.

As is usual with this type of amplifier Tr1 is operated in a grounded emitter configuration, having its emitter connected directly to earth. Another Pi network tuned to the required frequency connects to the collector which is supplied with its dc via RFC2 and RFC3 together with heavy decoupling at RF frequencies. C6 is adjusted for optimum transfer of power to the output stripline L4.

Tr1 is intended for broadband applications although this unit will not cover the whole of our 1.3GHz allocation without re-peaking. The approximate 0.5dB bandwidth is +-15MHz from nominal at 1.3 and +-6MHz at 70cm.

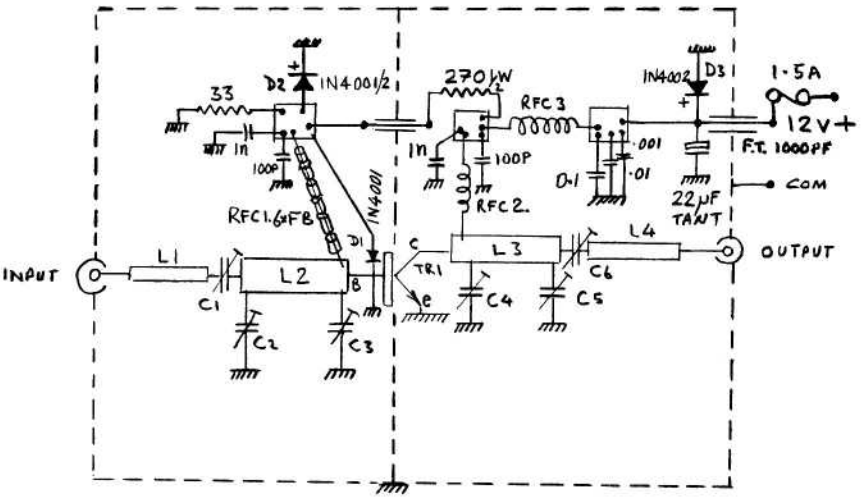


Fig.1 COMPLETE CIRCUIT DIAGRAM

COMPONENTS

It is important that the correct type of trimmer capacitor be used since this circuit has been designed to cater for devices having specific self-capacitance and inductance characteristics. The ones used are Mullard type 809 (part No.809 05001) which are square, PTFE film dielectric, professional, miniature components having a minimum capacitance of 1.2pF and a capacitance swing of 2.3pF. (1)

The transistor - type BLV93 is currently priced at around £20 and is available from (1).

Good quality single-sided fibreglass PC board material is used for the main board. Decoupling capacitors are miniature ceramic wired with short leads, and input/output connectors are square-flanged BNC. The heatsink is 100 x 75mm 4.0°C/W (RS Components 401-497) although Maplin type 4Y (order No.FL41U) or Cirkit type 4M-229 (stock No.21-08229) should also be suitable. Ferrite beads are FX1115 or similar VHF types and the feedthrough capacitors are 1000pF bolt-in ceramics. A suitable diecast box is required to house the amplifier.

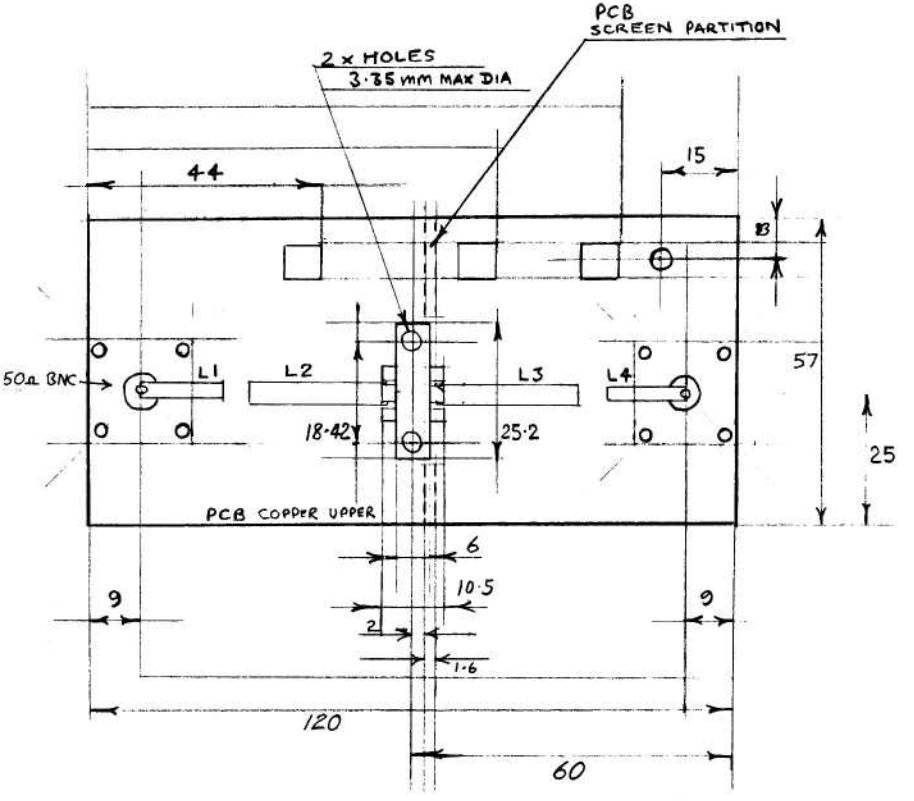


Fig.2 KEY DIMENSIONS FOR THE MAIN BOARD

70cm OPERATION

This amplifier will tune to 70cm using the inductor dimensions given for 24cm, in which case all the trimmer capacitors should be changed for type 808 devices (green, film dielectric) having a range of 2 - 22pF. However if it is intended that the amplifier be only used for 70 then the appropriate inductor dimensions should be used (see component list). A variation in overall board length and diecast box size will not be needed.

At 435MHz the amplifier achieves around 9dB of gain therefore 1W input would produce 9 - 10W of RF under narrow-band conditions. For linear AM-TV 0.5W of drive will produce 5W rms without sync crushing although the peak sync power would be of the order of 8 - 9W. For 70cm the RF chokes will require additional ferrite beads (see component list).

CONSTRUCTION

Cut out the laminated fibreglass PC board to the dimensions in Fig.2, trim the outside edges to fit the inside lid area of a suitable diecast box and cut a slot in the centre to provide a clearance fit for the bolt-down sections of Tr1. Place the board copper uppermost inside the box lid and clamp it in a vice. Drill holes for the BNC sockets at either end (see Fig.2) providing 6BA clearances for the four screws and a suitable size hole to accept the metal protrusion on the underside of the socket. Trim the PTFE insulation from both sockets so that they are flush with the underside of the lid allowing the centre pin to pass through a 3/16" hole in the PC board. Using four screws to each socket bolt-on the connectors clamping the PC board and box lid firmly together.

Carefully mark the centres for the bolt holes for Tr1 (see Fig.4) and drill these holes using a 6BA tap size drill, check the alignment of the centres and offer up the heatsink clamping it in the vice central to the lid. Drill two holes with the 6BA tap drill through the heat sink and remove it from the vice. Tap the two 6BA holes (use paraffin or light oil as a cutting lubricant) and de-burr all holes and edges. With a 6BA clearance drill open up the two holes in the lid and de-burr the edges.

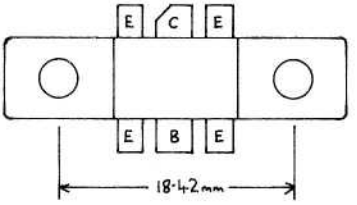


Fig.4 DETAIL OF Tr1

Mark a safe area around the heatsink and drill a hole for the 1n feedthrough allowing room for the fixing nut. Bolt Tr1 to the heatsink using thermal compound on both Tr1 and heatsink-to-lid sandwich using 2, 0.5" 6BA screws with washers placed on top of Tr1 flanges since the holes provided are slightly larger than 6BA clearance. Make sure that Tr1's base and emitter lugs are correctly orientated - the collector has a diagonal cut on the lug. Now firm down the assembly just enough to squeeze out some of the heatsink compound as it takes a little time for final tightening down. Position the heatsink gently for square alignment and finally tighten Tr1's screws firmly. It will be noticed that a gap is evident between the emitter flanges and the ground plane, make four copper spacers to fit in this gap and quickly solder them into position at the four emitter connections.

Using a small saw cut out L's 1 to 4 from a similar piece of PCB material as that used for the main board (see component list), also cut out three square pads 7mm x 7mm, de-burr the edges and fix them to the main board using super

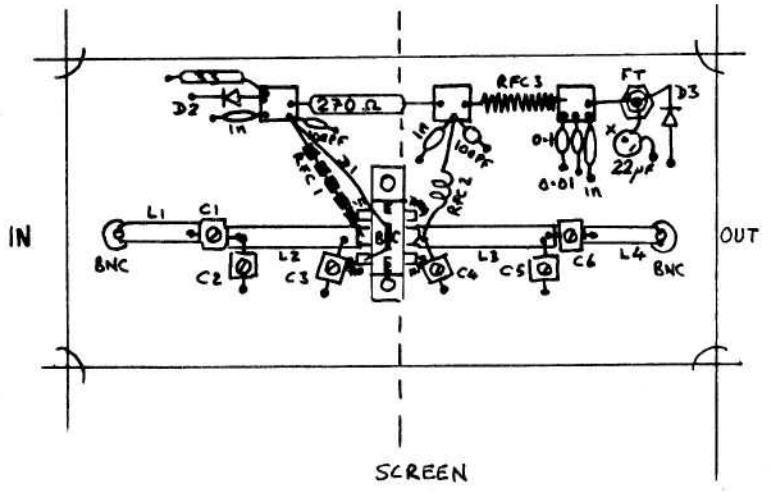


Fig.3 COMPONENT LAYOUT DIAGRAM

glue in the positions indicated in Fig.2, the inductors should just tuck under the base and collector lugs of Tr1 and the matching lines (L1 and L4) butt up to the centre pin of the BNC connectors, allow time for the glue to cure.

Solder all components into position as indicated in Fig.3 with the exception of the screen and associated feedthrough capacitor. D1 (heat sense diode) should be positioned across the top of Tr1 and good thermal contact made using heatsink compound. Check your work against both Fig's 1 and 3. Finally cut out a screen from tinplate, sheet brass or copper or PCB material to fit the inside of the diecast box, making suitable cutouts to avoid shorting out Tr1's collector and any other components, the clearance above Tr1 collector should be at least 1/16". A hole should be drilled in a suitable position to accept the feedthrough capacitor. Solder the screen in position (Fig's 2 and 3) tacking it first and ensuring that the assembly fits inside the box, then solder the screen to the main board all along the seam.

ALIGNMENT

To avoid any costly mistakes check the following:-

1. That Tr1 is the correct way round.
2. There are no wiring errors.
3. The resistors are of correct value.
4. The diodes are the right way round.
5. The coaxial socket centre pins are connected to L1 and L4.

Arrange input and output cables and provide a SWR meter or diode probe and a 50-ohm dummy load. Provide a 5v or 5-12v power supply with 1.5A current limit. Apply drive and +5v and adjust all trimmers for maximum power output, gradually increase the voltage re-tuning for maximum output each time until 12v is reached, then check the current stability by switching the amplifier off and on several times whilst monitoring the current drawn, it should be the same each time the unit is switched on. If all is well fit the amplifier inside the diecast box, tightening down the lid and re-check the readings, they should be approximately the same or slightly higher.

If fluctuations or variations in the current readings are observed it indicates that instability is present. Try a re-tune and check the load and drive conditions. Remove the drive and make sure the standing current falls to below 100mA (it should normally be around 80mA at 12v operation), if it does not then the amplifier is oscillating. Check that you have all the right components, if it still oscillates reduce the bias voltage or change the type of decoupling capacitors or even add some extra ones. Note that VERY SHORT or ZERO lead lengths only are permissable at these frequencies; try different values of capacitors as well.

(1) All components are available from: LMW Electronics, 102 Stamford Street, Ratby, Leicestershire LE6 0JU

COMPONENT LIST

D1, D2, D3 - 1N4001/2 or similar.
RFC-3 - 22t 26swg enamelled copper wire 1/8" dia.
Tr1 - Mullard BLV93

1.3GHz

RFC-1 - 6 small ferrite beads threaded on hookup wire.
RFC-2 - 2t 26swg enamelled copper wire 1/8" dia.
L1, L4 - 2.5mm wide copper laminate, length as required to butt against socket pins.
L2, L3 - 3.25mm wide copper laminate 18mm long.
C1 - 6 - Mullard type 809 1.2 - 3.5pF trimmers.

70cm

RFC-1 - 8 small ferrite beads threaded on hookup wire.
RFC-2 - 3t 26swg enamelled copper wire 1/8" dia.
L1, L4 - 2.9mm wide 1.6mm thick copper laminate 15mm long.
L2, L3 - 3.25mm wide 1.6mm thick copper laminate 24mm long.
C1 - 6 - Mullard type 808 (or similar) 2-22pF miniature film trimmers.

DATA PROTECTION ACT

The BATC has officially registered under the new Data Protection Act and its representative is Dave Lawton, GOANO. Under the act any member is at liberty to request a copy of his or her own personal information held on the club's membership computer, but you are asked please not to request such information just for interests sake - only if it is really necessary - otherwise the additional workload on the club's limited resources will inevitably slow down other areas of administration. To obtain personal details members should send a stamped addressed envelope to Mr. D.Lawton, Membership Secretary, 'Grenehurst', Pinewood Road, High Wycombe, HP12 4DD. Details supplied will be in the form of a computer printout similar to the one illustrated below.

MEMBERS UPDATE SCREEN

Record number : 1104

Address details:-		Membership details:-	
Initials	[D.B.]	Callsign	[GOANO]
Surname	[Lawton]	Subs to end	19[86]
Address 1	[Grenehurst]	Total sent	[5.00]
Address 2	[Pinewood Road]	Mem type	[Committee]
City	[High Wycombe]	Requires	[ ]
County	[Bucks]	Summary#	[86000]
Postcode	[HP12 4DD]	Date entered	[01-Jul-85]
Country	[ ]	Last updated	[27-Feb-86]

TOTAL SENT - Only applies to the LATEST amount received from a member, it is not a running total and does not include money sent to other BATC departments.

MEMBER TYPE - relates to 'special action' membership such as Committee, Overseas, Airmail etc., normal UK members have this space left blank.

REQUIRES - This is used only when a new member first joins and details such requirements as back issues, lapel badges etc.

SUMMARY - This is a reference number to cross reference money in the TOTAL SENT column to a banking. ie: There may be 50 records relating to a banking of £250. This figure is for use by the Treasurer.

HOW WIDE IS WIDE ?

By John Wood, G3YQC

An important consideration in any amateur TV station, particularly when working in the 70cm band, is that of the bandwidth taken up by the transmission. In order that TV'ers can make sure that their transmissions stay within the amateur allocation in compliance with the licence regulations, and also that they do not interfere with other band users, it is important to be aware of just what a television signal consists of when it is transmitted over the air.

Since this article is mainly concerned with operation in the 70cm band, only amplitude modulation (AM) will be considered.

Referring to the amateur licence schedule (22nd March 1982), high definition television (A3F) may be used in the band 432 - 440MHz. Now according to both the BBC and IBA the total channel bandwidth of a 625-line broadcast colour TV transmission is 8MHz so at first glance it would seem that one can just fit a full specification TV transmission into the amateur allocation. Now comes the rub:

432 to 434MHz is used by amateur phone and CW stations whilst repeaters operate as high as 435MHz. 435 - 438MHz is also used (along with amateur TV) for space communications, so you see we have company on the band and it is up to us all to try to ensure a peaceful co-existance so that everyone may enjoy their particular branch of the hobby.

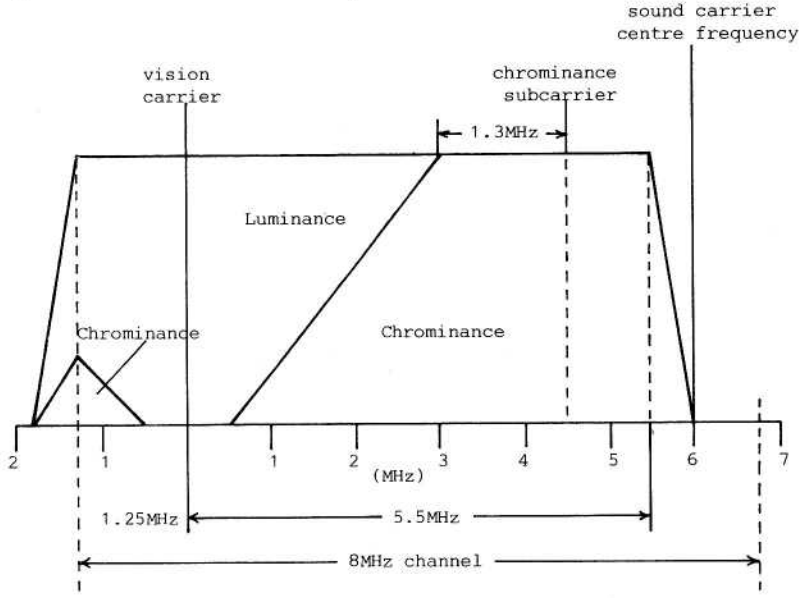


Fig.1 BROADCAST VESTIGIAL SIDEBAND SIGNAL

Fig.1 illustrates the frequency bands occupied by the colour picture components and sound signal from an ideal transmitter (broadcast specification). The transmission has its lower sideband largely suppressed and is called a 'Vestigial Sideband' (VSB) transmission. There are very few amateurs who are able to transmit such signals so we can re-draw the diagram to show the bandwidth which would be occupied if we were to transmit a full spec picture without the use of vestigial sideband (Fig.2) - frightening isn't it? Obviously of course this is not possible for use on 70cm however we can still transmit our pictures by making a few compromises.

SIDEBANDS

The signal bandwidth for a full spec 625-line system is approximately 6MHz resulting in a modulation bandwidth of 12MHz when AM double sideband (DSB) is used. In order to economise bandwidth, one can use a form of DSB in which a 'vestige' of one sideband is transmitted together with the whole of the other sideband (Fig.1). This reduces the overall bandwidth to about 8MHz.

Fig.1 shows the transmitter characteristics where the vestige of the lower sideband includes transmission of the d.c. signal since it represents the average brightness of the picture and its important picture detail. As a result, during transmission, the higher frequency components of the signal in the vestigial sideband are overemphasised, and so the receiver is provided with a response characteristic which reduces the high frequency components, this restores the information content on reception to its original balance prior to transmission. It is quite possible for amateurs to construct a TV transmitter using vestigial sideband and such a project (for which PC boards are available) is described in both the BATC's 'Amateur Television Handbook - vol.2' and 'The Revised Amateur Television Handbook'. There is no reason of course why a VSB filter cannot be fitted to most ATV transmitters.

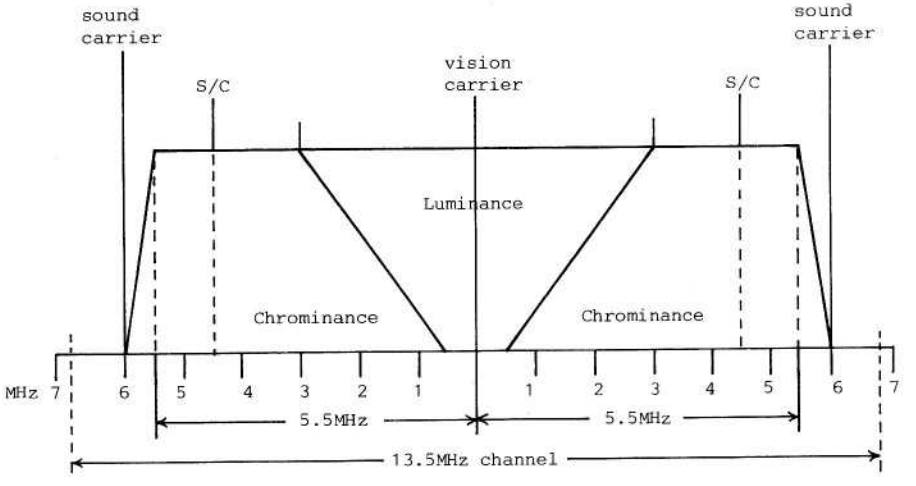


Fig.2 BROADCAST DOUBLE SIDEBAND SIGNAL

PRACTICAL CONSIDERATIONS

First let's see how amateur pictures differ from commercial ones. The specified bandwidth of a commercial video signal is 5.5MHz, but there is little likelihood of a domestic or surveillance camera having anything like that bandwidth, in fact 2.5 - 3MHz is probably the very best you could expect. Video cassette recorders usually have a bandwidth of only 2 - 2.5MHz so we amateurs can save a fair bit of bandwidth there. Intercarrier sound is transmitted on a 6MHz subcarrier (UK) and there is little we can do about that. Obviously +- 6MHz from any carrier frequency we can use (DSB system) will put the sound carrier outside the band; so intercarrier sound is out on 70. The colour subcarrier frequency of 4.433618MHz should also be considered in the same light.

Having removed the sound and colour we can now re-draw Fig.2 to show the theoretical bandwidth occupied by a 'typical' double sideband amateur TV transmission (Fig.3). Similarly Fig.4 shows the same transmission but using a VSB filter. Now you can see that 625-line ATV is perfectly possible on 70cm without spreading out too far.

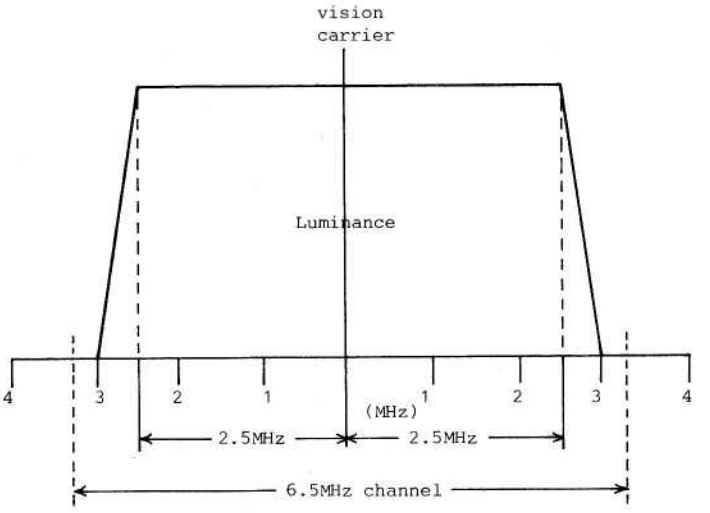


Fig.3 AMATEUR DOUBLE SIDEBAND SIGNAL

So far all the illustrations have only been theoretical. They show a 'wall' of RF energy emanating from the carrier at constant amplitude. Of course in practice the energy dispersion is nothing like that. The photograph shows a picture of a broadcast specification television transmission taken from the screen of a spectrum analyser. You can clearly see that the actual transmitted energy falls away sharply as it spreads from the carrier, therefore it would only be those band users in the immediate vicinity of an ATV station who would be aware of such a transmission. Further away the TV sidebands will be so far below the carrier level that they become insignificant.

