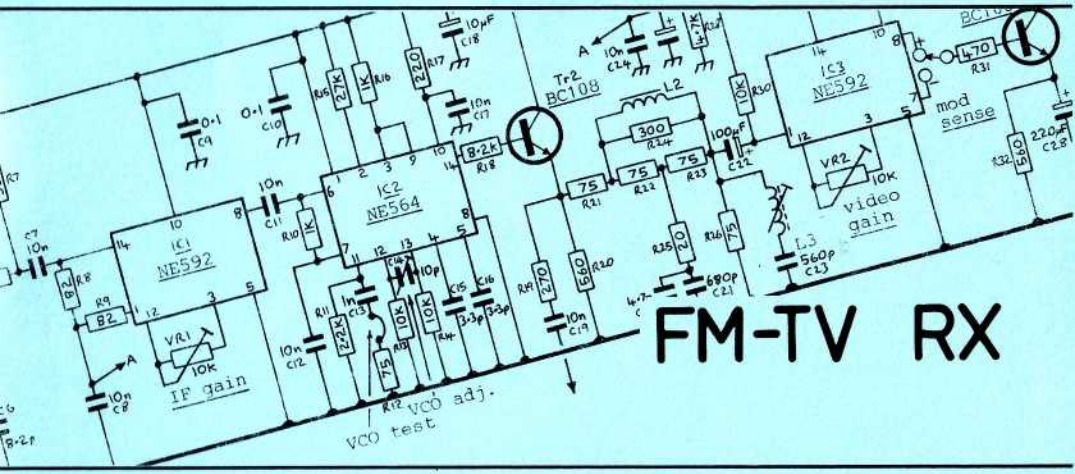
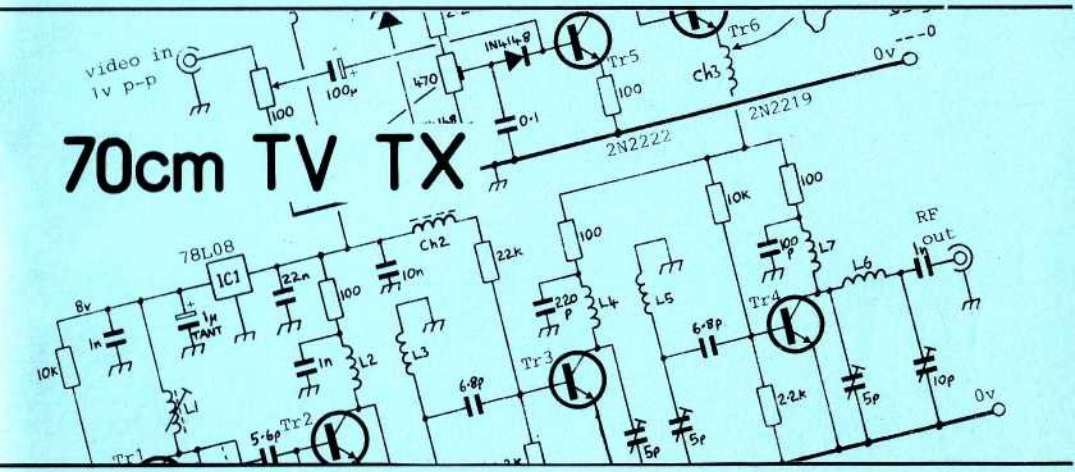
CQ-TV MAGAZINE No. 122

BRITISH AMATEUR TELEVISION CLUB

MAY 1983



TWO NEW PROJECTS



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Membership Enquiries and applications	B.Summers. 13 Church Street, Gainsborough, Lincs. Tel: 0427 3940
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PLEASE NOTE: If, when writing to a committee member, a reply is required, please enclose a stamped addressed envelope or, in the case of an overseas member, an International Reply Coupon.

MEMBERSHIP

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

CONTENTS

CLOSE FOR PRESS DATE FOR THE MAY ISSUE.....20th June 1983

EDITORS POSTBAG

Dear Ed,

Being in receipt of issue No.121 of CQ-TV, I was both delighted by the article by John Goode on the colour caption keyer, and the simple TVI filter, but also a little disappointed by the A5 re-prints.

I have just 'blown up' my neighbour's telly last week whilst beaming 60 Watts of TV into my Jaybeam 88-element to the North which is right at their aerial. Well, I knew I caused them some interference while the linear was on, so the filter may well be the answer.

But mainly I was concerned by your appeal for copy, as an avid reader of A5 (not nearly as good as CQ-TV) I don't really want to see reproductions of it, though I suppose I would do the same if I were in your shoes. (Case of having to I'm afraid, unless members send me sufficient original material of course - Ed).

So I racked the old brainbox and enclose an article which I hope you can use. I also have two other projects on the stocks at the moment, one being a development of the Blue Handbook ATV RX, the other a colour bar RGB generator specifically for GW8PBX coder tweaking. If they bear fruit I'll send on the details.

Norrie Macdonald GM4BVU

Dear Ed,

I have recently moved QTH and would be glad if you would print the following message:

To the many who visited Cornwall and the shack of G3LPB, he would like to mention that the new QTH is: 45 Marlborough Avenue, Falmouth, TR11 4HS where a new shack will be put into service. The first to be attacked is the garden - used for making Tarzan films!

John Brown G3LPB

Dear Ed,

I have a Shibaden SV610K VTR which has recently stopped working. I have tried to get it repaired but am told that parts for it are no longer available.

As I have tapes of ATV contacts going back about seven years, I am anxious to get it going again.

Can any of your readers help me with repairs or enable me to copy my tapes onto VHS?

G.Shipton G4CRJ
55 Rupert Avenue,
High Wycombe,
BUCKS.

Dear Ed,

I have a ZX81 (16k) and a Spectrum (4.8k) computer and I would like to see more reference to computers in CQ-TV.

As an SWL I would be especially pleased to see an article about programms and interfaces for receiving and processing SSTV pictures using a computer. Listening-in to QSOs on 2metres suggests that it can be done but I have never managed to find out how. In fact I am rather dissatisfied by coverage (or the lack of it) in the amateur press generally. The information seems rather old-fashioned and out of date*.

I must confess that I am not one of the clever types that has anything to contribute, I therefore need to use other people's designs to start with.
E.D.M.Horton.

*I refuse to be drawn again!!
Computer and SSTV buffs please note.
Ed

Dear Ed

Could you please let it be known through CQ-TV that I would be interested in QSOs or correspondence on SSTV using the Apple II Plus micro-computer.

I have the Chris Calfo disc for

RTTY/CW/SSTV and would give copies to anyone interested in exchange ideas.

I have a spacemark monitor that has given excellent service for about ten years and I actually use the 1200Hz sync pulse to drive the Apple games port to copy RTTY.

Interest in SSTV in Bahrain is on the increase with A92CX having a Pet micro and A92NH having an Atari, A92P a Sharp and A92Z about to purchase?

Sheridon Street A92BE/G3VFU
Box 26803,
Manama,
Bahrain,
Arabian Gulf.

Dear Ed,

I feel obliged to thank Grant Dixon G8CGK, through CQ-TV magazine, for the help he offered me with SSTV. I am very proud to say that with this help the first SSTV transmissions have started from Cyprus.

Taking this opportunity I would also like to thank Peter Delaney G8KZG (Members Services) for the help he offered me on my new projects.

Nicos Hadjimiltis 5B4CV

Dear Ed,

Just by listening on 144.75MHz it is quite apparent that there are many ATVers experimenting with various systems for 24cm and 70cm ATV, further observations reveal a fair amount of DX also being worked. Why then are all these things not reported in CQ-TV magazine? To answer my own question, the reason is that members WILL NOT sit down and write about it, this lethargy will certainly be reflected in the magazine if the quality is forced to fall. Come on Guys, tell the mag. all about it and put us all in the picture (pun intended!).

Rod Timms G8VBC

Dear Ed,

I wholeheartedly agree with Mr.Webb's letter in the last issue and would like to express my own views on the subject.

I have noticed on several occasions ATV transmissions in excess of two-hours duration. This is very anti-social and selfish. I would think that 15 to 20minutes is ample to send pictures. Remember there is only room for one 70cm TV channel at any one time in a particular area. Another point is that colour should only be transmitted if the receive station is taking a sufficiently strong signal, this helps to keep the bandwidth to a minimum since there may be SSB stations in your locality who can be interfered with by a strong video transmission (see filter in this issue - Ed).

Perhaps the BATC could publish details on basic theory and operating practices associated with ATV, (the new 'TV For Amateurs' booklet contains much of this information and advice - Ed).

R.Platts G8OZP

NEWS ROUNDUP

BATC VHS VIDEO TAPE - LOST

Owing to problems with the postal service it is thought that one of our members has received the Clubs loan copy of the BATC ATV programme on the VHS format. Would the member concerned kindly return the tape to Trevor Brown (address inside front cover) when the postage cost will be refunded.

EDITORS NEW PHONE NUMBER

Please note that I have a new 'phone number. It is: RUGBY (0788) 69447

COLOUR CAPTION KEYER

A small error crept into last issues Colour Caption Keyer circuit.
The transistor driving the 'Colour Range' and RGB ports is an N-P-N device and not P-N-P as shown.

Sorry!

9th Annual NBTV Convention, Nottingham.

Sat. 14 May 1983

Another annual meeting of the N.B.T.V.A. is scheduled for Saturday the 14th of May at the Trent Polytechnic in Clifton, near Nottingham. The venue is easily reached from junction 24 of the M1 motorway; follow the A453 towards Nottingham and you will reach the college on your left, just after a 'Clifton Village' road sign. The LAST of the three entrances (nearest to Nottingham) is the best one to use to reach the old science block where the Physics Lab is the one to look for.

Doors open 10am. Literature and various goodies are on sale at the exhibition.

MEMBERS SERVICES

Members ordering from the above department are asked to use only the LATEST price list and order form. Some members have been sending orders on forms more than a year out of date! As a consequence - since some items are now discontinued and others have price changes - these orders are being held up or unfullfilled.

2/3" VIDICON TUBES

Amateur grade tubes are sometimes available in small quantities only and, without any promise of delivery date. At the time of writing, the waiting period for outstanding orders is over a year! Therefore we cannot accept further orders until these are filled.

Educational grade tubes are available, at a price!. Any further information may be obtained from Members Services by phone (evenings/weekends) or by letter enclosing a stamped addressed envelope.

A TV RECEIVER

Regarding the article on a TV receiver in CQ-TV121, the IF strip mentioned is available from Sendz Components, D.Whitworth, 63 Bishopsteignton, Shoeburyness, Essex SS3 8AF. According to the April issue of 'Television' magazine they are priced at £3. each plus VAT and 50p postage. This is also a very good source for varicap TV tuners of all types plus lots of TV spares, all at affordable prices.

HANDBOOK 1 REPRINTED AGAIN

Volume one of the popular 'Amateur Television Handbook' has just been re-printed for the third time. Sales at present top 3,500 copies and, leaving only 500 in stock and the rally season only just under way, we may have to print again before long.
Where are they all going?

CQ-TV ON COMPUTER

At long last the Editor has installed a complete word processor system to assist in the preparation of CQ-TV magazine.

The equipment consists of a BBC

model B computer with a 5.25" floppy disc drive. The firmware is the 'Wordwise' WP system which is resident in ROM within the bowels of the machine. Printing is done on an Olympia ES100 daisy wheel printer.

The system has only just been installed therefore only a small part of this issue has been prepared using it. However it is hoped that future issues will at least look better even if it doesn't correct the spelling and grammatical errors!

Anyone preparing an article using a similar system is invited to send it to me-all made up- on disc. (How lazy can you get?)

CQ-TV COPY AGAIN

Whilst speaking about CQ-TV I am rather disappointed with the reaction to my last plea for material. A look through this issue will tell you who has put the bulk of the articles together. Obviously this can't go on and if copy is not received more regularly the magazine will suffer. Come on chaps,there's 1600 of you out there, some of you must have something to contribute, it's easy to leave it to others.

COMPONENTS FROM FORTOP

Did you know that Fortop Ltd (see ad on back page) are able to supply devices for ATV constructors?

A sales list is being prepared but as an example thay can supply such items as BFR91, BFR96, BFR34A, BFY90, 3N204 MOSfets, and power transistors for 70 and 1.3GHz. Fortop should also be able to supply NE592 and NE564 ICs for the FM-TV receiver in this issue.

Please send an SAE with all enquiries.

