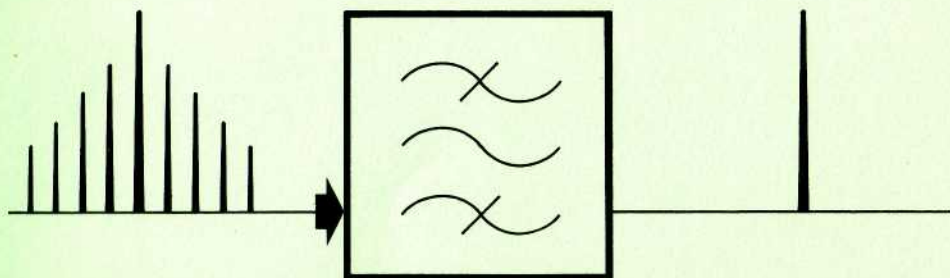


CQ-TV

MAGAZINE
No. 120

BRITISH AMATEUR TELEVISION CLUB

NOVEMBER 1982



FILTERS

R.F.

I.F.

VIDEO

Also.....

25Hz OFFSET.

LINEAR AMPLIFIERS.

A 10W TRANSMITTER.

24cm A.T.V.

DISTRIBUTION AMP.

etc. etc...

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Orders for components and printed circuit boards	P.Delaney. 6 East View Close, Wargrave, Berks. Tel: 073 522 3121
Orders for books and other publications	I.Pawson. 14 Lilac Avenue, Leicester, LE5 1FN. Tel: 0533 769425
General Correspondence	T.Brown. 25 Gainsbro Drive, Adel, Leeds, LS16 7PF. Tel: 0532 670115

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

MEMBERSHIP

FULL YEAR: £4 or £1 for each remaining quarter of the year.
All subscriptions fall due on the first of January each year. Overseas members are asked not to send foreign cheques please.

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The BATC Committee would like to wish all members a happy Christmas and a successful new year. May this be the year of the ATV repeater!

CLOSE FOR PRESS DATE FOR THE FEBRUARY ISSUE.....20th December 1982

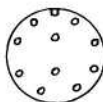
EDITORS POSTBAG

Dear Ed,

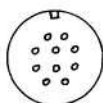
With reference to Andy Emmersons article on plugs and sockets in CQ-TV119, readers may like to know the following:- Sony Q type 14 pin plugs and sockets which may or may not be the same as the 14 pin K type can be obtained from Jessops of Leicester. Prices are:- Cable plug and socket £16.57p ea + VAT Chassis plug and socket £10.25p ea + VAT Jessops are primarily photographic stock-ists, but also carry an extensive range of VCRs, Cameras, Plugs, Sockets and Cables etc. They also stock Honda 8 pin plugs also known as the EIAJ 8 pin type, and the 10 pin VHS type plug. Catalogues are free and can be obtained by writing to:

Jessops of Leicester Ltd.,
Photo Centre,
Hinkley Road,
Leicester LE3 0TE

Whilst on the subject of VCR plugs and sockets, I wonder if Andy could comment on the fact that the 10 pin plug he shows in his article differs from the 10 pin type fitted to most VHS machines in that the physical pin configuration is different as shown below.



Andy's
10 pin
type.



VHS type.

Chris Maxwell GB8MKT

Dear Ed,

Help please! regarding the character generator in the ATV handbook (blue), is the character generator IC a 2513U or a 2513L? I have no info. on these devices at all.

Tony Livesley GB8JAI

The 2513L generates lower case characters and the 2513U upper case, (capitals).

ED.

Dear Ed,

Here's a tip that may be helpful to club members; Some practical uses for a model control joystick include R/C model aircraft, electronic games and quad sound systems. Now a joystick can be put to use in your fast-scan ATV station. To locate your video i.d. or video clock on the TV screen, a separate vertical and horizontal potentiometer is usually used. These two pots can be meshed with a joystick for easier positioning.

Bruce Balla VE2Q0

Dear Ed,

The proposal was made in CQ-TV recently that the BATC might operate a phone-in news service similar to the RSGBs. The idea is certainly a workable one - but I wonder whether it's the best solution to the problem? Wherever the BATC sited its recording machine, it would inevitably be quite a long way from many members who would like to make use of it. The cost of phone calls would deter all but the most enthusiastic: And even some of these might find it frustrating to dial in, only to find that the recorded message had not been changed. So is there a better way?

Another medium the RSGB uses for disseminating its news bulletins is Teletext. For some time now, ITVs Oracle service has carried several pages of amateur radio news. These pages are available to the viewer at any time at negligible cost; they can be updated quickly by the information provider for the price of a stamp or a phone call, and they provide potentially useful publicity for the amateur radio movement because the general public has the opportunity to see them too. Oracles pages of RSGB news are evidence of the many friends amateur radio has in the broadcasting organisations - and it seems likely to me that Oracles editors might give a sympathetic reception to the idea of tagging on a further page giving news

of TV activity. It is their own medium after all!

No doubt there would be many BATC members who might like to make use of a service of this sort but who don't yet have a teletext equipped set.

Teletext TV receivers are still very much in a minority - though I suspect that amateur TV enthusiasts, being technically minded, would be among the first to have them. However, the situation is changing rapidly and the sales figures of teletext sets are on the up-and-up. What do you members think of the idea?

Richard Lambley G8LAM.

The following letter was received by Trevor Brown (Hon Sec) who thought I might like to see it.....

Dear YTV,

My name is Adrian Riley, I am 11 years old. I have seen on London Weekend TV a boy who has his own little TV service which he sends his TV pictures by a transmitter. I would like to do this myself as a hobby. Could you please, please tell me how much it will cost me and how it is done. The camera I would use is just a video camera and a video. I have enclosed a stamped addressed envelope. Thank you.

From Adrian Riley.

Could this chap become our youngest member? I certainly hope so. You can rely on the BATC Adrian to help you all we can.

Editor.

This next letter was also passed on to me from our Secretary. Unfortunately the page with the name and callsign on was not attached, however the content I thought to be sufficiently interesting to publish nonetheless.

Editor.

Dear Sir,

I have been reading about your moves into FM-TV and would like to comment as follows; Regarding your FM-TV standard, I think that 8MHz deviation is too high. Don't forget the spectrum is equal to: Deviation + two-times the highest frequency transmitted. So for 8MHz deviation + 2 x 6MHz sound you will have 20MHz for the first sideband. This is too much. We have used 3.5MHz which is the same as satellite TV on 12GHz and also as vision links in Europe. We have done lots of tests with 2.5MHz but in this case the signal-to-noise is not high enough. The other parameters seem good and for those I offer no comment.

I think this may have been from F3YX but it is too close to printing date to confirm!

Ed.

NEWS ROUNDUP

ROBOT 400 SSTV BOARDS.

At the BATC convention Peter Burnett had on display some genuine Robot 400 printed circuit boards. This board is available separately to enable SSTVers to build a 400 scan converter at his own pace and as funds permit. The board, although complicated looking, is not difficult to construct and can be tackled by anyone who is reasonably proficient with a soldering iron. Full details are provided with the board and, should you run into difficulty, Peter is available for consultation to assist you with any problems. Peter has kindly offered a discount to BATC members. Details may be obtained by sending an SAE to: Peter Burnett, 7 Rydings Avenue, Brighouse, West Yorkshire HD6 2AJ

CLUB COMPUTER

For some time now the BATC committee has been considering employing a micro-computer to aid in the administration of the clubs affairs. Over the past few months a feasibility study has been conducted to ascertain whether the cost of such a system can be justified by the amount and type of work it could handle. After lengthy discussions, perhaps hastened by the recent failure of the Addressograph platemaker which produces the address plates for magazine envelopes, it was decided to purchase a complete system based on the Apple computer.

This installation will be used to directly produce address labels, to process and file-handle all membership details, to assist in the clubs' accounting plus many other tasks.

In order that the correct information is held in the computer, would members please ensure that the details printed on your CQ-TV mailing envelope is correct. Should there be a discrepancy please be sure to advise the mailing Secretary ; Mr. D.Lawton, 'Grenehurst', Pinewood Road, High Wycombe, HP12 4DD. This may be done at the same time as sending in your subscription renewal form which is included with this issue. Please ensure that it is CLEARLY marked

"CHANGE OF DETAILS".

Speaking of which, please don't forget to renew your subscription promptly. Now that things are computerised those who have not renewed by the 31st of March 1983 will be automatically deleted from the membership files and copies of CQ-TV will therefore cease.

TWO NEW COMMITTEE MEMBERS

At the AGM held at the 1982 BATC convention, two new committee members were elected. They are Rod Timms G8VBC (Woodville, Nr. Burton-on-Trent) and Paul Elliot (Leicester).

These positions became available owing to the retirement of Jeffery Borin, Grant Dixon and Eric Edwards. The committee would like to thank these members for their services to the Club.

OVERSEAS MAILING

Overseas members are reminded that when sending any money to the BATC, including membership renewals, this should be made either by a cheque drawn on a UK bank or by International money order. Please do not send foreign cheques. Unless otherwise arranged CQ-TV magazine will be sent surface mail. Should you wish to have your copy sent Air Mail this can be arranged by including sufficient payment with your subscription renewal to cover the extra expense. The extra charges are:-

Europe	£1.25 per year
Zone A	£1.50 per year
Zone B	£2.00 per year
Zone C	£2.25 per year

Principle countries and their zones are as follows:-

Australia	B
Bahrain	A
Barbados	B
Canada	B
Egypt	A
Hong Kong	B
India	B
Israel	A
Japan	C
Kenya	B
Kuwait	A
Malaysia	B
New Zealand	C
Nigeria	B
Oman	A
Pakistan	B
Saudi Arabia	A
Singapore	B
South Africa	B
South America	B
United Arab Emirates	A
U.S.A	B
Zambia	B

When requesting air mail please make clear on your renewal form that air mail is required.

The address for all subscriptions is:- Mr. D.Lawton, "Grenehurst", Pinewood Road, High Wycombe, Bucks. HP12 4DD England.

NEW ATV AERIALS FOR 1.3GHz

Some of you may have seen an advert for a new company - Selectronic Services displayed recently in Radio Communication. It seems that several aerials are to be made available in the near future, briefly, they are as follows:

6 turn helix, 12dB gain,
12 turn helix, 16dB gain, (2.5ft long),
20 turn helix, around 17.5dB and
30 turn helix around 20dB gain.

All will be RH circular polarisation. Also available will be a 14dB stacked colinear with a beamwidth of 50°. All aerials will be 50 Ohm and will use modern glass fibre materials with the emphasis on quality and reliability. Further details will be published as soon as they are available.

W & D LAUNCH THEIR FM-TV MODULES

Shown for the first time at the BATC Convention in September were some of the range of modules which are to be available shortly for FM-TV on 24cm and the Microwave bands.

VIDIF 1 - is a complete MDTV (medium deviation TV) receive demodulator which accepts an RF signal at 52MHz, processes and demodulates it, and provides a standard 1v p-p video output. Modulation polarity is selectable and an a.f.c. signal is available. This unit can be supplied centred on 36MHz to special order although W&D point out that a slight degradation in performance may be experienced.

TVDC3/52 - a 24cm to 52MHz down converter designed to drive the demodulator. Available November, further details to follow.

70 LIN 3 LT - is a lower level linear amplifier delivering a maximum output of 3W and is suitable for all 70cm modes including of course TV.

70cm Master Oscillator OSC 050 - a free-running power oscillator giving 50mW output and incorporating a video input to enable the unit to be frequency modulated. The oscillator should be followed by a 70LIN3 amplifier to give better loading on the oscillator. Subsequent stages could be a 70FM10 FM amplifier, a varactor tripler (which should produce about 5W on 24, and

then into, say, a 2C39 amplifier (CQTV119) to produce 30 to 40W of MD-TV on 24. Other modules to complement this range will be available later. Please send an SAE if any further information is required on Wood & Douglas products.

OLD CQ-TV's WANTED

As part of the research into the history of amateur television the Editor requires the following issues of CQ-TV magazine to complete the set: CQ-TV 31, 56, 57, 58, 59, 60, 61, 62 and 63. If anyone has these issues that they would like to pass on they would be gratefully accepted. Please send to J.Wood, G3YQC, 47 Crick Road, Hillmorton, Rugby, CV21 4DU.

VIDEO CONNECTORS

Members may like to know that those hard-to-get video connectors could be available from Ross Electronics, 49/53 Pancras Road, London NW1 2QB. Tel: 01 278 6371. It is suggested that your local wholesaler or retailer may be able to obtain items from this company.

ATV ADDRESSES

Since the publication of a list of publications received by the Editor in the last magazine, members who may wish to subscribe to some have asked for addresses. The principle ones relating to amateur TV are as follows:
Der TV AMATEUR. AGAF.D.E. Wunderlich, Im Springfield 56, D-4250, Bottrop, West Germany.
AMATEUR TELEVISION MAGAZINE (A5) (USA), A.Emmerson, 4 Mount Pleasant, Blean Common, Canterbury, Kent.
NBTV. D.B.Pitt, 1 Burnwood Drive, Wotton, Nottingham, NG8 2DJ.
THE ATVer. R.Foxwell VK5ZEF, 16 Conyngham Street, Glenside South Australia 5065.

70cm ATV UP-CONVERTER BOARDS.

You may have noticed that the BATC are producing a printed circuit board for the excellent G4DYP up-converter. Unfortunately the magazine in which this appeared is out of print but copies of the article may be obtained from the Clubs' Publications department. Photocopies are 20p per sheet and there are two for the article. Order pages 10, 11, 12 and 13 of CQ-TV 112. Please don't forget the postage.

SSTV on 2 Metres

On the 14th of September during a lift in band conditions, Grant Dixon G8CGK made a two-way SSTV contact with DF1YQ in West Berlin (GM48J), at a distance of some 1,100km. Very good pictures were reported at both ends of the link but with some QRM getting in on the act. Well done Grant.

DX TVI! WHAT NEXT?