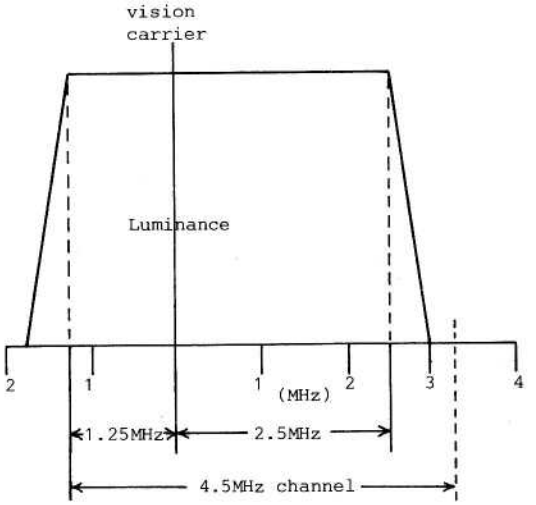


Fig.4 AMATEUR VESTIGIAL SIDEBAND SIGNAL

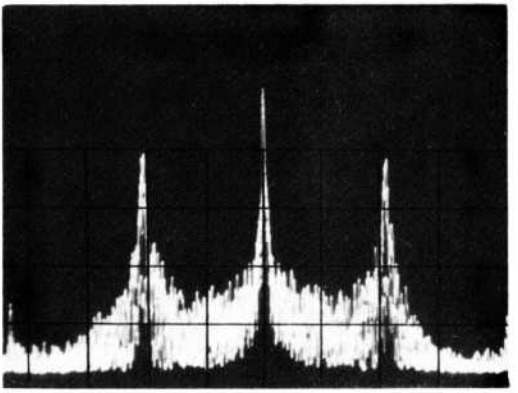
THE VIDEO SIGNAL

As mentioned above the actual video bandwidth necessary to produce an acceptable quality picture is around 2MHz. This can be determined by experimentation on broadcast signals: If a band-pass filter were fitted into an ordinary TV set between the tuner and IF amplifier, by varying the bandwidth of the filter the various effects of reducing that bandwidth can easily be observed. The first to go of course is the sound; then the colour as the subcarrier is attenuated and then the picture resolution starts to deteriorate. In practice it is difficult to see any deterioration until the filter reaches about 3MHz. Going down to 2MHz still produces a good picture although some of the resolution bars on a testcard multiburst will have become indistinct. In fact even when the bandwidth is reduced to 1MHz you can still see a good bit of detail in the picture. This technique incidentally is ideal for improving reception of weaker signals and rejecting adjacent channel interference, especially under lift conditions.

For practical purposes a bandwidth of 2 - 2.5MHz is a good compromise. If shots from a camera or video recorder are being used then it is unlikely that this figure will be exceeded, however, if you are using a digitally derived picture or one from a home micro, then the overall bandwidth is liable to be very wide indeed - often much wider than 6MHz. The reason for this is that the fast logic switching within the generation circuitry produces very high frequency pulses which, if not filtered out, will cause a TV transmission to spread much more than is desired.

The answer is to fit a low-pass filter at the video input to your TV transmitter. Such a filter was described in CQ-TV120 although an updated version may be found in the BATC's 'TV for Amateurs' and the new 'Best of CQ-TV' publication advertised in this issue. This unit uses a Toko block filter so no alignment is necessary, and a printed circuit board is available from Members Services. In fact this design was originally intended for colour

use and therefore has a cutoff around 4.5MHz, however a range of suitable filters is available from Cirkit and Bonex Ltd and the correct one may be chosen for your particular application. If you have access to sweep equipment then a passive low-pass filter may be used. Such a filter is illustrated in Fig.5.



Spectrum analyser photo' of a double-sideband TV signal modulated with 100% saturated colour bars.
The colour subcarrier can be clearly seen and the picture illustrates the energy dispersion within an amateur TV colour transmission.

Horiz resolution: 2MHz per div.
Vert resolution: 10dB per div.

(sound subcarrier absent)

Photo: G8CJS

A PASSIVE VIDEO LOW-PASS FILTER

This simple 5-pole elyptical design uses toroidal inductors in order to achieve repeatability. Its characteristic impedance is 75-ohms, the cutoff frequency is 3MHz and it has been tailored to have a deep notch at the 4.43MHz colour subcarrier frequency. Stop-band loss is around 40dB and the maximum insertion loss between DC and 3MHz is 0.2dB The prototypes were built on single-sided PCB and the capacitors were low-voltage 2.5% tubular polystyrene. Provided the circuit values are followed exactly and the specified components used, there is no reason why the filter shouldn't work well without any adjustment, however, to be certain, it is best to test it using either sweep equipment or by plotting the response using a signal generator and an oscilloscope.

If you route all your video sources through a filter immediately prior to transmission, you will significantly reduce the likelihood of interfering with other band users and, more especially, make sure that your transmission remains within the band.

So, for 70cm the best thing to do is:-

FORGET THE SOUND
DO AWAY WITH COLOUR
USE A FILTER

Of course you CAN use a full spec system if you want to - go to 24cm or one of the other microwave bands which can support broadband television!

References:

Specification of Television Standards for 625-line System-I Transmissions, January 1971 by BBC and ITA.
Modulation by F.R.Connor (Arnold).
The New Licence Schedule - 22 March 1982 by RSGB.

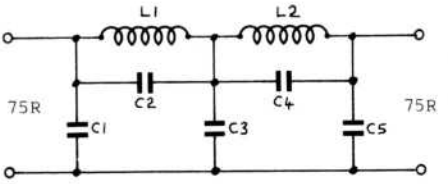


Fig.5 3MHz VIDEO LOW-PASS FILTER

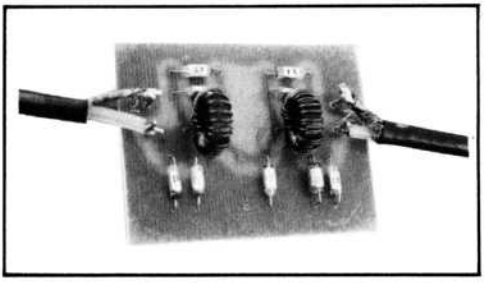
L1 = 3.16uH: 25t 26swg enamelled copper wire wound on Amidon T50-2 (0.5" dia RED) dust iron toroidal core. (Cirkit stock number: 55-00502)

L2 = 2.43uH: 22t 26swg enamelled copper wire wound on core as above.

C1 = 930pF: 820pF and 100pF in parallel.
C2 = 166pF: 150pF and 15pF "
C3 = 1500pF: 1500pF
C4 = 520pF: 470pF and 47pF "
C5 = 650pF: 470pF and 180pF "

All capacitors 2.5% 63v Polystyrene.
The first value shown is the calculated one, those following are the combinations used in the prototypes.

The filter can be made on a simple printed circuit board.



INTERNATIONAL ATV CALLING 144.750MHZ

IN THE STUDIO
(feedback)

by John Goode

I am prompted to write this article because of the response to the original "In the Studio" series, particularly the instalments that offered circuit ideas. A number of people 'phoned me with problems or queries, which I sometimes couldn't satisfactoraly deal with there and then, especially as I didn't always have copies of the original articles to hand, and I may have written them any thing up to a year previously! This is one of the problems with writing for a quarterly magazine that is as popular and well provided for as CQ-TV is. I didn't keep a note of the names of the members that contacted me, so I hope you will forgive me if I deal with most of the points raised "anonymously", so to speak.

One member rang asking me to clear up a confusion that had arisen from my attempt to explain standard levels and impedance matching. This is precisely the sort of question that is almost impossible to deal with "cold" over the phone, so I will attempt to clarify things here.

Referring to Figs 1 & 2 in the original article (CQ-TV127, p.26), I chose to explain matching in terms of a low impedance amplifier of gain 2 as the source driving a 2:1 potential divider. This is fine, and seems to have been followed by most people, but it should be understood that it is only one way of realising practically the equivalent circuit of Fig 1. The difficulty seems to have arisen when people came to deal with the output circuits of the PDA shown in Fig 11 (CQ-TV127.p.31). I have shown this in fig's 1a and 1b in this article. In this case the output is taken from the transistor's collector, which is of high impedance, the 75R collector load being effectively in parallel with the transistor's internal collector resistance. The equivalent circuit is shown in fig.1b compared to the original equivalent circuit, and you can see that they amount to the same thing.

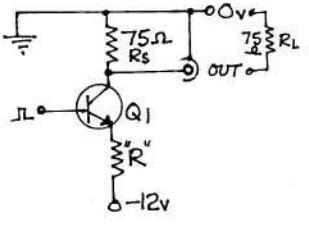


Fig.1(a) PDA OUTPUT

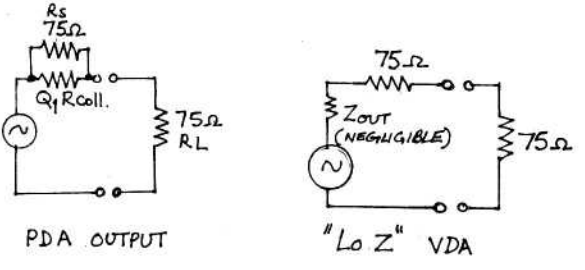


Fig.1(b) EQUIVALENT CIRCUITS

A number of people have contacted me about the DC-coupled VDA (CQ-TV127, p.29, Fig.8). There are a couple of points about this design, and so I've shown it again in Fig.2, together with the calculated DC voltages that should be measured when it is correctly set up.

The first point to make about it is that it IS DC-coupled, and so if the input signal applied to it has a DC-offset, the output of the amplifier will also be DC-offset. It's possible that RV2 may be incorrectly set if it is adjusted with a DC-offset signal at the input, so check that the input IS at 0v when setting-up. The second point is that this circuit will not handle a signal that has a POSITIVE DC offset greater than about 2v. This is because Q1 transmits the positive DC shift to Q2 emitter, tending to cut Q2 off as its base is tied to ground.

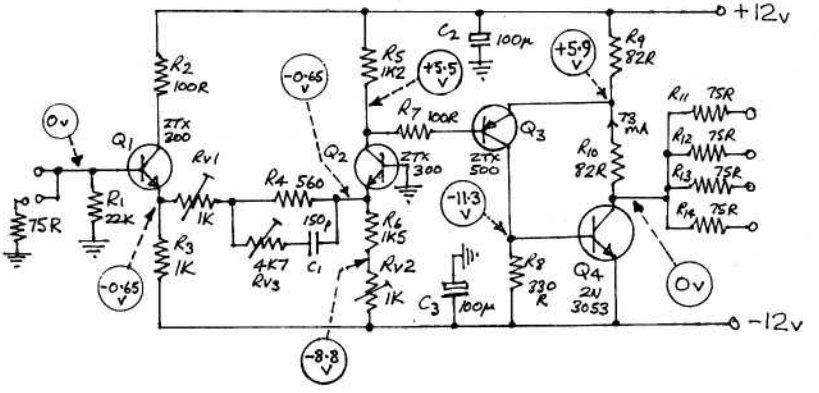


Fig.2 DC-COUPLED VDA

Lastly, all of the VDAs illustrated in the original article use the same current-feedback pair. A rule-of-thumb for calculating the collector current for the output transistor in this configuration is to allow 18mA per 75-ohm load to be driven; this can be reduced to 15mA per load if the output is AC-coupled. Also, don't use supply rails that are less than 10 to 12 volts apart if you want to avoid white clipping or sync-crushing; more than this, you must bear in mind that colour signals can have positive excursions that go beyond peak-white.

A slightly worrying development, brought to my attention originally by Bryan Dandy G4YPB, is the escalation in cost of the MC1445 ic that I have used in a number of my circuits. As an example, in the RS Catalogue the one-off price of these chips has jumped from around £3.50 to £8.15! The reason for this is not clear, although one rumour that I heard was that the increased cost is occurring as stocks are run down ready for a new chip to supersede it. If so, I wish they'd hurry up!

The circuit that uses the 1445 that I have had the most interest in is the black & burst generator, CQ-TV127,p.34. If the 1445 becomes difficult or too expensive to obtain, it may be possible to redesign the circuit using a balanced modulator chip such as the 1496. I have shown a theoretical redesign in Fig.3, but this has not been tried or tested.

Bryan Dandy also pointed out to me that in the Video Delay Unit in CQ-TV130, p.31, I have shown an unnecessarily complicated 20nS delay section. It is, of course, much easier to put two of the 10nS sections together than to use the 20nS section as shown. In fact it can be simplified further if the two 2.2uH inductors are replaced by a single 4.7uHone (accurate enough in practical terms) as shown in Fig.4.

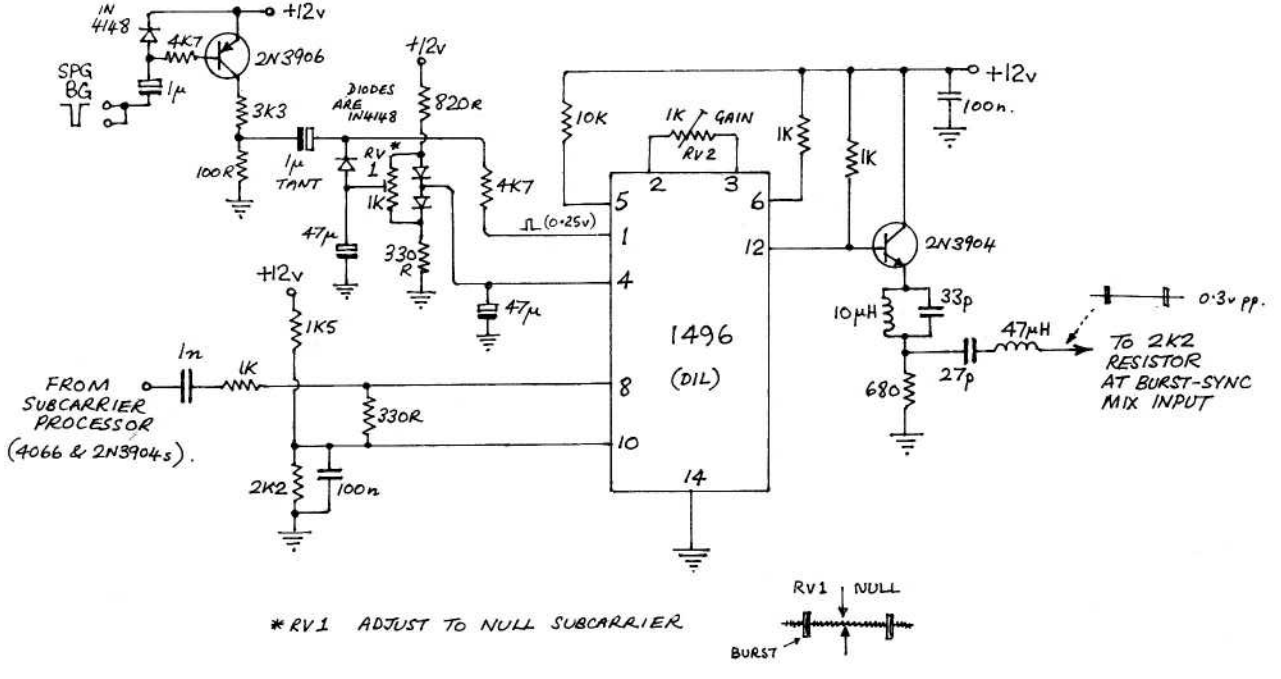


Fig.3 POSSIBLE ALTERNATIVE TO MC1445 in BLACK & BURST GEN. (not tested)

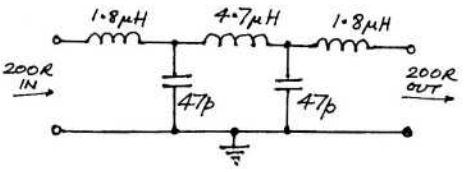


Fig.4 20nS DELAY

Finally, I was contacted by one member who queried the validity of Fig.17, CQ-TV127, p.33, which gives details of the field-rate timings of the CCIR System-I sync signals. In particular, he questioned the timing and duration of the field-drive signal in relation to the field-group in the sync-train. If I remember correctly, he said that he believed that the field-drive pulse should start at the first equalising-pulse, and continue for 7.5 lines. I do not think that this is the case, but I have been unable to confirm one way or the other. However, I believe that I have logic on my side, as starting the FD pulse at the first equalising pulse, i.e., 2.5 lines before the actual field-sync signal, would mean that if the MS signal were describing (say) an ODD field, the associated FD would be describing an EVEN field (and vice-versa); this is because the relationship between them involves a HALF-line. If anyone else has any definite information to add to this somewhat theoretical argument, please weigh in!

IS T.V.I. YOUR PROBLEM?

The BATC has received an interesting communication from Les Robotham, G8KLH. Les is a member of the RSGB's EMC committee which deals with matters involving complaints of interference either from neighbours or the DTI-RIS.

At a recent EMC committee meeting it was agreed that closer associations should be sought with amateur radio groups and societies who are affiliated to the RSGB. In pursuance of this Les has volunteered to handle any problems which BATC members may have in this field, regardless of whether or not they are members of the RSGB. In his letter Les advises that if you do have an interference problem which looks as though it may cause difficulties, then it is far better to seek the help and advice of the EMC committee AT THE OUTSET, rather than let it escalate perhaps to the point of involving the DTI or even a local MP. The phone number to ring is: 01 907 4219.

G8KLH was an RIS engineer until his recent retirement and is therefore very well equipped and qualified to advise on interference matters. Dealing with angry neighbours or awkward DTI officials needs fairly quick and experienced information for members, and in that way problems can usually be overcome with a minimum of conflict.

The BATC hope that Les will be on hand at our Rally in May where he will be happy to discuss the interference problem with any member. In future Les's phone number will be included on the inside front cover of CQ-TV.

CONTEST NEWS

Mike Wooding, G6IQM

As I write this column we are still in the grip of the severe anticyclone that has done nothing for VHF and UHF propogation. The winter cumulatives have only recently finished (is that my wife muttering strange incantations which sound like "CQ contest"?) and the Editor has just reminded me that closing date for copy is earlier than usual, so, without more ado.....

There are two main items of news this time plus an assurance that despite the 'April Fools Fiesta' name for the next contest; it is NOT a hoax but indeed a real contest! Don't YOU be the fool and miss it!. The first item of news is that I have arranged another annual contest, this time called Autumn Vision' (AV for short). It is to be held on Sunday the 9th of November and will be an all-band, all-mode affair running from 0001 to 2359Hrs local time. The second item is that, subject to ratification from our European counterparts, the BATC will be organising the prestigious 'International' contest for the foreseeable future. This will include producing a special certificate for the event which will be received by all participants - more in the next issue.

WINTER CUMULATIVES

The level of activity seems to have been quite low, certainly from the number of stations that I worked and also from the information I have received both on and off the air, but this may have been due in part to the severe weather conditions, (conditions which caused my rotator to throw a fit of pique on the last night - it sulks yet!) The bands seem to have been about average on the first three nights, but signals on the last were considerably lower. Several stations report that signals were often stronger and more stable on 70cm than on 2m. The level of entries for 24cm was disappointingly low and for SSTV non-existant* Come on now, I know a lot of you use SSTV so let's have some entries next time please!

Before going on to the results let's look at the usual selection of anecdotes and comments from your letters, I hope they amuse you as much as they do me, please keep them rolling in and apologies to any of you for my diliberate mis-reading - Hi.

G4ROB - "The linear ran so hot that even 'LIR/P wasn't wearing gloves for the last exchange....."!

G8GKQ - "Most of the DX I received was the result of a passing aircraft..... First the shuttle now British Airways".

G6SKO - "No longer a welding person on the electrical staff now"

G8MNY - "Day four was a disaster, didn't warm things up enough and so had wet feeder" - *Come on John, I mean, STEAM RADIO?*

G8PX - "I hope to make a masthead-mounted pre-amp and 2C39 amplifier for next time" - *No need for a cooling fan up there eh?*

G4WGZ - *Not a letter but rather a few succinct words on the back of an entry form:* "Well someone's got to be last!"

Heartiest congratulations to G8LIR for his overwhelming win on 70cm from their precarious perch on Hailstone Hill, and to G4CRJ for winning the 24cm section. Congratulations also to G8DIR for coming first (!) in the SSTV section.

1986 WINTER CUMULATIVE RESULTS

70cm SECTION

Posn	Call	Points	contacts	Best DX	@	Km
1	G8LIR/P	14023	76	G4CRJ		251
2	G4CRJ	6747	47	G8LIR/P		251
3	G8MNY	4598	49	G8LIR/P		299
4	G8BWC	4524	36	G8MNY		208
5	G6IQM	4064	32	G8LIR/P		163
6	G6HMS	3703	49	G8MNY		207
7	G4ROB	3061	33	G1IXE		195
8	G6SKO	2643	33	G8LIR/P		89
9	G8DIR	2172	29	G8BWC		153
10	G8GLQ	1939	19	G8LIR/P		252
11	G4VTD	1903	32	G8GKQ		148
12	G8GKQ	1513	13	G8LES		202
13	G8YKC	1412	27	G8LIR/P		104
14	G4WGZ	678	16	G4CRJ		62
15	G8MMF	562	16	G4CRJ		87
16	G8PX	473	5	G8MNY		96
17	G2BMI	432	9	G8MNY		37

24cm SECTION

1	G4CRJ	991	10	G8MMF		57
2	G4VTD	527	13	G4CRJ		57
3	G8MMF	357	8	G4CRJ		57
4	G8GLQ	37	4	G1IXE		6
5	G8GKQ	14	1	G8GTZ		7

SSTV SECTION

1	G8DIR *	326	6	G6EHJ		86

(* last minute entry!)

1985 INTERNATIONAL RESULTS

Below are the overall results for the 1985 International ATV contest. Unfortunately the French results were not submitted due to some confusion, and the certificates don't seem to be forthcoming as yet.

Congratulations to G8DIR for coming 5th overall on 70 and to G6WOR for his 5th on 24cm.

70cm SECTION-A TRANSMIT/RECEIVE STATIONS

POS'n	CALL	QSOs	SCORE	Pos'n	CALL	QSOs	SCORE
1	DK0SF	35	11393	42	G3YQC	18	2007
2	DJ0OE	51	8370	43	ON4KBF	23	1995
3	PE1HXD	42	8209	44	DF7EA	22	1854
4	PA0SON	48	7398	45	G6SKO	17	1784
5	G8DIR/P	47	6843	46	PA3CHH	23	1718
6	PA0HVB	49	6667	47	G6AMM/A	15	1696
7	PE1BZM/P	43	6592	48	GW8GIZ/P	21	1457
8	ON7ZI	49	6545	49	DF9MU	17	1445
9	G8LIR/P	28	6514	50	G4VTO	18	1416
10	ON7MB	44	5758	51	G3WSC	21	1357
11	PA3BJC	33	5400	52	G4ROB	13	1304
12	PE1KRU	31	5260	53	G6HMS	14	1297
13	G6MNY/P	28	5236	54	G8GLQ	14	1252
14	ON5ID	45	5157	55	ON4BK	12	1157
15	G6CUQ	40	5143	56	PE1FYZ	11	1117
16	DL0PT	20	5067	57	G4VBS	10	1099
17	G0ATV/P	39	4988	58	ON6AN	16	1021
18	ON4ABC	45	4926	59	DJ9VX	7	997
19	DL4RBB/P	33	4712	60	DL4FAE	6	916
20	PA3CQE	34	4388	61	DF1QM	19	898
21	ON7LT	38	4093	62	G6IBA	6	888
22	PE1DEO	28	3989	63	G3SBV	9	862
23	G6WOR/P	39	3924	64	PA3CMT	15	718
24	G4WRA/P	54	3912	65	DC9QT	6	636
25	DL0AAN	27	3905	66	PE1GVS	8	627
26	G4CRY	27	3511	67	PA0BOJ	12	581
27	G1DDA/P	40	3449	68	PA0HCK	8	542
28	PA3CVM	23	3273	69	PA3DVI	11	416
29	PE1HVX	30	3068	70	G4TEP	7	406
30	DD2EE	29	2573	71	PA3BIC	9	392
31	PA3CZY	28	2558	72	G2BMI	8	358
32	DC7MG	14	2368	73	G4LDL/P	4	352
33	ON7VY	26	2334	74	PE1CME	8	317
34	PA2ENG	22	2297	75	DK6EU	9	275
35	G8BWC	21	2259	76	G4JEC	7	270
36	DL9EH	25	2236	77	GJ8EZA/P	5	195
37	PE1BZL	24	2202	78	DC6CF	6	178
38	ON5NK	28	2187	79	DL0BTX/P	7	171
39	ON1JD	21	2051	80	PE1APH	5	122
40	PE1ITR	23	2040	81	G4LXC	6	95
41	G6MNJ	17	2021				

24cm SECTION-A TRANSMIT/RECEIVE STATIONS

POS'n	CALL	QSOs	SCORE	Pos'n	CALL	QSOs	SCORE
1	PE1HZR	15	1578	15	PA3BJC	7	201
2	DJ0OE	16	1475	16	G8BWC	2	162
3	PA2AAD/A	14	953	17	DC6CF	5	158
4	PA3AOG/A	14	953	18	PE1GVS	4	115
5	G6WOR/P	12	788	19	G4LXC	5	105
6	G8MMF/P	6	528	20	PA3BIC	3	102

7	DL9EH	10	495	21	PE1CSI	4	74
8	G4CRJ	5	494	22	G3WSC	2	70
9	DK6EU	9	429	23	DF1QM	4	63
10	G5KN/P	6	362	24	G8GLQ	2	18
11	PA2ENG	6	344	25	PA0BOJ	2	15
12	G3YQC	5	330	26	G3SBV	1	14
13	DL4FAE	4	232	27	PE1APH	1	12
14	G4VTD	5	220				

Don't forget the May Day Microwave and the Summerfun contests (rules in CQ-TV133). The SUMMERFUN times are from 1200Hrs (local) Saturday 5th July to 1600Hrs (local) Sunday 6th July. Please remember that if you require a contest certificate then please enclose a large (A4) SAE with your entry. Contest entry forms and log sheets (large, A4 size stamped addressed envelope please), contest entries and any other contest correspondence: BATC Contests, Mike Wooding, 3 Perkins Grove, Rugby CV21 4HU.