AWARD NEWS

Three awards have been issued recently to G8VBA (bronze), G8AKF (bronze receiving) and G8XPZ (bronze/silver).

It is interesting to note that G8AKF achieved his by receiving just two ON stations and G8XPZ gained a bronze award by working two French stations. Just shows how easy it is!

All future applications for the Diamond award will receive an enscribed cup or plaque and a certificate.

The BATC award scheme is being expanded and details will appear in the next issue.Please don't forget to send return postage with award applications, two 12.5p stamps is about right.

The award manager is Rod Timms G8VBC, 16 Butt Lane, Woodville, Nr.Burton-on-Trent, Staffs DE11 7EL.

EAST SUFFOLK WIRELESS REVIVAL 1983

This popular annual mobile rally for radio amateurs will take place on the Bank Holiday Sunday, 29th May 1983 at the Civil Service Sportsground, The 'Hollies', Straight Road, Ipswich (between Bucklesham Road and Felixtow Road (A45) and adjacent to the Suffolk Show Ground).

The rally will open at 10.00am and will be similar to previous events except that the 'Bring and Buy' will be replaced by a 'Fleamarket' and 'Car Boot Sale'. The Transceiver clinic and aerial testing range will be featured as usual in addition to the traders and stands and displays for the rest of the family.

This event, set in the heart of 'Constable' country and the East Anglian touring region including the new and spectacular Orwell Bridge, makes a happy day out for the whole family.

All enquiries to J. Tootill, G4IFF, 76 Fircroft Road, Ipswich, IP1 6PX (0473 44047).

AN FM-TV RECEIVER

By J.Wood G3YQC

There is no doubt that frequency modulation is by far the most widely used ATV mode at present in use in the 1.3GHz band. This is probably due to the realisation of the not un-considerable advantages that this mode offers over amplitude modulation. Another leading factor is that all of the proposed ATV repeaters cater for FM-TV.

When presented with the choice between AM or FM the first, and most common, reaction is "....but FM is so difficult to receive as it requires a special demodulator for correct reception". True, it does need a special demodulator but it need not be very complicated or expensive to build and - in this design - needs almost no test equipment to align.

There are various ways of incorporating an FM-TV receiver in the shack and these will be discussed later on.

SYSTEM REQUIREMENTS

1. An FM-TV receive system needs to have sufficient bandwidth to enable the whole of the signal to be demodulated. If the receiver bandwidth is narrower than the signal deviation, video or syncs will be lost, conversly, if the receiver bandwidth is too wide the demodulator will not produce a full amplitude video signal at its output.

2. Front-end gain should be sufficient - when used in conjunction with a domestic varicap TV tuner - to cause limiting in the PLL (IC2) at around the noise threshold, this will ensure that even a weak signal will be correctly received.

3. The system should have a low impedance input and be capable of being driven from a varicap or similar TV tuner.

4. The system should deliver a standard 1 volt peak-to-peak composite video output suitable for feeding a monitor or an RF modulator.

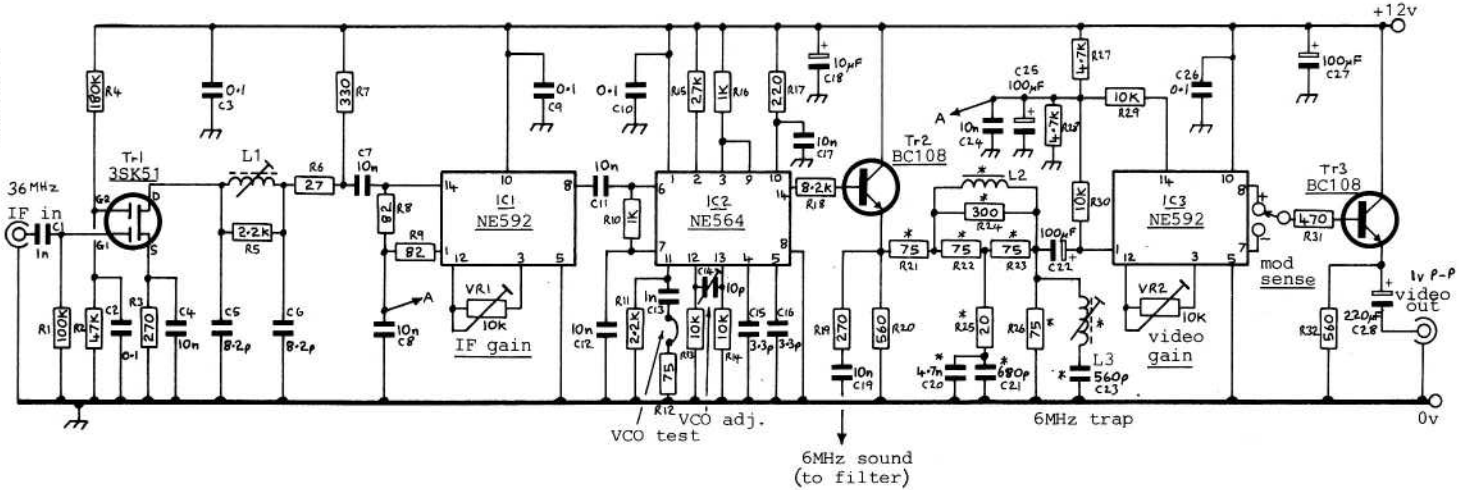
5. Variable front-end gain should be provided to cater for different input levels.

6. CCIR standard de-emphasis should be available as an option.

7. Provision should be made to extract an inter-carrier sound signal.

8. The unit should be powered from a single 12 volt d.c. source (excepting any tuning voltage requirements) to enable portable operation.

9. The whole should be accommodated on a single printed circuit board.



L1 - Toko TKXCA34732 CN (36MHz)

L2 - 33uH fixed choke 144LY-330

L3 - Toko MKANSK1731 HM (6MHz)

Ambit International

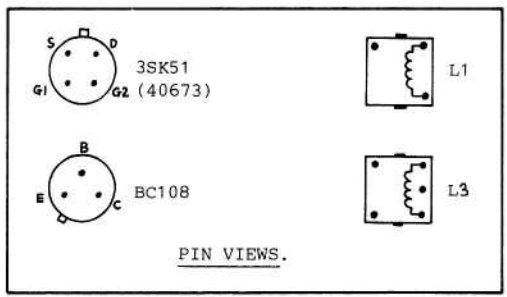


Fig. 1 FM-TV RECEIVER CIRCUIT DIAGRAM

CIRCUIT DESCRIPTION

Input to the receiver is directly from a varicap tuner and is applied to gate 1 of Tr1. A MOSfet is used in order to give high amplification together with low noise performance. The tuned circuit L1 provides some selectivity which helps with the overall noise performance, R5 damps this circuit to provide sufficient bandwidth. The signal passes to an NE592 wideband amplifier i.c. operating at the IF frequency. A gain control is provided but in this design will usually be set to maximum. The output of IC1 passes directly to the PLL demodulator IC2. This device was chosen for its superb linearity and ease of use. The circuit has been described in various forms in previous issues of CQ-TV. C14 sets the voltage controlled oscillator (VCO) which should be at the IF centre frequency. A test point is provided on the board for this purpose. The demodulated video signal passes through an emitter follower (Tr2) where the sound signal is extracted. The following passive circuit is a de-emphasis network whose response is set for the CCIR standard. At present, in the U.K., no emphasis standard has been established and indeed there may not be a need to do so for amateur work. Provision is made on the board though in case de-emphasis is needed in the future or in case the receiver is used for the reception of satellite TV. Video passes to IC3 - a second NE592 - this time acting as a video amplifier. This stage also has a gain control which sets the video output to 1 volt peak-to-peak into a 75-ohm load. There are two outputs from IC3 providing both positive and negative going video signals. Provision is made to switch between these outputs enabling both standards to be received - useful for the continentals! Tr3 is another emitter follower providing a 75-ohm video output.

COMPONENTS

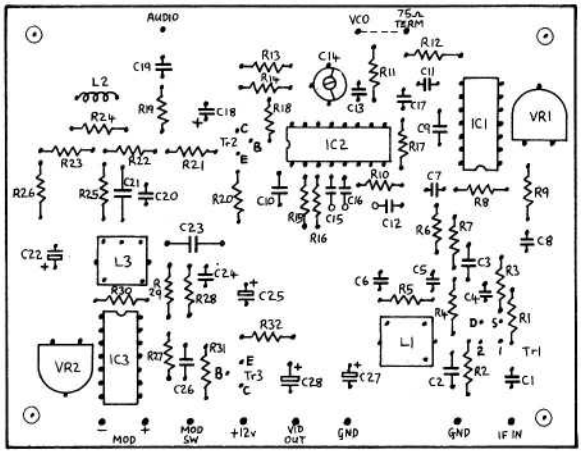
Most of the components are available from AMBIT International. The three integrated circuits are ordinary plastic dual inline packages (suffix 'N'). If de-emphasis is not required the following components should be omitted: R21, 22, 23, 24, 25, 26, C20, 21, 23, L2 and 3. The emitter of Tr2 should then be connected to the negative side of C22. The 6MHz sound trap cannot remain connected in its present position if the de-emphasis components are omitted. It may be possible to connect this later in the circuit if required, perhaps in the base circuit of Tr3. It is not recommended that i.c. sockets be used-especially for IC1 and IC2.

NE592 devices are unfortunately a little hard to come by (see suppliers list). A possible substitute could be the uA733. The device is pin-compatible and similar in concept but has not been tried in this design.

CONSTRUCTION

The printed circuit board is double sided, its component side being predominately a ground plane to ensure circuit stability. Components should be mounted carefully using minimum lead lengths. Where possible leads which connect to ground should be soldered on both sides of the board. ·· Note that C12, C15 and C16 earth leads are soldered directly to the top of the board, there being no holes provided. The component side track connecting R9 and C24 should be soldered on both sides at each end. Care should be taken to insert the active devices the correct way round.

Vero wiring pins should be inserted into the holes provided round the edge of the PC board, these are used for the external connections.



o =earth to top of board

Fig.2 FM-TV RECEIVER COMPONENT LAYOUT

ALIGNMENT

Alignment is very straightforward and may be carried out using no test equipment. However the following sequence should be carried out if possible: Connect +12 volts and ensure that this voltage appears on the i.c. pins and transistor collectors. Connect a frequency counter to the VCO test point and adjust C14 for a reading equal to the IF frequency (36MHz), C14 is usually around half mesh. Switch off and connect a link wire to terminate the test point with R12. Turn VR1 to maximum (fully clockwise) and VR2 to halfway. Connect the IF output from a varicap tuner to the input (see figs. 4 and 5) and a video monitor or oscilloscope to the output. Switch on and make sure there is plenty of white noise (snow) on the screen. Adjusting VR2 should alter the contrast. Peak L1 for best signal, its tuning will be rather flat.

OPERATION

Although it is possible to receive an FM signal on an AM receiver by 'slope detecting' it is not possible to see an AM signal on a FM receiver, therefore you will need a FM-TV signal to finally check the unit.
When you first tune in a picture it is tempting to tune for maximum signal (best contrast) just as you do for AM. With FM though this is not necessarily the optimum position. In practice the receiver should be tuned for the best LOCKED picture (correct 7:3 video/sync ratio if viewed on a 'scope).

NOTES

Several of these units have been constructed and they have worked without troubles. Please realise that tuning in an FM-TV picture is different from what you are used to so a little patience and experience may be required to realise the best from the system.
It has been found that pins 3 and 9 of IC2 require between 1 and 1.5 volts on them, this may be adjusted by altering the value of resistor R17,

changing this voltage will alter the demodulated bandwidth which is set here to around 10MHz. One user has arranged to vary the main supply rail to acheive this effect, in this case the demodulator was being used to receive the Russian Gorizont TV satellite in the 4GHz band and thus required a bandwidth of some 30MHz! Of course the tuned circuit (L1) was removed.

It is quite possible to change the IF frequency of this unit (due to the fact that no complicated filters are used in the design) which will work quite happily at over 70MHz. If this order of frequency is required it should only be necessary to change the frequency of L1 tuned circuit and reduce C14 from its present 10pF to around 5pF maximum capacity. The VCO frequency will then require setting to the new IF centre frequency. The sound output is designed to connect directly to a 6MHz ceramic filter as used in TV sound systems. In fact most ordinary TV systems are ideal for providing the sound channel.

For those interested, Fig.3 shows the demodulated waveform obtained by applying a sweep signal to the RF input.