Talking of openings the following is a true story:
There was Rod (G8VBC Nr.Derby) waiting for his tea when there was a knock on the door. "Now then now then" said an official looking gent when the door was opened, "did you know that you have been causing TVI?" "Who me?" came the swift reply. "Can I inspect your station sir?" said the OLG sternly. Having satisfied himself that all was well with the rig and waiting for Rod to wipe away the beads of perspiration, the official proceeded to recount how the interference manifested itself. It seems that on the night of the 13th of September, during a good lift, Rod was gaily sending pictures to F1EDM. What he didn't know was that right in the path in the South of England, was an area of blocks of flats whose TV pictures are all fed from one of those common wide-band relays. You guessed it, Rods picture got into this thing and all the residents could see was the 'VBC test card!
What was the outcome? The official gent. said he reckoned it was a decent bit of DX and thought that a QSL card should be requested!
Honest it's true.

A.T.V. AT STONELEIGH

Report by Mike Crampton, G8DLX.

The annual Town & Country Festival, held at the Royal Showground, Stonleigh, Warwickshire over the August bank holiday weekend, drew record crowds again this year. Amateur TV (and radio) was exhibited and demonstrated and pictures were transmitted from several points around the showground back to the stand in the Royal Pavilion. Video recordings were also made of several events in the main ring including a fashion show, a steel band and a trampoline display. Recordings were made on a closed circuit system in most cases although some over-the-air recordings were taken. Most of the performers involved were able to see the recordings later and were (we hope) suitably impressed.

Those involved in the activities were: Kevin G8TWH, Steve G8SBF, Bob G6CYT, Wilf G8ZVE, Peter G4GYI - and son John, Berni (call awaited anxiously), and Mike G8DLX. These amateurs came from as far afield as Coventry, Rugby, Leamington Spa, Stratford-on-Avon and Nuneaton and were all involved in the main exhibition. The RSGB had a stand at the show which was manned by Henry Pinchin G3VPE (zone B council member).

25 Hz OFFSET

By Trevor Brown G8CJS.

One of the most difficult things to explain about the PAL colour system is 25Hz offset. Not only is it difficult to explain, but it is most difficult to achieve. Perhaps that is the reason why, to date, most amateur television stations do not have the correct relationship between subcarrier and line.

When the relationship is correct, the subcarrier is displaced on each successive line of picture by 45° giving some degree of visual cancellation of dot patterning. This subcarrier relationship also causes the visual dot pattern to crawl slowly up the picture. Both these effects were deliberately engineered into the PAL system to minimise subcarrier patterning, but have not so far been taken full advantage of by amateurs.

Fig.1 shows - in theory - how this relationship is achieved.

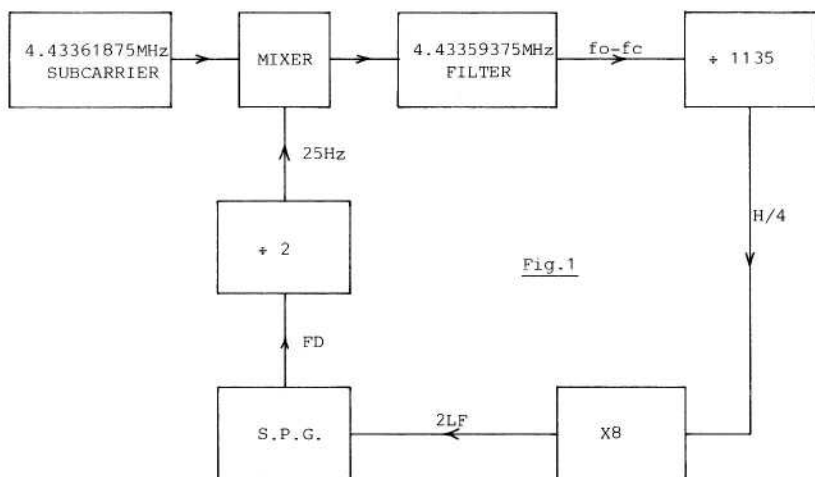


Fig.1

Subcarrier is mixed together with a 25Hz signal that is obtained by dividing field drive by 2. This will produce in the mixer stage, f_o , f_c , $f_o + f_c$, $f_o - f_c$. If it were then possible to select the product $f_o - f_c$ by the use of a filter and subsequently divide this signal by 1135 and then multiply the result by 8, we would have a twice-line signal that could be used as the master oscillator for a SPG.

The problem comes in the filter as f_o , $f_o + f_c$ and $f_o - f_c$ are too close together for a filter technique to be used.

If, at this point, we turn to commercial circuits we can see how the professionals have solved this problem.

RCA in their TK76 camera have used a system that works along the same principle as an SSB transmitter where all the signals are shifted in phase by 90° this causes the unwanted signals to be cancelled out rather like the unwanted sideband. The resultant $f_o - f_c$ is then divided by 1135 and compared with $H/4$. The resulting error controls a 1.25MHz phase locked loop which replaces the crystal oscillator in their one-chip SPG. configuration.

Bosch Fernseh in their new BCN100 cartridge video tape recorder use a digital system to control a Ferranti ZN134J. This system looks ideal for amateur adaptation. The ZN134J has a 25Hz output on pin 14 so the field divide-by-two circuit is not required. The 25Hz output is used to suppress one cycle of subcarrier each frame, resulting in a waveform of $4.433593.75 (f_o - f_c)$ but with a rather uneven distribution of cycles. This signal is again divided by 1135 in two counters ($\div 5$ and $\div 227$) to facilitate standards switching. the resultant is flywheeled in a phase locked loop to even out the holes in the waveform, and then compared with an $H/4$ waveform to provide an error signal. This error signal is used to control the master crystal oscillator frequency (2.5625 for 625 lines) by the use of a 'varicap' diode arrangement.

Acheiving the correct PAL subcarrier-to-line relationship not only improves your pictures but is essential if ever the need arises to have your pictures recorded on a professional video tape machine.

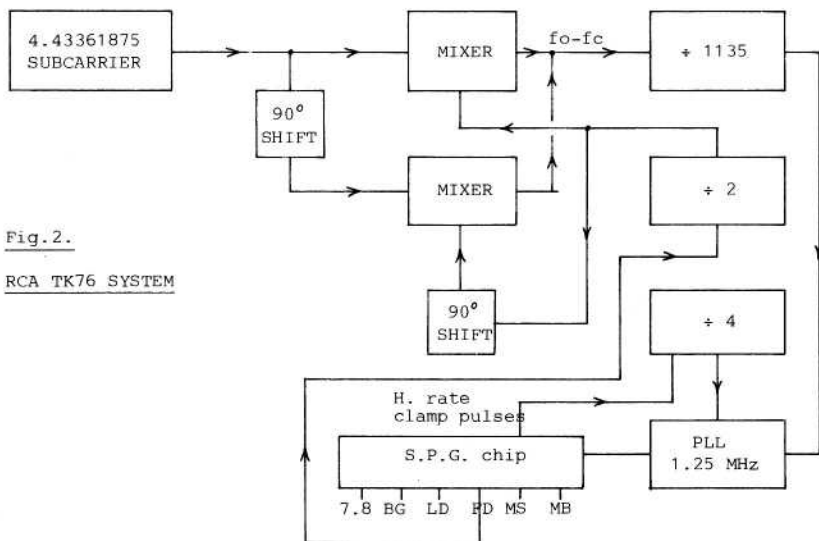


Fig.2.

RCA TK76 SYSTEM

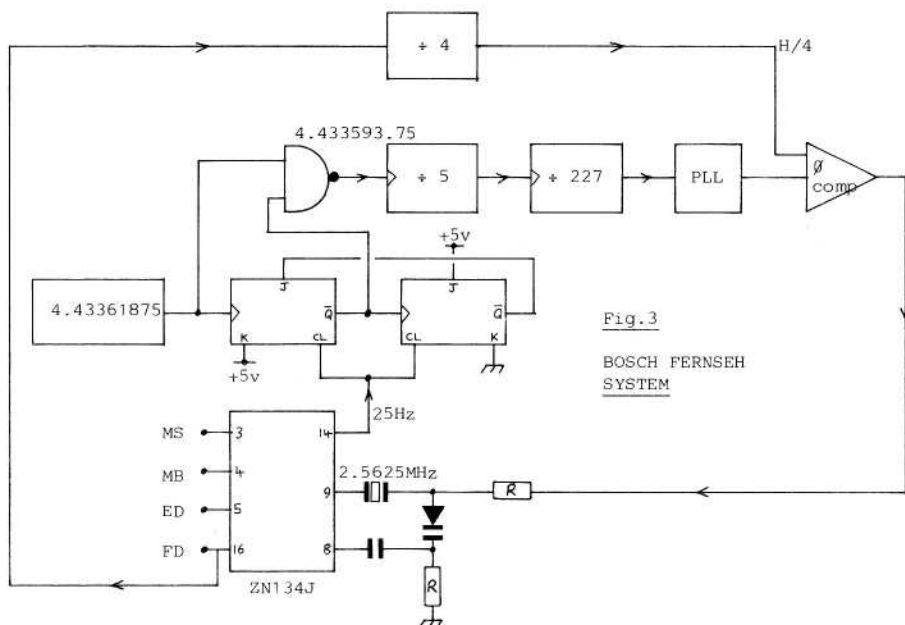


Fig.3
BOSCH FERNSEH
SYSTEM



ATV CAMERAS KIT AND READY BUILT

2/3" Monochrome Television Camera

This British made, high resolution Vidicon camera is self-contained with 240 volt mains power supply and 'C' type thread 16mm lens. It uses solid state circuitry mounted on 2 PCBs. A standard 1V video output across 75 ohms is provided. Automatic light Control with a range of over 8000:1 is provided and resolution is better than 400 lines per picture width.

Camera model CVC500 is available from stock, ready-built for £138.00 (inc. VAT and post).

A kit version less Vidicon is also available (uses standard 2/3" E.M.I. 9831 Vidicon) at £94.50.



CATRONICS LTD., Dept. 19, Communications House, 20 Wallington Square, Wallington, Surrey SM6 8RG

Tel: 01-889 6700. Shop/Showroom open Mon to Fri 9am to 5.30pm. Closed for lunch 12.45 to 1.45pm. Sat 9am to 1pm.

A VIDEO FILTER

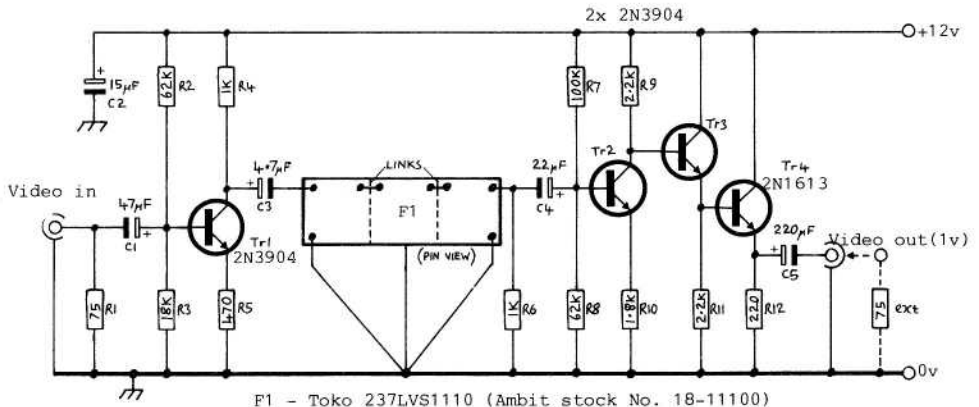
By Roy King G8CHK.

With the advent of digitally generated video sources including computer outputs, care should be taken to ensure that the high frequencies (caused by fast logic switching) are not radiated as they may extend out of the top of the 70cm band. The easiest way of avoiding this is to feed the video through a low-pass filter with a cut-off at a suitable frequency.

Toko market a range of such filters with cut-off frequencies of 2.3MHz, 4.5MHz and 10.5MHz (at -3dB). The filter used in this design cuts off at around 4.5MHz which still enables a colour burst signal to be transmitted. The filters' quoted response is:-

-3dB	4.5MHz
-40dB	6.2MHz
-60dB	7.5MHz

As the source and load impedances are 1k, matching to 75 Ohms is required. R4 and R6 provide matching in and out and Tr1 gives a medium input impedance with a small amount of gain. Tr2 has a higher input impedance so that it does not effect the frequency response of the filter which has a 1k load resistor (R6) at the output. Tr3 and Tr4 buffer the output and enables Tr4 to provide a 75 Ohm output. On test, approximately 3 volts p-p of input signal can be tolerated without causing distortion. The overall gain is approximately one and the unit is non-inverting. There is very little ripple in the passband and the basic response agrees with the manufacturers data.



VIDEO LOW-PASS FILTER



DON'T GET CAUGHT!

renew NOW!

Now then, Now then! What about that form then?

Subscriptions for 1983 are due on the first of January. Although the subscription has risen slightly to £4, this is still far cheaper than anything else in its' class.

The Committee hope that you have been pleased with the way the Club has prospered over the last year. We now have more members than ever before-(over 1,600) and still rising.

Amateur television is entering a new and exciting phase in its' history as next year promises to see the first British ATV repeaters on the air. FM-TV promises to provide considerable opportunities as does the increased use of the 1.3GHz band. With the ever-increasing amount of commercially made ATV equipment now on the market, 70cm is more popular than ever. If you care about Amateur Television and wish to see it flourish - in spite of un-founded rumours about 70 - then the BATC as your instrument must be a voice to be reckoned with.
THE LARGER THE MEMBERSHIP THE LOUDER THE VOICE.

A renewal form is enclosed with this issue. Would you please check your address details on the magazine envelope and indicate in the box whether or not they are correct. This is to ensure that all details are correctly stored on the new membership computer files.

DO IT NOW!

B.A.T.C. Subs.
"Grenehurst",
Pinewood Road,
High Wycombe,
Bucks HP12 4DD
ENGLAND.

A 70MHz I.F. FILTER

By Jan-Martin LABAK.

As with any good receiver it is essential that the receivers' bandwidth be restricted to only that required for the system in use. To this end good filtering at signal and/or I.F. frequencies should be provided. Now that FM-TV is becoming more widely used both in amateur TV circles and for domestic satellite reception, and bearing in mind that the most widely used microwave I.F. frequency is 70MHz, I would like here to briefly describe a 70MHz band-pass filter which I have found most valuable in resolving weak TV signals on my own satellite receiver.