See you at the Convention in May.

35-YEARS AGO

Editor

This look back to the early days of the BATC sees Mike Barlow still trying to get rid of CQ-TV magazine! ATV transmitting licences are beginning to emerge although members don't yet know the full details, and plans are being made for the first ever BATC Convention. The following is taken from CQ-TV number-8 (March 1951) and is part of the "EDITOR'S NOTE" item:

'Now that the TV licences are on their way, some of you have enquired about the future of the BATC, and in particular what will happen to CQ-TV. New members may like to know that the club was originally formed for the specific purpose of getting the TV licences issued, and that this magazine came as an afterthought. For the moment, I intend to let the magazine die a natural death as soon as stocks of paper, covers etc. run out. This means about another five or six issues only, finishing up in about mid-1952. By that time, one or other of the commercial radio mag's may find space for a page of TV transmitting topics. In that case, your editor, printer, publisher, and sticker-on-of-stamps will invite himself to have a pint in celebration!

With regard to the actual licences, these are being issued on a provisional basis, and the precise conditions are not yet known. However, the conditions are likely to be very similar to the sound TX licence. It is certain, though, that a sound licence must be held before a TV licence will be issued. One other definite ruling - sound may be transmitted simultaneously or independently, on the same or any other channel as the vision.....Negotiations are in progress for the release of the Seventy Cm band for TV, but as there is a lot of official business to be run through, it is most unlikely that even if permission is granted, it will be possible to use the band before 1952 at the earliest.

In the last issue, the idea of a TV Convention, to which all members would be invited, preferably bringing some item of TV gear in lieu of entrance fee, was mooted.....It is felt that it would help members if our Convention coincided with the RSGB's four-day Festival of Britain effort.'

VIDEO MODULATING THE PYE POCKETPHONE

Editor

One often hears Pye 'Pocketphones' on the air. Although they are often for sale at rallies and junk sales, sometimes at real bargain prices, many amateurs shy away from them because they are reluctant to delve into the innards to get them going on specific frequencies. The majority of buyers only purchase them if they know someone 'in the know' who has the necessary equipment for re-alignment. For those who think one needs a good range of test gear to align these sets then read on.

IDENTIFY YOUR RIG

The Pye Pocketphone-70 range of equipments is just what it says: a RANGE. There are absolutely no outside differences, except for the identification on a rear label, between a 78MHz AM rig and a 432MHz FM rig in the range. Don't be badgered into buying one at a rally or sale until you have looked at this label to make sure it is what you think it is, also, beware of the advert which describes the machine as a PF70 - THERE IS NO SUCH RIG and it probably demonstrates that the seller doesn't know what he is selling! Here then is a list of the three main equipments in the range:-

PF2UB - Three channel UHF FM bodyworn rig with external speaker/microphone.

PF2UH - Three channel UHF FM handheld with internal speaker/microphone.

PF5UH - Single channel UHF FM handheld with internal speaker/microphone and internal aerial.

Sometimes the equipment type number will be followed by '2e', unless you're desparate for one or it's very cheap I would suggest you steer clear of it. This is a special intrinsically safe instrument designed for use in hazardous environments such as oil rigs, and the insides are coated with a rubbery compound which is extremely difficult to remove.

All three sets use similar 15v ni-cad batteries and it is important that you include one of these with your purchase if you intend operating it portable, although for ATV use you will probably be using the transmit board only and fitting it into another cabinet, unless that is you intend removing the receiver board to make room for a vision modulator. If one of these batteries go U/S it is likely that only one of its cells is faulty. The battery can be carefully prized open and the faulty cell replaced with a new one from RS Components. For shack use a stabilised 13.8v power supply is ideal for powering the set.

Internally the unit comprises several 'daughter' boards on a larger 'mother' board, this makes fault finding and component replacement fairly easy.

CHANGING FREQUENCY

If you have just bought a set then it needs altering to 436MHz for TV use. The sets themselves cover the entire 70cm band and just need fitting with a new crystal and peaking the transmitter strip for maximum output. To calculate the crystal frequency required simply divide the required output frequency by 27 ie: 16.148MHz will produce a carrier frequency of 436MHz. Crystals are wire-ended HC18/U and are available from the normal crystal manufacturers advertising in amateur radio journals.

In the PF2UB and UH the crystals are located beneath the channel select switch/RX IF screen. To remove this first undo the channel switch nut, then using a pair of long-nosed pliers, remove the larger notched round nut securing the screen. Remove the screen and fit the new crystal in the marked position replacing the screen afterwards. On the PF5UH the transmit crystal is plugged into the lower part of the set and is often visible, although sometimes it has a piece of sponge above it to hold it in place, hiding it from view.

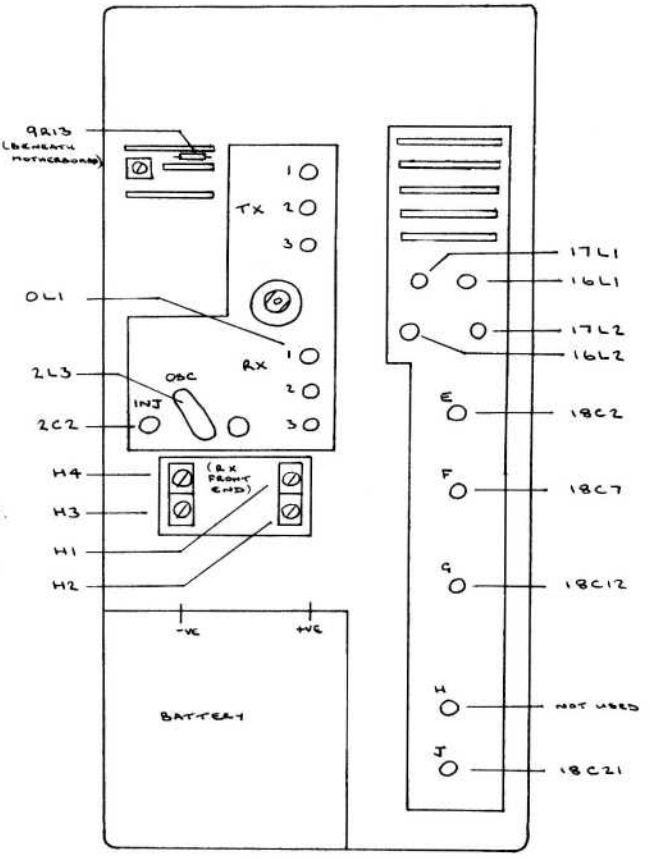


Fig.1

PF2 ALIGNMENT DIAGRAM. (PF5 is similar)

TRANSMITTER ALIGNMENT

Before attempting to add a video modulator to the rig it is wise to make sure it is working correctly first.

Connect a 10v supply to the set, if you have only 12v or 15v from the battery then wire a few diodes in series with the power lead; 1N4001's are about right and remember that 0.6v will be dropped across each diode. Monitor the current with a multimeter (100mA range) and connect the output to a dummy load. Key the transmitter and, referring to Fig.1, tune 16L1, 16L2, 17L1 and 17L2 in that order for maximum indication on the current meter or for maximum RF on a power meter. Use a non-metallic trimming tool since the presence of metal may alter the tuning point especially on the UHF circuits. When you have aligned for maximum power output the power supply can be increased to 13.8 or 15v and, using a larger non-metallic trimming tool, adjust 18C2, 18C7, 18C12 and 18C21 for maximum output.

Adjustments to the transmit modulator and the receiver will not be detailed here since this article is primarily concerned with TV operation.

VISION MODULATOR

Fig.2 shows the circuit of a vision modulator suitable for use with many low-power transmitters of this type.

Composite video is applied to the base of amplifier Tr1 via a 100-ohm carbon potentiometer which serves not only as a video gain control but also to terminate the video signal. Tr5 is biassed from a potential divider network held constant by a zener reference diode. Simple diode DC restoration takes place at Tr1's base and the bias level is set by another potentiometer. Tr2 is an emitter follower whose output is a voltage which varies in amplitude dependant on the video signal present. This modulated voltage is used to power both the driver and PA of the pocketphone transmitter.

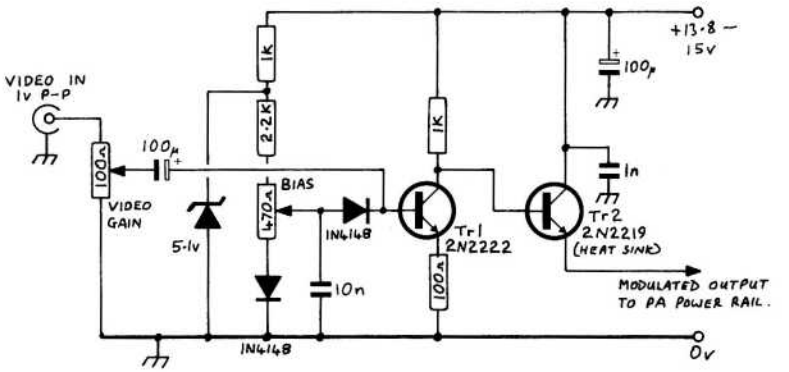


Fig.2 VISION MODULATOR

MODIFYING THE TRANSMITTER BOARD

Refer to Fig's 1 and 3 and locate Tr2 and Tr3. Remove C18 (1n) from the power rail and change C8 and C14 to 100pF. Locate the PA supply line, this is easily recognised by the ferrite beads which are strung onto it, and disconnect the feeds to Tr2 and 3 collectors from the main power line. Make sure that power is still connected to the 3rd multiplier Tr1. Fit the modulator board as close to the PA as possible and connect its output to the feeds to both Tr2 and 3 of the transmitter using as short a piece of wire as possible.

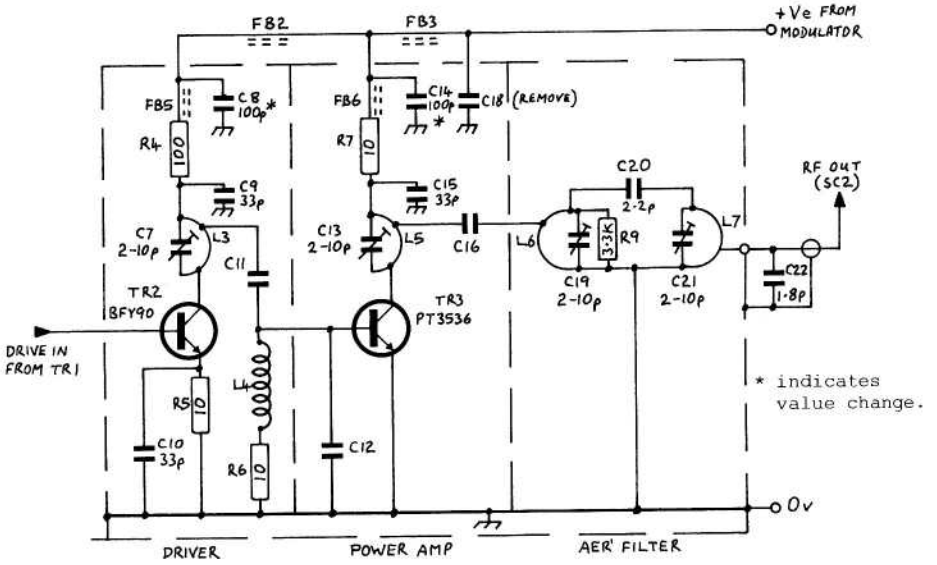


Fig. 3 PF5UH CIRCUIT DIAGRAM

ADJUSTMENT

Since the transmitter has already been aligned there should be little need for re-adjustment, however, after the video transmission has been set up correctly it may be advisable to re-tune the driver and PA stages in case they have shifted due to the different supply rail being used.

Set both modulator controls to around half position and apply power. RF output should be observed on the power meter and this can be varied with the 'bias' control. Connect a video signal and the power output will go down, this is correct. Now monitor the picture using an RF probe such as that described in the BATC's 'TV For Amateurs' (amongst numerous others) or, failing that on a local TV set (only if you have to). Look at the demodulated signal on a scope and adjust the 'bias' control for correct video/sync ratio, advance the video gain control if necessary to obtain a fully modulated picture. Don't be alarmed if the output power appears to be around half of that expected, this is due to the power meter averaging out the signal. To determine the actual 'peak' power output simply remove the video and read off the power meter. In practice you are unlikely to realise as much power output

under video modulation as you could with the ordinary FM system, this is because in order to achieve an un-distorted picture with correct sync pulses the amplifiers must be run in a more linear mode thus reducing the efficiency - a level of around 300mW would be about right.

The output filter in the pocketphone should be wide enough to accommodate the video signal but if you suspect that bandwidth limiting is taking place try increasing the value of the output filter coupling capacitor (C20) and/or reducing the value of R9 in order to further damp L6.

If any instability problems are experienced when connecting up the modulator an RF choke in series with the modulator output should cure it. Wind about 8 turns of enamelled copper wire onto a 3mm drill and make it self-supporting.

NOTES

I must point out that I have never carried out this modification myself. The article was inspired by one which appeared in the Cambridgeshire Repeater Group Newsletter (No.9) by Chris Lorek, G4HCL to whom grateful thanks are expressed for his advice and permission to quote from his article. The modifications and techniques described here are well tried and tested ones and have been used on a variety of similar equipments, therefore there is every reason to suppose that good results will be achieved by those carrying out the mod's.

If you intend driving a power amplifier with this transmitter, especially if that amplifier is to be one of the UHF power modules which are currently available, be sure to first ascertain the correct amount of drive power required and attenuate the output from the pocketphone if necessary. Overdriving these block PA's will almost certainly result in their destruction.

SOFTWARE NOTEBOOK

6 - CAPTION GENERATOR BBC

By Jon Large

This short program for the BBC micro provides immediate double-height mode-7 captions that automatically self-centre. An alternative procedure that allows revealing captions is offered at the end of the listing. In order to use it line 260 should be rewritten as:-

```
260 PROCX(cap$(J),pos)
```

In the interests of conserving magazine space this listing has been produced using a special formatter which splits some program lines over several lines of print. Because of this it is sometimes difficult to indicate where spaces should be in some of the on-screen printed instructions, therefore users may need to modify the spacings in some lines to make a pleasing screen presentation.

When entering a line do not press RETURN until you reach the next line number.

The listing is as follows:-

```
10 REM NOWCAP - A PROGRAM FOR
   INSTANT CAPTIONS
 20 REM by J.R.G.Large.
 30 MODE 7
 40 DIM cap$(8)
 50 VDU23;8202;0;0;0;
 60 PROCG("INSTANT CAPTION!",2)
 70 PROCG("                ",4)
 80 PRINTTAB(0,6)"This program
    enables Double Height      Mode 7
    captions to be typed in for
    immediate use."
 90 PRINT'"Captions are centred
    automatically."
100 PRINT'"To use, simply enter
    how many lines     of caption
    there will be, the position
    of the top line on the screen
    (1 = top; 11 = centre; 22 =
    bottom),    and type in the
    caption when asked."
110 PRINT'"Pressing SPACE BAR
    afterwards will clearthe screen;
    press it again to repeat    that
    caption, enter another, or exit."
120 PRINTTAB(0,22);"(Press Space
    Bar to continue)"
130 X=GET:CLS
140 PRINTTAB(0,4);"Enter your
    data now:"
150 INPUT'"   How many lines of
    text",lines
160 IF lines>8 PRINT'"No more than
    8 lines - try again:":
    A=INKEY(100):GOTO 150
170 INPUT'"   Position of top line
    (1 = top; 11 = centre;
    22= bottom)",pos
180 IF pos>24 PRINT'"Must be
    LESS THAN 23 !!  Try again:":
    A=INKEY(100):GOTO 170
190 FOR J=1 TO lines
200 PRINT'"   Wording of caption
    - line ";J;" :"
210 INPUT'"   ",cap$(J)
220 IF LEN(cap$(J))>38 PRINT'
    "CAPTION SHOULD NOT EXCEED 38
    LETTERS    Enter again:":GOTO 200
230 NEXT
240 CLS
250 FOR J=1 TO lines
260 PROCG(cap$(J),pos)
270 IF pos>22 CLS: PRINTTAB(0,11)
    "Impossible! Your top line cannot
    be more than       line number ";
    24-(lines*2);" If you want to fit
    all that in!"
280 IF pos>22 PRINT"      Press SPACE
    BAR to start again.": X=GET:CLS:
    GOTO 140
290 IF lines>1 THEN pos=pos+2
300 NEXT
310 IF lines>1 THEN pos=pos-(lines*2)
320
330 PROCR(250)
340 END
350 DEF PROCG(cap$,Y%)
360 X%=40-LEN(cap$)
370 X%=(X%DIV2)-1
380 PRINT TAB(X%,Y%);CHR$141;cap$
390 PRINT TAB(X%,Y%+1);CHR$141;cap$
400 ENDPROC
410 DEF PROCR(Z%)
420 X=GET:CLS
430 PRINT TAB(0,10);"Press RETURN
    to repeat that caption.
    Press C to enter another caption.
    Press ESCAPE to escape!"
440 INPUT'"Which",R$
450 IF R$="C" OR R$="c" THEN CLS:
    GOTO 140
460 CLS: GOTO Z%
470 ENDPROC:REM::::::::::::::::
    :::::::::
480 REM A revealng caption procedure:
490 DEF PROCX(cap$,Y%)
500 X%=40-LEN(cap$)
510 X%=(X%DIV2)-1
520 FOR A%=1 TO LEN(cap$)
530 PRINTTAB(X%,Y%);CHR$141;
    LEFT$(cap$,A%)
540 PRINTTAB(X%,Y%+1);
    CHR$141;LEFT$(cap$,A%)
550 A=INKEY(5): REM Number affects
    speed of "typing"
560 NEXT
570 ENDPROC:REM::::::::::::::::
    :::::::::
```

Be careful to differentiate between noughts and zeros.

TV ON THE AIR

By Andy Emmerson G8PTH

These words are being written in what is described as the coldest February since 1947 - all I can say is I hope it has thawed out by the time they appear in print! Sometimes a cold, bright spell gives us an opening on VHF and UHF, but this year not even that has cheered us up. No matter; I have received a tidy bunch of letters - and promises of same. The former you can now read, and as to the latter, well hang your heads in shame!

Just before this I can just mention that the chairman of the Swiss ATV club USAT, Fritz HB9RWD, came to London on a rapidly arranged visit. I had the pleasure of meeting him and presenting him with some BATC publications. We spent an interesting afternoon and evening discussing ATV operations in our two countries and agreeing on the need to cooperate through the European ATV Working Group.

An interesting point is that in Switzerland ATV is officially banned on 70cm. Banned not by the licensing authorities but by USKA, the national radio society! They have interpreted literally the IARU "Brighton" recommendation that "ATV should move to higher frequencies". This recommendation was, unfortunately, one of the worst ever made, since the word "should" is capable of two meanings, namely "must" or "ought to".

As a result there has been more than one interpretation of the words, and the Swiss have taken the more restrictive one - officially, that is. There are, however, 25 ATV stations on 70cm! On 24cm there is just one - HB9RWD - but six or seven are also constructing and should be on the air soon. They all use the French (F3YX) FM system, so in future it should be worth keeping an eye open in the Swiss direction on 1255 MHz.

First of all a letter all the way from Italy, coming from Stefano Malaspine I6MQS in Fermo. He says that ATV activity is rather low, just himself and I6CEY, though in Milan there are many more stations. He uses a Microwave Modules transmitter and receiver and has built a Wood & Douglas pattern generator. To compensate for the lack of ATV activity Stefano is very much into weather satellites and has built a VHF receiver and scan converter. All this works very well and has been a source of great satisfaction.

News is still coming in about the lift last October. For Ron G6GHP in Westgate-on-Sea (Kent), October 13 was not an unlucky day - he managed to make a P4 contact with John G4HMG in Devon. He also made some good 24 cm contacts which I'll cover later on. G8JET reports that he is now on 70 using what is believed to be the LAST Fortop transmitter, so if you live around Doncaster I hope you will look out for him. No more 70cm news, so onto higher things .....

PUBLICATIONS

QTY	PUBLICATION	PRICE EACH	UK P&P	TOTAL inc.P&P
.....	The revised AMATEUR TELEVISION HANDBOOK by T.Brown G8CJS (155gm)	£2.00	0.40	.....
.....	TV FOR AMATEURS by J.Wood G3YQC (85gm)	£1.50	0.25	.....
.....	MICRO & TELEVISION PROJECTS by T.Brown G8CJS (140gm)	£3.00	0.50	.....
.....	THE BEST OF CQ-TV By J.Wood G3YQC & T.Marsden G6JAT (130gm	£3.00	0.50	.....
	CQ-TV BACK ISSUES. The following issues are still available although stocks of some are low. Please circle those required.			
.....	122,127,130,131,132,133 ..... *Please estimate appropriate postage (approx 90gm per copy)	£1.00	*	.....
.....	RE-PRINTS. Photocopies of any article from past publications are available	0.20 sheet	0.20	.....
.....	INDEX. All main articles in past issues of CQ-TV and 5 Handbooks. Inc. page count, (essential for ordering re-prints). (40gm)	£1.00	nil	.....

TOTAL £ .....

ANY EXTRA POSTAGE £ .....

TOTAL ENCLOSED £ .....

Weights indicated above are in Grammes and are to assist in estimating the correct amount of postage. Overseas members should ask for a postage quotation before ordering and should NOT pay by foreign cheque.