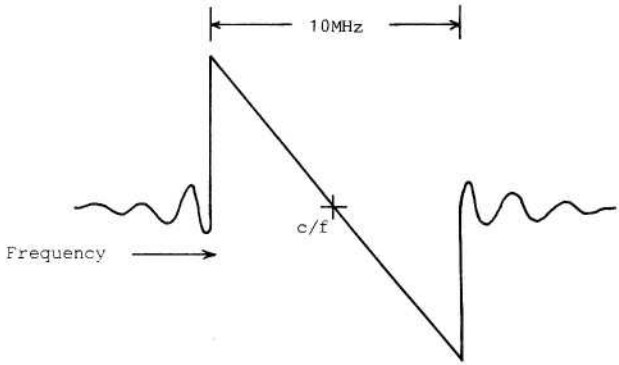


Fig.3 FM DEMODULATOR SWEPT RESPONSE

A measure of the linearity is the straightness of the line, although drawn here it is indeed very straight on an analyser screen.

INSTALLATION

The easiest and most versatile way to construct an FM-TV receiver is to custom-build it. A demodulator can be installed into an existing TV set, especially if the set is not required for AM as well, but this may mean a fair bit of work and will restrict the units veratility. A straightforward system is to simply connect a varicap tuner to the demodulator, provide a tuning control and put it into a metal box. This could, if desired, house a sound board and loudspeaker as well. Figs 4 and 5 give details of the connections for the U321 tuner and for the popular ELC1043 range. It is useful to provide a meter on the front panel to monitor the tuning voltage, this will give some indication of where in the UHF band you are tuned and may be calibrated in frequency or channel numbers if calibration facilities are available.

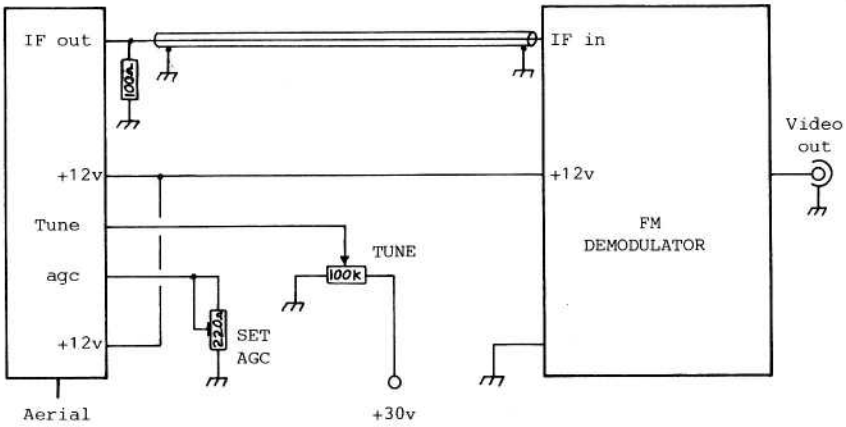


Fig.4 USING THE U321 VARICAP TUNER

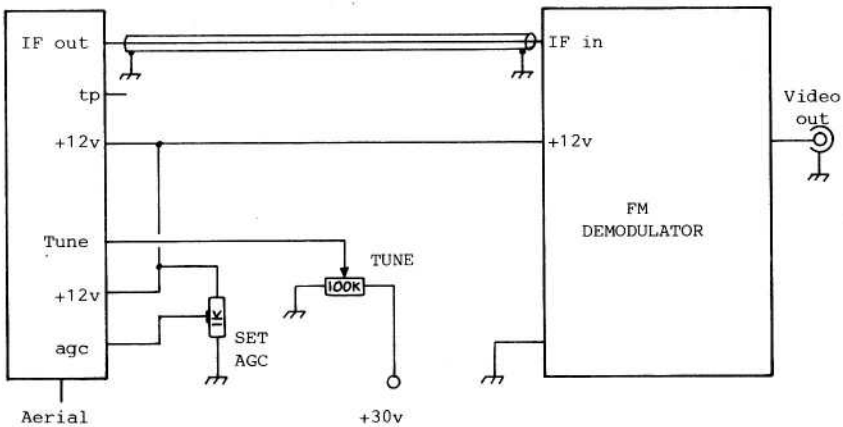


Fig.5 USING THE ELC1043 STYLE TUNER

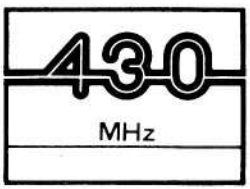
All components - including the NE's are available from Ambit International, 200 North Service Road, Brentwood, Essex CM14 4SG.

NE592 and NE564 devices are available from Fortop Ltd., 13 Cotehill Road, Werrington, Stoke-on-Trent, Staffs. and from Technomatic Ltd., 17 Burnley Road, London NW10 1ED or Quarndon Electronics Ltd., Slack Lane, Derby.

PRINTED CIRCUIT BOARDS are available from Members Services.

TV ON THE AIR

I am delighted to say that the mailbag has filled up again this time, so "TV on the Air" is back to its proper length. The activity notes for 24 cm. are on the increase again, so I have copied the other magazines and split the news into two chapters. If I had any SSTV I'd include that as well, but there isn't any. Of course I really would welcome a few more contributions - I don't mind recycling material from elsewhere but I think you would prefer the operating details to outweigh the background "filler" material. So how about putting pen to paper?!



Mike G8DLX, no stranger to this column (or at least he's no stranger than some of the others we mention regularly) writes from Rugby with an extract from his log!
1.1.83: G3DFL Geoff from Warley back on the air after a break. Now has an improved aerial system. P5 exchanged. G8IMN Dennis (Sutton Coldfield) also back on the air with a 4½ signal taken at G8DLX.
3.1.83: G6NJG (Leicester) and G3DRN (Birmingham) heard attempting an exchange.
9.1.83: G6IQM heard receiving pictures from G3DFL.
18.1.83: Picturessent from G8DLX to G6IQM 10 km north of Coventry. Attempts at sending pics to G3XPZ. Nothing received from G6IQM.
22.1.83: G3UMF Alan (Shotover Hill 5 km east of Oxford ZL15f) was heard attempting to work G8BUX under lift conditions. Pictures were later exchanged with Alan from G8DLX, where Alan's pix were received grade 3.

From south Warwickshire Peter G4GYI sends the following report ...
Broadcast television viewers in south Warwickshire may have been perplexed when the franchise for commercial television changed to Central but some of them still found the letters ATV if they tuned their receivers down near the bottom of the range.
For about a year now G3LLS and G4GYI/G8OED (senior op./junior op.) have been on 435 MHz from Alcester - ZM61d - with camera and BBC micro generated pictures. The path between these two stations, all of 400 metres, is very reliable but even at that range some peculiar effects occur with reflected signals. Both are using the Fortop transmitter with excellent results. Alcester is, however, a mediocre QTH at 160 ft asl, with rising ground in most directions. Contacts have been made with stations in Malvern, Redditch, Stratford and Warley, and pictures have been seen from Rod G3VBC who is about 50 miles away and from G8GLQ in Bristol.
Following a demonstration at the Stratford Club, when camera pictures were taken from G3LLS and G3DFL plus computer graphics from G8OED, sufficient interest was stimulated for Steve G6MMD and Doug G3UOC to dash out and buy MM transmitters. Steve has been having problems getting his beam at sufficient height to get over the Snitterfield hills and during the recent gales had an unfortunate experience with the Stratford club mast which he had borrowed. Contacts are sought with other stations - there is usually someone in Alcester monitoring 144.750 and 435.0.

The photographs in this issue (and probably several more to come) come all the way from Holland and were very kindly sent in by Rijn Muntjewerff. Rijn's name will be familiar to anyone who reads Roger Bunney's DX-TV column in *Television*, and Rijn is the DX-TV organiser in the German ATV club AGAF. He lives in the Beemster, not far from Amsterdam, and has an impressive receive setup. Where dates are known they are given on the pictures.

Another of our "regulars" is Norrie Macdonald, GM4BVU, of Hamilton, Lanarks.. He just missed the deadline for the last episode of "On the Air" with news that he has finally hit the airwaves after some years of sitting on the video sidelines. An MBM88 aerial is now radiating some 60 watts of colour from an MM MTV435 transmitter and MM 100 watt linear modified for ATV use. The receive side uses the MM upconverter into the tuner of a Hitachi VT6500 portable VCR and pictures are displayed on a National Panasonic TC800G 8" rx/monitor. On transmit the outgoing signal is switched via a JVC 14" triple standard monitor (for future expansion of facilities). After only one week's operating, results are encouraging with rx reports from GM3HBT (P4/5 over 5 miles), GM6AOR (P5 over 10 miles) and two-way QSOs with Gordon GM3ULP (P5 pix both ways, 4 miles). So far, no colour reports are to hand, although much of the visual material is in colour.
The best report so far must be GM3RVK, George in Kennoway, who gave a variable P1 to P3 over a 56 mile path. Unfortunately Norrie could not receive George's pix, but he was using only 20 watts versus the 60/70 watts. "So there's an incentive for him to build a linear and for me to get power to the MV432A mesfet masthead preamp". Visual material includes graphics, film and slide, plus video tape programmes on the shack and the Glasgow marathon. The stop press news is that GM3ULP has sent not only PAL but also NTSC colour! Is this a first for GM, with American standard pix received at 4BVU?

If you have played around with NTSC or other colour systems why not write in and tell us all about it? It can be quite instructive, and if not instructive, well at least fun. I recall Chris G8GHH used to send 525 line PAL colour bars (or was it proper NTSC?), while Nick G4IMC and I have sent each other SECAM. Incidentally, quite a few domestic PAL system VCRs will record SECAM if you turn the colour killer circuitry off. Philips 1500 and many VHS machines will work, though you should not expect compatibility with proper SECAM recordings made on French machines. I am also told you can record 405 line signals on any modern VCR - certainly theory suggest this should be so, and I must get down to trying this so that I have a source of signals for my 405/525 line monitors when the BBC and ITV finally switch off the 405 line transmissions!

Recently I had reason to venture into the New Forest and quite by chance had an invite to an ATV station ... great hobby this, free cups of coffee and a welcome chance to stretch the legs even in strange territory! So thanks to Tony G6IAC in Ringwood for showing me the station, with a converted Storno PMR converted to video service putting about 5 watts into an impressive aerial array. Hills in the district pose a bit of a problem to the locals, who are Henry G6MYU in West Moors, John G8MCP in Corfe Mullen and Jim G4MHF in Broadstone. Also in the net are Nick G8MCQ and Bill G2HCG; Nick lives near Bournemouth and Bill at Barton-on-Sea. So much for 70, then ...

On towards higher things, and as threatened in the last issue I have prepared an activity map for 24 cm. So far there aren't many stations to put on it, and if there are any transmitting stations who have been omitted please enable me to rectify this ... drop me a line! From rumours I hear that stations are on the air in the London area but I have no firm evidence!!

Anyway the big news this time is a superb contact between the UK and France, which you can plot on the map here. I'll let John G3YQC take up the story.

On the 23rd January Rod G8VBC and I worked a few French TV stations on 70 cm and we also tried on 24. One station F1EDM, who was using only a few watts on 24, was received by Rod at P2 although I could see nothing (I am not very good towards France from here). However, F1EDM was unable to get anything from Rod's

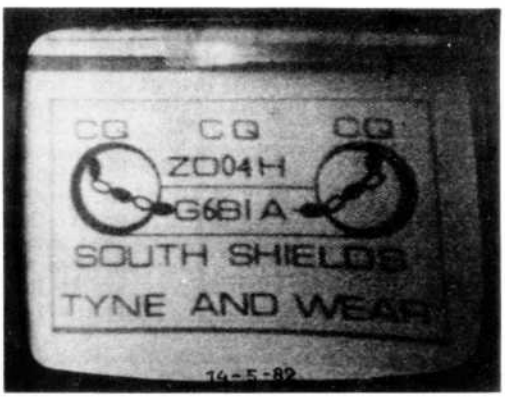
AM transmission. BUT ... when I put on the FM he was instantly able to see my pictures and gave me a good P1. Not bad on 24, eh? So between Rod and me, we had what could be called a two-way on 24 with France. I haven't worked out the distance (about 200 miles, very roughly) but it must be considerable. We were the first 24 cm stations that F1EDM had ever worked in the UK, so he was tickled pink as well.