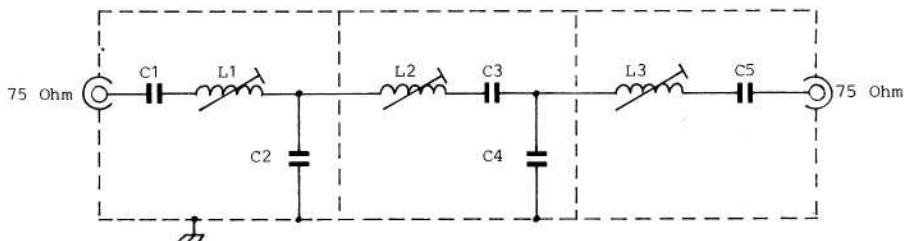
The circuit is shown in the figure and is a variation of the constant K filter. Three sections are provided giving good bandpass response together with a fairly sharp cut-off.

It is not recommended that a printed circuit board be made for the design since this can induce losses in the PC base material. The three sections should be built in a box (which can be made from PC board material) with two dividing screens as shown. It is important with any filter of this type that different sections be isolated from each other. Feedthrough insulators are used to couple the stages together. The input/output characteristic impedance is 75 Ohms and, to maintain the specified performance, it is essential that the filter be terminated in that impedance.

With a Q of 120 the insertion loss is around 1.5dB. The 3dB bandwidth is 9MHz and the 10dB bandwidth is 12MHz. To obtain the correct bandpass response the filter should ideally be aligned using RF sweep equipment. An alternative is to plot the curve by hand using a signal generator and some method of level indication. The generator is set at various frequencies in order over the required passband and the level of output is plotted on a piece of graph paper. This is a bit tedious but is capable of excellent results.

The table shows the calculated values of the components (75 Ohms, 70MHz, 11.3MHz bandwidth) and the actual values used in the prototype.

	<u>Calculated Value</u>	<u>Used Value</u>
C1	3.8pF	3.9pF
C2	33pF	33pF (+10%)
C3	4.3pF	4.7pF
C4	33pF	33pF
C5	3.8pF	3.9pF
L1, L2, L3	1.5uH	1.2 - 1.7uH. 10t 0.3mm enam. copper close-wound on 10mm former, with core.



70MHz 75 Ohm BANDPASS FILTER.

NIGHT-WORK

*Who are these Wood & Douglas people that excel at all they do.....?
They are just names behind an advertisement to most of us but they are human.
They think and do much the same as the rest of us. Well almost.....!*

Ensclosed in room 246 of the Post House Hotel on the Saturday evening prior to the 1982 BATC Convention and the launch of their new FM-TV system onto the unsuspecting ATV fraternity, were two of the motivating forces in the W&D team. Having had an hour or two in-depth discussion on the following days plan of campaign, they were recumbant in a horizontal mode on the brink of a conscience-free sleep.

The curtains wafted gently to the warm evening breeze blowing through the open windows. Down below in the car park sat vehicles pregnant with the new technology that would stagger in a few short hours, the clock struck three and shortly after the chimes had died came a gentle clicking and rattling from below. With a rise-time akin to Schottky TTL one of our heroes rushed to the window wearing nothing more than a quizzical frown. Peeping through the drapes at the scene below revealed a figure intent on apparent access to our best kept secrets and all the other deserted vehicles.

A call to the night porter was quickly made from beneath the bed (any over deviation would have alerted the prowler). A quick re-check at the window and the figure had moved along. Instant action was called for. Jeans on, shoes on, out! Dashing down to the car park and joined by the porter our heroes confronted a slightly worse for wear individual intent on his next illegal entry. Minutes later a mid-band mobile arrived with a blue flashing LED on the roof. The culprit was apprehended, statements were taken. By 4 am our heroes were horizontal again and already neg. 20 into sleep.....

Up at 7am, stand set up, breakfasted and then seven hours customary courtesy and exceptional service to the ATV fanatics who think we are just technical boffins. How do we do it?

These events really did take place. Two cars at least were entered although as far as we are aware nothing was taken. The court case will appear in due course. The night porter has CCTV on the car park but it is next to useless at night. Could any member recommend a better system for night surveillance?

W&D Team.

LINEAR AMPLIFIERS

By Paul Marshall, G8MJW

Transmitting colour and/or 6MHz intercarrier sound on 70cm is not a straight-forward process. Keeping a transmission within the allotted 8MHz is a primary concern since it is a licence condition. Traditionally there are three ways to accomplish the required 8MHz bandwidth:

- A high or low level modulated transmitter followed by a UHF inter-digital filter (current commercial products require this filter to be added).
- A low-level (usually IF) modulated transmitter with vestigial sideband (VSB) filtering accomplished at a lower frequency with lumped element filters followed by very linear amplification.
- Restriction of the input video bandwidth to about 3.5MHz thus giving a 7MHz overall RF bandwidth for a double sideband signal.

Method 'a' requires a filter which can be difficult to build and align and which may well be lossy, so it has to be applied at levels less than about 10 Watts. Any subsequent amplification must then be very linear. Method 'b' is complicated and difficult to align, but not impossible. Method 'c' is clearly simple but means that colour and intercarrier sound cannot be employed, thus anyone wishing to transmit colour and/or 6MHz sound must use either 'a' or 'b'. There are several areas in both types of transmitter where care is required in the design, construction and alignment, one of the most important is the linear amplifier chain.

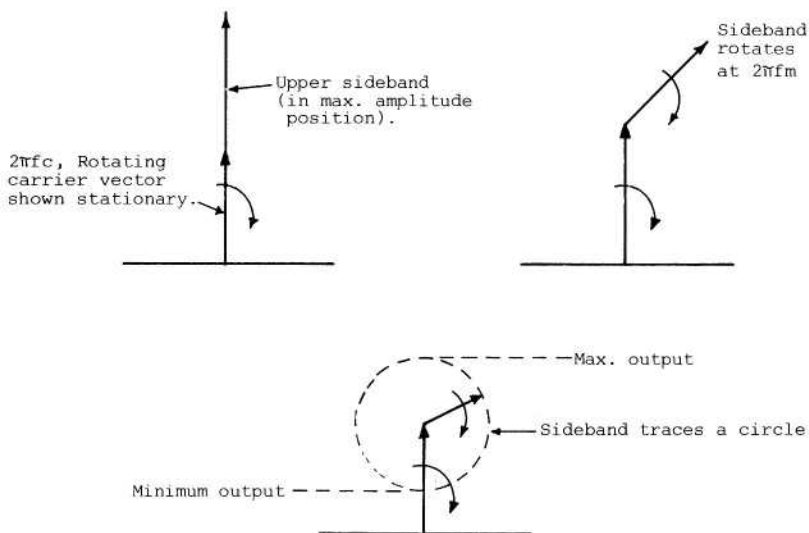


Fig.1. Vector representation of sideband plus carrier.

LINEAR AMPLIFIERS

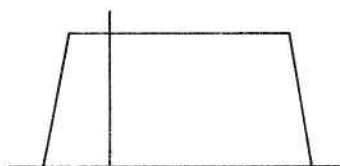
The author has heard of cases where amateurs are using class C amplification for TV signals, (such as offered by several propriety modules such as the otherwise excellent Motorola MHW710), this will not only give badly crushed whites (assuming negative modulation), appalling differential phase and gain but furthermore will actually RESTORE a filtered sideband. Differential phase and gain errors by the nature of the PAL system are not too noticeable, even when excessive, on the screen, so many stations are probably not aware that they have the problem.

The above holds true to a lesser extent for classes A, AB, AB₂, or B amplifiers (or maybe greater if incorrectly designed). To illustrate how a sideband may be restored, consider a single sideband, full carrier signal. This can be represented in vector form as shown in Fig.1.

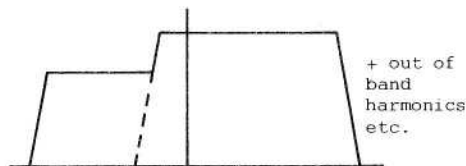


Fig.2. Sideband restoration.

The modulating frequency is f_m and carrier is f_c . A truly linear amplifier passes the signal cleanly. Now, suppose that this signal is passed through an amplifier which crushes at the high power end (ie the gain falls off as power output increases). from Fig.2 we can see that at the top end the sideband will require a contribution from the opposite sideband to make up the required vector (by the laws of vector addition), thus the opposite sideband has been restored - albeit at a lower amplitude.



Broadcast VSB signal (transmit)



Effect of non-linear amplification (diagrammatic)

Fig.3a

Fig.3b

With a VSB signal the output will be as shown in Fig.3a. The result of passing it through a non-linear "linear" is illustrated in Fig.3b. The same effect gives rise to differential phase and gain errors, (see Figs 4 & 5)

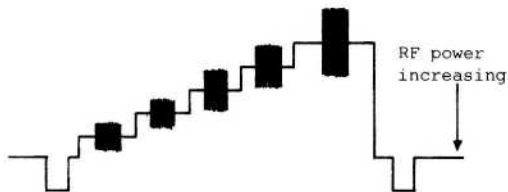


Fig.4a. Differential gain.

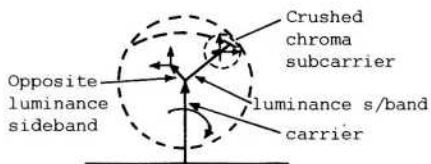


Fig.4b. Vectors for diff. gain.

How can linearity in transistor power amplifiers be achieved?

There are three main reasons for poor linearity:

- 1] Poor transistors.
- 2] Wrong load.
- 3] Wrong bias/class.

Good RF power transistors for UHF are expensive, but modern devices are much better than the early ones which gained a dubious reputation. Where possible use proper PA transistors intended for TV or alternately, those for SSB/AM. Using devices intended for class C will mean derating the power output of the device. A guide to the linearity of the device is its Intermodulation Products (IP's), these are usually specified as being either two or three tone, having specific standard levels representing vision carrier, colour subcarrier and sound carrier. A basic test set-up is shown in Fig.6. A minimum of -30dB for IP's will give reasonable results.

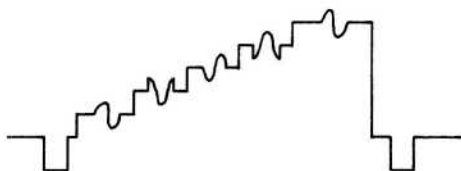


Fig.5a. Exaggerated diff. phase.

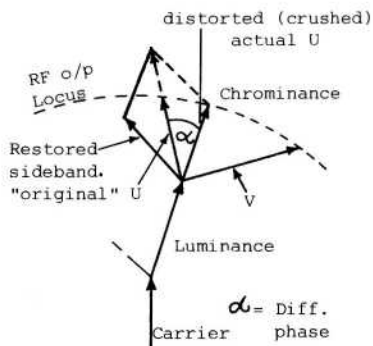


Fig.5a. Simplified vectors for diff. phase.

3 signal generators.

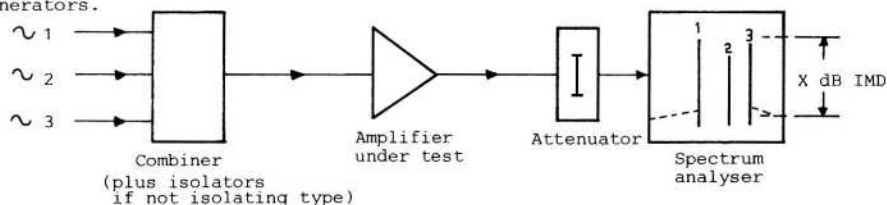


Fig.6. IMD Measurement.

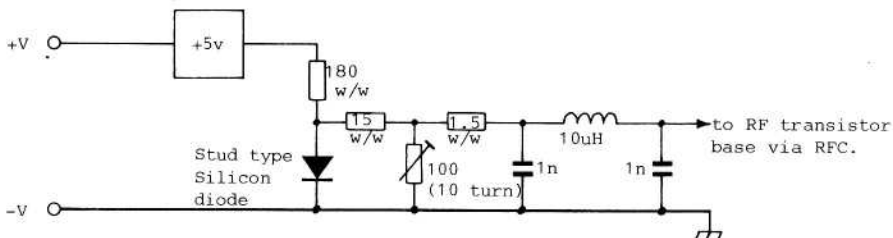


Fig.7. Biasing for class B - very high power (<100W)

The load applied to a transistor is important not only for efficiency and gain, but also for linearity. Just as in an audio amplifier the output load should be $\frac{(V_{cc}-V_{ce} (SAT))^2}{2P}$ Where P is the output power in Watts. High power

transistors (<20W) have very low output impedances, typically 5 Ohms plus the reactive component. There are numerous techniques for transforming down from 5 Ohms to this level of impedance - manufacturers handbooks often give "how to" guides in appendices but they do assume a basic knowledge of Smith charts.

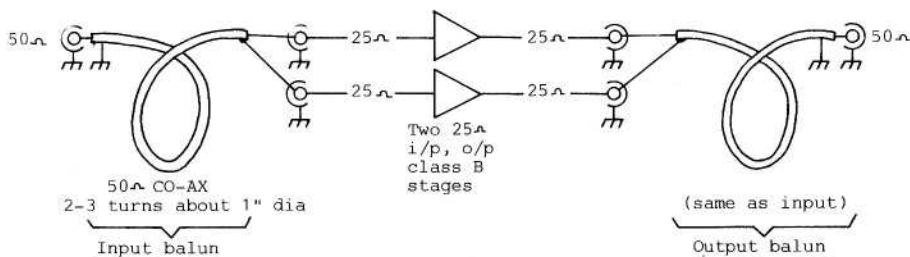


Fig.8. Balun coupling.

Provided class C is avoided, good results can be achieved from either class A or push-pull class B designs. Class A is inefficient and for high power requires an active bias circuit to provide the necessary power and stabilization for the low hfe of RF power devices. Class B bias can be accomplished very simply with a diode (power type) as shown in Fig.7. Splitting and combining of a pair of class B stages is readily performed for the amateur using simple baluns (Fig.8).

Linear RF amplifiers are not wholly "black art" electronics and, with care and SOME suitable test equipment, circuits can be designed without blowing-up half of a distributors stock!

Other advice and circuits on how to keep linears linear may well be published in the future.