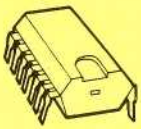
Please send orders for publications only to:-
BATC PUBLICATIONS, 14 LILAC AVENUE, LEICESTER, LE5 1FN, ENGLAND

name	call
address	
	post code

BLOCK LETTERS PLEASE

MICRO AND TELEVISION PROJECTS

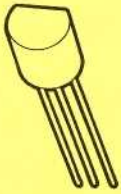
BY TREVOR BROWN



ANOTHER BRAND-NEW ATV BOOK FROM THE PEN OF TREVOR BROWN.

THIS ONE TAKES THE LEAD IN DIGITAL ELECTRONICS AND INTRODUCES IN A PRACTICAL WAY THE ALL-IMPORTANT SUBJECT OF USING A HOME MICRO-COMPUTER IN THE ATV SHACK OR STUDIO. THOSE WITH OTHER INTERESTS HAVE NOT BEEN FORGOTTEN THOUGH AND YOU WILL FIND MUCH TO INTEREST YOU.

CONTENTS INCLUDE:



Test pattern and sync generator.
Electronic caption writer.
simple vision switcher.
SECAM colour encoder.
Home computers.
Spectrum user port.
Computer controlling character generators.
Spectrum E-Prom programmer.
RS232 E-Prom programmer.
Spectrum freezer.
Teletron.
Teletron VDU.
Ham text.

ANOTHER WORTHY ADDITION TO YOUR SHACK COLLECTION.

MEMBERS SERVICES

QTY	CAMERA TUBES, SCAN COILS, BASES & LENS MOUNTS	EACH	P&P	TOTAL
.....	1" Vidicon scan-coils (low Z focus coils)	£6.00	£1.20	.....
.....	1" Vidicon scan-coils (high Z focus coils)	£6.00	£1.20	.....
.....	2/3" Vidicon scan-coils	£6.00	0.80	.....
.....	Vidicon bases - 1"	0.50	0.17	.....
.....	Vidicon bases - 2/3"	0.50	0.17	.....
.....	TV camera lens mounts - "C" type **	£1.00	0.24	.....
.....	Vidicon camera tubes - see below	-	-	
.....	Image Orthicon camera tubes type 9565 **	£10.00	+	.....
.....	Photomultiplier tube type 6097F **	£2.00	0.60	.....

(+ Buyer to arrange transport).

TOTAL THIS PAGE £.....

1" vidicon tubes are available in different heater ratings (95 and 300mA) - 6" long, and also a 95mA 5" long version; (EMI types 9677, 9728, 9706 and EEV types P849 and P8031). 2/3" tubes have 95mA heaters (EMI type 9831, EEV type P8037). All tubes are of separate mesh construction, with magnetic focus and cost £25 each, including postage. Electrostatic vidicons, Leddicon and Ebitron tubes are available, to special order. Members requesting information on different types of tube or equivalents for other manufacturers are asked to send a stamped, addressed envelope for their reply.

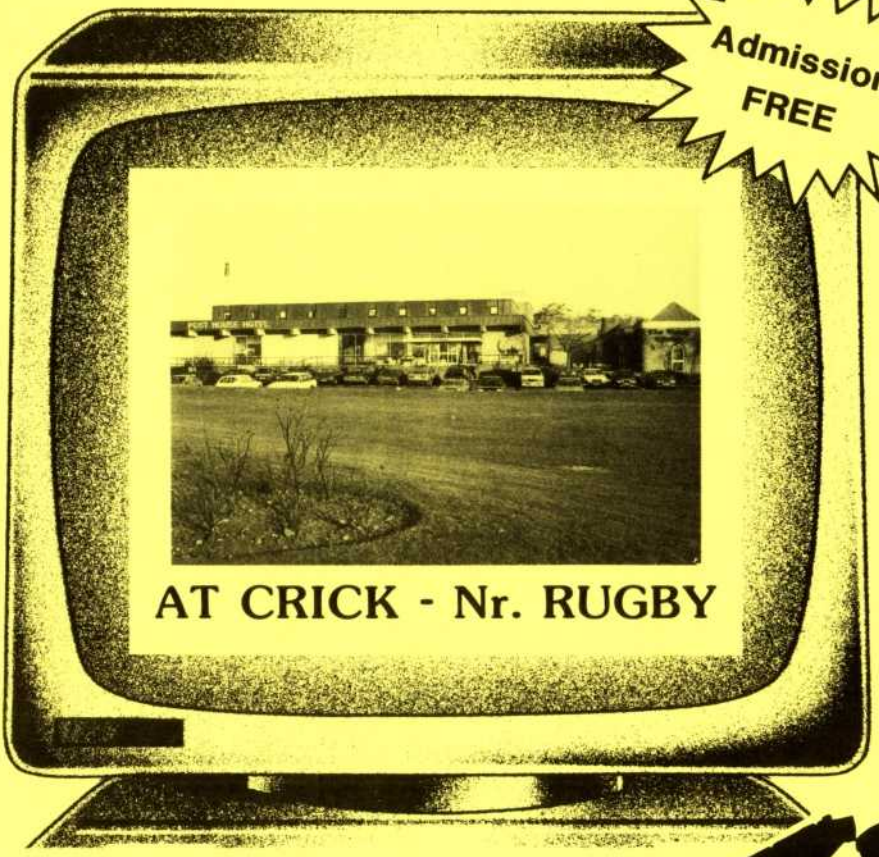
QTY	PRINTED CIRCUIT BOARDS	EACH	P&P	TOTAL
.....	Amateur television receiver (HB1)	£1.50	0.30	.....
.....	Electronic character generator (HB1)	£3.00	0.30	.....
.....	Colour test card (set of 3-double-sided)	£15.00	0.60	.....
.....	Horizontal aperture corrector (HB1) **	£3.00	0.30	.....
.....	PAL colour coder (HB1)	£3.00	0.30	.....
.....	Sync pulse generator (HB2)	£3.00	0.30	.....
.....	Vision switcher matrix (HB2)	£4.00	0.30	.....
.....	Vision switcher logic (HB2)	£4.00	0.30	.....
.....	Vision mixer (HB2)	£4.00	0.30	.....
.....	Wipe effect generator (HB2 rev)	p.o.a	0.17	.....
.....	70cm VSB transmitter-7 boards (HB2)	£15.00	0.40	.....
.....	SSTV pattern/sync generator (HB2)	£3.00	0.30	.....
.....	Character colourizer,(printed legends HB2)	£5.00	0.30	.....
.....	70cm TV transmitter (TVA and CQ-TV122)	£3.00	0.30	.....
.....	ATV up-converter (TVA and CQ-TV112)	£2.25	0.30	.....
.....	Spectrum user port (MTP)	£3.00	0.30	.....
.....	Spectrum PROM blower (MTP)	£3.00	0.30	.....
.....	Teletron (MTP)	£3.00	0.30	.....
.....	Teletron VDU (MTP)	£4.00	0.30	.....
.....	SPG, greyscale, char gen (MTP)	£4.set	0.60	.....
.....	Keyboard add-on (for above char. gen) (MTP)	£2.25	0.25	.....
.....	4 Way vision switch (MTP)	£3.00	0.25	.....
.....	'Project 100' sync generator (CQ-TV100)	£3.00	0.30	.....
.....	FM-TV demodulator (CQ-TV122)	£3.00	0.30	.....
.....	Video filter (TVA and CQ-TV122)	£1.00	0.17	.....
.....	Sync processor (CQ-TV129)	£3.00	0.30	.....

TOTAL THIS PAGE .....

1986 BATC RALLY / SHOW

MAY 4th

Admission FREE

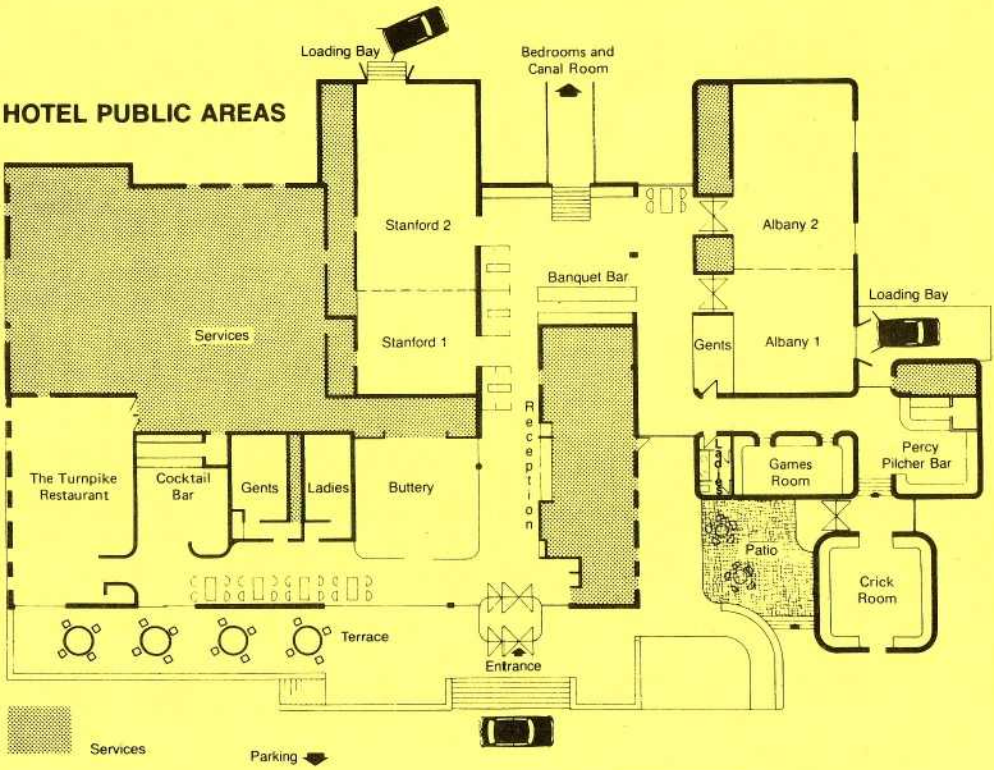


AT CRICK - Nr. RUGBY

VIDEO

Radio Communications

FLOOR PLAN



The Post House Hotel

There are 96 bedrooms, many of which are family rooms. All have private bathroom, colour TV, radio, telephone, private bar and facilities for making tea and coffee. When it comes to something more substantial than tea and coffee, the Post House offers a wide range of options. The Turnpike Restaurant is a first class venu offering both an excellent menu and wine list. You can enjoy breakfast, as well as grills, salads and snacks, in the bright and airy coffee shop. Full facilities for children are available.

There are two bars, the Cocktail Bar, which opens out onto the terrace and the Percy Pilcher Pub, decorated in the style of a comfortable Edwardian pub.

The BATC has made a special arrangement with the Post House Hotel whereby visitors to the Convention may ask for half-price overnight accommodation. Please mention the BATC Convention when booking.

The Post House Hotel, Crick, Northamptonshire. Tel: 0788 822101

EXHIBITION

DOORS OPEN 10am.

This years show will be bigger than ever and will include more trade stands - a special marque will be erected - Colour SSTV; Demonstrations of various projects from BATC books and CQ-TV; Members exhibits; Commercial and home-brew outside broadcast units (including the 'CARASCANNER' feàtured in this issue); Bring-and-buy; Club sales; NBTV; Repeater groups; etc., etc.

This year will see a larger lecture theatre than before. The lecture programme will include a SEMINAR ON AMATEUR TV REPEATERS. Conducted by Graham Shirville G3VZV, BATC Committee member and liason manager, with Paul Elliott G4MQS, BATC Committee member and Special Projects Manager for the RSGB Repeater Management Group. Also Trevor Brown, GG8CJS on MICRO & TV PROJECTS' and 24cm AMATEUR TV by Andy Emmerson G8PTH. Other lectures are planned but not finalised and details will be on display at the show.

The BATC's Biennial General Meeting (members only) will be held in the lecture hall, commencing at 4.30pm. Further information from Trevor Brown, General Secretary. Members attending the meeting are advised that BATC account sheets and the meeting agenda will be available on the day.

For the first year (in recent times) there will be a RADIO TALK-IN which will be conducted by the Rugby Amateur Transmitting Society, under the special callsign GBOATV, from their clubhouse at the Rugby Radio Station. Talk-in will be on S22 (145.55MHz) FM and on GB3ME 70cm repeater (RB6).

LUNCHEON - The Turnpike restaurant is licenced and has an adjoining cocktail bar. Members are advised to book lunches in advance, special children's meals are also available.

SNACKS AND DRINKS - There is an excellent coffee shop and buttery bar as well as the Percy Pilcher pub, all of which sell food.

Ample car parking facilities are provided. Large grounds and gardens surround the hotel and it is hoped to have a fun castle and other facilities available for children. The grass areas may be used for picnicking.

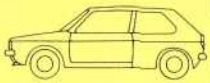
Members staying overnight are invited to a BATC social evening in the Percy Pilcher bar during Saturday evening (3rd) - please wear your badge.

Further information on matters relating to the show may be obtained from Frank Elliott on (Leicester) 0533 553293 (office hours). Hotel reservations and bookings on (Rugby) 0788 822101.

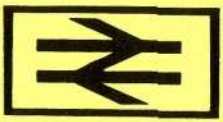
THE BEST SHOW .....

OF THE YEAR

How to get there



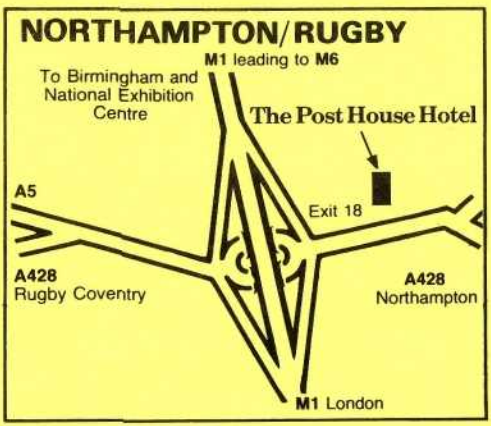
Located in the centre of the Country, the POST HOUSE HOTEL is about 300 yards East of exit 18 of the M1 motorway.
Motorists should leave the motorway at J18 and take the A428 signposted to Crick and Northampton.
Those travelling on the A5 Watling Street will find that it passes very close to the motorway roundabout. If in doubt, follow the M1 motorway signs to the roundabout and then take the second exit, signed A428.



The nearest mainline and Inter-City railway station is 'Rugby Midland' situated in the town itself.
Busses to Crick are infrequent but there is a taxi rank outside the main entrance.

Both the Oxford and Grand Union canals pass close to Rugby and Crick where there are numerous marinas, wharfs and moorings at which to stop. Members using this mode of transport should consult their Waterways guide publications for the necessary information.

The nearest major terminal is Birmingham International Airport. This is situated between Birmingham and Coventry and is around 30-miles from the Convention venue.
The POST HOUSE HOTEL has its own Heliport for those arriving by hellicopter. Members wishing to use this facility should contact the Hotel in advance to make their arrangements.
Tel: 0788 822101



QTY	SLOW-SCAN TV	EACH	P&P	TOTAL
.....	G3WCY SSTV to FSTV RX converter & reprint	£10.set	0.60	.....
.....	G4ENA mods for above (CQ-TV127) - set of 4	£5.set	0.30	.....
.....	G4ENA SSTV transmit board (CQ-TV129) (Add-on to G3WCY converter) NB: Incorporates LSC and width circuit as in G4ENA SSTV mods. PCB set (above).	£6.00	0.30	.....
.....	G4ENA SSTV aux board (CQ-TV130)	£2.00	0.20	.....
.....	G8CGK SSTV pattern generator - inc. notes	£3.00	0.30	.....
	STATIONERY, ACCESSORIES AND COMPONENTS			
.....	BATC test card - with data sheet	0.50	0.24	.....
.....	BATC reporting chart (illustrated)	0.12	0.20	.....
.....	BATC lapel badge - diamond - button hole	0.40	0.17	.....
.....	BATC lapel badge - round - pin fastening**	0.50	0.17	.....
.....	BATC callsign badge - pin fastening Please print callsign clearly	£1.50	0.17	.....
.....	BATC key fob	0.60	0.17	.....
.....	BATC equipment stickers - 1" round	0.15	0.17	.....
.....	BATC windscreen stickers - 2.5" round	0.10	0.17	.....
.....	Surplus delay lines (not KT-3) **	0.40	0.20	.....
.....	13.14MHz TV TX crystal (HB2)	£5.00	0.17	.....
.....	108.875MHz TV TX crystal (TVA)	£7.00	0.17	.....
.....	5MHz SPG crystal for P100 (CQ-TV 100)	£2.75	0.17	.....
.....	2.5625MHz SPG crystal for ZNA134 (HB2)	£2.75	0.17	.....
.....	4.433618MHz PAL colour subcarrier crystal	£2.75	0.17	.....
.....	TBP28L22 PROM for test card circle.	£10.00	0.25	.....
.....	2732 E-PROM. SSTV program (HB2)	£12.00	0.17	.....
.....	2716 E-PROM - programed as a substitute for 74S262 (see mod in CQ-TV132)	£5.00	0.17	.....
.....	E-PROM-programmed for Teletron typewriter	p.o.a	0.17	.....
		TOTAL THIS PAGE		£.....

TOTAL FOR GOODS £.....

TOTAL POSTAGE £.....

TOTAL ENCLOSED £.....

*SPECIAL NOTICE - Some of the PROM's for the test card circle have been incorrectly programmed by our suppliers. If you have purchased a TBP28L22 from the BATC between Oct 84 & Aug 85, please contact Members Services as soon as possible.

ORDERING INFORMATION

OVERSEAS MEMBERS should ask for a quotation of postage costs and acceptable forms of payment BEFORE ordering from Members Services. Please enclose an International Reply Coupon for reply.

PUBLICATIONS must be ordered SEPARATELY from the Publications Department on the form provided in this magazine.

CHEQUES should be made payable to "BATC" and should be for English banks only please, in £ sterling.

ORDERS PLEASE TO:- Mr. P.Delaney. 6 East View Close, Wargrave, BERKS RG10 8BJ, England. Tel: 073 522 3121 (evenings/weekends only please)

BLOCK LETTERS PLEASE

name	callsign
address	
	post code

HB1 = ATV Handbook (blue); HB2 = ATV Handbook vol.2, or revised edition; TVA = TV for Amateurs; MTP = Micro & Television Projects.

All Club crystals are HC18/U (wire ended).

Items from these lists can ONLY be supplied to CURRENT members of the BATC. These lists supercede all previous ones. Components for club projects are not available from Members Services unless contained within these lists.
Items marked thus: ** are available only until present stocks are exhausted.

Do components make you MAD?

A number of members seem to be having difficulty in obtaining certain parts for club projects and circuits, so in answer to the questions most asked we have compiled a list of suppliers which may help:

Economic Devices of P.O.Box 228, Telford, Shropshire TF2 8QP stock the SL1432, TBA520 and many other discrete semiconductors.

Post-A-Part Electronics of 6 Chapman Court, Charfleets Road, Canvey Island, Essex SS8 0PQ stock the TDA2540 and SW153A filter.

Technomatic Ltd of 17 Burnley Road, London NW10 1ED stock ZNA134J, NE564, NE592, MC1495L, LM711, RO-3-2513-UC plus 74.., 74LS.., and 74S series as well as most of the C-Mos series IC's. This firm also keep a comprehensive stock of general electronic parts.

Greatech Electronics Ltd of Hay Lane, Braintree, Essex CM7 6ST stock 2N3866, BFR90, BLX67 together with other thermionic and solid-state RF devices.

BCD Electronic Services of 200 Hessle Road, Hull HU3 3BE Tel: 0482 225437
and
Cricklewood Electronics of 40 Cricklewood Broadway, London NW2 3ET Tel: 01 450 0995

Both the above firms offer a comprehensive range of components. BCD Electronics advertises in CQ-TV and - being a BATC member - is particularly biassed towards amateur radio and TV .

BATC LIBRARY

The BATC library, though not huge, may well contain that article or paper that you have been searching for.

A duplicated list of the libraries contents is available to members upon receipt of a stamped addressed envelope, or you may send or telephone your specific requests for information. Should the material required not be to hand the librarian will try to obtain it for you.

At present the library contains a large number of manuals for Marconi, Pye, E.M.I. etc., broadcast equipment, back-issues of CQ-TV, A5, Der TV Amateur etc., and a vast amount of Mullard publication notes. There are some historically interesting letters and photographs from the very early days of the Club. Also included are some (mostly early) audio tapes and lectures which are available for loan.

Paul Marshall, G8MJW. Fern House, Church Road, Harby, Nottinghamshire NG23 7ED. Tel: 0522 703348.

There are a number of video tapes available for free loan to groups and societies. The tapes include BATC demonstrations and exhibitions, programmes on ATV plus a good selection of material from other countries showing how they operate amateur television and demonstrating ATV repeaters.

If you have any ideas or material for future programmes, Trevor Brown would be pleased to hear from you.

Trevor Brown G8CJS, 25 Gainsbro Drive, Adel, Leeds LS16 7PF. Tel: 0532 670115

First of all the G6GHP log for October 13. On it is G3DFL in Warley, who was on 1249MHz; Ron sent to him on 1275. Later, on the 17th, he had a hookup with John G3OGX in Essex. John has just one watt at his disposal but managed to put a P4 picture into Westgate. This cross-water path is now worked regularly. The previous month Ron had no little success working a number of Dutch stations on 24. On September 27 he got a P5 report from PE1HLR (after a P5 linkup on 70cm) and on the 30th he worked PE1AAQ and PE1HZR. Both stations were AM, which meant they had to slope detect Ron's signals but despite this he had P5 reports from 'AAQ and P3 from 'HZR. Both stations were received P5 in AM at Westgate and Ron managed to work them both again on September 30th.

Another kind of 24cm test has been going on in Northamptonshire recently. Charlie Suckling G3WDG, well known for his moonbounce and other 23cm SSB activity, has lately equipped for satellite TV using equipment with an IF of 950 - 1450 MHz. He hit on the excellent idea of trying a 23cm receiving aerial connected to the tunable IF downconverter, and asked me to send him some colour and sound signals. I am pleased to say this was a total success. Colour vision and audio signals on 1255MHz were received on the 9th February with 10 to 11 carrier-to-noise margin, despite the slightly unusual receive setup.

Some repeater news now. GB3UD, near Stoke on Trent, is in operation as a manned relay station. Output is but 200mW, and the best DX report to date is G5KS who is receiving it at P3 strength. They hope to raise the power to 6 watts soon. Another machine operating as a beacon and manned relay is Durham, though it is on a temporary site. It uses a pre-production 'DC-to-Light' transmitter generating 2 watts. As soon as the licence is received the repeater will swing into full action. There are also whispers abroad that the Bath repeater may enter service during March.

A nice long letter next on smart-looking "Bristol FM TV Group" paper. It comes from Shaun O'Sullivan G8VPG, who also enclosed a call-up letter addressed to the FM fraternity in and around Brissle. They are very keen to build a TV repeater (FM only!) for Bristol and are actively generating local support. Roger Worth G4ZQF and Shaun are the ringleaders, acting as chairman/treasurer and secretary/chief engineer respectively.

Their intention is for a fairly simple repeater (initially), without all the bells and whistles such as teletext pages but with good RF engineering. ATV activity in Bristol is running at a high level now, with several newcomers joining the scene. Beside the usual Wednesday and Sunday local TV nets activity is often seen on other nights. Certainly a call on 144.750 will usually produce a response.