This is great news and will encourage those folk who wondered if lifts worked on 24 as well as 70cm. In fact they work better - and more frequently - because if you consider a tropospheric duct as a form of natural waveguide it becomes clear that only a small duct will support microwave signal transmission, whereas to carry 70 cm or two metres you need a much larger one. Very often conditions are "up" on 23 and 24, with hardly anything noticable on two. What's more, conditions fluctuate much more rapidly, without any apparent change in the weather. Frazer G8FEZ tells me he often monitors the Dutch beacon PAoQHN, which is normally down in the noise, and suddenly it will rise to 20 over 9 for half an hour and then return to normal. So listening to the 23 cm beacons can be very rewwarding, giving you a sort of early warning of conditions. All this has been discussed more eloquently by G3OSS in issue 4 of *Ham Radio Today* and also in a recent *RSGB Microwave Newsletter* (still only £4 a year from RSGB HQ).

New stations on the air, both FM and both in Coventry. They are G8MLA and G8OPN/A; welcome aboard. In the north Bedfordshire we have the following roster, courtesy of G3VZV (thanks Graham).

G3VZV (Milton Bryan)	*3 watts - F9FT - slope detect receive.*
G4DPE (Luton)	*50 watts - 4 x 23 el. quad - FM rx to CQ-TV design*
G4HCZ (Dunstable)	*20 watts - 1 x 23 el. quad - FM rx as above*
G8XTW (Leighton Buzzard)	*30 watts - 1 x 23 el. quad - FM rx as above*
G4ENB (Luton)	*RX only.*

That's all for this time, but keep the letters coming for the next episode. Send those reports, corrections, threatening letters and everything else to me at 4 Mount Pleasant, Blean Common, CANTERBURY, Kent, CT2 9EU.



A couple of members received in Holland by Ryn Muntjewerff - 1982.


THE BRITISH AMATEUR TELEVISION CLUB
24 cm Activity Map
showing transmitting stations
MARCH 1983
STOKE AREA
G4DVN G3JMJ
G3DFL
G8VBC
near DERBY
LEICESTER
RUGBY
stations constructing
G3YQC
G8DLX
G4LRT
COVENTRY
G8MLA G8OPN/A
G3VZV G4CPE
G4HGZ G8XTW
LUTON
AREA
stations
constructing
BATH
stations
constructing
WORTHING
F1DL F1BJB
AMIENS
LE HAVRE
F3LP F1EDM

COLOUR SUBCARRIER PHASING and DISTRIBUTION AMPLIFIER

By John Goode.

If vision-mixing of encoded PAL (or NTSC) signals is to be successfully accomplished, some form of subcarrier phasing will almost certainly be required. For instance, suppose we have a system comprised of a mixer fed with two encoded sources such as the BATC test card and a caption colouriser. Each coder will be fed with station subcarrier, and one of these will form the reference source that provides the mixer's burst signal. See Fig.1.

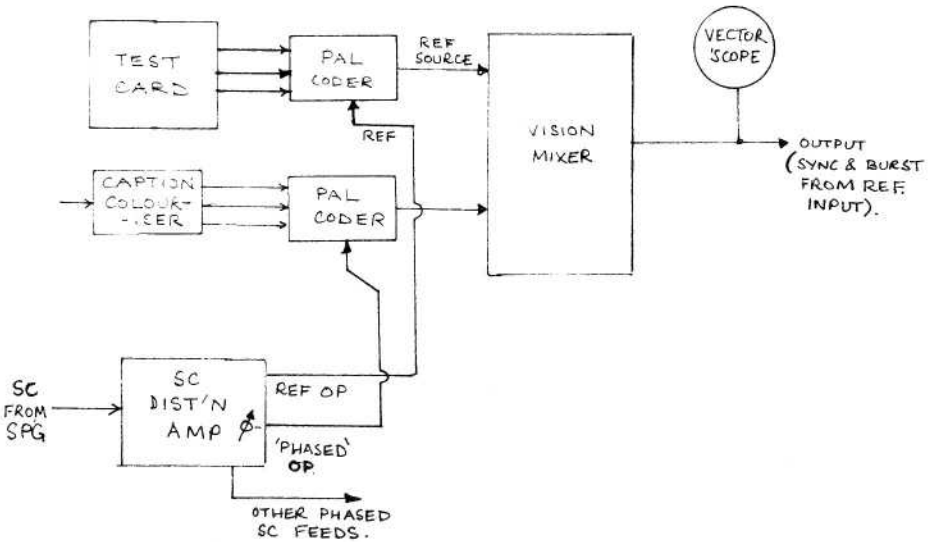


Fig.1 BASIC SYSTEM

When sources other than the reference source are selected on the mixer, it is essential that the phase of the reference colour-burst is correct for decoding the selected colour signal. The easiest way of ensuring this is to arrange for the subcarrier distribution amplifier feeding each source encoder to be phase-adjustable over the range of one cycle of subcarrier.

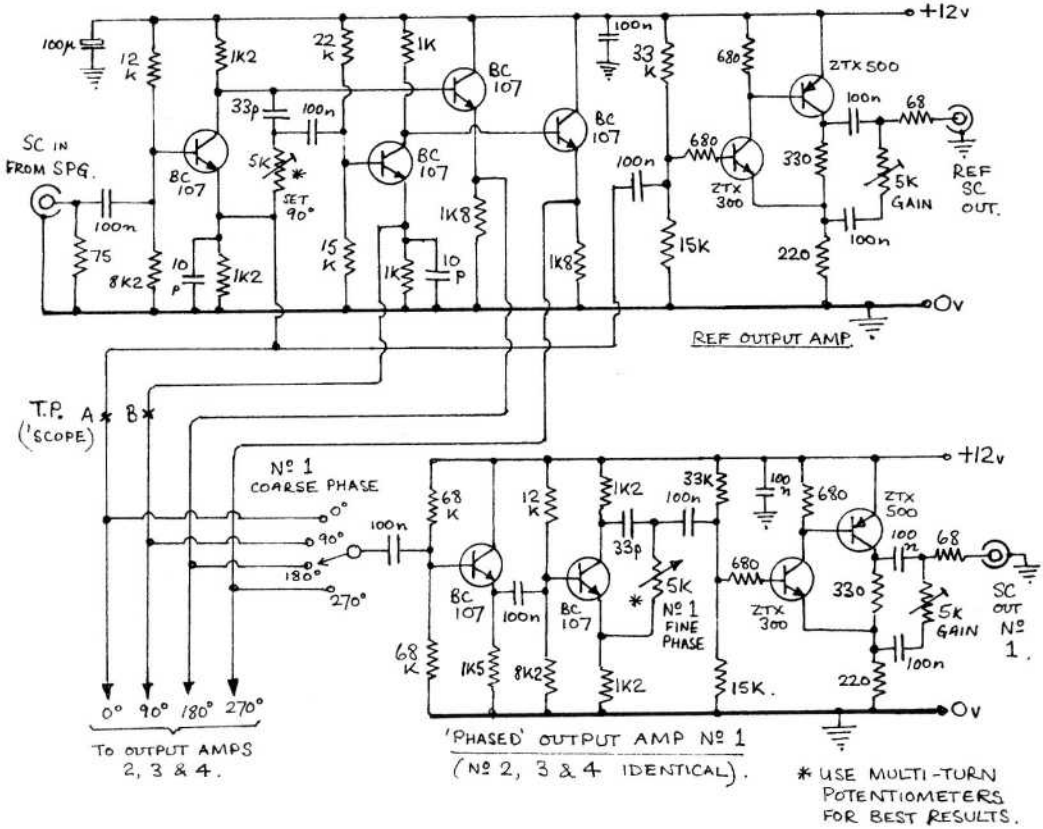


Fig. 2(a). SUBCARRIER DISTRIBUTION AMPLIFIER

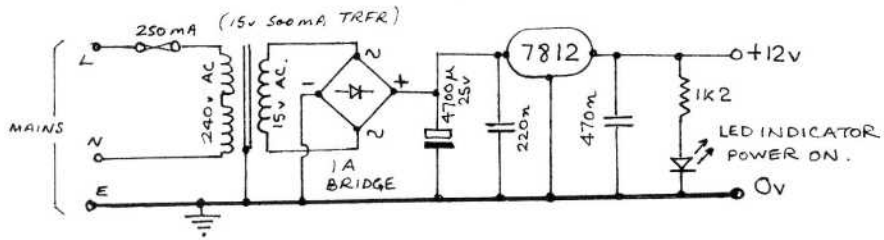


Fig. 2(b). POWER SUPPLY

The circuit shown in Fig.2 provides up to five outputs - one non-adjustable 'reference' output, and the four 'phased' outputs. The circuit is divided into two sections - the input section giving coarse adjustment of phase (0°, 90°, 180°, 270°), and the output sections having a 0° - 90° continuous fine adjustment. In this way it is possible to adjust the phase-shift to anywhere in the range 0° - 360° - see the block diagram (Fig.3).

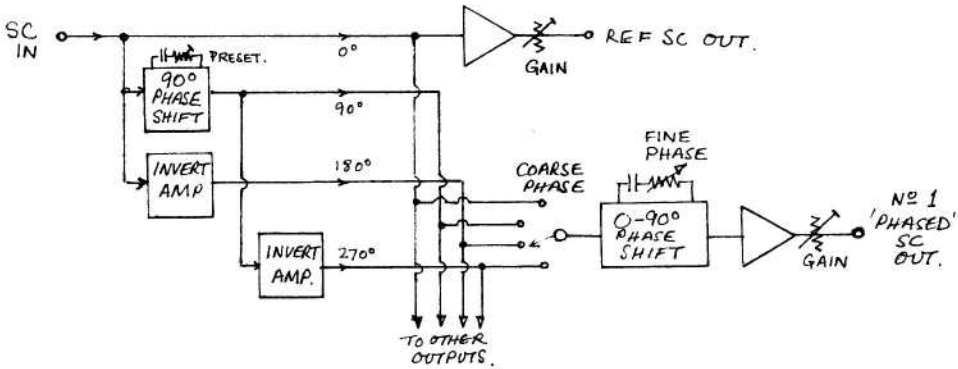


Fig.3 BLOCK DIAGRAM

Setting-up the unit involves adjusting the basic 90° phase-shift in the input unit, and adjusting the output levels. (1v p-p into 75-ohms). The phase-shift can be set using a double-beam oscilloscope, provided that it has a fast enough horizontal timebase - at PAL subcarrier frequency one cycle's period is only 225ns. See Fig.4.

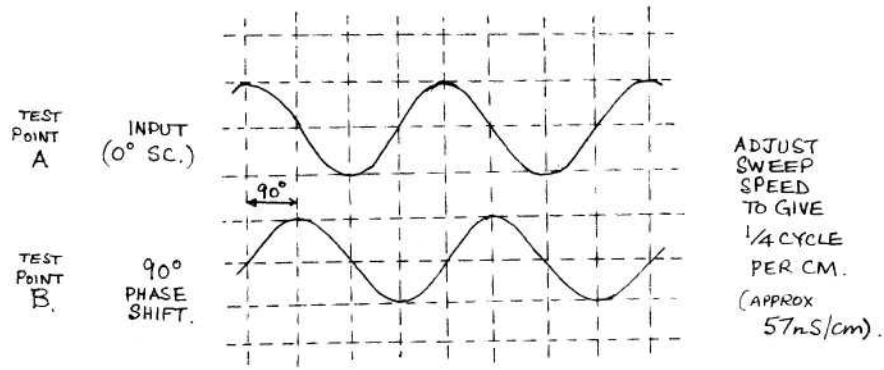
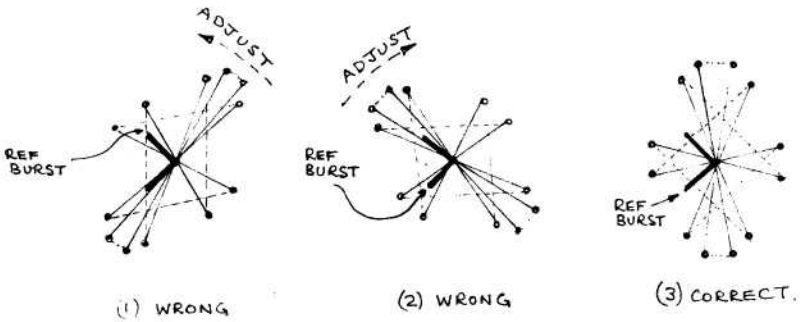


Fig.4 SETTING 90° PHASE SHIFT

Using the phasing controls accurately requires the use of colour bars and a vectorscope. If no vectorscope is available, the best one can do is adjust for the correct colour bar sequence with maximum obtainable saturation.