A 10W TRANSMITTER

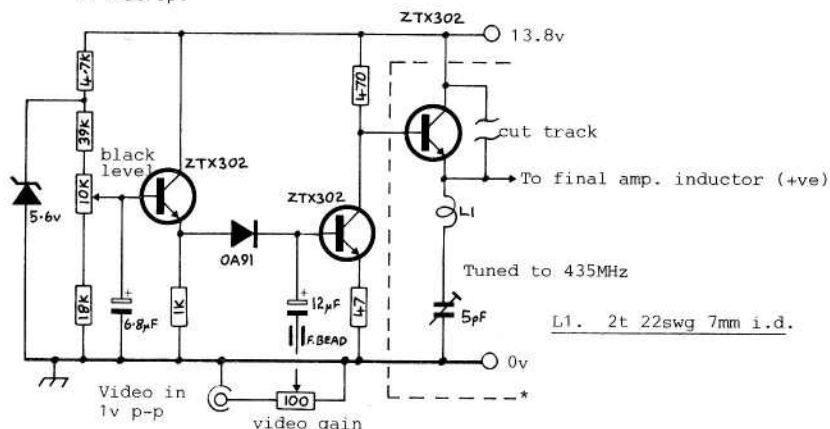
by C.Lewis G6ACL and G4LOV.

Shown at the 1982 BATC convention was a 10 Watt ATV transmitter. Features include an internal power supply, an RF demodulator probe, giving composite video output, for monitoring the signal and an RF power meter. Panel controls include bias and video gain.

The RF carrier is generated by the ever popular Pye PF1 'Pocketphone'. On reduced voltage the harmonic radiation from this transmitter has been found to be acceptable for ATV although it is undoubtedly best to use a correctly aligned bandpass filter in the output.

Fig.1 illustrates the modifications to the PF1 and also shows the video modulator, care must be taken in construction at this stage. By changing to a suitable crystal an output on 435MHz can be obtained. Modifications are as follows:-

- 1) Remove ALL decoupling from the final amplifier stage located at the earthy end of the second hairpin loop from the end of the board.
- 2) Decrease the current limit resistors in the collector circuits of all the RF driver stages to 1/2 to 2/3 of their original value.
- 3) Hard-wire the modulator onto the printed side of the board remembering to leave access to the tuning controls of the RF stages. An alternative is to build the modulator on a separate PC board located near to the final amplifier and screened from it. It is best to wire the last modulation transistor onto the back of the PF1 strip.



* Components within the dotted line should be so mounted as to keep all connections as close as possible to the +ve feedpoint of the final amplifier.

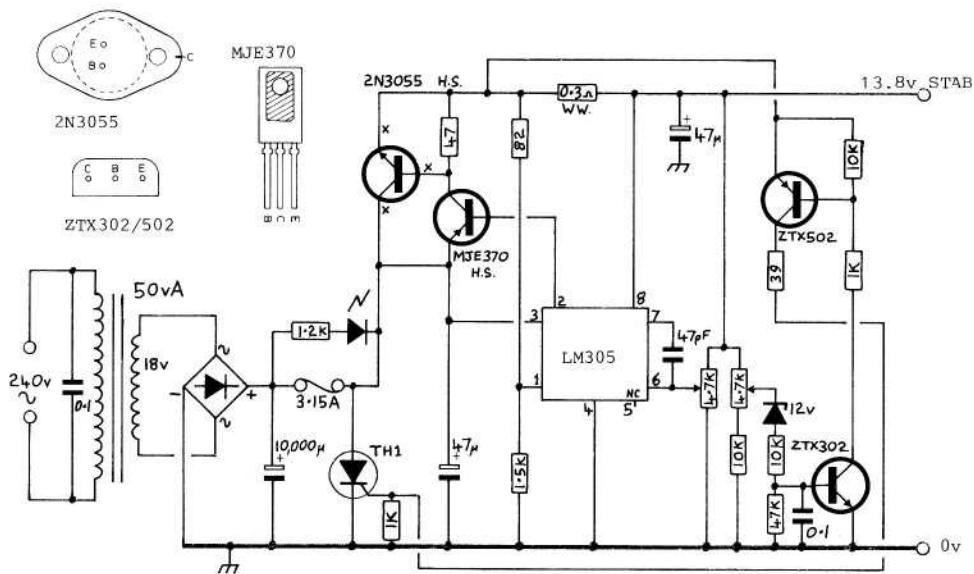
Fig.1.

VIDEO MODULATOR CIRCUIT

Fig.2 shows the construction of the PA, (refer also to the BATC Handbook (blue) page 28). The RF demodulator probe is featured on page 31 of the same BATC Handbook. The pickup wire is placed near to the output line of the transmitter. Do not over couple this probe otherwise distortion will occur.

The 3Amp 13.8v stabilised supply should present little difficulty although as a precaution, ferrite beads should be fitted according to the circuit diagram shown in Fig.3. 'Crowbar' protection is used in the power supply to protect the PA module from the effects of overvoltage, a suitable 20-30A thyristor should be used owing to the high energy stored in the smoothing capacitor.

On-air the transmitter has proved very successful and this article is presented more as a source of ideas than a finished script. It must be stressed that a lot of experimental work may be required to tune the Pocketphone correctly and therefore should be attempted only by those competent in UHF techniques.



x - Keep leads as short as possible, if necessary fit ferrite beads to reduce RF pickup.

HS - Heat sink.

TH1 - 20-30A Thyristor.

Fig.3.

13.8volt STABILISED POWER SUPPLY - 3A

The indefatigable Rod Timms G8VDC from Woodville near Burton on Trent has written with a progress report on 24cm activity in the Midlands. I think Rod deserves a special vote of thanks for his PA design in the last CQ-TV, by the way. First station to get a mention is Steve G4LRT who gets around 30W from a 2C39 and uses the G3YQC design of converter. 'YQC has transmitted EM on 24cm with encouraging results and you can guess his design of converter! Mike G8DLX is also on the band with both tx and rx. Rod's own system is a 2C39 for transmitting and either the G3YQC or R&EW converter, preceded by two BF991s as preamp and a brass interdigital filter. Exchanges are now on a regular basis with a virtual P5 in colour twoway between Rod and Steve, and P3 between him and John, both over paths of 35 miles. G4DVN (of the Fortop fraternity) in Stoke gives Rod a P3 and Rod says he has tried the Fortop converter and found it satisfactorily gainy! G3XXK in Leicester shares the same opinion and uses one to give Rod a P3 over the 20 mile path. Crossband experiments have been successful too (and useful, G3YQC receiving Rod on 24cm and sending the signals back on 70cm so that Rod could adjust the transmitter!) Both the Jaybeam D15/1296 and the 1260 MHz Tonna aerial have been used, and both seem to perform equally well in TV service.

Elsewhere interest in 24cm TV continues apace. The Northing repeater group had some gear on display at the Brighton rally and supplemented club funds by selling neatly made stacked dipole aerials at an affordable price. I bought one for my setup here and am just about to start constructing the F3YX tx/rx design. I hope to progress to building a PA after that and will report success or otherwise in the next CQ-TV (hopefully!) Other stations who are going the F3YX way are

Roger G3YMK (Biggin Hill), Ian G8CQE (Addiscombe), Nick G4IMO (Southend), John G8UWS (Folkestone) and Jean F2X0 (Boulogne). The chief advantage of this design is that it has been built by some twenty stations already and that PCBs and coil sets are available. The total cost of these is around £30. The rx is complete, while the tx produces around 150mW of F3 on 418MHz. The idea is that you use this to drive a Motorola MMW-710 module to get 15W out and poke this into a varactor tripler. The resulting 8 to 10W on 1255 MHz is then adequate to drive a 2C39 linear or similar. In the interests of European coordination (and to maximise the chances of twoway DX contacts) we have all adopted the French de facto standards, including audio subcarrier on 5.5MHz. Until circumstances alter we shall be simplex on 1255MHz, the normal French frequency.

Up to bonny Scotland to meet Chris Towns G88KE and the TV activity in the Clyde Valley. GM4HC0 and GM3VTB took time off from a recent Raynet exercise on Ben Lomond to televise the event from the summit. Using a colour camera and FM transverter (plus lots of nicad batteries) lasted about 40 minutes with good pictures being received at Chris's qth. A 19 element antenna was used at the summit and a 46 element one at G88KE. Up in Ayrshire GM3KJF has been active from Brown Carrick hill. Chris has been trying /M TV: a Pye Lynx camera attached to the passenger's seat of the car looking forward and a 10W version of the DJ4LB transmitter was used to transmit via a 5/8λ over 5/8λ whip. Real mobile pictures were transmitted to a number of stations in the Glasgow area, with better results than expected. All concerned were delighted and it made a change from the normal 'shack interior' type of transmissions!

First reports indicate the September contest was a great success for the stations who took part: an opening coincided with the event to enliven proceedings. I was only watching this year but I saw plenty of signals flying around. Not wishing to poach VZV territory I shall leave the topic for him to report, though. Beyond that, there's not much more to report except that I hear the MM 70cm to 1296 varactor tripler is now out of production, so if you intend to use one start looking for one now! Until next time 73s, and so there is a next time please continue to send me your reports. The address is 4 Mount Pleasant, Blean Common, Canterbury, Kent, CT2 9EU.

CONVENTION

82

The Clubs' bi-annual convention was held on Sunday the 5th September at the Post House Hotel in Leicester. The convention was very well attended - several hundred members turning out despite the inclement weather.

This year provided somewhat of a milestone in amateur television history in the UK, with the first public showing of a 24cm amateur TV repeater. This was demonstrated by the Leicester group and, although much work is still to be done, the basic machine is working and could be on the air shortly after a licence is granted.

FM television featured significantly for the first time. The Dunstable Downs ATV group had a working 24cm FM system on show which demonstrated the difference between receiving the signals by slope-detecting on an AM set and by using a proper FM demodulator. Another first was the attendance of the widely known Wood & Douglas team. Wood & Douglas introduced, for the first time on the amateur market, a complete range of modules to bring FM-TV within everyone's compass. There is now really no substance to the old argument - "yes but the FM receiver is a problem". The system was demonstrated on-stand using a 3cm microwave link and the pictures displayed were excellent. Also on sale were a fair range of components and kits together with some TV cameras, monitors, lenses etc. Needless to say, business was brisk.

Sirkit Projects were well represented and showed their 70cm ATV transmitter - ready built - delivering 10 Watts of RF. The transmitter was also available in kit form. A new product for this company is a 70cm up-converter which is available in either ready-built or kit form. A particular attraction was the very attractive presence of Sue 8BYKU who graced the stand throughout.

The now well established duo comprising the Fortop camp were showing their wares as usual. The new TWT432 70cm transmitter was on show with an excellent demonstration of the bandwidth limiting filters which are built-in.



The Leicester 24cm ATV repeater
L-R: 8BYKU, 8BYCU, 8BYCS, 8BYCS



Two of the Wood & Douglas team -
GALEE (L) and GORBY (R).

MEMBERS SERVICES

Items from these lists are available to club members only.

This list supercedes all previous ones.

CHEQUES should only be made payable to "The BATC" and should be drawn on English banks only please.

ALL ORDERS TO:- Mr. P. Delaney. 6 East View Close, Wargrave, BERKS RG10 8BJ
England. Tel: 073 522 3121

QTY	TV CAMERA TUBES AND SCAN-COILS	EACH	P&P	GOODS TOTAL
.....	EEV Leddicon	£82:00	nil	.....
.....	½" EMI 9777 Ebitron	£30:00	nil	.....
.....	2/3" EMI 9831 Vidicon - amateur grade	Temporarily discontinued		
.....	1" EMI 9677 Vidicon - amateur grade	£15:50	nil	.....
.....	1" EMI 9728 Vidicon - amateur grade	£15:50	nil	.....
.....	1" EMI 9706 Vidicon - amateur grade (5" type)	£15:50	nil	.....
.....	4½" EMI 9565 Image Orthicon	£10 per2	collect	.....
.....	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" or 2/3", state which)	0:50	0:16	.....
.....	TV camera lens mounts, 'C' type	£1:00	0:24	.....
<u>STATIONERY AND ACCESSORIES</u>				
.....	BATC test card - latest - with instructions,	0:50	0:24
.....	BATC reporting chart (illustrated)	0:12	0:20
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.....	BATC callsign* lapel badge-round-pin fastening	£1:50	nil
.....	* Write callsign CLEARLY. Item sent from supplier			
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.....	BATC equipment stickers, 1" round	0:15	0:16
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TOTAL this page £ :

PUBLICATIONS SHOULD ONLY BE ORDERED FROM THE PUBLICATIONS DEPARTMENT
(see separate list)

QTY	PRINTED CIRCUIT BOARDS	EACH	P&P	GOODS TOTAL
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.....	Wide-band 70cm TV tuner	£3:00	0:30
.....	Amateur television receiver	£1:50	0:30
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.....	Character generator memory	£3:00	0:30
.....	Colour test card (set of 3, double sided)	£15:00	0:60
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.....	TBP28L22 PROM, pre-programmed for colour test card circle. (eqt. 74S471)	£10:00	0:25
.....	TMS4036 memory IC for char. gen. memory board	£5:00	0:25
.....	4.433618 MHz PAL colour sub-carrier crystal*	0:40	nil
.....	Colour TV delay line*	0:60	nil

*surplus, untested.

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.....	SLOW-SCAN TELEVISION. B.A.T.C. by B.J.Arnold. G3RHI (second edition)	0:35	0:16
.....	CQ-TV BACK ISSUES. The following issues are still available although stocks of some are low.(circle) 68,77,82, 88,89,90,91,92..... 93,94,95,96,97,99,100,101,102,103,105,106,107, 108,109,111, 116, 117, 118, 119..... *please estimate appropriate postage	0:25 0:50	* *
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ORDERS please to:- BATC publications, 14 Lilac Avenue, Leicester LE5 1FN.

AUSTRALIA

Would Australian members please note that the 'Amateur Television Handbook' is available directly from the Wireless Institute of Australia at PO box 150, Toorak, Victoria 3142.

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CQ-TV AWARD

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

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

TRANSMITTING AWARD.

For pictures transmitted which have been successfully identified by another station claim 2 points per kilometer; if the contact becomes a successful two-way exchange of pictures then 10 bonus points may be claimed by each station regardless of distance.

Careful logging of transmissions is essential.

RECEIVING AWARD.

For any picture positively identified claim two points per kilometre

POINTS.