Roger G4ZQF, Chris G8GLQ and Shaun G8VPG carry out most of their exchanges on 24cm FM towards the bottom end of the band. Shaun and Roger are both fully equipped with Wood & Douglas gear, complete with pre/de-emphasis and subcarrier audio. They both use 23 element Tonna antennas. Chris G8GLQ has mainly homebrew gear including a 2C39 amplifier. He has a corner reflector antenna. Len G8UUE is receive-only at present but is building Allan Latham's transmitter. He has a Sandpiper helical antenna. Pete G0DRX is equipped with Wood & Douglas gear. Viv G1IXE and Ivor G1IXF are active viewers with W&D equipment and a JVL 48-element loop yagi. They are awaiting the DC-to-Light transmitter.

Shaun is starting to dabble with 10GHz but has not had time to progress much. He and Roger find on 24cm the addition of W&D's pre/de-emphasis modules have produced a staggering improvement in picture quality. Over their obstructed 14km path reports have gone from P2 to P3.5 to P4, with additional improvement in picture stability. So these modules are highly recommended, even if sound is still a bit scratchy (some more development work to be done!).

Another welcome letter comes from Andy Goy G4HJD in the city of Kingston-upon-Hull. After a great summerfun contest using BCD's call G6CCV they decided to carry out some more 1255MHz FM tests. The equipment was working but there was no-one to work during the contest! Andy had more luck on his summer holidays when he worked three of the Worthing stations on 1255MHz - on their home ground.

His transmitter is constructed using Wood & Douglas modules and G8KOE's design of audio modules. Receiver is the Fortop TVC 1300 and BATC FM demodulator. Andy has had some problems with the intercarrier sound but a circuit by Martin G8KOE cured the problem. He had problems of interaction between sound and vision but the November 'CQ-TV' video strip should solve this. The tunable sound demodulator is already built and works well.

Getting out and about he and Nick G8PSE have been operating /P from a field (!) six miles back to Andy's QTH. Picture quality was P5 but colour eluded them. Dave G4WCD has also assisted in these tests. They are hoping to attract more people up to 24cm and intend to apply for a repeater next year. In the meantime they will take portable ATV systems to some public special events.

Finally the slower scanners - and writers. Once again, despite promises to the contrary, the only letter is from Richard G3WW. What an idle lot you slow-scanners are! But back to the plot.

First of all, commiserations to Grant Dixon, who suffered a fall in his shack - while looking up some data for another amateur! He should be well by the time you read this, so here's hoping all is now to rights. G3WW tells me he is still receiving phone calls asking him to compare the Wraase (why do people mis-spell it Wrasse?) SC-1 with the Robot 1200C in terms of their operation. The answer is that they are compatible for black and white but not for colour. The most recent enquiry was from EA5FIN on 20 metres, who then proceeded to give Richard a lengthy lecture on the 1200's capabilities - based on the literature alone.

A new station worked was I5HHE on 20 metres using a Commodore 64: he wanted a QSL card direct just to prove to his friends who said it wasn't possible. But it was - good clean captions, says Richard.

A local 144.5 FM net has sprung up using BBCs and Spectrums. It comprises G6YQJ (Littleport, Cambs.), G0BDD (Ramsey St. Mary, Cambs.), G1ACB (Brinkley, Suffolk), G6OHM (Wimblington, Cambs.), G4VYG (Tofts, Cambridge), G4UVU (Newmarket, Suffolk), G8XOC (Stoke Ferry, Norfolk), G1MIA (Southery, Norfolk), G1ACO (Wretton, Norfolk) and G1EMW (Wareham, Norfolk). They are known as the "Fenland Net" and aim to meet at 1930 on Monday evenings (to give night shift workers a chance before they disappear to work), though most of these operators seem to be on nightly at present.

Richard is making two-way contacts to EU and the USA (when 20 metres is open) in b/w and colour using the SC-1 and the 1200C. the Ferguson Movie Star TV is working well as a colour monitor "after 12+ hS been taken off IFs". G3WW suggests that SSTV might liven up 29.6MHz FM.

Richard adds "Never think of moving house after 43 years!" Preparation is ghastly even though the house is not yet sold, and discards from the junkbox will fill several dustbins - and cause much heartache ...

Finally a couple of SSTV snippets. G4VYG (mentioned above) has made a very good job of a G3WCY transmit and receive converter and has also made a 24-second single-frame colour adapter. perhaps he will share the details with us! G3CDK has made an excellent 1200C tape of the shuttle flight in colour.

That's it for this time. We can do with a few more letters for the next roundup, so don't keep all the news to yourselves. Drop me a line at 71 Falcutt Way, Northampton, NN2 8PH or leave a 3 minute message on 0604-844130.

IN RETROSPECT

AN FM-TV GENERATOR - CQ-TV132

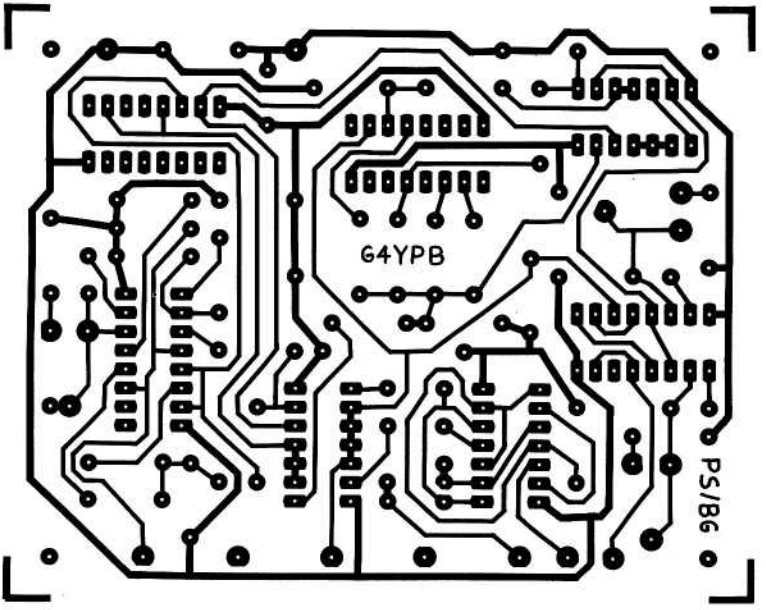
A bit of a mix-up in this one: The text refers (correctly) to the circuit in Fig.1 as being 'non-inverting' and to that in Fig.2 (inset) as 'inverting', however fig.2 itself is actually described as 'non-inverting' and the output is duly taken from the emitter. What it should read is 'inverting' and the output taken from the collector. Sorry about that and thanks to LA8AK and G4MQS for spotting that one. G4MQS also advises that if the 1k stopper resistor from the collector of Tr2 (Fig.1) is replaced by a 1uH choke, the amount of RF feeding back into the video will be considerably reduced, also, If you require more deviation from the unit the varactor diode (D1) can be replaced by a BB205.

BRUCH BLANKING - CQ-TV133

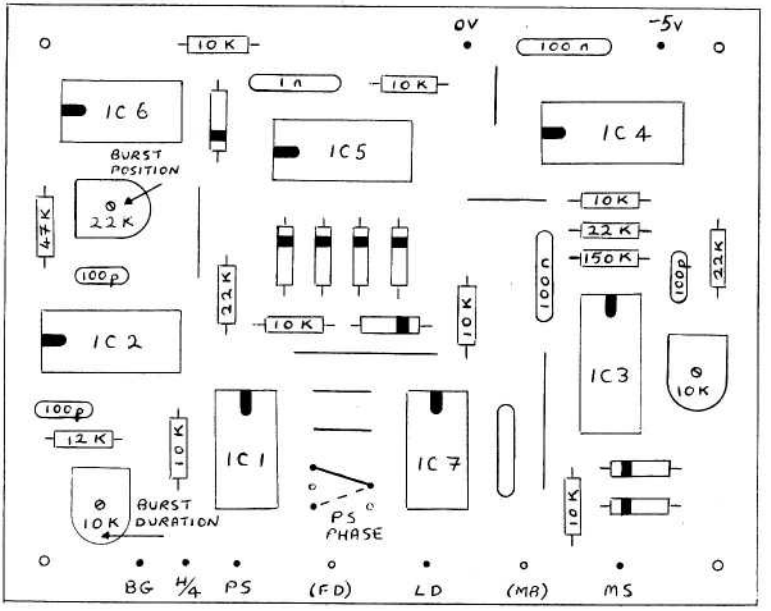
A couple of small errors were spotted in G4YPB's article: IC2a is not re-enabled until after its trigger (LD Leading Edge) has gone, therefore lines 0-9 (10 lines) are blanked and the latch reset during LD pulse 8. Remove the lowest diode (on the Qo line) from IC5 and re-label the lower half of IC5 ÷8.

The logic must be run from 0v and -5v. Only Fig.2 requires a +5v rail therefore all references to +5v in Fig.1 should be changed to 0v.

A printed circuit board has been designed for the project and it is reproduced full size (3.9" x 3.1") here. The board has provision for preset controls in all 'AOT' positions and is designed for 'piggy back' mounting on the main SPG, sufficient connections for FD and MB are provided in case they are required.



BRUCH BLANKING PCB PRINT PATTERN - Full size (3.9" x 3.1")



BRUCH BLANKING COMPONENT LAYOUT

24cm FM-TV TRANSMITTER - CQ-TV 133

Peter Johnson has notified some corrections to his transmitter article and added a couple of suggestions and a drawing:

On PCB-1 (Fig.1) R22 (470-Ohm) should be selected from values between 270 and 680-Ohms for optimum HF response of the combiner, it could be omitted completely but this may cause slight HF streaking. Both R22 and the previously mentioned C17 produce HF compensation; with a good 'scope displaying colour subcarrier, it is possible to establish these values to suit the parameters of T4 and give the desired frequency response. For general construction however values of 470-Ohm and 10pF should provide about optimum results.

PCB-2 (Fig.2) shows C17 (RF out) as 1n whereas it should be 10pF (or thereabouts).

Page 14; first line of table: TR1 (BFR51) should read BFR91.

Fig.3: To avoid operation on a wrong frequency, both TC1 and TC2 should be 1 - 3.5pF - Mullard 809 orange.

Page 9, PCB-1: delete R6 (75-Ohm).

Page 11, delete P4 and connect 6MHz switch contact direct to 'reg volts'. Set L1 for 6MHz, set P3 for 5.5MHz oscillation with the switch in the appropriate position.

The drawing on page 16 should be marked Fig.6.

V.E.T. (Fig.3 input) has been puzzling some of us! Apparently is means Video Entry Terminal, (whatever happened to Video In?) Constructors should note that this entry point should be via a feedthrough insulator - not a capacitor.

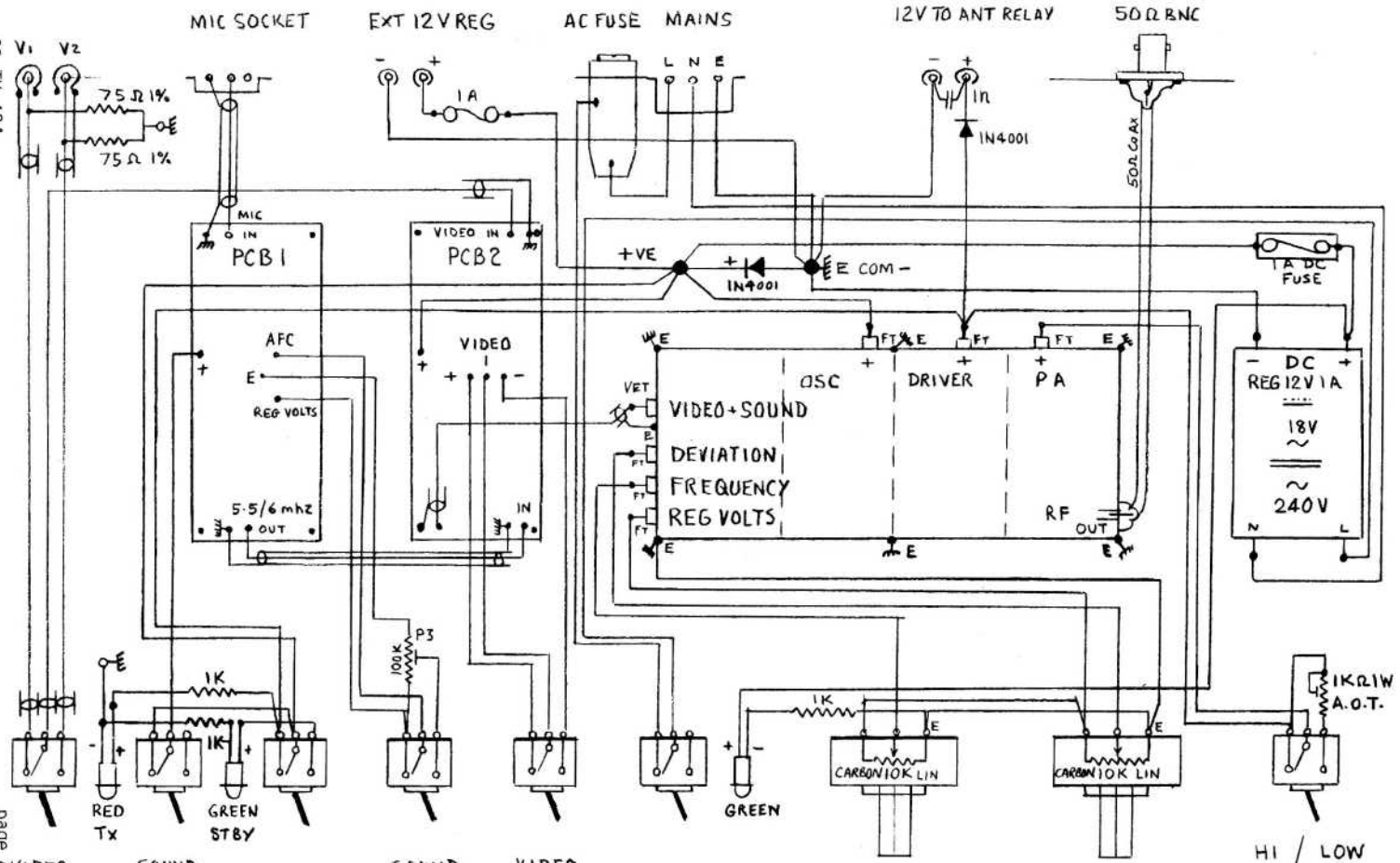
In response to several requests Peter
has drawn-up an interconnection diagram for the complete transmitter including full diagramatic details for wiring the external circuits, this is shown in the accompanying figure.

NOTE

The +VE and E COM terminals are the distribution common points for the power supply, only one earth point for the dc neg. PSU connection should be provided to avoid earth hum loops. PCB's 3 and 4 are grounded by six solder tags and suitable screws soldered on the box and fixed to the chassis. PCB's 1 and 2 are bolted to the chassis at each corner, this provides the ground connection to chassis.

UHF DETECTORS - Various

Peter Johnson has found that if shottky diodes are used in UHF/SHF detectors such as the wavemeter on page 23 of CQ-TV131 or the 24cm forward power indicators on page 33 of CQ-TV120, they will give considerably more output than the more conventional point contact or silicon switching types. The HP2800 (more accurately 5082-2800) is a particularly useful device in this application and is readily available from many component suppliers.


MIC SOCKET
EXT 12V REG
AC FUSE
MAINS
12V TO ANT RELAY
50Ω BNC
V1
V2
75Ω 1%
75Ω 1%
1A
L N E
In
IN4001
50Ω Co Ax
MIC
IN
PCB1
VIDEO IN
PCB2
+VE
IN4001
E COM −
1A DC FUSE
AFC
E
REG VOLTS
5·5/6 mhz
OUT
VIDEO
IN
OSC
DRIVER
PA
VET
VIDEO + SOUND
DEVIATION
FREQUENCY
REG VOLTS
RF OUT
DC REG 12V 1A
18V
240V
N
L
1K
P3
100K
1K
1K
CARBON 10K LIN
CARBON 10K LIN
1KΩ 1W A.O.T.
RED
Tx
GREEN
STBY
GREEN
VIDEO 1 / 2
SOUND ON / OFF
TX / STBY
SOUND 6mhz / 5·5
VIDEO POS / NEG
AC ~ ON / OFF
TX FREQ
DEVIATION
HI / LOW
RF POWER

IN FRONT OF THE TUBE

Part 2

By Peter Delaney G8KZG

In part one we looked at the basic properties of simple lenses. In the early days of television, both professionals and amateurs used this type of lens. The angle of view was fixed, because the lens had a fixed focal length. The initial way that this was overcome was to use several lenses, of different focal length. They were mounted on a rotatable 'lens turret', so that any of the set (usually four), could be brought in front of the tube by turning a handle at the rear of the camera. The front cover of "TV for Amateurs" shows such an arrangement.

Modern cameras, however, do not normally use fixed focal length lenses, except when positioned to always view the same scene (such as in security or industrial applications). The lens is made to have a variable focal length - a 'zoom lens'. Whilst operationally the zoom lens has many advantages, it does present problems as well. The main advantage, of course, is that it is now possible to change from a wide angle shot to a telephoto (narrow angle) one 'on air'.

So how does the zoom lens work? The front and rear lenses are basically the same as in a fixed focal length lens, but in between are some other lenses. (Fig. 1) These are made to move to and fro by the zoom control. The camera tube can now see either the whole room (wide angle) or just the test card (narrow angle), without moving the camera. (Fig.2) It sounds easy - but... . As the lenses move, so does the point where the sharpest picture is obtained behind the lens. If this was not compensated for, then the picture would go in and out of focus as the zoom control is operated. The lens designer has two ways of doing this: In the first, extra lenses are added between the moving elements, which is awkward (Fig.3). The second method involves having a second set of lenses that are moved by the zoom control. This second set must move on an accurate, but non-linear cam (Fig.4). In either case, the extra pieces of glass mean greater attenuation of the light, as mentioned in part 1. Simply then, the zoom lens will pass less light than a fixed lens of the same focal length and diameter. This is the main disadvantage of a zoom lens. In practice, except for the best - (equate with 'most expensive') - zoom lenses, a compromise is made between the sharpness of focus during the zoom and cost.

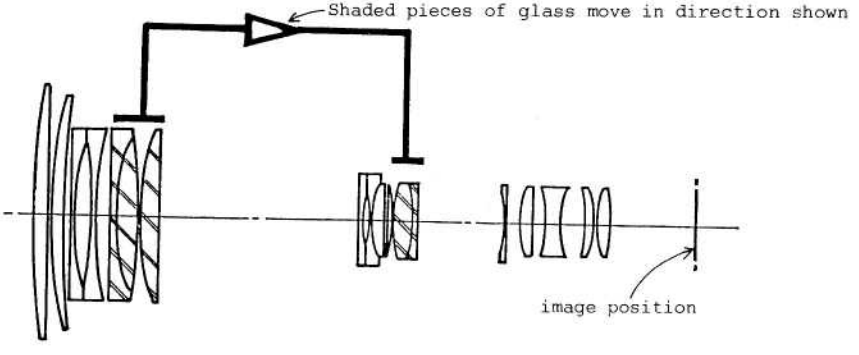


Fig.1 TYPICAL ZOOM LENS

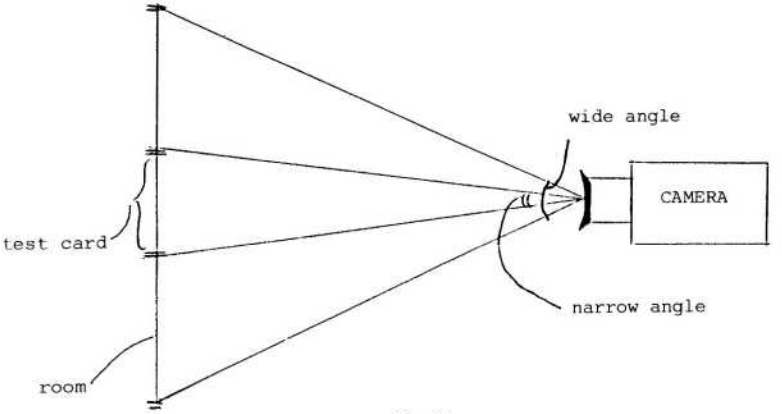


Fig.2

When a zoom lens is fitted to a camera, there is also the problem of how far in front of the tube it should be. For a fixed focal length lens, the distance is the focal length, measured from the optical centre. As a zoom lens has a range of focal lengths, this method is not suitable. The procedure to take is as follows - called 'zoom setting'. First, zoom to the longest focal length (narrow angle), and focus an object for the sharpest picture. The lens is then moved to its shortest focal length (wide angle), and the SAME object focussed, by moving the camera tube to and fro. Return to narrow angle and refocus the lens, then to wide angle and adjust the tube position again. Repeat this process two or three times until there is no need to make an adjustment at either end of the zoom. The lens will then stay as nearly in focus as possible throughout any subsequent zoom action done on the lens. It is, incidentally, best to focus on an object in narrow angle before making a zoom action, as this is the more critical setting.

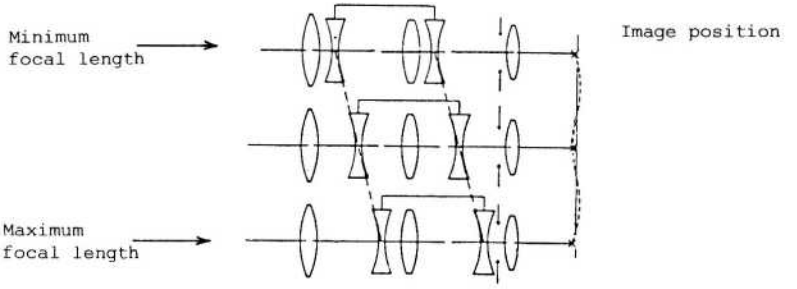


Fig.3 OPTICAL COMPENSATION

Most zoom lenses are described by the ratio of the wide angle and telephoto focal lengths. For example a lens ranging from 20mm to 100mm is described as a 5:1. Lenses are available in ratios from about 3:1 to 20:1, but the larger ratios are normally only used for outside broadcast work. It is difficult to design a small lens to pass adequate light at the longer focal lengths, so 6:1 seems to be the most popular for non-broadcast use. Although the ratio is a

useful measurement for a zoom lens, it is only a ratio, and gives no indication as to how wide or narrow a field of view it 'sees'. This is because the angle of view depends on the size of image required.

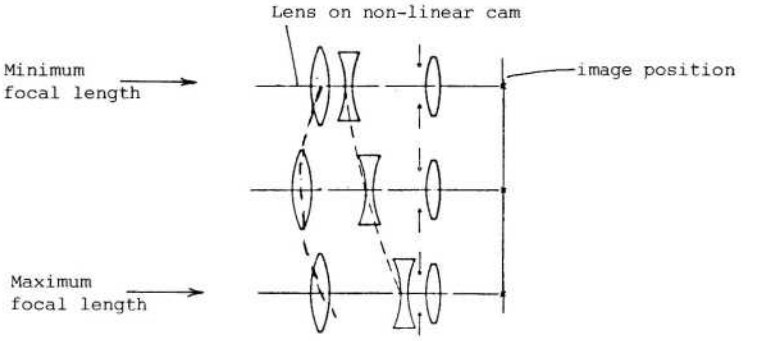


Fig.4 MECHANICAL COMPENSATION

To work out the angle of view for a lens, the focal length and the image size are drawn out as in Fig.5. The image size will be either the horizontal or vertical (depending on which angle of view is required - they are different as the picture is not square) size of the active part of the camera tube faceplate. For a 1" tube this is 12.7mm x 9.6mm, and for a 2/3" tube 8.8mm x 9.6mm. The diagram should be drawn symmetrically about the horizontal. The angle of view can then be measured between the dotted lines. For example a "standard" 25mm focal length lens used for a 1" vidicon has an angle of view of 28 degrees, and the 16mm "standard" for 2/3" tubes an angle of 30 degrees. Angles larger than this are wide angle, and narrower are telephoto. The 16mm lens, if used on a 1" tube has an angle of 43 degrees - however the use of a 2/3" lens to get a wide angle effect on the inch format is not recommended, due to the problem of vignetting (see part 1).