Each source (other than the reference source) is selected on the mixer in turn, and the relevant SC distribution output phase controls are adjusted to give the correct bars to burst phase relationship in the mixer output, using the vectorscope graticule. See Fig.5.



These displays must be viewed in conjunction with a colour monitor to check for correct bars colour sequence - if vectors are 180° out this will be wrong.

Fig.5 VECTORSCOPE DISPLAYS (100% colour bars)

It is important to check the colour bar sequence on a colour monitor, as it is possible to align the vector display 180% out, due to the colour bar vectors being symmetrical. If this is viewed on a monitor the normal bar sequence of white, yellow, green, magenta, red, blue, black, will not be followed.

In the prototype unit 20 - turn cermet potentiometers were used as the fine-phase controls. Although these are on the expensive side, it does allow the phase to be set and maintained accurately.

A 70cm TV TRANSMITTER

By J.L.Wood. G3YQC

This article also appears in the BATC's new booklet 'TV FOR AMATEURS' which is described elsewhere in this issue. It seems appropriate to include the design here since many members may not purchase a copy of the booklet and a special printed circuit board is being made available for the unit from Members Services.

The transmitter has been developed primarily to be easy to construct and align using the minimum of equipment. Particular attention has been paid to the problem of instability which can cause trouble when commissioning a home-built transmitter and for this reason use has been made in the last two stages of small 'flatpack' transistors.

The transmitter is intended either as a low power self-contained unit or as a driver for subsequent linear amplifiers. The video modulator is included on the printed circuit board and requires only the addition of a 100 ohm carbon potentiometer to provide adjustment of the video input level.

CIRCUIT DESCRIPTION

Tr1 forms a crystal controlled oscillator which operates at 108.875MHz. In order to ensure maximum stability and spectral purity, the oscillator is powered from a three terminal voltage regulator (IC1). The output is coupled directly to the base of Tr2 which operates as a frequency doubler. The collector tuned circuit (L2) resonates at 217.750MHz and, together with L3 forms a simple bandpass filter. Tr3 is another doubler stage and brings the signal to its final frequency of 435.50MHz.

The collector of Tr3 also connects to one half of a bandpass filter (L4) but derives its supply from the video modulator. Tr4 is the output amplifier and is also powered by the modulated rail. The collector connects to a simple Pi output stage which provides a low-impedance output suitable for matching into 50 or 75 ohm coaxial cable.

Video modulation is applied to the base of amplifier Tr5 via a panel mounted 100 ohm variable carbon control providing adjustment of the actual video level. Tr5 base is biassed from a potentiometer circuit fed from a zener stabilised voltage source. DC restoration is provided by a 1N4148 diode. Tr6 acts as an emitter follower and delivers up to 12 volts (modulated) to Tr3 and 4.

CONSTRUCTION

A double-sided printed circuit board is available for this transmitter from the BATC's "Members Services" department. The component side of the board acts only as an earth plane, and where possible component leads which are connected to ground should be soldered to both sides of the board. Although HC18 or HC25-U crystal packages are most often used for frequencies over 100MHz, provision is made to use the larger HC6-U style as well.

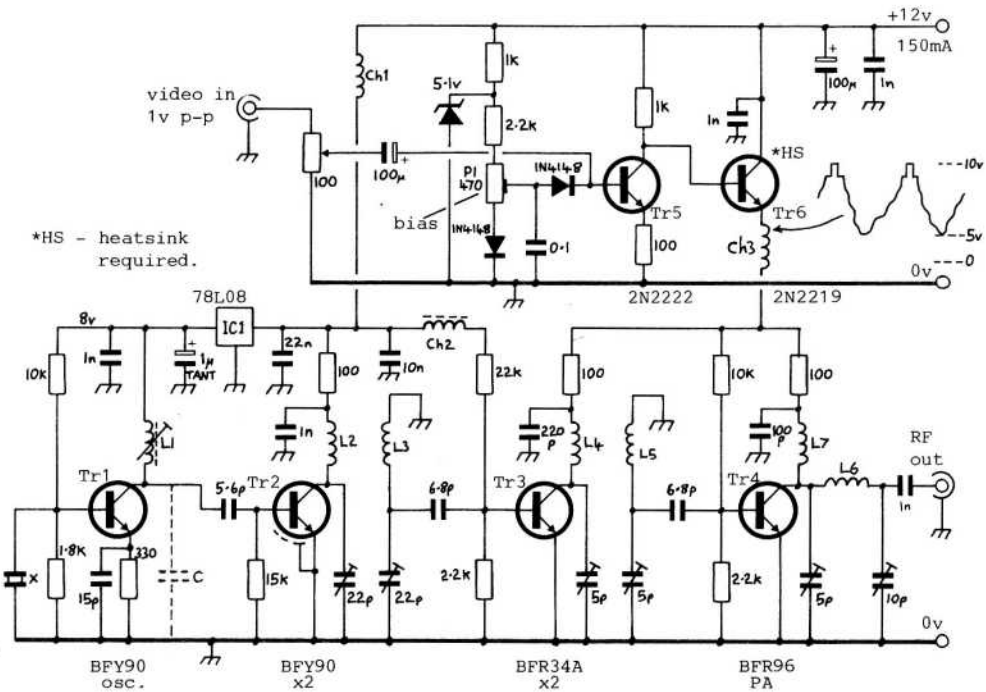
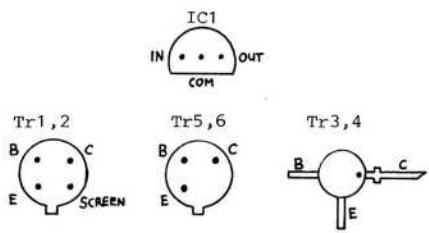


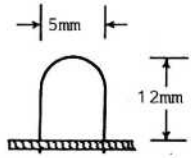
Fig.1 COMPLETE CIRCUIT FOR THE 70cm ATV TRANSMITTER

L1. 5½turns 26swg enamelled copper on 4.5mm former, with core.
L2,3.1¾turns 20swg enamelled copper, 5mm i.d. spaced 2mm from board.
L4,5.¾turn 20 swg enamelled copper bent to shape as illustrated.
L6. 1¾turns 20 swg enamelled copper or silver plated, spaced 2mm from board.
L7. 3turns 26swg enamelled copper, 3mm i.d. close wound.

Ch1. 10turns 26swg enamelled copper wound on 3mm drill, self-supporting.
Ch2. 3turns thin wire on ferrite bead.
Ch3. 8turns 26swg enamelled copper wound on 3mm drill, self-supporting.

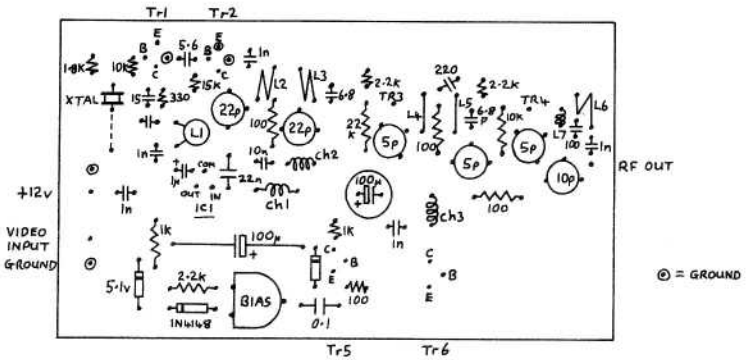


PIN VIEWS



Detail of L4 and 5.

Trimmers should be good quality PTFE film types. Try to use Mullard or DAU makes as these are among the high quality ones available. (note that this type of trimmer is not intended for lots of 'twiddling' and may become unserviceable if subjected to too many adjustments). All lower value capacitors are miniature plate ceramic. One 100uF electrolytic is axial mounted whilst the other is a vertical radial type. A small heatsink should be fitted to Tr6.



PRINTED BOARD COMPONENT LAYOUT

L2 and L3 are wound in opposite directions and should be wound to fit the holes provided. The screen lead of Tr1 may be either clipped off or soldered to ground on the top of the board.

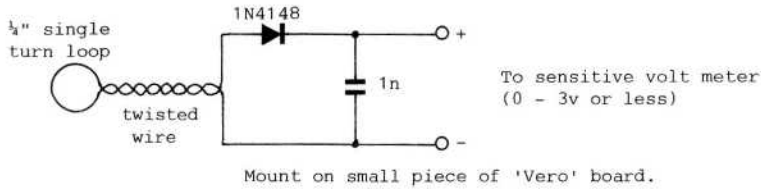
A suitable sized hole should be drilled to accept the former used for L1. The former should be glued into position. 3/16" holes should be drilled in the board at the places indicated for Tr3 and Tr4. These transistors are mounted on the print side of the board and carefully soldered to the tracks provided. Care should be taken to ensure that the devices are installed the correct way round. The printing on the transistor package should face downwards.

The completed unit should be housed in a screened metal box fitted with a BNC socket for the RF output. Power is fed in through a 1000pF feedthrough capacitor.

ALIGNMENT

Alignment is straightforward and may be carried out using the minimum of equipment.

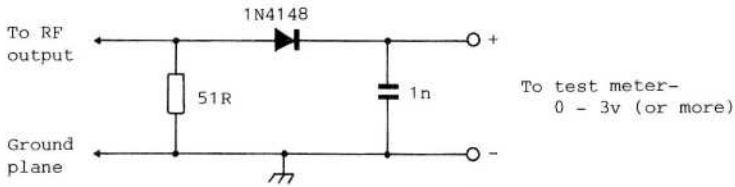
Temporarily up-end Ch3 and apply power to the unit. Check that there is +8 volts at the collector of Tr1. Using the RF 'sniffer' probe described below place the loop over the oscillator coil former and adjust the slug until the oscillator starts, indicated by a reading on the test meter.



Mount on small piece of 'Vero' board.

Now place the probe near to L2 and adjust its trimmer for maximum indication. Whilst in this position, re-peak the oscillator coil for maximum output then withdraw the tuning slug about a quarter turn, this should ensure that the oscillator starts readily. Switch the unit on and off several times to check that it does.

Re-connect Ch3 and turn the 'bias' control (P1) fully clockwise. Set the video gain control to minimum. Make a test load/detector circuit as shown below and connect it to the RF output.



Apply power and adjust L2, L3, L4 and L5 tuned circuits for maximum indication on the test meter. Adjust the Pi output tuned circuit for maximum output, (one capacitor should be played off against the other).

At this stage a variation in the output power should be noticed if P1 is adjusted. If all is well, apply video and turn up the video gain control. Turn P1 slowly anti-clockwise and as you do this the output power reading should fall. This indicates that video modulation is present. Do not be troubled if, when modulation is applied the indicated power output falls considerably. This does not mean that the actual *peak* power is degraded, it is merely the effect of the power meter which is averaging the power indication. To establish the peak power level simply unplug the video signal and watch the power meter, it will be indicating the actual power output level.

Monitor the output signal either using a monitor probe or by receiving the signal on the station receiver and adjust the bias control for correct video/sync ratio. In practice this is usually almost at the fully anti-clockwise position. The video gain control should be turned up 'till just before the whites start becoming over-white which would indicate that white crushing or 'flat topping' of the video waveform is occuring. In other words you

are driving the amplifier into non-linearity.

This transmitter has been carefully designed so that even when adjusted without the aid of a spectrum analyser all harmonics are better than 30dB down. However if equipment is available the transmitter should be aligned for minimum harmonic content.

NOTE

Since this design went to press in "TV For Amateurs" several more units have been built. It has been found that some crystals are unhappy in the original circuit in that they tend to oscillate at around 65MHz instead of their overtone frequency. The problem is that a high-Q tuned circuit is required to ensure correct operation therefore a small modification was needed to the circuit. This consisted of simply removing the 22pF series capacitor from L1 thus relying on stray circuit capacitance. It has also been found worthwhile to increase L1 to 6½ turns.

The circuit printed here incorporates this modification and details will accompany the printed circuit boards. Capacitor pads remain on the board since some capacitance may be required in some cases.

BFR96 transistors may be obtained from Technomatic Ltd., 17 Burnley Road, London NW10 1ED or from Gothic Crellon, Trafalgar House, P.O.Box 301, 28 Paradise Circus, Birmingham B1 2BL.

78L08 voltage regulators from Ambit International, 200 North Service Road, Brentwood, Essex. CM14 4SG.

ANYONE FOR VIDEO TAPE SWAPPING?