Points are claimed as above; however if the contact is on 24cm or above, the points should be doubled.

The award is divided into five grades: for the bronze - 1,000 points, for the silver - 5,000 points, for the gold - 10,000 points and for the diamond - 100,000 points.

CONTACTS.

A station may be worked once only per day for the purpose of this award. It is quite possible for the award to be gained by working the same station many times, but the aim is to promote activity of any sort. Points may only be claimed for contacts made from the first of November 1977.

THE AWARD.

Upon qualification for the bronze award a certificate will be issued together with the bronze seal; the certificate may be up-graded later with silver and gold seals. The diamond award is in the form of a specially made trophy. (If you make that many points you have earned it!).

APPLICATIONS.

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

Applications should be made to the new award manager: Rod Timms G8VBC, 16 Butt Lane, Woodville, Nr. Burton-on-Trent, Staffs. DE11 7EL.

A new 20W linear was also put through its paces and drew much comment. All the other Fortop units were there including the 24cm down-converter and (to a favoured few!) a sneak preview of a prototype 24cm ATV transmitter which should be available soon.

SSTV was much in evidence this year. Grant Dixon demonstrated his excellent home-brew system built around a Triton 8080 based microcomputer. G3CCH and G4EQD demonstrated their superb home-built colour SSTV system (designed by G4EQD). The colour signals were digitally stored and displayed on a domestic TV modified to accept an RGB input. The storage comprises three banks of 16k RAM. On-screen results were spectacular to say the least.

Peter Burnett demonstrated the Robot 400 SSTV system and was selling PC boards and components for this project.

A new feature this year was a constructors competition in which members were invited to enter a piece of home built equipment. The winner for his excellent miniature 70cm ATV transmitter and companion 5W liner was G80ZP from Burton-on-Trent. (These items are now available commercially - see ad. in CQ-TV118). Second prize went to G4EUF for a "handbook" character generator and memory unit, and the third was for a 70cm transmitter based on a Pye PF1 pocketphone module, built by G6ACL. (see this issue).

G80ED demonstrated some very eye-catching colour TV test cards, captions and patterns which he generated using a model "B" BBC microcomputer. The effect was very impressive and shows where the future lies in electronic and abstract picture generation.

On the NBTv (Narrow Band TeleVision) stand was an excellent mechanical 32 line caption scanner made from (among other things) an LP record. The unit, made by Jeremy Jago, worked well on the live demonstration, (see feature elsewhere in this issue). Also on show was a home-built solar cell camera. Doug Pitt and his crew presided over the stand very ably as usual.

Whats left? Oh yes, the BATC stand of course. Well this was up to the usual high standard and put together by our Chairman Mike Crampton, G8DLX. All the Clubs' goodies were there and much advice and help was meted out to all who wanted it, (and probably to some who didn't!), such was the enthusiasm of the happy band in attendance.



Brian Summers' outside broadcast van was in its usual place with great arteries of cable spreading to all points of the compass. Apart from a few inevitable hiccups, the proceedings in the lecture theatre were televised and recorded successfully. The three lectures - 'Repeaters for Amateur Television' by Graham Shirville, 'Vestigial Sideband TV Transmitters' by Paul Marshall and 'FM Television' by Peter Blakemore and the W&D team - were an absolute sellout with standing room only for most of the time.

Is that it? Not a bit of it. We had an honoured guest who came all the way from Montreal in Canada to be at the convention. Bruce Balla VE2QO is very active and comes up with some useful circuits and information which he regularly sends to the Club. It was a great pleasure to welcome Bruce and, who knows, perhaps next time he will bring with him our founder, Mike Barlow.

The convention ended with a bang - literally - as people were drifting away there broke out a particularly nasty thunderstorm. People got soaked, streets became flooded and it was as black as night. Ah well, what do you expect in the middle of an English summer? SUN?

Thanks once again to Trevor Brown G8CJS for an excellent job of organising, and to Derek Wills G3XXK for taking the photographs.



DIGITISING VIDEO part 2

(CONTINUED FROM CQ-TV 118)

by C.Grant Dixon, G8CGK

In the last article I mentioned the grey code and Fig.2 gives circuits which will convert from grey to binary and vice versa. The EXOR gate is one where if one input is held high the other input is inverted and inspection of the tables in Fig.1 shows that A must be inverted when binary B is present, B inverted when binary C is present, and C inverted when D is present - hence the connections to the gates are always on the binary side. The 7486 is a useful device and Fig.3 shows how it is used to produce negative pictures when required.

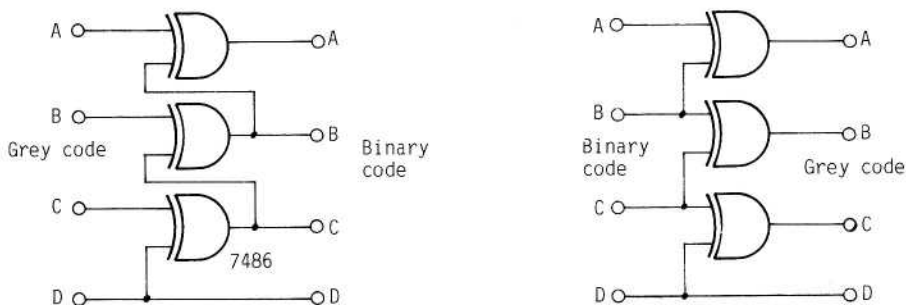
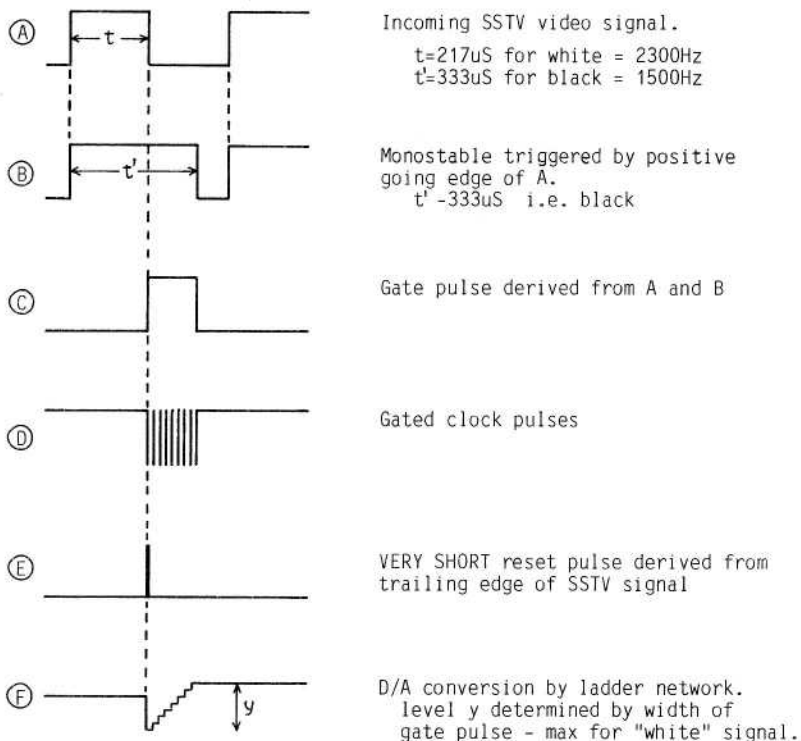


Fig.2

When SSTV is received over the air, or from a tape, it is a sine wave of varying frequency and to digitise this we need to get a digital number corresponding to a given waveform period - this suggests the use of a clock and counter and the circuit of Fig.4 was the result of various attempts to try and get an accurate DC level representing the grey level of each cycle of waveform as it arrived. Associated circuits filter out unwanted frequencies and then square up the sine wave so that it arrives at point A as a TTL square wave. If the picture point is white then the frequency is fairly high and the width of the TTL pulse is short. The leading edge is used to gate the monostable which produces a much longer pulse corresponding to black...^(B) These two pulses are ANDed after the first one has been inverted and the output at ^(C) is a pulse corresponding to a difference in length of the white pulse and black pulse. This is used to gate a clock which is set to give 15 pulses in the gate time - thus we have a count of 15 for white. If the incoming cycle of waveform is somewhat longer, then the difference pulse is shorter and the count will be correspondingly less - say, 7 or 8 for mid grey and, of course, zero for black. In my case I used a count of 6 bits to give 64 levels as I was immediately converting the counter outputs to an analogue signal to drive a 5FP7 CRT. The circuit works equally



NOTE - Each cycle of waveform is represented by the correct DC level.
 With 6 digits we have a maximum of 64 levels.

Fig.5

well with 16 levels (4 bits). The counters have to be reset and this is done by producing a very narrow reset pulse from the trailing edge of the incoming square wave, so the counters are reset just before the counting operation starts all over again. See the waveform diagram (Fig.5) for further clarification. One of the disadvantages of the 4 bit counter is that if the clock frequency is not set accurately, or the original is incorrectly tuned, it may be possible to have more than 15 pulses fed to the counter and on the 16th pulse the counter will reset to zero and apparently generate areas of black in what should be peak white. This can be avoided by detecting the 1111 condition within a 7420 and using the output to stop the clock. This is used in the rather more elaborate circuit devised independently by WØLMD some years ago and which is shown in Fig.6. In setting up this circuit some form of indication is required to show when the video waveform is reaching peak white and black levels; this takes the form of two LEDs, but note that the black level LED is held OFF by the sync pulses so that it doesn't give any spurious black indication during sync time.

DECIMAL	GREY CODE	BINARY CODE
0	0000	0000
1	0001	0001
2	0011	0010
3	0010	0011
4	0110	0100
5	0111	0101
6	0101	0110
7	0100	0111
8	1100	1000
9	1101	1001
10	1111	1010
11	1110	1011
12	1010	1100
13	1011	1101
14	1001	1110
15	1000	1111

Fig.1.

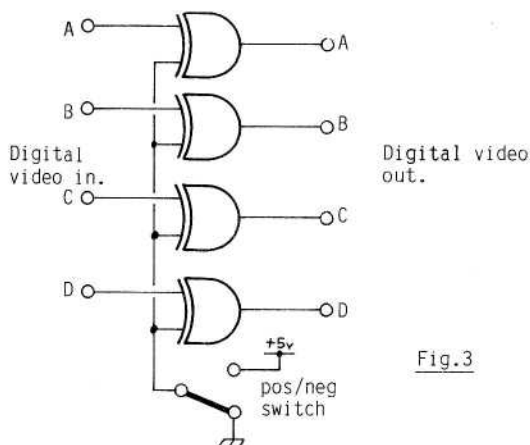


Fig.3

Of course it is quite possible to digitise SSTV by first converting it to an analogue signal and then treating it just as any other video signal. In the scan-converter (slow to fast) designed by JAØBZL and adapted for 50Hz supply etc. by ZL1LH an ingenious use is made of some Toshiba LED driver ICs which are used these days for bar indicators. These ICs may be difficult to get in the UK but it has been reported that the μ AA180 Siemens IC works quite well in the circuit and this is obtainable from Watford Electronics and possibly other suppliers. Fig.7 shows the relevant part of the circuit; potentiometers (W) and (B) serve similar purposes to the previous circuit.