There is one other dimension that may need to be considered for any lens - the minimum distance between the lens and object being viewed for a sharp picture. The addition of a close-up lens to the front of the main lens can often help, but this leads to a limited field of view (i.e. it is difficult to focus foreground and background at once).

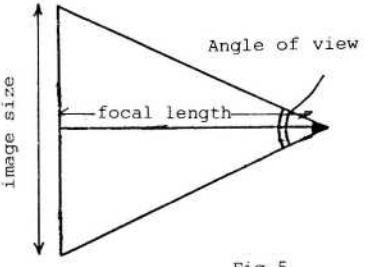


Fig.5

All this does not mean that expensive lenses have to be used, but the user should be aware of the limitations of using lenses not designed for the particular television format.

In part 3 filters and other optical "add-ons" will be considered.

G4ENA - SSTV EXTRA

By Peter Asquith, G4ENA

Since the publication of my articles - 'Modifications to the G3WCY SSTV Scan-Converter' (CQ-TV127), 'The G4ENA SSTV Transmit Converter' (CQ-TV 129) and 'G4ENA SSTV TRANSMITTER AUXILIARY BOARD' (CQ-TV 130) - several ideas and additions have accrued which may prove interesting to constructors.

The f-v converter (CQ-TV 127) requires a constant audio signal level in order to produce high quality received video. The low level output from some transceivers causes a patterning effect on the picture whereas a high level source, such as a cassette recorder, will often necessitate adjustment of the balance control. What is required of course is an audio amplifier which will supply a constant level signal regardless of the input amplitude so, to overcome these large signal variations the circuit shown in Fig.1 was designed.
IC1 is a SL6270 VOGAD (Voice Operated Gain Adjusting Device) i/c which was specially developed by Plessey for use in voice communications equipment. The chip will accept an audio signal anywhere in the range 10mV to 10v and present the SSTV converter with a constant amplitude signal, ideal for optimum performance of the f-v.

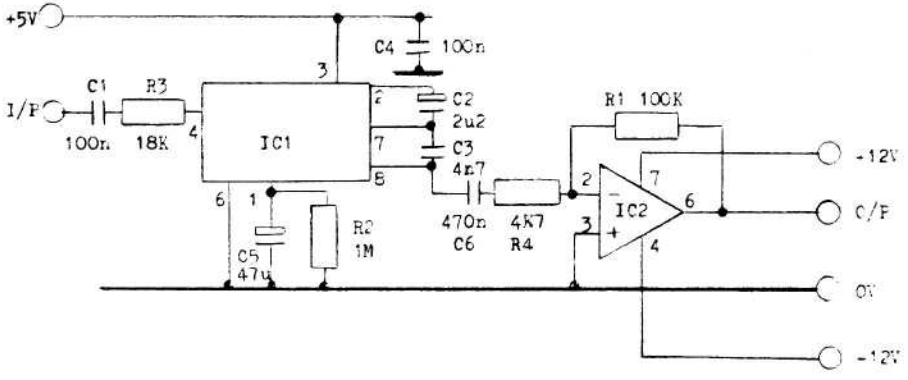


Fig.1 SSTV AUDIO INPUT SIGNAL CONDITIONING CIRCUIT

COLOUR SSTV

Separate R,G and B filters, plus a good monochrome camera, will create first class colour pictures, especially if a very white light is used. The most suitable sources of such lighting are daylight, a projector lamp or special lights made for this purpose. However generating 'live' SSTV by this method is likely to be somewhat inconvenient therefore we tend to use other, more convenient methods of picture generation:

A useful piece of equipment for general use in this field is the Ferguson MC01 monitor. This monitor can accept RGB signals from a scan-converter for direct display on the screen, whilst the RGB drives to the colour guns make an excellent source for extracting colour signals for transmission (stored SSTV for example). The RGB input is designed to operate with home-computers (TTL level signals) and it is not suitable for 1v p-p analogue RGB video. It is possible to increase the video gain to 1v sensitivity by fitting a 1.5k resistor in series with a 10uF capacitor into the vacant component holes for C's 819, 820 and 821. Without access to the service manual I can't say whether or not a technically superior method exists, nevertheless this modification seems to work very well.

For transmit; RGB signals are available on the Red Green and Blue wires connecting the TV's electronics to the sub-board mounted on the end of the CRT. The amplitude of these signals is 1-volt making them ideal for feeding into the colour snatch facility described in CQ-TV 130. If this system is used however, three video buffer amplifiers should be fitted to prevent loading of the monitor's RGB drive circuits. As well as snatched off-air pictures, shack shots from a colour camera connected to the MC01's composite video input can also be transmitted (that's if you don't mind the lights!).

(EDITOR's NOTE - Modifications to monitors or TV sets should only be attempted by those who are familiar with such equipment. Unless you know precisely what you are doing enlist the assistance of your local dealer. Under no circumstances should a TV set be worked on whilst it is still connected to the mains.)

Now some design notes relating to some of the units described in the articles previously referred to:

G4ENA SSTV TRANSMIT BOARD (CQ-TV 129)

It is possible that unreliable 'VS' may be encountered on some units. If this is so connect a 1M resistor from the junction of C20 and D8 to +5v, also a 1M from the junction of C19 and D7 to +5v.

AUXILIARY BOARD (CQ-TV 130)

When installing the auxiliary board increase R46 (TX board) to about 750k. A pulse of at least 80mS ('T' TX board) is required to guarantee loading of RG and B fast-scan frames. On receive IC2 connects R2 across R46 (TX) to shorten the pulse.

SC160 LINE SEQUENTIAL COLOUR

The SC160 transmits an additional pulse to the start of each red line. Its presence shifts the red frame to the right causing colour fringing with the green and blue frames. It is possible to turn off the pulse on the SC160 and this corrects the problem.

I hope to attend the BATC rally/show at Crick again this year and will be pleased to demonstrate my system and discuss any technical problems which members may have.

A COLOUR SYNC PULSE GENERATOR

By Pete Carliell.

This is the first of a two-part article which describes a frequency converter for mathematical PAL - a simple system for locking colour subcarrier to line frequency and providing a 25Hz offset. The article first appeared in 'Radio & Electronics World' for October 1985 and thanks are expressed to the Editor for permission to use the material.

The television waveform requires synchronising and blanking signals with line and field components which may be considered separately.

LINE

To create the line components a series of edges are generated by a 4 to 16 line decoder, IC3, driven by a binary counter IC1B. As the counter is clocked at 1.25MHz, sixteen edges each 0.8uS apart are available to create the start and finish of line syncs, line blanking and equalising pulses, eg output 0 = line blanking start, output 5 = equalising pulse finish. Broad pulses are more than 122uS long and their finish edges are delayed by an 18-stage shift register, IC4. The double inversion of IC16 trims the timing of the common sync start edge.

Once in each field IC5a is allowed to measure three blocks of 2.5 lines each, before locking itself out when A and B = 1. The A and B outputs control IC6 which selects line sync, equalising or broad pulse finish, and route once or twice-line resets to the inhibiting latch IC14a. Complications arise with twice-line pulses when output D of IC1b presents invalid information to IC3 and thus has to be blanked: IC4a takes its cue from output 7 of IC3.

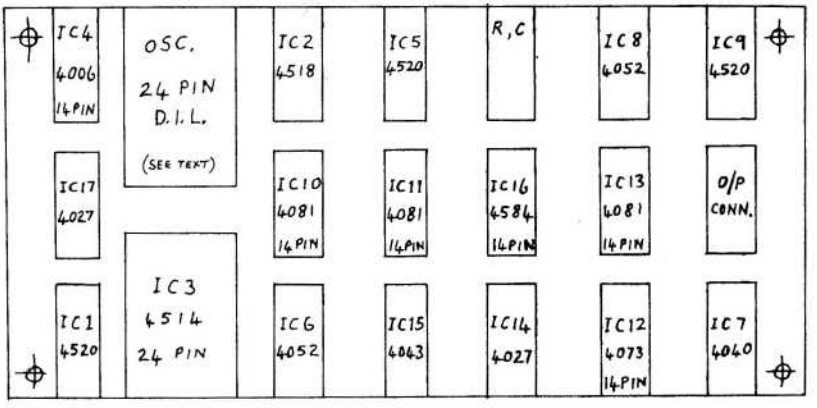


Fig.2 RECOMMENDED BOARD LAYOUT

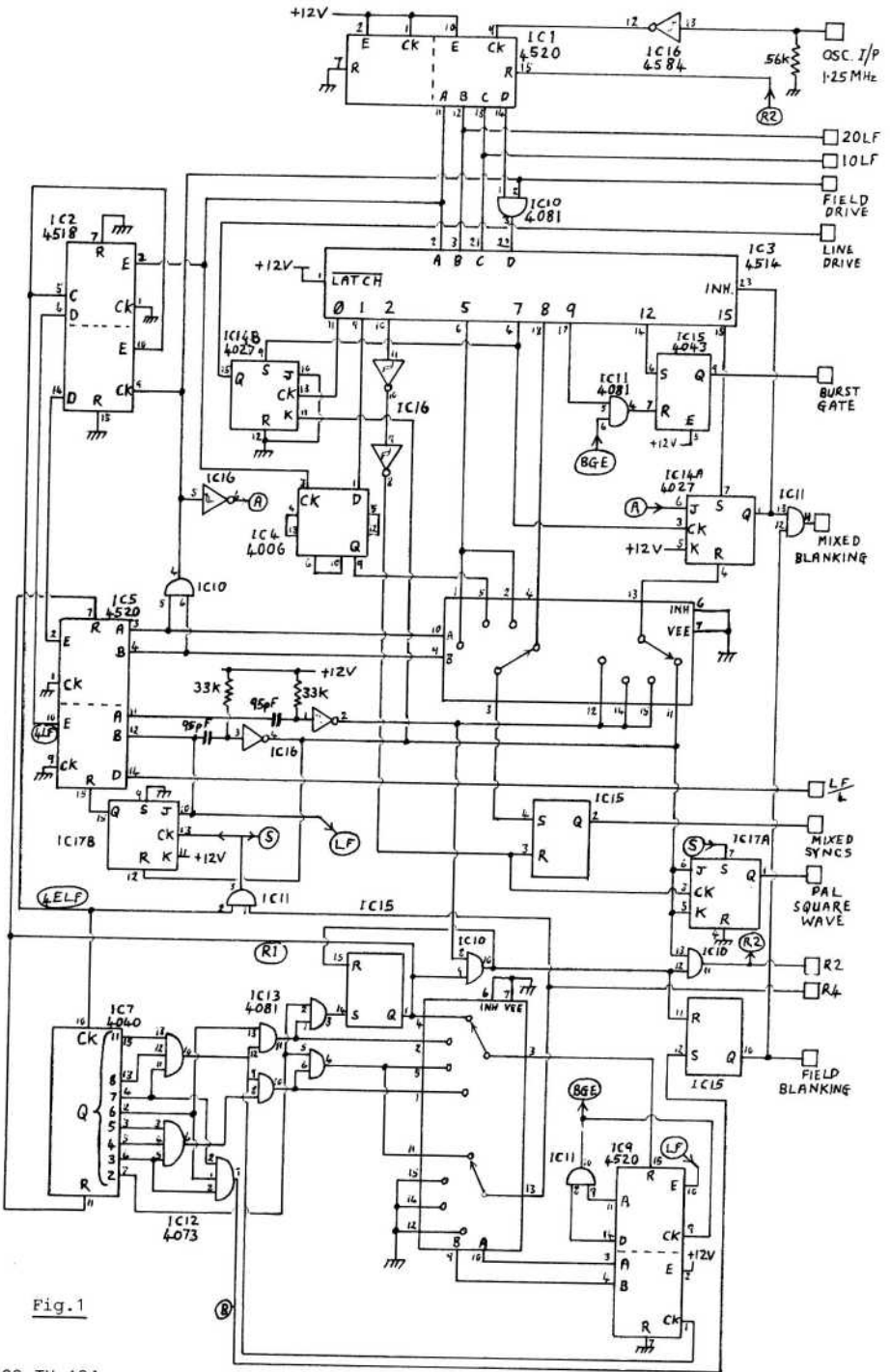

+12V
IC1 4520
IC16 4584
56k
OSC. I/P 1·25 MHz
R2
20LF
10LF
FIELD DRIVE
LINE DRIVE
IC10 4081
IC2 4518
IC3 4514
LATCH
INH.
0 1 2 5 7 8 9 12 15
IC14B 4027
IC15 4043
IC11 4081
BURST GATE
BG-E
IC16
IC4 4006
IC14A 4027
IC11
MIXED BLANKING
IC5 4520
33k
95pF
INH
VEE
IC17B
IC17A
MIXED SYNCS
PAL SQUARE WAVE
IC15
IC7 4040
IC13 4081
IC12 4073
IC9 4520
FIELD BLANKING
LF
R1
R2
R4
BGE

Fig.1

FIELD

The field components are initiated by binary counter IC7, which should be regarded as counting half-lines although it is clocked by 4 x line frequency (the 4LF in that its active negative edge is 1.6uS earlier. Switch IC6 is therefore changed over before the vital edges that it has to pass).

When IC7 has counted 625 half-lines, field reset R1 is generated to reset IC7, clear IC5a from its locked condition and start field blanking. The latter is stopped by signal B after 50 half-lines. Alternate R1s give rise to a very short (80uS) R2.

From counter IC7's outputs, 622, 623, 624 and 625 half-line signals are gated and selected in a four field sequence by IC8b to form the start of Bruch blanking. Note that IC8 switches from top to bottom in the order of fields 4, 1, 2, 3. Nine lines are counted by IC9b and the burst blanking is performed by BGE, which controls the start triggers of 'Burst Gate'.

It is possible at power-up or during a severe power disturbance for the line frequency squarewave at IC5b O/P B to be in the wrong phase with respect to the burst blanking sequence. This would produce nonsense outputs, but IC17b will correct IC5b if it is ever wrong. Connected to the LF and 2LF squarewaves are differentiator and inverter networks which make short positive pulses from negative-going edges. The pulse durations are roughly 4uS, but must lie within the range 1.5uS to 6.0uS.

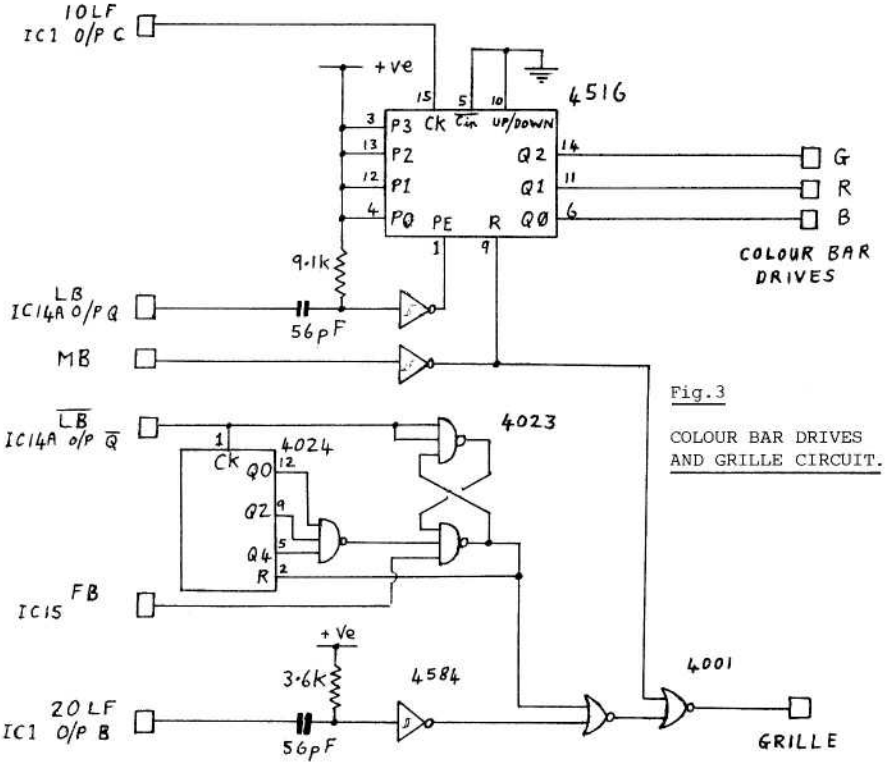


Fig.3

COLOUR BAR DRIVES AND GRILLE CIRCUIT.

CONSTRUCTION

The prototype was built using wire-wrapping techniques, which proved to be ideal for a one-off requiring many interconnections. The circuit fits easily onto a 6" x 3" board - the size of a Vero 'VQ' board, which could be used by those who prefer soldering. A recommended layout is shown in Fig.2.

Provision was made in the original for a 5MHz oscillator built in a 24-pin DIL module. This was used in one application where non-mathematical PAL with a separate subcarrier oscillator was adequate.

The waveforms available within this SPG offer the chance to easily generate colour bar RGB drives and a grille. The latter is useful in lining up cameras as well as converging colour monitors. The relevant circuits are shown in the diagram of Fig.3.

THE "CARASCANNER"

By Bob Robson, GW8AGI

I have often been asked why I chose to build my OB 'scanner' in a caravan, the main reasons are that you don't have to tax the thing in order to take it on the road and it doesn't need an MOT, with the attendant expensive maintainance. Perhaps the main disadvantage though is the severe weight limitation on the chassis, as I found out three weeks before last year's BATC show when I had to strip out a couple of hundredweight of gear to stop the tyres overheating.

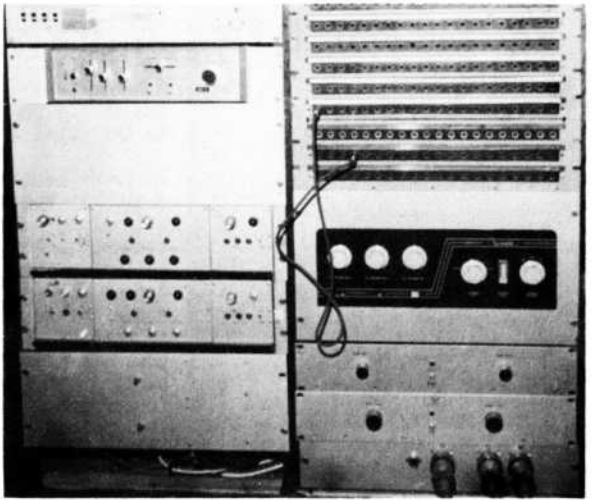
Three years ago the Welsh tourist board decided on a Welsh promotion by declaring 'The Year of the Castle'. Thus every town who could boast a castle (or even part of one) started twisting the arms of local people to lay on a carnival. Chepstow was one such place and I was approached to provide the PA system.

Now most castles today tend to suffer the problem of not having enough dry places where mains equipment can be installed and operated, in fact many have no such facilities at all. Chepstow castle came into the latter category so something had to be done quickly because the request for our services came only four weeks before dress rehersal.

Monitor bridge, VTR shelf with one Bell & Howell machine displaying Brian Summers's OB van "Blue Bottle". The present mixing desk is in the right foreground.

My sound engineer (Malcolm) and I hurredly searched for a suitable caravan and eventually found one of appropriate size (12ft long) and at the right price! The price was right because the previous owner had fitted just about every 12-volt device imaginable to run off the van's battery; unfortunately he had forgotten one important device - A FUSE. The inevitable happened; Ohms law prevailed and one day the wiring caught fire, this was extinguished before it burned through the skin of the van but the heat melted every bit of plastic inside and didn't do a couple of windows much good either.

We stripped out the remains of the internal fittings, except for one long seat/storage box, twin seats at the door end and one roof level cupboard. To clear the effects (and smell) of the fire we had to wash the entire van down. Water used to fight the fire had got into the roof lining so half of that had to be replaced. We divided the van into two using a partition and sliding door and built a rack to hold the audio equipment. The walls were lined with a carpet type material to improve the acoustics, and to avoid bringing cables in through the door, we fitted a large glass reinforced plastic box through the outside skin of the van, where the heat had distorted it, for use as a cable connecting point. This box contains all the mic. input lines, speaker outputs, video connectors and mains input.



THE AUDIO RACK

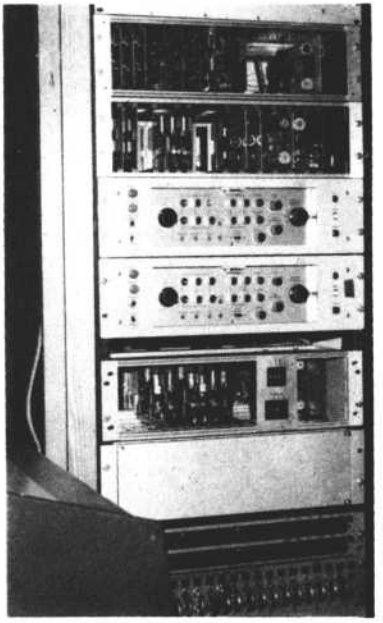
Remembering the lessons of the van's previous owner, we took the mains input to two earth loop trips; one for video and the other for audio. Each trip then feeds its circuit via magnetic trips - easier than a fuse to reset in a hurry. The basic wiring and PA equipment was installed and the last of the faults rectified during the on-site dress rehersal.

THE AUDIO SECTION....

All the audio cables from the cable box go to a 200-point jackfield to ensure maximum flexibility. The mic circuits can be patched to the audio mixer (12-input orange with 4 outputs). The outputs go to the jackfield so they can be patched to the main PA amplifiers (four at 120W, one at 100W and one at 60W). In addition to the PAs there are a number of 30-Watt amplifiers for the audio and video monitor speakers.

AND THE VIDEO:

As you go through the door to the video section the first thing you see is a monitor bank across the end of the van. At present it contains two 12-inch monochrome monitors, one 14-inch colour and a 20-inch ex-domestic colour TV.



THE VIDEO RACK

In addition there is space for two further 12-inch monitors. The monitors are not hardwire allocated to any specific function and each is fed from its own 16-channel vision selector, controlled from the electronics rack. Below the monitor bridge is the recorder shelf where cables are fitted for up to three recorders feeding video in/out, audio in/out and remote control. Again the source for feeding each recorder is selected in the electronics rack. To the right of the recorder shelf is a diecast box containing UHF modulators for the mono monitors and the TV set. In front of this box is the monitor speaker for the audio feed to the tapes.

In front of the recorder shelf is the control desk. At the moment it is of the ABC pattern but plans are afoot to change the data flow somewhat. At present there are four rows of twelve switches for video selection; the bottom row is bank 'A' with bank 'B' just above it. Further up are the effects selector switches and the resulting output goes to form the 'C' bank. To the right of banks A and B are the two A/B faders, wired in antiphase for smooth cross-fading and to their right is the C-bank fader. Sources available on the switches are: cameras 1 - 4, off-air receiver, captions, VT's 1 - 3 (output), C-bank output, test signals and colour black.

At the top of the panel and to the right are the selector switches for the effects and line and field rate pots. At the top left are selector switches for monitoring the audio feeds to the VT machines. To the right of the main control panel is the remote control panel; this contains switches for the VT machines, controls for an electronic stopwatch (its display, along with a clock is mounted in the top centre of the monitor bridge), and the comm's control switches to speak to camera operators and the sound section.