One of the major problems with ATV is that once you have an audience, it's essential to transmit pictures of interest. I'd like to make a plea for a tape-swapping system, so that ATV'ers throughout the country can be aware of what the other guy is doing, as well as providing a ready source of transmitting material to stimulate interest among the viewers. If such a system can be devised I would happily coordinate it.

My suggestion is a duplicated list compiled from details submitted by interested parties, containing callsigns and addresses with a list of 'programme titles' and whether on VHS, Beta or even U-Matic. This would be despatched on request, with the best material advertised in CQ-TV, as the US-TV Society is doing with its tapes in A5 magazine. The borrower could then source the tapes direct from the recipient, paying the postal charges as agreed. Presumably no one would submit to the list unless they were keen to circulate their own material, so the lender would pay the outgoing postage, and the borrower the return cost, so spreading the load. Some time limit would probably be needed but that's a detail.

If geared-up to do so, the borrower would be expected to add-on some station details at the end of a borrowed tape, so the lender gets something out of it as well, and then it would go out on loan again and so on. I have already done some tape swapping and found it great fun.

Anyone interested is invited to write to Norrie Macdonald GM4BVU at 3 Townhill Road, Earnock Estate, Hamilton ML3 9UX.

PUBLICATIONS

QTY	PUBLICATION	EACH	P&P	TOTAL
_____	AMATEUR TELEVISION HANDBOOK vol.1 by J.Wood G3YQC and T.Brown G8CJS	£1.50	0.40	_____
_____	AMATEUR TELEVISION HANDBOOK vol.2 by T.Brown G8CJS	£2.00	0.40	_____
_____	TV FOR AMATEURS by J.Wood G3YQC NEW	£1.50	0.25	_____
	CQ-TV BACK ISSUES. The following issues are still available although stocks of some are low. Please circle those required.			
_____	68,88,89,90,91,92.....	0.25	*	_____
_____	93,94,95,96,99,100,101,102,103,105,106,107, 108,109,111,116,117,118,119,120..... *Please estimate appropriate postage	0.50	*	_____
_____	RE-PRINTS. Photocopies of any article from past issues of CQ-TV are available. Payment (if ordered seperately) in UK postage stamps please.	0.20 per sheet	0.20	_____
_____	INDEX. All main articles in past issues of CQ-TV and 4 Hanbooks. Inc. page count, (essential for ordering re-prints).	£1.00	nil	_____

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AUSTRALIA

WOULD AUSTRALIAN MEMBERS PLEASE NOTE THAT THE "AMATEUR TELEVISION HANDBOOK" VOL.1 IS AVAILABLE DIRECT FROM THE WIRELESS INSTITUTE OF AUSTRALIA AT: PO BOX 150, TOORAK, VICTORIA 3142. PLEASE ENQUIRE FOR VOLUME 2 AND "TV FOR AMATEURS".

ALL OTHER ORDERS PLEASE TO:- BATC PUBLICATIONS, 14 LILAC AVENUE, LEICESTER LE5 1FN.

name	call
address	
	post code

MEMBERS SERVICES

Items from these lists are available to club members only.
This list superceded all previous ones.
CHEQUES should 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	TOTAL
_____	EEV Leddicon	£82.00	nil	_____
_____	0.5" 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")	£15.50	nil	_____
_____	4.5" EMI 9565 Image Orthicon	£10 for 2	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	_____
	STATIONERY AND ACCESSORIES			
_____	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	0.16	_____
_____	BATC lapel badge - round - pin fastening	0.50	0.16	_____
			TOTAL this page	_____

"What's all this then?"

TV-83

that's what.

Well worth tracking down

1983 B.A.T.C. SHOW

at the Post House – Leicester on Sunday May 22nd

DOORS OPEN 10am.

11 - 12.30pm

TV REPEATER SEMINAR

Conducted by Graham Shirville G3VZV. All five repeater croups comprising phase-one have been invited. BATC members are also invited, especially those from other interested groups.

LIVE 4GHz SATELLITE TV DEMONSTRATION

A chance to see live pictures from the Russian Gorizont bird.

MEMBERS DEMONSTRATIONS

This is where our boffins show off the results of a winters' building.

MEMBERS OPEN MARKET

Members equipment for sale will be both outside AND inside this time.

CLUB SALES

The BATC stand will include the new booklet 'TV FOR AMATEURS' and a range of printed circuit boards from Handbook 2.

TRADE STANDS

There are some interesting new products to be launched this time. You will need lots of cash!

OUTSIDE BROADCAST VAN

Brian Summers' outside broadcast unit will again be in attendance this year.

COLOUR SSTV

A demonstration of line-sequential colour SSTV by G3CCH.

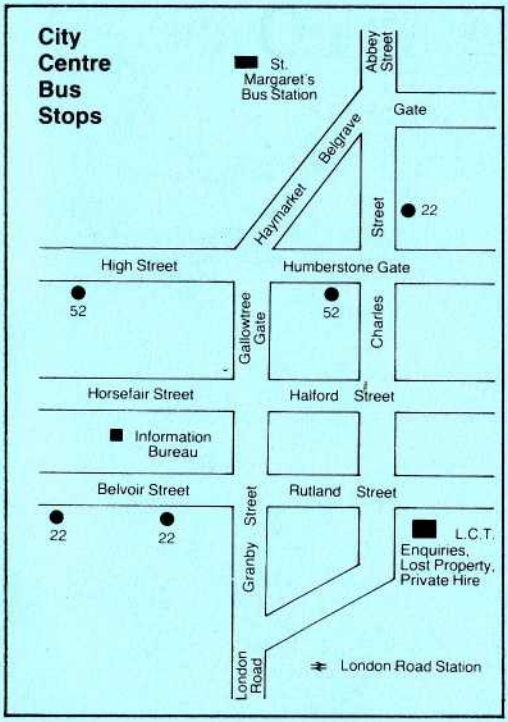
NARROW BAND TV ASSOCIATION STAND

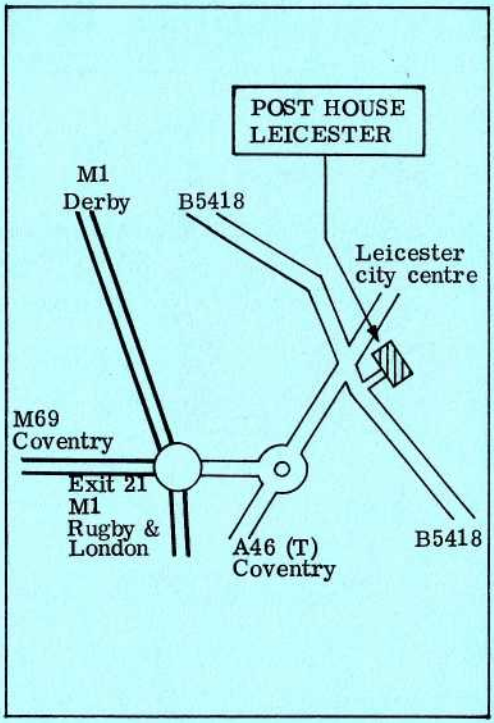
32 line TV at its very best.

The Wyggeston room will accomodate all Fast-Scan TV exhibits and the Wolsey room those for SSTV and NBTV.

Sunday lunch is available as is half-price overnight accommodation for those attending the show. Please book early by phoning 0533 896688.

SEE YOU THERE - DON'T MISS IT





HOW TO FIND THE POST HOUSE HOTEL

The hotel is located at the junction of Narborough Road (A46) and Braunstone Lane East (B5418).

BY ROAD

If you are travelling on the M1 motorway, leave junction 21 and follow the signs to'City Centre' which is a dual carriageway. The Post House is about one mile along this road on your right at the junction with the B5418 signposted 'Aylestone'. There are traffic lights at this junction and you should turn right to gain access to the hotel. If travelling from the City direction, follow the signs for A46 Coventry and the M1, these will take you along the Narborough Road when the Post House will be on your left at the junction with the B5418 as above.

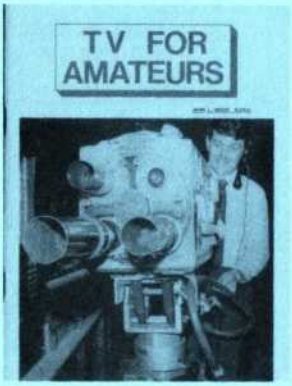
BY TRAIN

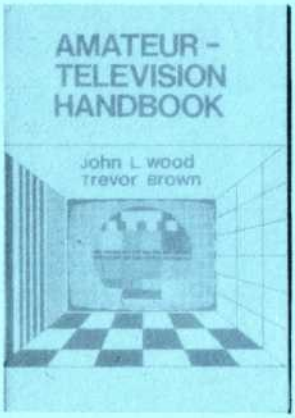
The bus service No.52 leaves the city centre at 8 and 38 minutes past the hour, this takes about 15 minutes to reach the Post House.

Return buses leave the Hotel at 26 and 56 minutes past the hour for the City centre.

THERE IS A LARGE FREE CAR PARK IMMEDIATELY ADJACENT TO THE EXHIBITION HALL. EXCELLENT RESTAURANT AND BAR FACILITIES ARE AVAILABLE.

The ABC of Amateur TV.





Three books are available from the BATC to assist the understanding and development of ATV, and which provide practical guidance and assistance to those wishing to master the techniques of amateur television:

A. TV FOR AMATEURS John Wood G3YQC

This latest release concentrates on basic ATV information and explains the hobby in a clear, straightforward way. The booklet contains sufficient practical information to enable the newcomer to assemble and correctly operate a TV station. Chapters include Principles, The station, Getting started, In vision, Transmitting, On-the-air, Colour TV, 1.3GHz TV and the BATC. Printed circuit boards are available for both the transmitter and receiver designs. This booklet will appeal to the old hand as well as the newcomer.
52 pages £1.50p plus 25p p&p (UK).

B. AMATEUR TELEVISION HANDBOOK VOL 1.
Trevor Brown G8CJS and John Wood G3YQC

The next step on. This book takes you further into the technicalities of ATV and deals with (among others) Transmission, Reception, Digital video generation, Colour, Video techniques etc. A constructional book which includes full details on the Clubs' electronically generated colour test card. PC boards are available for most projects. A must for the shack.
100 pages £1.50p plus 40p p&p (UK).

C. AMATEUR TELEVISION HANDBOOK Vol 2
Trevor Brown G8CJS

This book compliments volume 1 and expands on some of its projects. A book largely for the technician it includes designs for 24cm, FM-TV, SSTV, Text-on-screen, Video effects etc. Microwave TV is covered for the first time with details of a 10GHz FM-TV system and there is a design for a vestigial sideband 70cm ATV transmitter. PC boards are also available. This one completes the set.
98 pages £2 plus 40p p&p (UK).

ORDER FROM:- BATC Publications, 14 Lilac Avenue, Leicester LE5 1FN.

_____	BATC callsign* lapel badge-pin fastening *Write callsign CLEARLY. Sent by supplier	£1.50	nil	_____
_____	BATC headed notepaper & envelopes (50 each)	£1.75	£1.20	_____
_____	BATC key fob	0.50	0.16	_____
_____	BATC equipment stickers - 1" round	0.15	0.16	_____
_____	BATC windscreen stickers - 2.5" round	0.10	0.16	_____
_____	BATC club tie - printed badge - dark blue (until stocks exhausted)	£1.80	0.30	_____
	PRINTED CIRCUIT BOARDS			
	"Amateur Television Handbook - vol.1"			
_____	Wide-band 70cm ATV tuner	£3.00	0.30	_____
_____	Amateur television receiver	£1.50	0.30	_____
_____	Electronic character generator	£3.00	0.30	_____
_____	Character generator memory (until stocks exhausted)	£3.00	0.30	_____
_____	Colour test card (set of 3-double-sided)	£15.00	0.60	_____
_____	Horizontal aperture corrector	£3.00	0.30	_____
_____	PAL colour coder	£3.00	0.30	_____
	"Amateur Television Handbook-vol.2"			
	Vision switcher matrix	+		
	Vision switcher logic	+		
	Vision mixer	+		
	70cm VSB transmitter-7 boards, printed legends	+		
	SSTV pattern/sync generator	+		
	Character colourizer	+		
_____	Piggy-back keyboard	£2.25	0.20	_____
	+ At the time of going to press prices for these boards had not been fixed. Members requiring them should phone or write for the latest prices and delivery (SAE please)	TOTAL this page		_____

"TV for Amateurs"

	70cm TV transmitter (also CQ-TV122)	+	
	ATV up-converter (also CQ-TV112)	£2.25	0.30
	Video filter (also CQ-TV122)	+	
	OTHER PC BOARDS		
	'Project 100' sync generator (CQ-TV100	£3.00	0.30
	TX-9 video/audio in/out (CQ-TV119)	2.25	0.30
	FM-TV demodulator (CQ-TV122)	+	
	COMPONENTS		
	5MHz SPG crystal (P100)	£2.75	0.25
	TBP28122 PROM. Pre-programmed for colour test card circle. (eqt.74S471)	£10.00	0.25
	TMS4036 memory IC for char.gen memory (until stocks exhausted)	£5.00	0.25
	4.433618MHz PAL colour subcarrier crystal**	0.40	nil
	Colour TV delay line**	0.60	nil

**surplus, untested.

total this page

total from previous pages

*postage

TOTAL ENCLOSED

It is cheaper to send several small items in one package. Please try to estimate the correct amount of postage. All enquiries requiring a reply should include a SAE or International Reply Coupon.
*OVERSEAS MEMBERS SHOULD ASK FOR A QUOTATION OF POSTAGE COSTS BEFORE ORDERING LARGER ITEMS. Please state whether air or surface mail is required. PUBLICATIONS should be ordered separately from the Publications department (see separate list) otherwise delays and extra expense will result.

name call

address

post code

receipt goods sent (office use only)

CIRCUIT NOTEBOOK

Number 36

by John Lawrence GW3JGA

BBC SOFTWARE TEST CARD

This edition breaks new ground for Circuit Notebook in that the Test Card Generator is a BASIC programme for the BBC model B micro.