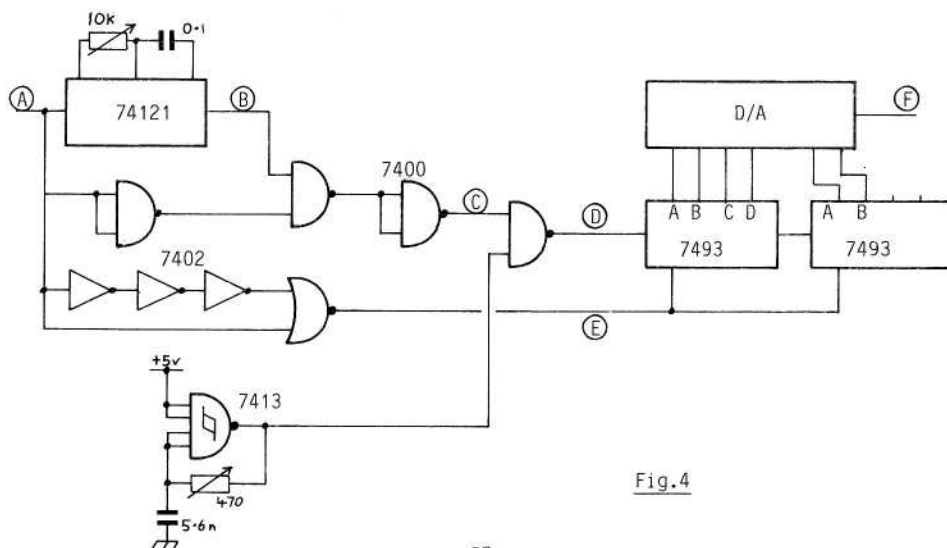


Fig.4

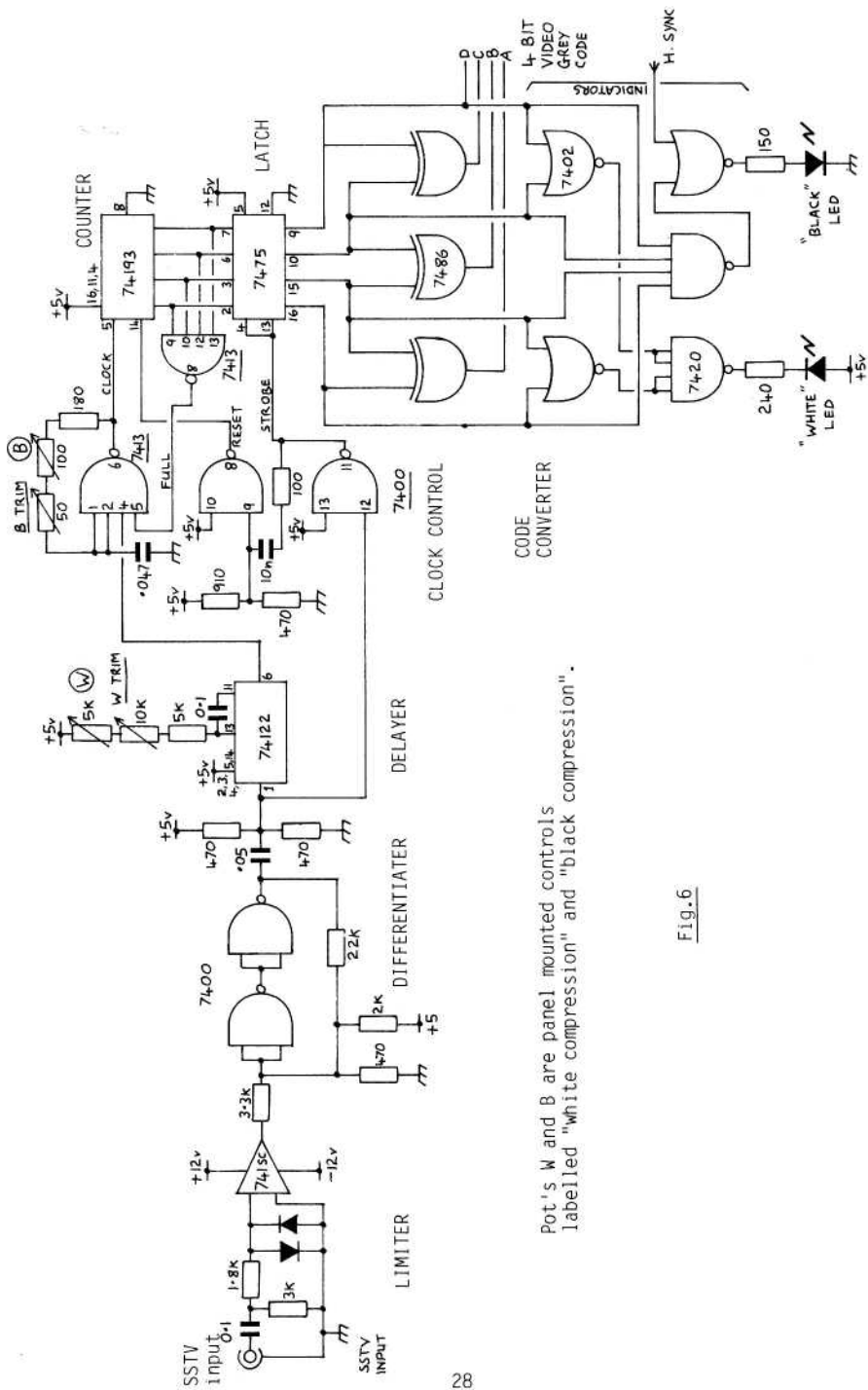


Fig.6
Pot's W and B are panel mounted controls
labelled "white compression" and "black compression".

Finally, whilst on the subject of 4 bit video we must be able to relate this to the 8 bit memory slots of microcomputers. It is usual to pack two picture elements into each 8 bit 'BYTE' but there are obviously two different ways of doing this. Using hexadecimal notation and taking pixels with levels from 0 to F we can store them in bytes as follows:-

METHOD A.

10, 32, 54, 76, 98, BA, DC, FE

METHOD B.

01, 23, 45, 67, 89, AB, CD, EF

Personally I have a preference for method A as when a byte such as 76 is selected the 6 is needed first and is in the right place. It can be read out and then the 7 is moved down to the bits of lower significance giving 07 and it can then be read in its turn. Would those of you who have been using computers for video work please give it a bit of thought and see if we can come to an agreed standard for this detail.

May I draw your attention to Lewis Elmer's article in CQ-TV 93 on the subject of digital video.

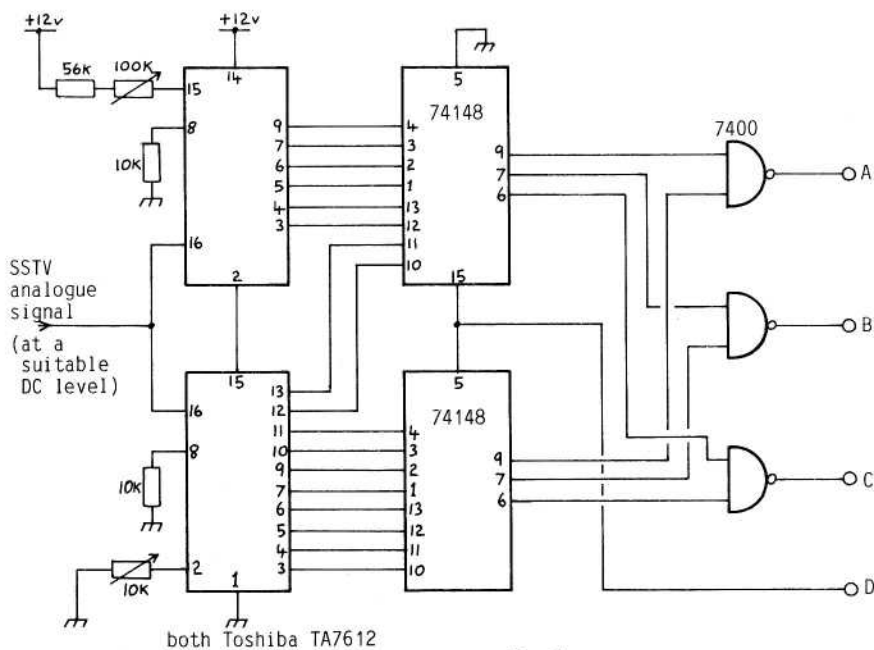


Fig.7

CONTEST NEWS

BATC SUMMER CUMULATIVE RESULTS

An interesting contest that appeared to generate a good level of activity and was enjoyed by all participants.

Congratulations go to Roy Humphreys G6AIW who operated single handed from the South Downs. Also worthy of note are John G8MNY's entry for 10GHZ - the first one we have had - keep them coming and Rod G8VBC's entry for 23cms. On 10GHZ John was using about 15 milliwatts to an 18" dish and slope detecting on receive with a Rigona RX, on 23cms Rod was running about 30 watts of AM using a G3YQC receive converter with a preamp and filter.

The best DX of the contest was achieved by GM4JLY in Aberdeen with a QSO of 692 kilometres. Jim complains bitterly that on non contest days conditions to Holland were superb (9 PA's two way on 13.5.82) however he has asked for publicity for the fact that he is active on TV and will be looking for contacts during openings and contests on 144.75 FM and 432.2 SSB. His nearest local is 250 kms away !

Finally may I thank G410F and G3XXK for their check logs and also publicly announce that I am now aware that Ipswich is in Suffolk (NOT ESSEX) - sorry chaps.

REMINDER - BATC AUTUMN CUMULATIVE on 6/14/22/30 November and 8/16 December, full rules in CQTV 119.

73's Graham Shirville.

POSITION	CALLSIGN	QRA	POWER	ANT	BEST DX	POINTS	QSO's
1	G6AIW/P	ZK09F	30	18P	F3YX - 304K	8933	71
2	G8RZO	AL45F	150	88M	G3DFL - 226K	4184	47
3	G8ZWM/P	ZL80J	25	48M	G8VBC - 208K	4166	52
4	G3UMF	ZL15F	10	46M	G8VBC - 113K	4027	35
5	G8MNY	ZL60A	150	19Y	G8VBC - 185K	3519	60
6	G8DIR	YM27J	150	23Y	G8YEV - 120K	3499	40
7	G3YMK	AL51G	90	23Y	G8CZE - 122K	2702	40
8	G4HMG	ZL38E	10	18P	G3ZMU - 138K	2541	43
9	G3ZNU	SUFFOLK	150	19Y	G6AIW - 170K	2200	27
10	G4CRJ	ZL38B	150	88M	G6AIW - 78K	1979	32
11	G6CZE	AM57J	10	24LOG	G6AIW - 162L	1562	8
12	GM4JLY	YR80A	50	48M	PE1CZG - 692K	1384	1
13	G8MMF	ZL50E	30	18P	G8RZO - 62K	832	22
14	G8UYR	YM40H	10	18P	G8TXG - 56K	752	14
15	G8GLQ	YL48H	150	48M	GW6CNS - 49K	618	19
16	G6CTV	ZL60H	15	18P	G8OVX/A - 40K	522	17
17	G8ZQF	YL38F	3	22Y	G8ZPQ - 46K	338	15
18	G80ZP	ZM12B	12	15Y	G4DVN - 41K	300	17
19	G4LIR	ZM12B	3	24LOG	G8TNE - 5K	28	6

23cms							
1	G8VBC	ZM13E	30	23Y	G4LRT - 55K	2368	10

3cms							
1	G8MNY/P	ZL60D	0.015	18"D	G8MMF/P - 3K	48	1

24 cm A.T.V.

By John L.Wood, G3YQC

In the last CQ-TV there appeared an article describing the construction of a power amplifier for use in the 23/24cm band. As so often happens after publication further thoughts, ideas, suggestions and alterations start to emerge. Here then is a roundup of this information together with a couple of useful items which you will find useful in your 24cm station.

First some observations on the actual construction of the amplifier:

It has been found to be quite difficult to solder all the grid plate securing studs to the plate without some of them dropping off. An alternative method is to solder the studs onto solder tags or into eyelets. These can then be bolted down into position through holes drilled into the grid plate. The holes should be countersunk on the underside.

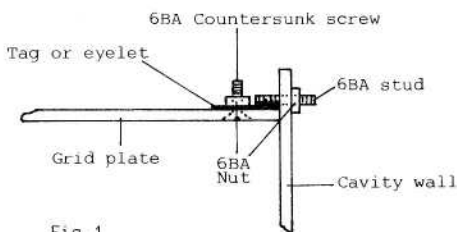


Fig.1

C4 adjusting screw may be made from brass or steel instead of nylon, this makes it sturdier and will enable a drive to be attached so that front panel tuning may be employed.

If the amplifier is to be used for FM, the heater feedthrough capacitors may be increased in value to 1,000pF.

The position of the grid tray has been found to be not too critical since there is a considerable capacity swing with C4. This wide range effectively compensates for variations in actual cavity size. It should be borne in mind however that resonance should not be obtained at either extreme of C4, otherwise re-tuning to a different frequency may not be very easy.

It will be found beneficial to totally enclose the cathode tuned circuit compartment, this is to reduce radiation from L1 and will ensure that most of the drive power goes where you want it - into the valve! A lid may be bent from thin sheet brass, copper or tin. The lid should be a push-fit over the outside of the compartment. A hole should be drilled in the lid to allow access to C3 and several 1/8" holes should also be drilled to allow a reasonable passage of air.

The amplifier can of course be made to triple from 70cm. The only change necessary is to substitute the existing 24cm input tuned circuit for a 70cm one. The valve will of course need to be run in a non-linear mode (class C). Although I have not tried it, if L1 is replaced by a single turn of 1mm diameter wire wound on an 8mm former and the (longish) ends connected between C1 and C2 which remain in their original positions, the circuit should resonate at 70cm. I do feel though that C3 may have to be removed and a direct connection made to the cathode in which case a 220pF tubular ceramic fixed capacitor should be connected between the input socket and the junction of L1/C1. It is also possible that C2 will need reducing to around 3pF if it is found that the original needs setting to minimum capacity.

VARIABLE BIAS SUPPLY

It is useful to be able to vary the output level from a power amplifier such as that described and, provided the amplifier is not being directly modulated (AM) this is quite easy to accomplish. The circuit shown in Fig.2 has a bias range which will control the valve from virtually zero output to the maximum available. If the valve is to be run in a fairly linear manner, with only around say, 20 to 30mA standing current, then a 2N1613 or similar TO-5 can transistor is all that is required. If however the valve is to be run nearer to class C then a larger transistor such as a 2N3054 or 2N3055 will be required. The 1K pot. may be made panel mounting if desired.

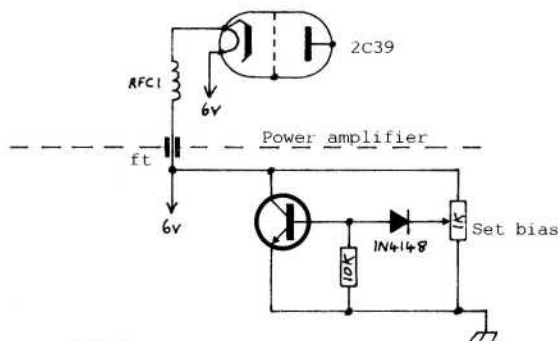


Fig.2

FORWARD POWER INDICATOR

Unlike many lower frequency amateur bands, forward power meters and VSWR bridges are not so readily available for 24cm (they are expensive to), however it is essential when setting-up and operating a power amplifier that a reliable indication of forward power be available. One of the problems soon encountered in using a simple diode probe is the pickup of stray signals as well as those present in the aerial feeder. The easiest way of avoiding this is to insert the probe much further along the coax away from the transmitter although this is not very neat, it is however desirable to house the indicator within the transmitter cabinet.

In "Radio Communication" magazine for January 1976, an article by P.Blair G3LTF and C.Suckling G3WDG described a forward power indicator suitable for insertion at the output of the transmitter. As you can see from Fig.3 the circuit is etched onto a piece of good quality double sided printed circuit board. The dimensions shown should be closely followed otherwise losses caused by mismatching may occur. The insertion loss is quoted at around 0.5dB.