The electronics rack is the heart of the system where all functions take place before routing to the various displays etc. The only exception is the PAL coders which are in the audio rack due to a lack of space elsewhere. At the bottom of the rack are the circuit breakers and above them a MUSA strip with all video inputs arriving on the top row. The lower row connects to some video distribution amplifiers which are 1-in/5-out so that a fault on one unit will not effect any other connected to the same source. There are twenty video amplifiers mounted above the MUSA strip. Above the VDA's are the Camera Control Units for the two CTC3X cameras which form the main video sources for the van. Surmounting these are PC cards for the video switchers feeding the monitor bridge, the VT shelf plus two which feed signals to the workshop alongside the van. These two outlets can be used to run remote displays if they are required.

The next card frame contains the faders, effects units and the processing amplifier. Above that again are the test signal and pulse distribution amplifiers and the last unit is a master synce pulse generator. The circuits used are, in the main, ones from CQ-TV magazine and are laid out on printed circuit boards. Each card frame has at least one power supply card (and in some cases two) rather than trying to provide a single heavy duty bulk power source.

I shall be taking the van to the BATC Rally/Show in May and I hope that some of you will drop in to have a look at our efforts.

THE SOUND MIXER

A NEW PAL CODER

by John Goode

This design is offered to members who may wish to construct a coder having a superior performance to that of the Handbook Coder, although of course it is more complex (and therefore expensive) than the GW8PBX coder. This design incorporates chroma filtering and luminance delay, and uses MC1496 modulator chips to get good carrier suppression. Three prototypes have been built so far - the first on two pieces of Veroboard approximately 160mm x 65mm, the second and third also on Veroboard but this time on a single piece the same size as the Handbook Coder board, although edge connections were not incorporated. The design has so far resisted attempts to fit it on the new Club standard Eurocard, so if any of you out there are keen.....?

Subjectively, the improved performance over the old coder shows up most markedly when using it with a caption colouriser (such as the "Golf-Whiskey Colour-Fiddle Box"). The sharp edges produced by slicing and keying produce high-order harmonics, which, when applied to an unfiltered coder, produce high order chroma sidebands causing objectionable "crawl" on vertical colour changes. This is made even worse if an unlocked subcarrier is used. The new coder improves this problem considerably - with the old coder the verticals when colourising double-hieght Mode 7 captions from the BBC Micro were barely acceptable, whereas with the new coder they are quite usable.

CIRCUIT DESCRIPTION

Refer to Fig.1. The luminance signal is formed using 1% resistors R4-8, summed by the luma amplifier Q1-3. The non-inverting output from Q3 feeds the delay line (Zo=100R) built on a small separate board using Toko miniature inductors. If the 200nS delay line mentioned in CQ-TV131 (Toko 157DLC451-182.D) from Bonex Ltd., is to be used, it will be necessary to increase the value of R16 to 1K, and R17 to 47K, as I assume that the Zo of this device is 1K. Please note that this has not been tried.

The luminance signal is added to sync and chroma at R19, its relatively low value giving a good summing point. The attenuation caused by the low value of R19 is made up by the gain of IC1, an NE592 video amplifier. Q4 provides a low output impedance feed from the PCB, the 75R build-up resistors being mounted on the output sockets in the prototypes.

Inverted luminance (-Y) is taken from Q2 and fed to the chroma matrices, where it is added to R and B via 1% resistors R27,28,50,51. At this point the BG pulse is added to the R-Y and B-Y matrices in opposite senses to generate the colour burst when fed to the modulators. The filters are formed by the circuits around Q5,6, & Q10,11, and are unusual in that no inductors are used.

Consider the R-Y filter, Q5 (Q6 is merely a buffer). Although R30 and C18 form a simple HF roll-off, the key component is C17 which "bootstraps" (feeds forward) the high frequencies from base to emitter of Q5. Now the base-emitter junction of a transistor acts as a forward-biassed diode, and provided that it remains forward biassed, the emitter will "follow" the base signal. However, the effect of bootstrapping the high frequencies to the emitter is to remove

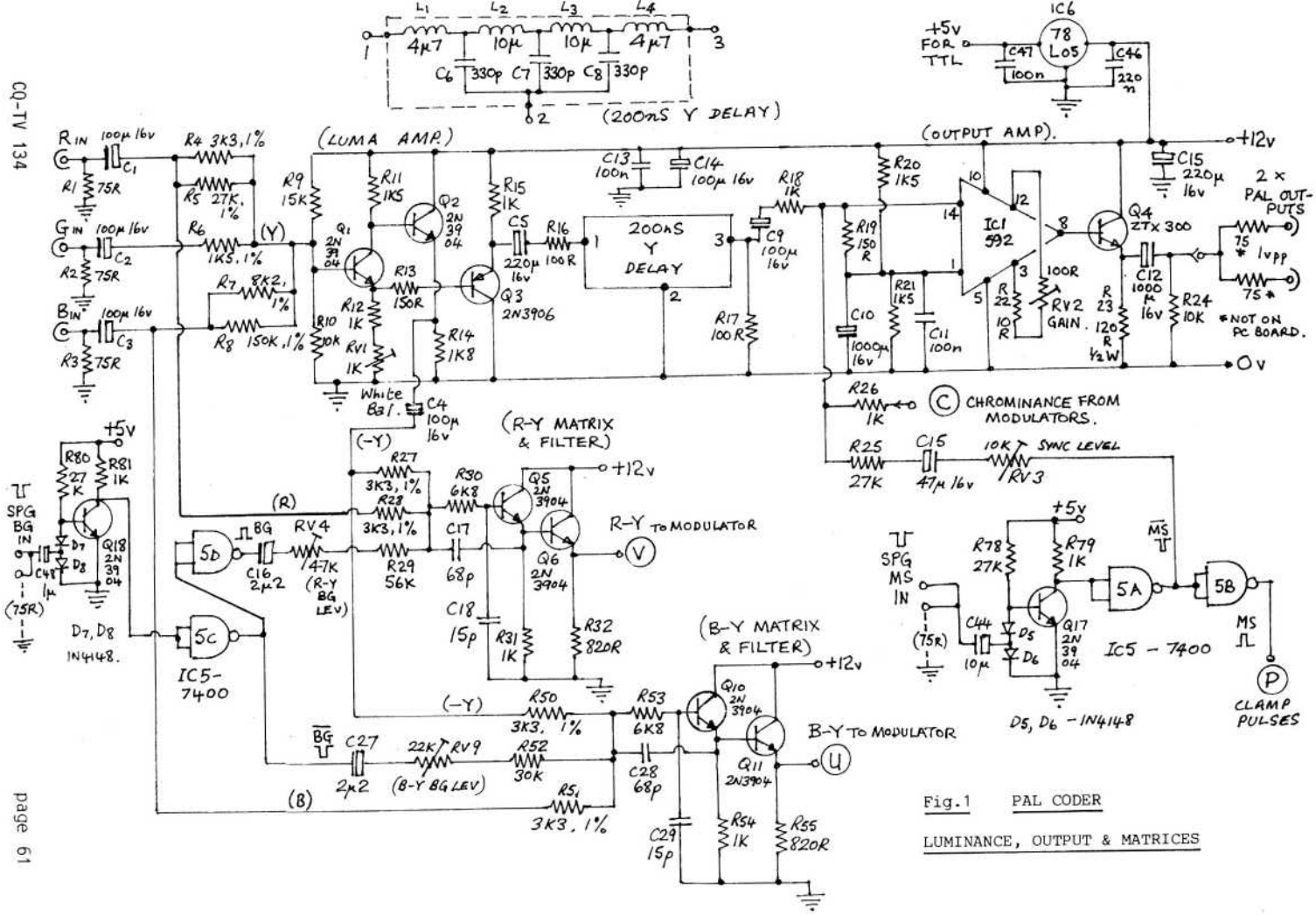


Fig.1 PAL CODER

LUMINANCE, OUTPUT & MATRICES

the base-emitter junction's forward biassing at these frequencies, and so the emitter-follower does not "follow" at HF. The bulk of the filter action is caused this way, R30 and C18 being used merely to "tailor" the response. The circuit around Q10 works similarly for the B-Y signal, of course.

Refer now to Fig.2. The modulators IC2 and IC3 are MC1496L chips, and the pinning given is for the DIL rather than the metal-can version. R-Y (V) and B-Y (U) signals from the filters are first clamped to about +4v, buffered by Q8 and Q13 before application to the modulators. As the MC1496's have differential inputs, the clamped signals are applied to the non-inverting inputs, and variable DC is applied to the inverting inputs to balance-out residual subcarrier when no colour is present. This is adjusted by RV5 and RV6 which form part of a common potential divider chain (R35,D1,D2,R37,D9) that includes forward-biassed diodes to give good temperature stability to the settings.

The outputs of the two modulators are taken from pins 12, and summed at R45. The combined chroma signal is then buffered by Q9, and an 8.86MHz rejection filter is included in its emitter circuit. The signal is then passed through a simple 4.43MHz acceptor circuit before it goes to the output amplifier (IC1).

The function of the Subcarrier Processor is to split the SPG SC feed into quadrature R-Y and B-Y feeds, and then to reverse the phase of the R-Y feed on alternate lines (using the PS signal) to give the PAL action. The quadrature feeds are created by C34,R65 & C36,R67,RV10. The B-Y feed is then taken to the modulator after appropriate attenuation and DC shifting (C35,R66,R62,R48,R49). The phase reversal of the R-Y SC is achieved by using a SN7486 XOR gate controlled by the SPG PS squarewave. The SC is therefore first fed to amplifier Q14,15 to boost it to TTL level; the slice control RV11 allows a 1:1 mark-space ratio to be achieved. After the SN7486 the switched SC is filtered to a sinewave and attenuated by R74,C41,L7,C42,R75 & R47 before application to IC2.

PAL CODER - COMPONENTS

INDUCTORS

All inductors used were miniature (5mm lead spacing) Toko type 7BS from Cirkit.
L1,L4 - 4.7uH, Cirkit Stock no. 34-47914
L2,3,5,7 - 10uH, Stock no. 34-10004

L6 - 47uH, Stock no. 34-47014

SEMICONDUCTORS

Q1,2,5,6,7,8,9,10,11,12,13,16,17,18 - All 2N3904.

Q3,14,15 - 2N3906

Q4 - ZTX300

IC1 NE592; IC2,3 MC1496(DIL); IC4 SN7486*; IC5 SN7400 or SN74LS00; IC6 78L05.

(* LS type has not been tried).

RESISTORS.

R1 75R
R2 75R
R3 75R
R4 3K3 1%
R5 27K 1%
R6 1K5 1%
R7 8K2 1%
R8 150K 1%
R9 15K
R10 10K
R11 1K5
R12 1K
R13 150R
R14 1K8
R15 1K
R16 100R
R17 100R
R18 1K
R19 150R
R20 1K5
R21 1K5
R22 10R
R23 120R 0.5W
R24 10K
R25 27K
R26 1K
R27 3K3 1%
R28 3K3 1%
R29 56K
R30 6K8
R31 1K
R32 820R
R33 2K2
R34 15K
R35 820R
R36 2K2
R37 220R
R38 560K
R39 330K
R40 1K
R41 1K
R42 not fitted
R43 10K
R44 1K
R45 1K
R46 680R
R47 330R
R48 1K5
R49 2K2
R50 3K3 1%
R51 3K3 1%
R52 30K
R53 6K8
R54 1K
R55 820R
R56 560K
R57 330K
R58 1K
R59 1K
R60 not fitted
R61 10K
R62 330R
R63 470R
R64 75R
R65 330R
R66 1K
R67 47R
R68 3K3
R69 27K
R70 120R
R71 560R
R72 1K
R73 270R
R74 270R
R75 8K2
R76 27K
R77 1K
R78 27K
R79 1K
R80 27K
R81 1K

RV1 1K White bal.
RV2 100R Gain
RV3 10K Sync lev.
RV4 47K R-Y BG
RV5 1K R-Y cxr bal.
RV6 1K B-Y cxr bal.
RV7 1k R-Y gain
RV8 2K2 chr.lev.
RV9 22K B-Y BG
RV10 470R SC Quad.
RV11 4K7 Slice lev.

DIODES

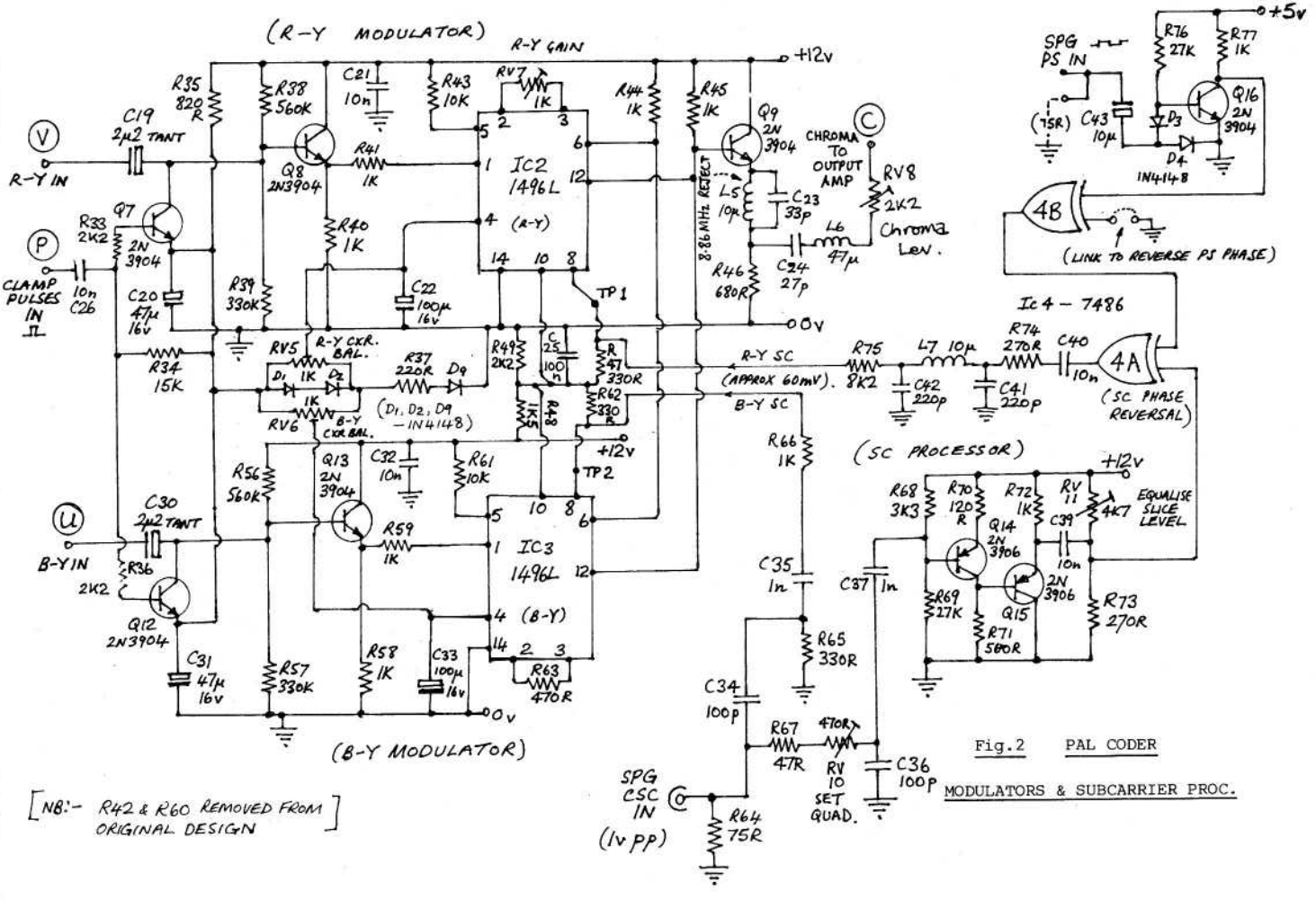
D1 to D8
All diodes 1N4148
or equivalent.

CAPACITORS

C1 100u 16v
C2 100u 16v
C3 100u 16v
C4 100u 16v
C5 220u 16v
C6 330p
C7 330p
C8 330p
C9 100u 16v
C10 1000u 16v
C11 0.1u
C12 1000u 16v
C13 0.1u
C14 100u 16v
C15 220u 16v
C16 2u2
C17 68p
C18 15p
C19 2u2 tant.
C20 47u 16v
C21 0.01u
C22 100u 16v
C23 33p
C24 27p
C25 0.1u
C26 0.01u
C27 2u2
C28 68p
C29 15p
C30 2u2 tant.
C31 47u 16v
C32 0.01u
C33 100u 16v
C34 100p
C35 1000p
C36 100p
C37 1000p
C38 0.01u
C39 0.01u
C40 0.01u
C41 220p
C42 220p
C43 10u
C44 10u
C45 1u
C46 0.22u
C47 0.01u
C48 1u tant.

SETTING-UP

In order to take full advantage of the enhanced performance of this coder a vectorscope is necessary for really accurate adjustment. However, it is realised that this will not be possible for many amateurs, and alternative



[NB:- R42 & R60 REMOVED FROM ORIGINAL DESIGN]

Fig.2 PAL CODER

MODULATORS & SUBCARRIER PROC.

setting-up instructions are given. I am assuming that anyone attempting this circuit will have access to a good oscilloscope, as this is the minimum requirement.

1. Centre all preset controls. Connect a well stabilised 12v supply, preferably that which will be used permanently with the coder. Now connect the SPG pulses to the unit, but do not connect CSC at this stage. Apply RGB colour bars (0.7v p-p), terminate the outputs with 75-ohms, and connect the oscilloscope across one of them. There should be a descending staircase - use RV2 to adjust this to 0.7v, and then use RV3 to adjust the sync to 0.3v, giving a 1v p-p composite signal.

2. Apply CSC to coder - this will probably result in SC all over the signal. Adjust RV5 and RV6 (carrier balance) for minimum SC on black bar and sync & blanking period. Now adjust RV1 (white balance) for minimum SC on white bar. Next, adjust the scope sweep speed so that the line-to-line SC "twitter" is clear. Now adjust RV10 and RV11 to minimise "twitter". If a vectorscope is available check that the U and V axes are in quadrature (90 degrees apart) - use RV10 for best results. Now retrim RV5,RV6 and RV1 for minimum SC as above.

3. The setting of the colour burst and the R-Y preset is easily done using a vectorscope. Use RV8 and RV7 to align the colour vectors with the markings on the graticule. Then use RV4 and RV9 to adjust the burst vectors until they match the graticule. Without a vector monitor it is necessary to use the chroma envelope shape. Adjust RV7 until the top of the cyan envelope is at the same level as the top of the yellow envelope. Now adjust RV8 so that the bottom of the green envelope is at black level. The burst phasing is best done by using RV4 and RV9 to give a burst amplitude of 0.3v p-p with both controls as close to the same setting as is possible.

4. After the unit has been on for about 20 minutes, recheck the carrier-balance settings (RV5,6). Some of the adjustments in the alignment may interact slightly with others, and so it may be advantageous to recheck all settings after initial line-up.

I am quite pleased with the performance of this circuit, and hope that I will be able to find time to design a PCB layout for it. However, I have a number of other projects on the stocks, and so if anyone else feels like having a go, please do so!

IMPORTANT NOTICE

BATC SUMMERFUN CONTEST

Due to an oversight this years SUMMERFUN contest has been advertised to take place on the same weekend as an RSGB field-day. So as to enable members the opportunity of taking part in both contests, the BATC SUMMERFUN contest dates have been changed. The times remain unaltered (1200hrs local on the 12th to 1600hrs local on the 13th).

JULY 12TH AND 13TH

BATC ON PRESTEL

After many months of problems the club has finally been allocated 9 pages (17 frames) on Prestel's ClubSpot service.

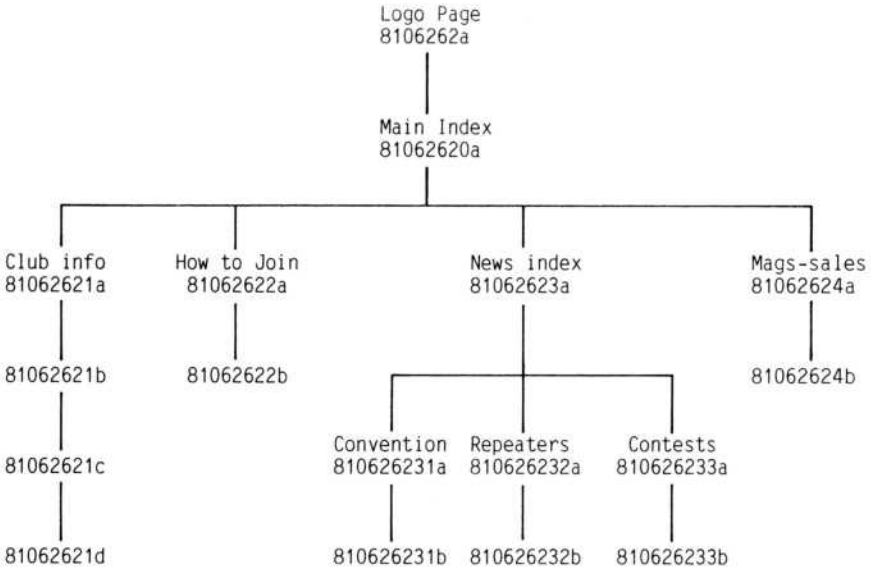
Despite the poor weather on the 9th February Dave Lawton, G0ANO, Ian Pawson, G8IQU and Mike Crampton, G8DLX attended an editor's course, for ClubSpot, in London. During a very busy and interesting day they were shown how to edit frames and pages within the Prestel system and the opportunity was taken to upload a header page from a disc previously prepared by Dave.

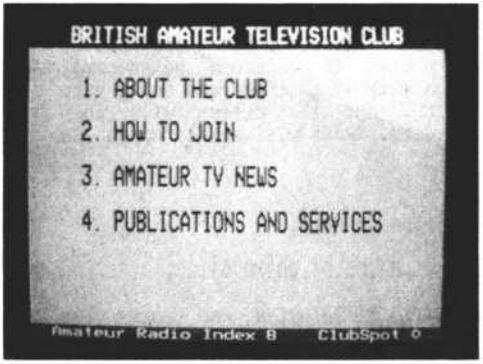
Since then a further 8 pages (16 frames) have been loaded into the Prestel computers. The information initially on these pages includes club membership details, contest news, repeater information as well as details of the various services available from the club. Of course for any information service to work the Editors must be kept informed of news and events so that the information may be continually updated. Anyone with information which is likely to be applicable to this service is asked please to contact Dave Lawton whose address and phone number may be found on the inside front cover. Any suggestions would also be welcome.

Shown here are some of the pages already prepared for ClubSpot, they are only for illustrative purposes and may not be the actual ones used. A full display should be on show at our Crick exhibition.

Any members wishing to join Prestel should dial 100 and ask for freephone 'Prestel Sales'. Membership costs £6.50 per quarter and calls are charged at the local rate. There are no Prestel charges after 6pm weekdays (up till 8am), after 1pm Saturdays and all day Sunday.

As a guide to the BATC pages the following 'tree' shows the layout and initial content of pages and frames. A 'page' represents a main subject whilst a 'frame' represents a screen of information residing within a page. A page may comprise one or more frames and each has its own number. For example: the 'Logo Page' (number 8106262a) is a page by itself whereas 'Club Info' (page number 81062621) comprises four frames; each having the same page number but identified by a suffix letter appended to the end.





SSTV FREQUENCY - 144.5MHZ

TELETRON (The continuing story)

By Trevor Brown, G8CJS

In the last issue I explained how to install a VDU and keyboard and fit a custom ROM - TRON-1 - which programs Teletron to function as a TV typewriter. At the time of presenting the program I believed it to be free of bugs but my son Simon (aged 8) took just five minutes to master the operating system and a further two minutes to discover how to type on the top line which is reserved for vertical interval data! In theory this line should not be accessible from the keyboard so I will leave it to you to discover the secret.