When run, the programme generates a simple test card in monochrome or colour which is a useful extra signal for test putposes. You can insert your own callsign in the programme on line No. 530.

The programme was written by my 14 year-old son, Geoffrey. (The fee goes to Scout Job Week). We would be delighted to hear from any other BBC micro users who are running software test cards on their ATV system.

```
100 REM *** B.A.T.C. TESTCARD ***
110 REM *** By Geoffrey Lawrence ***
120 MODE2:GCOL0,132:CLG
130 MOVE 639,511
140 GCOL0,2
150 FOR I=0 TO 360 STEP 10
160 LET A=639+(400*SIN(RAD(I)))
170 LET B=511+(400*COS(RAD(I)))
180 MOVE 639,511:PLOT 85,A,B
190 NEXT I
200 DATA 7,3,6,2,5,1,4,0
210 DATA 0,4,1,5,2,6,3,7
220 FOR X=1 TO 2
230 FOR I=40 TO 1239 STEP 150
240 READ A:GCOL0,A:MOVE I,100
250 MOVE I+150,100
260 PLOT 85,I,200:PLOT 85,I+150,200
270 NEXT I
280 VDU 29,0;722;
290 NEXT X
300 VDU 29,0;0;
310 GCOL0,0
320 MOVE 639,511
330 FOR I=0 TO 360 STEP 10
340 LET A=639+(300*SIN(RAD(I)))
350 LET B=511+(300*COS(RAD(I)))
360 MOVE 639,511:PLOT 85,A,B
370 NEXT I
380 GCOL0,7
390 FOR I=557TO 705 STEP 16
400 MOVE I,561:DRAW I,661
410 NEXT I
420 FOR I=557TO 689 STEP 32
430 MOVE I,461:DRAW I,561
440 MOVE I+8,461:DRAW I+8,561
450 NEXT I
460 FOR I=557TO 721 STEP 64
470 MOVE I,461:DRAW I,361
480 MOVE I+16,461:DRAW I+16,361
490 MOVE I+8,461:DRAW I+8,361
500 MOVE I+24,461:DRAW I+24,361
510 NEXT I
520 COLOUR 15
530 PRINT TAB(7,9)"CALL  SIGN"
540 COLOUR 8
550 PRINT TAB(6,22)"B.A.T.C."
560 VDU5:MOVE -100,-100
```

HOME COUNTIES ATV GROUP

The group put on a display recently for the demonstration of ATV to local clubs etc. Demonstrations were given of slow-scan TV (from tape and off-air) in colour, followed by 70cm and 1.3GHz TV. Those present were also televised on 70cm, and later were able to see the recording made by the receiving station transmitted back to the meeting. All in colour. The demonstrations were set up by G8ASI, G8LES and G8MNY.

The group produce a newsletter called 'Line Out'. They meet on the fourth Wednesday in each month in Iver, Bucks at 20.00hrs. Details of meetings are available from G4REE and talk-in is on 145.20MHz.

CONTEST NEWS

Firstly some dates for your diary.

June 19th - Summerfun Contest (rules this issue).

September 11/12th - International ATV Contest (rules this issue).

Nov/Dec - BATC Cumulative Contest (rules/dates next issue).

RESULTS

1982 WINTER CUMULATIVE

POSITION	CALLSIGN	POINTS	QRA	BEST DX	POWER
1	G8RZO	4363	AL45F	G6CZE-146k	150
2	G8MNY	4211	ZL60A	G4DUN-188k	100
3	G4CRJ	2956	ZL38B	G4MRS-127k	150
4	G4MRS	2643	AM77J	G6BNT-421k	150
5	G4NGS	745	ZL48D	G3ZWM-34k	3
6	G6CZE	732	ZM57J	G8RZO-146k	50
7	G8GLQ	661	YL48H	G4DVN-175k	150
8	G8VPG	552	YL48C	G4DVN-175k	10
9	GM4BVU	500	XP20E	GM3RVK-81k	60
10	G8ZQF	266	YL38F	GW6CNS-50k	20
11	G8VBA	156	ZM12B	G4DVN-40k	12
12	G4LIR	39	ZM12B	G6CTD-7k	3

Congratulations to G8RZO who beat G8MNY into second place by a small margin.

Conditions were uniformly average and activity was slightly down - perhaps the two facts are related?

1982 INTERNATIONAL ATV CONTEST

The full results for both 70cm and 1.3GHz are available but too long to print here in full, therefore a condensed version follows which includes all 'G' station entries.
The results certainly show a very high level of activity around Europe - 128 entries on 70cm alone. Best DX for the whole contest appears to be 582kM by G3PTU - well done.

Certificates are being prepared for all contestants.

Did you know.....

that French TV amateurs in the 1.3GHz band appear to use a single fixed frequency of 1255MHz and almost exclusively the FM mode.

70cm SECTION A TRANSMIT/RECEIVE STATIONS.

POSITION	CALLSIGN	POINTS	QRA	QSOs	BEST DISTANCE
1	F3YX	28302	BI21F	88	465
2	ON1JE	21884	BL80F	88	392
3	F8MM	20658	AI10E	71	442
4	ON7ZI	20115	BK17F	75	370
5	ON4ABC	15201	BK17D	73	291
6	ON6AR	14963	CL53D	119	343
7	F6BEZ	14157	AI30F	64	398
8	G3WOR/P	13383	ZK09F	55	515
9	F1BJB	12479	BJ02E	52	270
10	PA0ERW	12253	CL48B	55	420
17	G6CAQ	10400	ZL39G	56	367
23	G8DTQ	8667	ZL60E	46	330
30	G8RZO	6764	AL45F	35	255
36	G4ARD/P	6206	ZL18H	38	348
37	G8MNY/P	6198	ZL26F	36	398
38	G4CRJ	6194	ZL38B	29	365
45	G8GLQ/P	4640	YL57G	29	254
47	G8ZWM/P	4283	ZL80G	25	246
53	G3YFo	3426	ZL37D	26	321
57	G4NPS	3200	ZN40E	13	487
65	G4BVK/P	2270	YL48C	18	162
66	GW8GIZ/P	2233	YN65H	26	100
76	G3YQC	1801	ZM54B	14	163
84	G8CHK	1430	ZM65C	18	150
86	G3PTU	1363	ZN32J	7	582
88	G8CQE	1275	ZL50D	22	88
96	G4NGV/P	810	YN29E	11	74
114	G4HJD	326	ZN19F	4	87
120	G3YBK/P	135	YK05A	3	43
121	G8VBS	134	AM64G	2	90
126	G8ZQF	86	YL38F	3	26

70cm SECTION B RECEIVE STATIONS

1	ONL4220	5572	CL77H	55	308
2	NL5184	5498	DL03D	49	481
3	PD0KJJ	4422	CL12A	37	391
32	BRS36591	374	YN38E		124
		(38 entries)			

1.3GHz SECTION A TRANSMIT/RECEIVE STATIONS

1	F3YX	2063	BI21F	16	171
2	F1ETG	1521	BI04F	11	195
3	F8MM	1415	AI10E	12	148
10	G3YQC	285	ZM54B	4	70
12	G4ARD/P	231	ZL18H	5	97
		(17 entries)			

1.3GHz SECTION B RECEIVE STATIONS

1	NL5184	214	DL03D	6	58
2	F9CH/P	80	BI55D	1	80
3	DF6YW	41	DL36H	3	19
4	PD0JFK	14	DL02D	1	14

RULES

SUMMERFUN CONTEST

This contest is intended as a gentle opportunity for equipment testing prior to the International Contest and the summer weather will hopefully encourage some portable activity from the high spots.

Please note the unusual format of the code group which should be exchanged by vision only. This is intended as an experiment partly to make a change and partly to give the contest manager some amusement when checking the entries!
Comments from contestants will be welcome.

DATE: June 19th 1983
TIME: 10.00 - 17.00 GMT (ie.11am - 6pm BST)
BANDS: 432/1260/10GHz
SCORING: Two-way QSO's on 432: 2 points/km.
Two-way QSO's on 1260: 8 points/km.
Two-way QSO's on 10GHz: 16 points/km.
(One way only contacts count half points)
EXCHANGES: 1) Callsign, QTH locator, Report and serial number starting at 001 to be exchanged on phone or video.
2) Code group to be exchanged in VIDEO ONLY.
This code group is to consist of:
A. For your first contact - your postcode.
B. For subsequent contacts - the postcode received from your previous (2-way) QSO.

NOTE - Portable stations should start with the postcode of their home station.
ENTRIES: Must include postal address, locator, station details in addition to a record of exchanges listed above, and be mailed not later than July 4th to:-

G.Shirville G3VZV,
18 Church End,
Milton Bryan,
Milton Keynes,
BUCKS MK17 9HR

Please keep video transmissions as brief as possible and QSY from the calling channels (144.75 and 144.17) as soon as contact has been established.

1983 INTERNATIONAL CONTEST

SECTION A: Transmit/receive stations.
DATE: 11/12th September 1983.
TIME: 18.00 GMT Saturday - 12.00 GMT Sunday.
BANDS: 432/1260/10GHz.
SCORING: 2 points per kilometre for each two-way QSO.
1 point per kilometre for each one-way QSO.
EXCHANGES: 1) Code group consisting of 4 non-sequential digits individually chosen by each entrant ie. 1865 or 9732 etc. THIS CODE GROUP MUST BE EXCHANGED BY VIDEO ONLY.
2) Call, QTH locator, report, serial number starting at 001. This data is to be exchanged via video or if necessary by phone.
ENTRIES: Must include log sheets recording all above information and full postal address, locator and station details and be mailed not later than 30th September 1983 to Graham Shirville (address on previous page)

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

SECTION B: Receive only stations.
The same rules are applied as in section A. Please note that entrants in section B may not 'give' points to those in section A.

ATV QUIZ LINK - A FIRST?

On the evening of January 25th an inter-club quiz competition between the Warrington Amateur Radio Club and the Bury Radio Society took place via a two-way ATV link on 70cm. This was the return match of a similar quiz which took place last year using a 2 metre sound link, the idea of a TV link being mooted after the earlier contest.

Colour pictures of P5 quality were received at Bury, thanks to the assistance of a representative of Microwave Modules, who kindly supplied a transmitter and 100 Watt amplifier for the station at Warrington. Other equipment was supplied by various members of the club. Pictures from Bury were received at P3 to 4 in monochrome, due especially to the effort of Mike Horrocks G8GTP who transported practically his whole ATV station, some of which at that time was still under development, to his club's meeting at the Mosses Centre in Bury. Mike's transmitter was believed to be running about 30 Watts peak sync. Both stations were using temporary aerials erected on portable masts for the occasion. The sound channel remained on 2 metres.

The evening as a whole was a great success, and plans for the next event include full duplex TV on 435 and 1250MHz! The quiz was won by Warrington (58 points to Bury's 56), who regained the Challenge Shield after last year's event. The Warrington Club would be pleased to hear from any other club within range who is interested in taking part in a similar contest.

Bob Jackson G8VLJ.