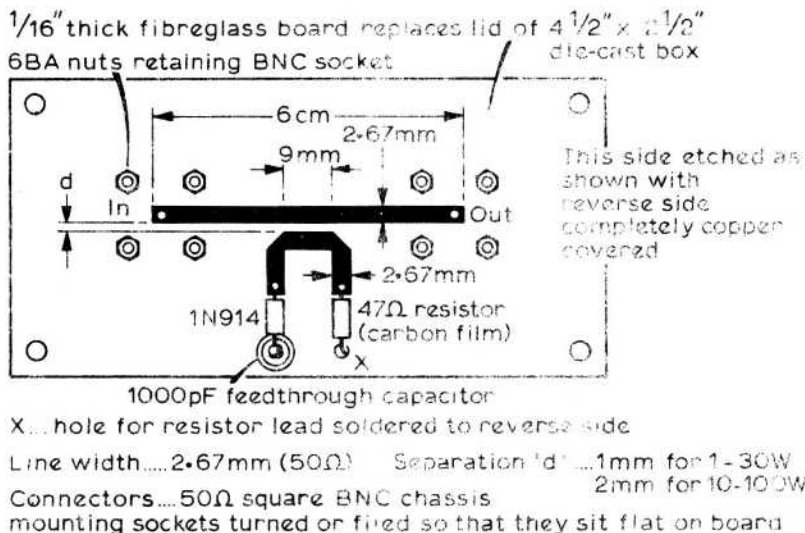
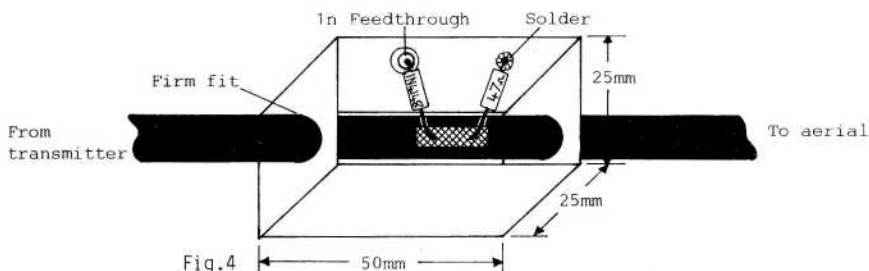


Fig.3

PRINTED CIRCUIT FORWARD POWER INDICATOR

The reverse side of the board is left as plain copper. Square flanged BNC sockets are mounted at the positions shown and the board drilled at the corners so that it will replace the lid of a 4 1/2" x 2 1/2" die-cast box. Alternatively a suitable box may be made from PC board. A meter is connected between the feedthrough capacitor and ground, the sensitivity of which will depend on the amount of power used and the degree of coupling employed. Different output levels may also be achieved by using different diodes. It may be worth experimenting to find one most suitable for your own use. For those who feel, as I do, that there are enough losses in a 24cm system without introducing the risk of more by using two coax connectors and a PC board, I shall describe my own variation on the above system and which is in use in my own 24cm transmitter. Since all that is required is a short loop to pick up a "sniff" of RF from the coax feeder, there is no real need to cut the cable at all. Cut an aperture (about 20mm x 5mm) into the outer covering of the coax at a suitable point, exposing the braid. Using a stout sewing needle thread a thin piece of insulated wire for about 10 to 15mm underneath the braid but not into the inner dielectric.



Make a box about 50 x 25 x 25mm from PC board material and drill a hole in each end suitable for taking the coax cable. Slide the box onto the coax to the position shown in Fig.4. (a small notch may have to be filed into one of the holes to enable the probe wire to be pulled into the box). Connect the diode and resistor as shown and solder a lid onto the box to make it RF tight. The box may be suspended on the coax cable or fixed to a convenient bracket or cabinet panel. Do not forget that this is a DIRECTIONAL coupler therefore forward power will only be observed if the input/output connections are as shown in Figs 3 and 4. The diode may be connected either way round and the meter polarity should be observed accordingly.

INTERDIGITAL BANDPASS FILTER

An almost essential piece of equipment in any ATV station is a good quality bandpass filter. This is needed in the transmitter output to ensure that any signals present, other than the wanted one, will be suppressed. At the receiver input, such a filter will attenuate unwanted signals (it's amazing how much rubbish can be found when using a "wide open" receiver) and will help the overall system noise performance by restricting the receiver bandwidth.

The design shown in Fig.5 is excellent for our purposes and is again taken from "Radio Communication" (Jan 1976). The unit is made from brass which should be accurately machined according to the dimensions shown. Although "N" type connectors are shown in the illustration, it may be easier to use BNC sockets. Square flanged sockets may be mounted as shown or (as I have done) screw threaded types may be used. A better arrangement for connecting the centre pin to the line is to drill and tap the filter side walls to accept the socket, this makes for a neater job and is possibly better electrically.

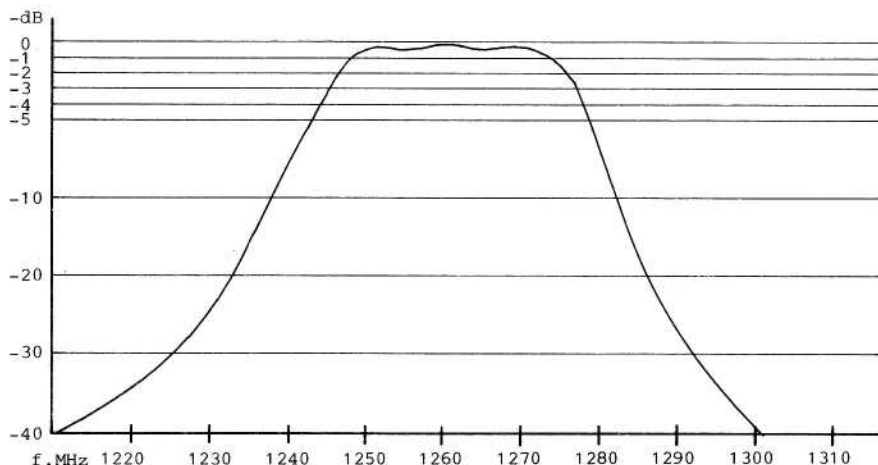
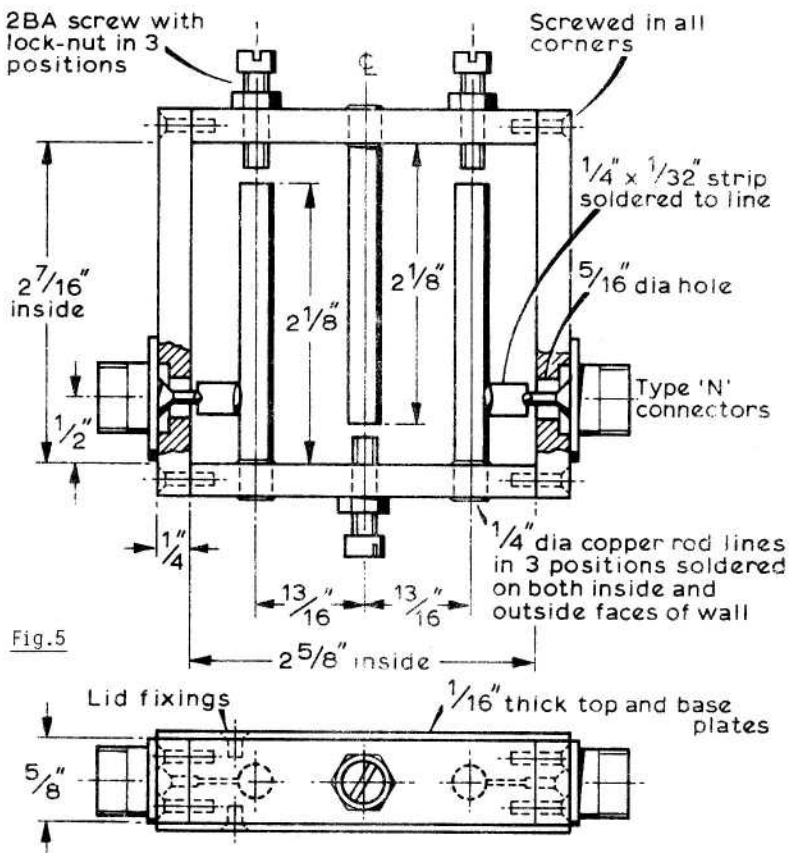


Fig.6

TYPICAL INTERDIGITAL BANDPASS FILTER RESPONSE



The elements are shortened $\frac{1}{4}$ wave lines tuned by capacitors made from 2BA screws. Alignment is best carried out using a sweep generator, but in the absence of one (if the filter is built carefully as described), tuning up can be done using the station 1.4GHz converter and a small signal source or received amateur signal. With the source some distance away and the filter connected in the aerial feed to the converter, each resonator is simply peaked in turn. This procedure should be repeated twice. Final adjustment should be made with the filter "isolated" between two pieces of thin coaxial cable approximately 20-50ft long which act as buffer attenuators. If adjustments at, say, two other places in the band can be made, then the filter should be tuned there also to achieve a better (and wider) bandpass response.

The insertion loss is small (typically less than 0.5dB) and so virtually no loss of output power should be observed when the filter is put directly in the output of the transmitter. The typical response from a correctly aligned filter is shown in Fig. 6. This is in fact an illustration of the performance of my own filter but two other units which I have also tested proved to be virtually identical in performance. The filter may be aligned to cover any segment between about 1240 and 1320MHz.

My thanks to the Editor of "Radio Communication" for permission to use material from that magazine.

32 LINE SCANNER

by Jeremy Jago.

The Narrow Band Television Association had a stand at the BATC convention on which were displayed and demonstrated several items of equipment for this interesting mode. Of particular note was an ingenious caption generator which could be termed "NBTVs answer to the Monoscope!".

The generator contains a 12 inch L.P. record driven at 750rpm. The signal is picked up optically from slots cut around the edge by two phototransistors (video and sync). The scanning standard is the ordinary NBTV Association one; (32 lines vertical scan, 12.5f.p.s. non-interlaced, sync blacker than black..

The original picture was drawn on graph paper and photographically reduced onto bromide paper. This was cut into lines and glued to the edge of the disc and used as a cutting stencil.

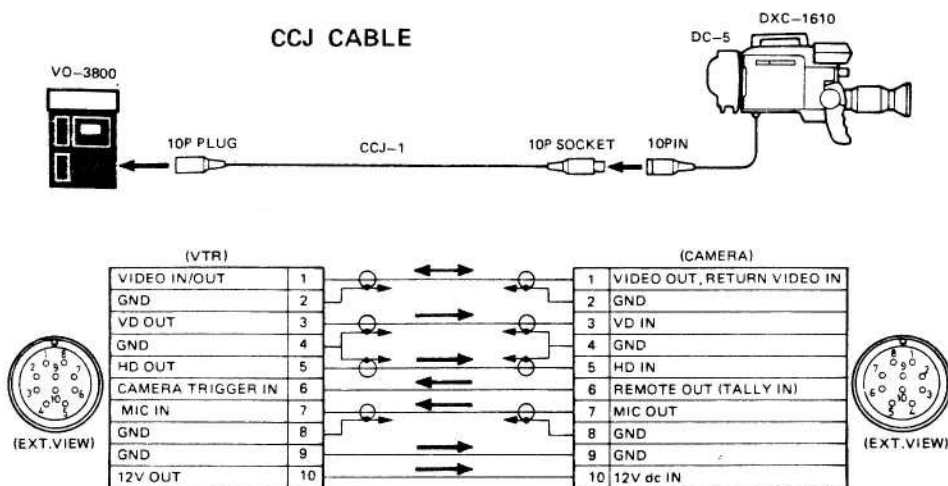
The photo shows Jeremy with his scanner. The receiver is on the right and uses a VCR517 display tube. The whole unit fits neatly into a wooden box with a protective hinged lid.

The inset photograph shows the finished caption as it appears on the monitor screen.

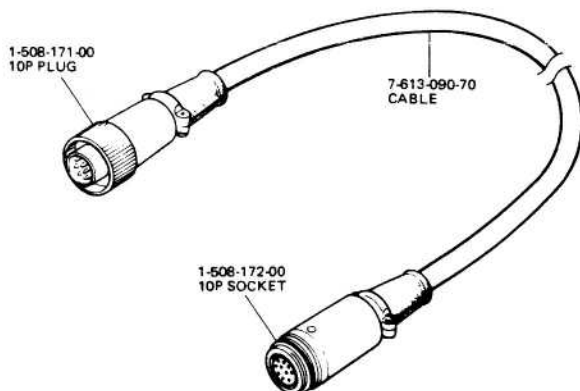


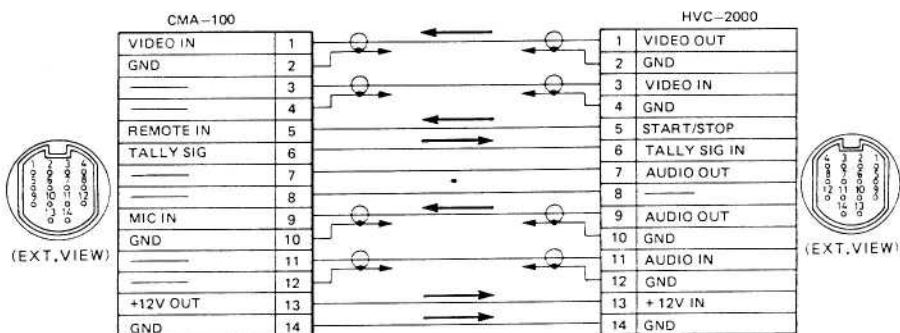
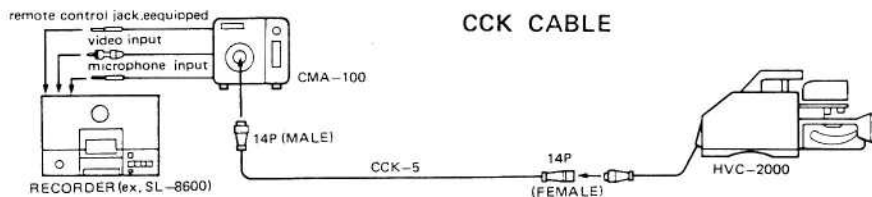
PLUGS AND SOCKETS

Following the article on plugs and sockets for video cameras and recorders, which appeared in the last issue. Mr. D.Reed from the Technical Information Department of Sony (UK) Limited has sent the following information which he feels may be of interest to readers. The parts mentioned are available from the following address: Sony (U.K.) Ltd., Spares Division, 219 Bath Road, Slough, Berks. Please telephone to confirm the price and postage on; Slough 70233.