In this article I shall explain how to use another custom EPROM (TRON-2) to develop your own software. TRON-2 is a very simple machine-code monitor which allows machine code programs to be entered into the RAM section of memory directly from the ASCII keyboard. The EPROM is again a 2716 device so no changes of the internal links are required, just plug the EPROM into the bottom of the 28-pin socket in place of TRON-1.

One additional piece of hardware which is required is a reset pushbutton, this should be push-to-make and wired across the 10uF capacitor connected via a 100-Ohm resistor to pin 13 of the 74LS04. Another worthwhile addition is a small LED to indicate the 'HALT' state, this can be connected to pin-18 of the Z80 CPU via a 1k resistor, the other end going to +VCC (take care to connect the cathode to pin-18).

On power-up the logo 'TELETRON MONITOR' should be displayed and the HALT LED will light. The only keys which function under the new program are 0 to 9, A,B,C,D,E,F,G,M and SPACE. The first four are used to enter a hexadecimal address at the bottom of the screen, the data at that address being then displayed. The data can be over-typed with 'NEW' and the screen will then scroll up and display the next address and data, SPACE will scroll up to the next address and retain the data.

EXAMPLE:-

Select address 8500 and enter the following data:

00,F7,CD,0C,85,DF,CD,0C,85,C3,00,85,01,FF,FF,E5,E1,D5,D1,0B,78,B1,20,F7,C9

Now press 'M', this allows a new start address to be selected, and enter the start address 8500, now press 'G' (for GO) and the program will run from the address displayed on the screen. The start-up logo will be flashed on and off and to escape this press the RESET button.

TRON-2 contains a full set of ASCII character fonts stored at 10 hex times their ASCII value and can be used as with the teletype program. RST 30 is a 'clear screen' routine and CALL 003F is a subroutine for printing the character code stored in the accumulator at the screen address stored in DE. The screen address is calculated by E, line number, position on line 0, so E780 is the middle of the bottom line and E100 is the first character on the top line.

To see all this in action I have written a short program which should be loaded, again at 8500. The message this time should be 'BATC RULES OK'.

```
8500             10        ORG  #8500
8500 F7          20        RST  #30       ;CLS
8501 1120E3      30        LD   DE,#E320  ;SCREEN
8504 3E42        40        LD   A,"B"
8506 CD3F00      50        CALL #3F
8509 3E41        60        LD   A,"A"
850B CD3F00      70        CALL #3F
850E 3E54        80        LD   A,"T"
8510 CD3F00      90        CALL #3F
8513 3E43       100        LD   A,"C"
8515 CD3F00     120        CALL #3F
8518 3E20       130        LD   A," "
851A CD3F0C     140        CALL #3F
851D 3E52       150        LD   A,"R"
851F CD3F00     160        CALL #3F
8522 3E55       170        LD   A,"U"
8524 CD3F00     180        CALL #3F
8527 3E4C       190        LD   A,"L"
8529 CD3F00     200        CALL #3F
852C 3E45       210        LD   A,"E"
852E CD3F00     220        CALL #3F
8531 3E53       230        LD   A,"S"
8533 CD3F00     240        CALL #3F
8536 3E20       250        LD   A," "
8538 CD3F00     260        CALL #3F
853B 3E4F       270        LD   A,"O"
853D CD3F00     280        CALL #3F
8540 3E4B       290        LD   A,"K"
8542 CD3F00     300        CALL #3F
8545 76         310        HALT
```

PHANTOM PROM

This system is limited in that the program resides in high RAM, where, any program written for Teletron needs to work in the PROM area to enable it to utilise the keyboard routine, the RST's and in order to run at switch-on. The simple, but expensive, solution is to replace the 6116 RAM with a non-volatile, compatible replacement such as the NVR-2. The program can then be loaded into RAM from the keyboard which can then be removed and fitted in place of the EPROM. After new RAM is fitted Teletron can be powered up and the program tested.

The less-expensive approach is to fit a switch which changes over the positions of EPROM and RAM in the memory map. This is a simple operation as the chip 'enables' set their map positions, so crossing over the connection to pin-20 on the 28-pin socket and the connection to pin-18 on the 24-pin socket will achieve this. Remember to keep the reset button pressed whilst operating the switch. This system requires the stack pointer to be reset to 07FF so that it will find RAM and not EPROM memory after the switch has been operated.

Both systems will require the character fonts moving from PROM to RAM by a block move before the program is written, ie:

LD DE 8200 hex, LD HL 0200 hex, LD BC 05F0 hex, LDIR

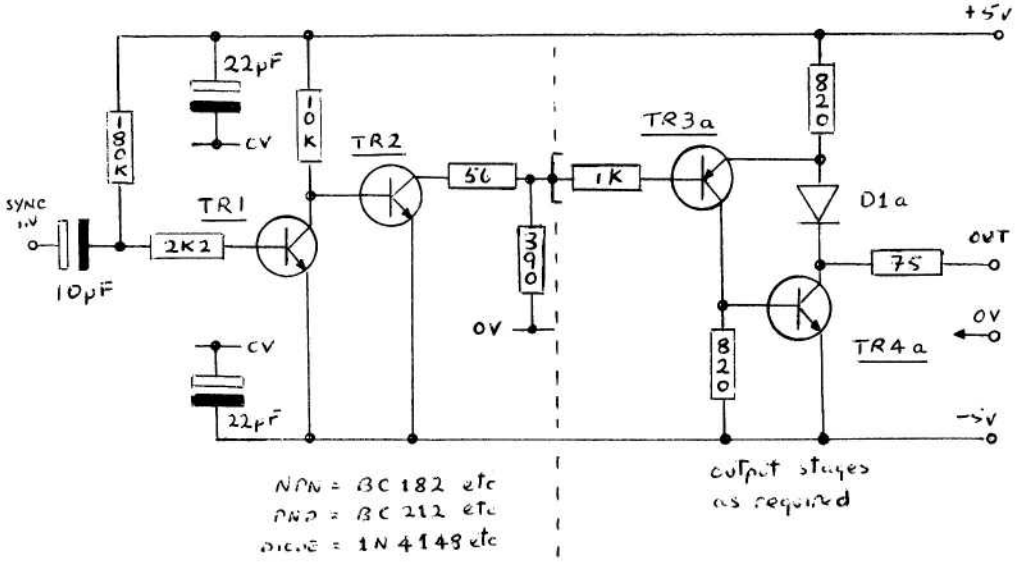
This will leave 200 bytes free below the fonts for program and 10 above the fonts for the stack. More space is available if all the fonts are not required.

A PULSE DISTRIBUTION AMPLIFIER

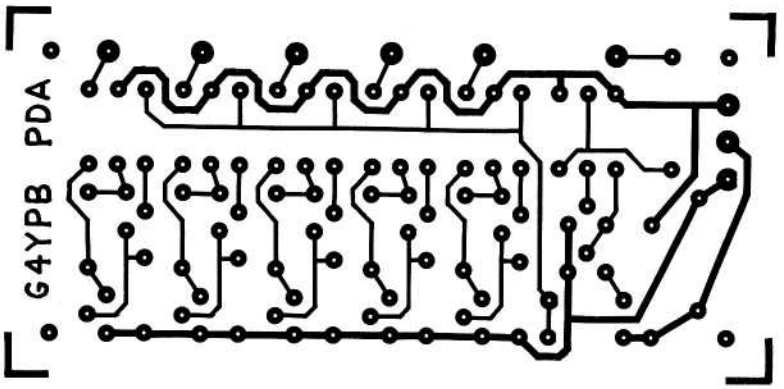
By Bryan Dandy G4YPB

This Pulse Distribution Amplifier is an improved version of the one shown on page 73 of CQ-TV 131. A suitable printed circuit design for a 5 output device has been developed and is illustrated here together with a component layout diagram. Although it's quite straightforward, a note here on the circuit operation may ge of interest.

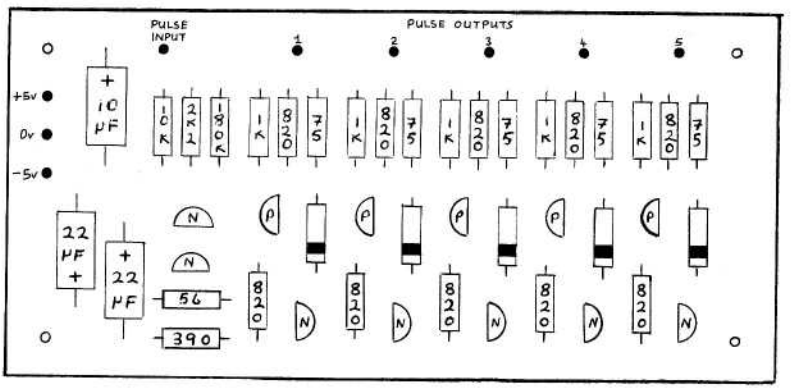
Standard negative-going pulses are applied to the input and turn off TR1. When TR1 turns off TR2 is turned on and its collector is pulled down to -5v. A portion of this voltage is tapped off and used to drive TR3 and TR4 output stage. The signal at TR4's collector is then 4v which provides an output of 2v into a 75-Ohm load. The diode in TR4's collector compensates for the base-emitter potential in TR3 therefore zero volts in will equal zero volts out. The 820-Ohm resistors are not at all critical; anything between 470-Ohm and 1k should be OK.



PULSE DISTRIBUTION AMPLIFIER



PULSE DISTRIBUTION AMPLIFIER PRINT PATTERN (4" x 1.9")



COMPONENT LAYOUT

CONVENTION TALK-IN - GB0ATV

2 metres - S22 (145.50MHz)

70cm - via GB3ME repeater (Rugby)

WRAASE SSTV

Following the article 'Robot & Wraase SSTV' in the last issue, the author of that article has followed up with a letter to Volke Wraase on the subject of standards used in Wraase equipment. The letter is reproduced here for members interest.

Herr Volke Wraase, DL2RZ,
VOLKE WRAASE ELEKTRONIK,
AM Zuschlag 19,
D-2067 Renfeld,
West Germany

Dear Mr.Wraase, DL2RZ,

I am writing to you because I am concerned about the need for as much compatibility as is reasonably possible between the several SSTV scan converters now available. You are no doubt aware that in the United States many amateurs have now bought the new Robot 1200C or 450C converters, whilst in Europe there are many Wraase units in use.

I recently exchanged my Robot 400, in which I had installed the Interface 3000C three-memory expansion, for a Robot 1200C. I now find that, using the 8-second frame speed, it is possible to copy an excellent picture from an old Robot 400, but many of the Wraase converters send me a picture which have missing lines and which occupies only about half of the frame. Also the lines are jagged and often the picture is totally corrupted. This is due to the Robot 1200C being microprocessor controlled and not accepting the line sync pulse from the Wraase transmissions.

G3EFP has a very new Wraase converter and this problem is evident when I try to receive him on 144.5MHz FM. G3LUI has an original DL2RZ system and I experienced the same problem with his transmissions, however he has added extra capacity to his line pulse timing circuit to make the pulse longer, and I now receive his pictures perfectly.

When the HF bands open again to the United States, I believe that many Wraase owners will be very disappointed as they will not be able to send pictures to the very many Robot 1200C or 450C units now being bought.

Is it possible that you could look into this matter and perhaps publish some modifications for making your equipment compatible with the new Robots? I have tried to get Robot in California to modify their units, but they say that their products are in accordance with Copthorne MacDonald's original specification.

Of course I am not referring to the different composite colour systems, but only to the Monochrome (black and white) or sequential frame colour modes.

One other query: A friend of mine has a Wraase and is asking about the 4.433MHz crystal. He suggests that this cannot be divided down to 4350Hz as in the manual, he says it works out at 4330Hz. Has he made a mistake?

I should very much appreciate your kind reply to this letter and I think the outcome could well help intending purchasers of Wraase equipment in the U.K., who ask for advice on our SSTV nets.

Yours sincerely,

Roderick Clews, G3CDK

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THIS IS THE PLACE TO ADVERTISE

MAY-DAY MICROWAVE CONTEST

24CM ONLY

0001 - 2359hrs local

Monday May 5th

FIRST PRIZE ...

This brand new Rigonda portable

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THE WORTHING AND DISTRICT VIDEO REPEATER GROUP PRESENTS

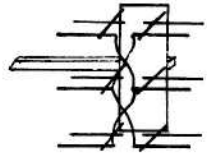
THE NEW ATV PROGRAM

48k Spectrum

The 'NEW ATV' with even more features than ever. There are over 50 commands on the new ATV program, which include:-

5 Testcards, Maps, Real time clock (now with alarm facilities), Flags, Cross hatch, Colour bars, all with callsign inserts, plus numerous size printing on screen, including a memo pad, Scrolling Messages, Maidenhead calculator, plus many more features including a demonstration mode. All this plus a smaller 16k version on side two for only £6.00 including P&P. Overseas please add £1.00.

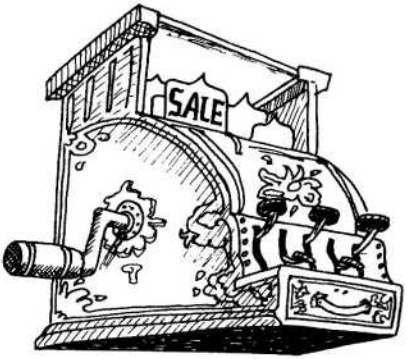
THE WORTHING 24CMS AERIAL KIT



The Worthing aerial is now available in kit form, with the tricky bits pre-drilled and is the ideal aerial for ATV repeaters as it covers the whole of the 24cms band and has been used by the repeater Group members for over two years now and will be used on the repeater GB3VR when it moves to it's new permanent site. The aerial comes complete with straight forward instructions and should only take an hour or so to complete. The aerial kit costs £10.95 including P&P.

Orders should be sent to Mr. R. Stephens (Treasurer of GB3VR) Toftwood, Mill Lane, High Salvington, Worthing, West Sussex.

If more details required please send a stamped addressed envelope.



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*Advertisements are placed in this column free of charge to paid-up members. All ads should be sent to the Editor at 47 Crick Road, Hillmorton, Rugby CV21 4DU. Tel: 0788 69447.

FOR SALE

ATARI 800XL COMPUTER SYSTEM FOR SALE. Only a few weeks old this machine has 64k of RAM, 6502 processor, built-in basic and superb graphics. Complete with matching data recorder; Atari assembler/editor/de-bugger ROM; Centronics printer interface; complete hardware manual, operating system manual, technical reference notes; Basic manual, Atari XL handbook; 'Mapping the Atari' book, Graphics and arcade game design manual plus lots of other documentation and a small amount of software. Still under guarantee and in 'as-new' condition. Genuine reason for sale and a bargain at only £90. (Buyer inspects and collects or carriage extra. John Wood, G3YQC, 47 Crick Road, Hillmorton, Rugby CV21 4DU Tel: 0788 69447 (evenings/weekends).

CRT's type D13-51GH and AW17-20...£10 each. Would swap for item in 'wanted' section. LENGTHS of ex-broadcast camera cable, suit Marconi Mk3 etc., with connectors - please enquire.
Peter Delaney G8KZG, 6,East View Close, Wargrave, Berkshire.RG10 8BJ. Tel 073522 3121.

MURPHY VIDEO CAMERA (valve type)...£10. TV CONVERTED to monitor...£5. 4-BEAM SCOPE...£10. AF SIG GEN...£10. PHILIPS 1702 video (no heads)...£10. PHILIPS 1460 video (replay only, M/C) perfect working order...£25. COMPUTER keyboards...£5. RIBBON cable, 400 metres...£50 the lot or will split. TELEPHONES...£1 each. FACSIMILE receiver system...£20. VARIABLE PSU up to 410v at 1.2A, with meters...£15. FM RADIO tuner...£3. CRYSTAL controlled pulse generator (1478A)...£15. WAVEMETER model 'D' No.1 Mk2...£5. COLOUR TV SPARES: Panels for Pye hybrid, RBM, A823 and BRC2000, from 0.40p each. NEW LOPTS and triplers from £1 each. MANY rare and common valves; all new and boxed from 0.20p each. Phone Ken Bailey on 021 472 3688

NEW UNUSED 23cm TV gear: Fortop TVR1300 receiver...£95. FORTOP TVD100 demodulator...£15. CR23 Jaybeam aerials...£20 each or £35 pair. AR1002 50kg rotators (2)...£25 each. OSCILLOSCOPE transformers (2)...£5 each.
Buyers collect or carriage extra. H.Burton G2JR, 149 Longfellow Road, Coventry CV2 5HN. Tel: 0203 455021

HITACHI FP1020 ENG 3-tube colour camera with 10:1 motorised zoom lens, CCU and 5m multicore cable, carry case, manuals and heavy-duty Miller tripod etc. Has video out from the camera head and needs 12v at the camera or mains at the CCU. Auto/manual colour balance. Could be used as caption camera in edit suite. Can be seen and tested in London...£950+ OR EXCHANGE for high quality HF rig with general coverage receiver. Further details from: Ted Eggs, G6CTV, 83 Boundary Road, Wallington, Surrey SM6 0TA. Tel: 01 647 7494

PHILIPS PM5553 NTSC CODER...£15. PHILIPS PM5552 colour pattern generator (RGB outputs only)...£20. A67-120X 26-inch colour CRT, used but good...£7. ADVANCE H1 audio oscillator...£8. WAYNE KERR 022B video oscillator...£12. SONY CV2100ACE VTR (tape available)...£25.
Jeffrey Borin, 50 Bonnersfield Lane, Harrow, Middlesex HA1 2LE.
Tel: 01 863 2880

SONY PORTABLE VCR: Complete Sony SL-3000UB portable Beta VCR complete with TT-3000UB tuner/timer unit, separate mains PSU/charger, spare battery, carrying case and strap. Ideal for ATV either in the shack or portable with a camera. In excellent condition, genuine reason for sale. Offers to:
Kerry Lewis, G4GGK, 10 Woodland Road, Rushden, Northants. Tel: 0933 314797 or 01 629 3345 (days).

TMS4060 memory chips, as used in ROBOT-400...£1.00 each or £15 for set of 16.
Ken Saunders, G8SFM, 'Tamarisk', Tetbury Lane, Leighterton, Glos GL8 8UP

EX-BROADCAST EQUIPMENT. A quantity of ex-broadcast equipment is available for sale. Please send a stamped addressed envelope for lists and details.
Walter Williams, Hatchways Farm, Burrows Cross, Gomshall, Surrey.

WOOD & DOUGLAS 24cm varactor multiplier (boxed)...£51. NEC model JB1202DH extremely high resolution (640 x 400 pixels) RGB colour monitor...£250. NEC 12" mono (green screen) composite video monitor...£79. Both in superb condition. Paul Chamberlain, G4XHF. Tel: (Crawley) 0293 515201.

TVT435 TV transmitter, as new...£100. 2-OFF TVC 435/40 ATV to UHF TV converters, new...£20 each. SAME but tatty case...£15. SONY HVS2000 video camera selector, HVM100 B&W camera and lens, 5-metres of camera extension cable. Good condition with instruction books, just needs colour video input to superimpose colour captions etc...£100. SONY AC F1 mains PSU/nicad charger and VMC330 video in/out connector for F1 video recorder, as new...£25.
Could bring items to BATC rally in May. Steve Whalley G4DVN, 1 Radley Way, Werrington, Stoke-on-Trent, Staffs. Tel: 078 130 5153

CAN ANYONE make use of a valved 70cm TV transmitter? Rack mounted with power supply. Crystal controlled oscillator/multipliers; QQV03-20 tripler to 70cm; QQV03-20 PA, AM modulated. No reasonable offer refused.
C.Grant Dixon, G8CGK, 'Kyrles Cross', Peterstow, Ross on Wye, Herefordshire HR9 6LD. Tel: 0989 62715. Buyer collects.

MICROWAVE MODULES ATV435 transmitter...£125 o.n.o. 30ft TOWER - rigid, can deliver 25 miles...£150.
Kevin Lloyd G1EVP, 24 Reservoir Road, Edgeley Park, Stockport, Cheshire SK3 9QJ. Tel: 061 480 1933

LIMITED NUMBER of 12" and 14" RGB monitors, uncased, ex-equipment. Fully tested, 110v operation, ideal for BBC computers etc...£50.00 each.
Bob Platts G8OZP, 8 Station Road, Rolleston, Burton-upon-Trent, Staffs DE13 9AA. Tel: 0283 813181 (8.00 - 9.00pm only please).

DISC DRIVE, suitable for BBC micro. 40 tracks, cased with built-in power supply. Good condition...£50. ABC-TV video distribution amplifier, twice one input, 4 outputs. Solid state, 19" rack format, collector's item, probably made by Mike Cox himself!...£3. JAYBEAM band 2 transmitting dipole...£5. BAND 2 transmitting groundplane, nice quality...£5.
The above are sold on a 'see and collect' basis, or by special arrangement.
Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604-844130.

VHS portapack kits comprising Sony HVC2000P camera, CMA-1010E cable adaptor, CCK-5 5m extension camera cable, Panasonic NV-3000B recorder, NV-B30 battery charger/mains adaptor, LCR1812E battery, camera and VTR carrying cases...£300 each; CONRAC RKC14 14" monochrome monitor with service manual...£25; ASTON SPG5S monochrome genlock SPG - will lock to helical scan playback - with service manual...£30; JVC CP5000E U-matic player. With service manual...£50; PHILIPS VCR cassettes, 30/65 and 45/95...£1 each; SCOTCH 1" tapes for IVC, type 361-1-2150 and 461-1-2150...£5 for 10; SONY CV2100 with some tapes and service manual...£45; TECH TE65 valve voltmeter with RF and EHT probes...£15; A49-11X 19" shadowmask CRT...£10; SHUGART SA200 5.25" disk drives: pair in dual case with power and data cables for BBC micro. With service manual and BBC formatting disk...£85; PHILIPS N1502: various spare boards, modules, mechanical bits...£cheap (tell me what you want). Screened multi-core cable: 18 & 24-way in various lengths, but willing to cut to requirements...25p/m. Offers considered for any or all of the above items. Carriage arranged at cost. Phone Peter Major on 0962 62281 ext 248 (daytime) or 0962 54851 (evening/weekend), or write to 6 Priors Way, Olivers Battery, Winchester, Hants, SO22 4HJ (s.a.e. please).

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RS STYLE 19" SUB-RACK - NOT the Eurocard variety. Information on the AFC output (pin 10) of the Plessey SL437 i.c.
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FOR A STUDENT REPAIR: head assembly for a Philips 1500/15 VCR - just the aluminium disc carrying the heads, new or secondhand.
J.Brown G3LPB, 45 Marlborough Avenue, Falmouth, Cornwall TR11 4HS

FREE TO A GOOD HOME: PYE Mk4 series-3 valve slave camera (needs SPG pulses). Works well and gives 7MHz video bandwidth. Can deliver on route London - Kings Lynn.
Dave Crump G8GKQ. 8 Ranworth Close, Swaffham, Norfolk PE37 7ST. Tel: 0760 23930

EDL432P 70cm linear amplifier wanted, also LA106(?) Belcom 2m linear. Complete monoscope camera also wanted.
D.R.Higginson, G8JET, 28 High Street, Misterton, Doncaster, S.Yorkshire. Tel: 0427 890768

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PHILIPS N1502 VCR for spares - condition immaterial provided that tuner electronics is working. Please phone with details/price to Peter Major on 0962 62281 ext 248 (daytime) or 0962 54851 (evening/weekend), or write to 6 Priors Way, Olivers Battery, Winchester, Hants, SO22 4HJ.

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