SPARE PARTS





SPARE PARTS

1-560-110-00
14P CONNECTOR(MALE)

7-613-091-10
MULTIPLE
10-CORE CABLE

1-560-134-00
14P CONNECTOR(FEMALE)

1-560-109-00
MALE CONTACT(L)*
1-560-108-00
MALE CONTACT(M)*

1-561-256-00
FEMALE CONTACT(L)*
1-561-257-00
FEMALE CONTACT(M)*

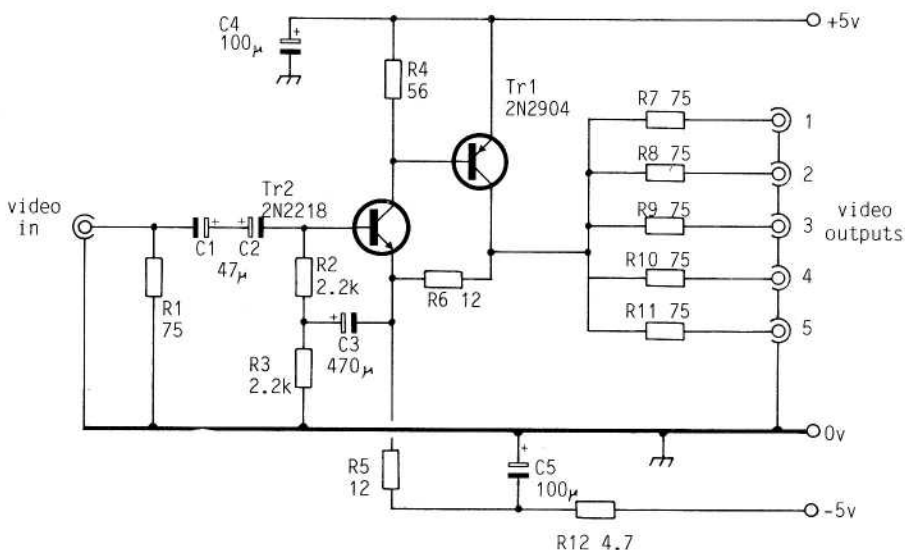
NOTE : * MARK
(L) - AWG #24 ~ #20
(M) - AWG #28 ~ #24

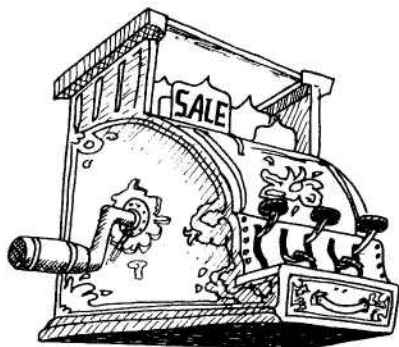
DISTRIBUTION AMPLIFIER

This video distribution amplifier is designed to supply at least five separate vision sources at the standard level of 1v p-p across 75 Ohms from a single input. The amplifier is suitable for the distribution of both colour and monochrome signals and has a bandwidth extending to over 8MHz and will not introduce any significant distortion to a standard TV signal. Since supplies of only 5 volts are used the unit is suitable for incorporating into TTL based equipment.

CIRCUIT DESCRIPTION

The transistors Tr1 and 2 are connected as a feedback amplifier with a gain of 2, determined by the components R5 and 6. C3 and R3 are incorporated to increase the input impedance of the transistor pair, the input impedance is therefore determined by R1. Since the impedance at Tr1 collector is low, the resistors R7 to 11 ensure the correct output impedance. The gain from input to any output is unity when the output is correctly terminated in 75 Ohms.





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PYE LYNX camera, less lens, with manual £40. IKEGAMI camera TK204VD, less lens, with manual £35. MARCONI BD871 industrial camera channel, with manuals, camera type 4339A, less lens, CCU, all cables etc £20 the lot. SPARE CCU for above £8. MARCONI industrial SPG type V3610A, 405/525/625, with manual £25.

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All the above have brief descriptions only, for further details on any of the equipment together with those of lots more not listed, please phone 0723 85252 L.O'Loughlin G8AXC, 49 Station Road, Snainton, Scarborough, N.Yorkshire YO13 9AP.

MOTOROLA MHW-710 power module (70cm) mounted on heatsink, used but OK. £10.
Alan G4GFD 234 Chaddock Lane, Boothstown, Worsley, Manchester, 061 799 0519.

PYE LYNX automatic camera c/w motorised lens £30. PYE 12" solid state monitor 19" rack mounting, £20. L.Elliott, 4 Rowan Drive, Cheadle Hulme, Cheshire, SK8 7DX. Tel: 061 485 2270.

SONY AV3650 less head. This had edit and external sync. Would break for spares. £25. VCR517B CRT c/w base, free to SSTV user. WANTED, grade 2 monitor for 12v and mains, comp. and line/frame inputs. PLEASE ENQUIRE for 1/4" Akai spares and tapes (letters only). J.R.Gomer G8UNZ, 55 Hythe Hill, Colchester, Essex. Tel: (day) 74427 ext 10.

SONY CV2100ACE 1/2" VTR, excellent condition, c/w manual and 7 tapes. £70 + car. 1" VIDICON yoke on focusing slide in small case (AE1) £3 + £1.90p Post. 1" VIDICON yoke (Fernseh) £1.50 + £1.20p Post. USED vidicons (1") £2 each inc. Post. Trevor Lumb, 14 Linton Gardens, Bury St. Edmunds, Suffolk. Tel: 0284 4318.

NORMENDE telecine for super 8 colour film, can be adapted to standard 8, £600. PHILIPS VCRs: 1500 sound £75, not working £50; 1502 sound order £90, not working £65; 1700 not working £90. Non working machines mostly have noisy heads, otherwise fine. PHILIPS VCR cassettes: VC-30 used £4, new £6; VC-45 new £8. HITACHI 1/2" colour cartridge tape VCRs, working with tapes £65. LENSES C-mount focussing but no iris £10. GOOD QUALITY wide angle and telephoto £30. Carriage extra or can be collected from South London. Andy Emmerson G8PTH. 4 Mount Pleasant, Blean Common, Canterbury, Kent. CT2 9EU. Tel: Blean 0227 77 471.

TEKTRONIX 585A oscilloscope, 82 dual trace unit, trolley, manuals, recently overhauled and calibrated. £175. AMPEX 7003 1" VTR (2 off) £60. ea. 1" VIDEOTAPE for above, £6 per reel. 1/2" VIDEOTAPE for Sony CV2100 etc, £4 per reel. EVR players. These are basically a specialised flying spot telecine and make good slide scanner conversions. Should be in fair working order. £25 each (5 off). MARCONI vision switching matrix. 8x1 relay type. Working £8. VEL SYSTEM 70 equipment. Large quantity of mixer and SPG modules and racking. Should be enough for a monochrome SPG and mixer. £20 the lot. BBC 3 output VDAs AM4/511 and AM4/512. All overhauled and set up. (20 off). BBC 4 output PDAs AM4/506A (6 off) £5. each inc mating connector. BBC microphone amplifiers. AM9/5, working (6off) £5 each inc. mating connector. BBC PAL decoders GE1/528, (3 off) £10 each. BBC modules and racking, various to clear, prices very negotiable. PYE INTERCOM/internal phone units. Approx 10 off. £8 the lot. 100 off each jack plugs and sockets. 2 pole 1/2". all either unused or VGC 10p each or £1. per dozen. ALL EQUIPMENT "as seen" unless otherwise stated. Most prices open to negotiation. Circuits and manuals available for most equipment. Ian Mitchell. 344 Liverpool Road, London N1. Tel: 01 607 2922.

COMPLETE MONOCHROME STUDIO for sale. Contents include 2 Hitachi FP-211 cameras on Vinten tripods and dollies, superb Varotal 6:1 lenses with remote control of zoom, focus, aperture etc. 5" viewfinders fitted. Complete with tally lights, CCU and cabling. Hitachi SPG and effects generator, 2 VDAs, 3 Sony 19" monitors, 1 Philips 5" monitor, 3 Sony CV2100 VTRs with loads of tapes. Philips rostrum camera with light box and zoom lens for caption cards or transparencies. Ten channel audio mixer, talkback mikes and headsets. Pulse shapers and telecine screen. All in good condition, can be inspected in South London area. Ideal for school, college or club. Price £1950 or offers for parts. No silly offers please. Andy Emmerson G8PTH Tel: 0227 77 471.

MHW-710 10W power modules. 100mW in, at least 10W out on 70cm. £84.50p +VAT from Motorola distributors (yes, you read that right), also available by airmail direct from the USA to your doorstep for £38 plus possible VAT/duty. Which would you rather pay? Orders accepted at either price by G8PTH. Blean Video Systems, 4 Mount Pleasant, Blean Common, Canterbury, Kent CT2 9EU.

G8GQS SALES LIST

PHILIPS colour camera 3 x 1" Plumbicon, shoulder mount, broadcast quality, with control gear. Needs working on - please phone for details.

EMI 203 image orthicon camera, viewfinder, CCU, PSU etc. £50.

MARCONI Mk 7 4-tube colour camera - please phone for details.

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CQ-TV PROJECT 100 SPG, working, £30.

B.Summers, G8GQS. 4a Knaith Hill, Knaith, Gainsborough, Lincs DN21 5PF

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3 PYE Mark V monochrome image orthicon studio camera channels complete with a full set of manuals, spare tubes and boards, and over 400 feet of cable in various lengths. Two of the cameras are equipped with zoom lenses (Evershed and Angenieux), the third with many different turret mounted lenses. All cameras working and until recently formed part of a complete black and white studio. Price: £500 the lot (O.N.O.) Offers considered for individual channels. Contact: Nick Howells, (Producer) G.T.V. The Union, Edgbaston Park Road, Birmingham B15 2TU. Tel: 021 472 1841 Ext. 33.

2 PHILIPS 1500 VCRs, working, plus large quantity of tapes. SHIBADEN SV700, working. c/w four machines for spares.

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G.Smart, Salford University. Tel: 061 736 5843 Ext. 7256

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Andy Emmerson, G8PTH. 4 Mount Pleasant, Blean Common, Canterbury, Kent.

CT2 9EU. Tel: 0227 77 471.

MARCONI camera channel type BD871, complete with CCU, cables, tube, lens and manual/circuits. £35 - buyer collects or pays carriage.

G3ZVC SSB module, with QC1246 filter, circuits and controls, boxed. Cost £80 asking £50. DJ5HD SYNTHESIS VFO, with crystals for 135MHz opt. (matching

'ZVC for 2m). Boxed, with circuits etc. (VHF Comm 3, ed1) cost £36 asking £20.

QM70 PA linear to give 2W output when driven by 'ZVC on 2m - c/w matching band-pass filter. Cost £43 asking £25. No reasonable offer refused on any of the

above. Peter Delaney G8KZG. 6 East View Close, Wargrave, Berkshire RG10 8BJ. Tel: Wargrave 3121.

PLUMBICON CAMERA TUBES. BATC members services still have available some ex-broadcast 30mm Plumbicon tubes. Available to members only.

Please phone Peter Delaney for details. Tel: Wargrave 3121.

WANTED

CRT and mains power supply for a Rigonda M portable. Complete but not working set considered. Also service sheets for same to copy or buy. Details during weekends only please. J.Blackburn, 11 Ravensworth Grove, Hartburn, Stockton on Tees. Tel: 0642 581035.

HANDBOOKS/MANUALS required to borrow for the following:- Solartron CRO type CD1016, EMI monitor MkVI type TPM6/14A, EMI camera and CCU MkVI. All expenses paid. D.Dunn G8KOV, Wayside Lodge, 8 Dursley Road, Dursley, Glos. GL11 6PE. Tel: Dursley 46971

DECENT SSTV MONITOR wanted, Robot, Venus etc. Eddystone 770U Receiver (inspect/collect) Microwave Modules receive converters for 4,6 meters, ATV and 136MHz, 10 metre if. G.Wilson, 65a Gypsy Lane, Nunthorpe, Middlesborough, Cleveland, TS7 0DR. Tel: 0642 318451.

INFORMATION or circuit diagrams for Philips TV camera Mod. LDH0050. A.Thompson, 3 Rufford Road, Sawley, Long Eaton, Nottingham. NG10 3FP.

PORTABLE or 12v car-portable VTR. Prefer $\frac{1}{2}$ " Sony compatible. Need not be colour. U-Matic OK, please no ultra slow linear speed modern VHS/Sony. J.Gomer, G8UNZ, 55 Hythe Hill, Colchester, Essex.

INSTRUCTION and service manual for Shibaden SV700ED VTR to borrow for photo-copying. All expenses paid. Will consider buying manual if price is right. C.Maxwell G8MKT. 24 Jensen, Tamworth, Staffs. B77 2RH. Tel: 0827 53946.

EARLY CQ-TV MAGAZINES wanted by the Editor for personal collection and research work for the BATC. Issues required: No. 31,56,57,58,59,60,61,62,63. Most important that I obtain these. Your price paid. John L.Wood, G3YQC. 47 Crick Road, Hillmorton, Rugby CV21 4DU. Tel: 0788 846220. (evenings w/e.

EMI 2001 bits for camera (please phone). Claud Lyons AVR TS3-S448, G101 camera cable. 1" tape on NAB spools. B.Summers, G8GQS. 4a Knaith Hill, Knaith, Gainsborough, Lincs DN21 5PF. Tel: Gainsborough 0427 3940.

EXCHANGE - a 24" video monitor in clean condition and in perfect working order for a monochrome video camera - any make considered. A Wilkes G4NTV, 34 Tideswell Road, Great Barr, Birmingham B42 2DT. Tel: 021 525 5445 (office hours only).

18element Parabeam (or similar) and rotator for 70cm ATV. Would part-exchange for some of the equipment in my "for sale" ad. Peter Delaney G8KZG. 6 East View Close, Wargrave, Berkshire RG10 8BJ. Tel: Wargrave 3121.



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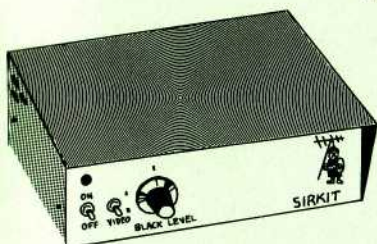


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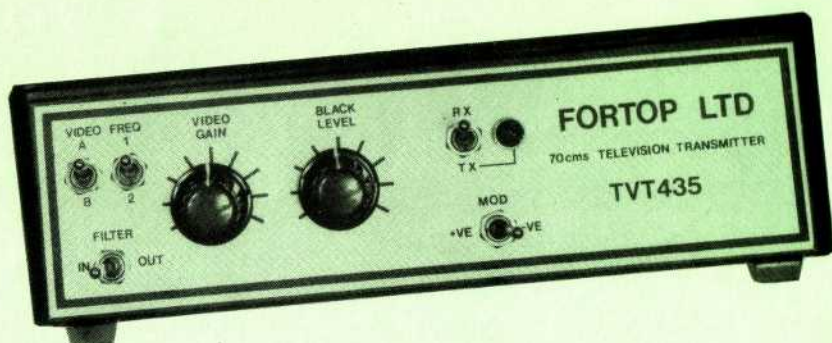
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