70cm CODE OF PRACTICE

Shown below is a 'Code of Practice' for 432MHz band users. This code was drawn-up by Mike Dennison G3XDV acting on behalf of the RSGB and Graham Shirville G3VZV acting for the BATC. It is hoped that these guidelines will help everyone to make full use of the band without causing undue interference to other users.

To assist with ATV bandwidth problems the BATC has recently published a vedeo filter design (CQ-TV 120) and the use of such a filter is particularly recommended for those using electronically generated and computer pictures. Full details of the filter appear in the clubs' new booklet 'TV For Amateurs' and printed circuit boards are available from BATC Members Services.

Whilst the circuit published in CQ-TV 120 provides the required filtering characteristics the filter has been re-designed to improve certain parameters necessary for the correct processing of high-quality picture transmissions. The new circuit is illustrated here and the clubs' printed circuit board design is for THIS design.

A 432MHz CODE OF PRACTICE

Repeaters and Amateur Television signals on the 432MHz band overlap each other because, following the removal of the top 10MHz of the band, there is really not enough room for both activities to have exclusive frequencies. The same is true of the Satellite band and ATV signals, but there is little evidence of terrestrial and extra-terrestrial contacts conflicting with each other.

Mutual interference does exist between ATV and repeaters, but it can be coped with, given an appreciation of each other's problems. Unfortunately, an increase in both activities is leading to more areas of conflict.

Co-existence can be assured by adherence to the following:-

ATV OPERATORS should operate as high in the band as they can, and use the minimum necessary bandwidth. Particular attention should be given to the bandwidth of digitally generated signals. ATV operators should be aware that their long overs may be keeping several repeaters open for long periods. They should be able to adjust the fine frequency tuning of their rigs to reduce this effect. Polarisation should always be horizontal.

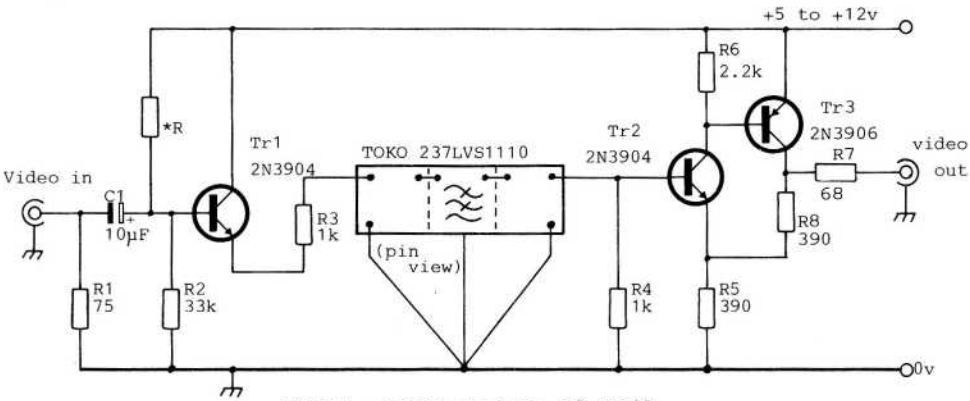
REPEATER USERS should always use vertical polarisation (this applies to all non-TV terrestrial transmissions above 433MHz, and repeaters will always use vertical aerials. Repeater periodic callsigns should be kept to a maximum of one every five minutes when the repeater is not in use. Care should be taken by repeater groups to prevent the repeater locking-up for long periods when not used for FM traffic. It should be appreciated that the UK repeater frequencies are deliberately non-standard in an attempt to avoid interference to ATV operators. There seems no reason why

individual repeaters cannot be switched off during an ATV contest by prior arrangement with the repeater group and the RSGB.

It is felt that publicity of these 'codes of practice', and of the need to be aware of each others existence will help to reduce the interference problem.

Mike Dennison, G3XDV, Chairman RWG, Member VHFC

Graham Shirville, G3VZV, BATC Committee, C.member RWG, VHFC



Filter - Ambit-stock No. 18-11100

*R = 33k for 9volts
22k for 5volts
47k for 12volts

A PC board may be available for this unit. Please refer to Members Services.

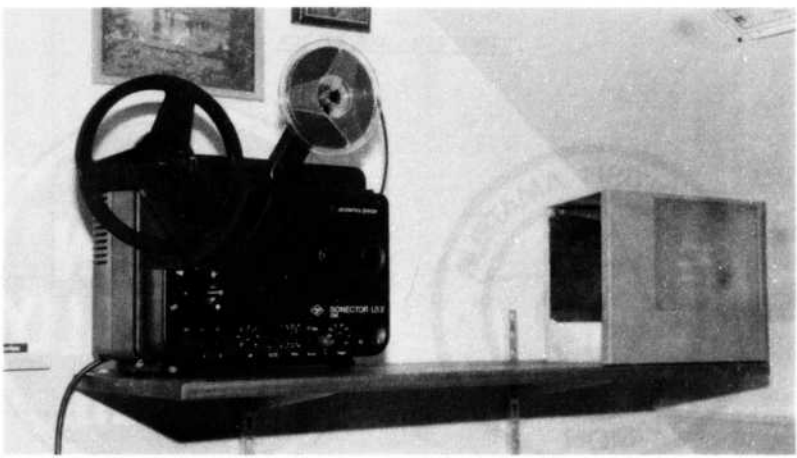
VIDEO LOW-PASS FILTER

EL-CHEAPO TELECINE

By Norrie McDonald GM4BVU

If you're feeling flush then a Sony VCR-4 or Panasonic WV-J20E home telecine unit would probably meet the bill, especially if like me you have a good supply of colourful 35mm slides or 8mm films with which to bore your viewing audience. Although you may direct both your pictures and comments to another amateur, it's surprising how many others will latch on to your activities and become casual viewers! Seriously though, sustaining the viewers' interest during an ATV QSO is made much easier if you can transmit a slide sequence or film as you talk....and it beats mug-shots of yourself.

I explored various options before trying the simplest technique of all, just project the image via a reversing mirror onto a daylight projection screen and point your station camera at it. At first I tried projecting onto a wall and with the VKC600 Hitachi camera the results were wishy-washy, so I decided to try a Boots preview screen (shown in the photo') working on the basis that the small image size and short light path would make for a brighter image, and it does. My slide projector is a Hannimex 1200A and uses an f2.8 85mm lens with a Hoya +1 (one dioptre) closeup lens taped in front, the projector is positioned about 15" from the centre of the mirror. The super-8 projector (Agfa Sonnector LS2) has a 16.5 to 30mm zoom lens, so positioning is less critical. In fact both projectors end up in roughly the same position relative to the mirror. Eventually I intend to develop a more sophisticated unit or use this one only for quick film-to-tape transfers for shot timing on the VCR prior to film editing, after which the film will be transferred again on a professional telecine unit to capitalise on the super quality of super-8mm, (shades of the cine-vs-video lobby!



The present limiting factor is really the colour camera, for good though the VKC600 is, it just does not produce the strong colours so typical of slide films. Excellent colour reports from Tom GM4PRO, George GM6AOR and Keith GM8HGT however suggest the camera is more than adequate for ATV use.

One change to the preview screen was to replace the conventional mirror with a specially made front-surfaced silvered mirror made by a local glass company for a few pounds. Cut accurately to size this was easily glued in place and effectively eliminates the ghosting or double-image characteristic of a standard mirror, visible especially on slides. The preview screen shown is rather elderly and I don't know if it's still available, but it should be easy to copy.

Incidentally a +1 closeup lens was also needed on the VKC600 to focus on the small screen image (52mm thread).

I tend to transfer slides onto tape before transmission, adding a voice-over commentary. One minor drawback is that the camera AGC circuits are fooled each time the slide changes but they quickly adjust to the new image.

Another solution to telecine which I may pursue when I win the pools is to use a Kindermann 1854 AV100 Automat fully automatic daylight slide projector which looks ideal for 35mm ATV use but not of course for super-8.

When using film slight flicker is evident when running at 24 fps, but it is not enough to cause concern especially when one takes into account the deficiences of a typical ATV transmitter and linear amplifier instalation. The picture quality seems to be surprisingly good for such a primitive set-up.

Perhaps someone could write an article on what can legally be transmitted without causing an infringement of the copyright laws or the amateur licence conditions. I assume that provided the slides or films are my own private ones then all is well. So dig out all those old slides and movies, blow the dust off and radiate. Your viewers can always switch off!

GM4BVU in his shack

new series

COAXIAL CONNECTORS

It is well known that the majority of radio amateurs often use inappropriate coaxial cables and connectors in their stations.

We spend much time and effort choosing the latest thing in sophisticated transceivers and spending a fortune on the highest gain, narrowest beamwidth aerials that money can buy-all in the interests of sending and receiving the strongest possible signals. Why then, when we come to connect the equipment together, do we invariably use any old lump of coax which happens to be laying around and terminate it with old and badly connected coax plugs? Regrettably what often happens is that a length of 'low-loss' colour TV coax - which worked fine on broadcast signals - is used and a UHF connector is fitted at the shack end,or sometimes even domestic Belling-Lee type plugs are used. Using these domestic TV components is a common error of judgement, they are designed for cheapness and do not need to exhibit particularly low-loss properties since the expected signal strengths at the aerial are very high. In amateur TV where the majority of signals are rather weaker, every decibel is important. Remember a 3dB loss will halve the incoming or outgoing signal. Try measuring the RF power output at the back of your transmitter and then measure it again via your length of coax, the results can be quite alarming. The same goes for coaxial connectors. The loss at 440 MHz across a Belling-Lee type TV connector has to be measured to be believed. Even the widely used UHF connectors are really only specified for use up to about 200 MHz, above that they can be quite lossy.

This series has been assembled to provide detailed information on the various RF connectors available to amateurs and to give assembly instructions for each connector.

Connectors which are to be described in future issues include series BNC (part 2), series UHF, series N, and series SMA/SMB/SMC/SMD miniature types, but we start this time with the popular series BNC.

The Editor would like to thank Mr. J.Stockdill, Marketing Director for Greenpar Connectors Ltd for his help in preparing these notes and for making available the technical information upon which the series is based.

GLOSSARY OF TERMS

The following terms are used to describe the various components detailed in this series.

Plug a connector for fitting to the free end of a coaxial cable, and incorporating the coupling nut, ring or sleeve. With the exception of certain miniature connectors, it also has a male centre contact.

Jack a connector for fitting to the free end of a coaxial cable, suitable for mating with the appropriate plug. It generally has a female centre contact.

Socket a connector for panel or bulkhead mounting, suitable for mating with the appropriate plug, and having a solder spill for attachment of equipment wire.

Panel socket a socket with a square or lozenge-shaped flange, drilled or tapped with 2 or 4 holes for fixing to the panel.

Bulkhead Socket a socket designed for single-hole fixing in the panel or bulkhead, retained by a single fixing nut.

Panel jack a jack which accepts coaxial cable, and which is suitable for panel mounting with 2 or 4 fixing holes.

Bulkhead jack a jack which accepts coaxial cable, and which is suitable for single-hole fixing in the panel or bulkhead.

Elbow a prefix used to indicate a 90° relationship between the mating face axis and the mounting or cable entry axis.

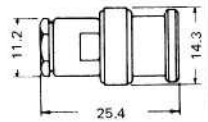
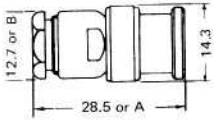
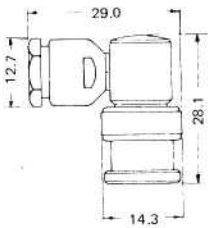
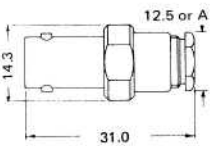
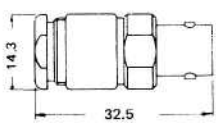
(m) or (f) a suffix indicating the sex of a centre contact
(m) denotes male centre contact;
(f) denotes female centre contact.

The following table lists various coaxial cables and shows their nominal characteristic impedance. The cable group number is part of the Greenpar part numbering system and enables the selection of appropriate connectors for use with particular cables.

Group	Nom. Impedance Ohm	Cable Type numbers
1	50	URM 67; RG8A/U; BICC T3364
	75	URM 57, 64; RG11A/U, 144/U;
4	50	URM91, 112; RG9B/U, 214/U
	75	URM 60;RG13A/U,216/U
6	50	URM 102
7	75	BICC T3205; F & G 0, 8/4, 9DZ;
10	50	URM 43, 76, RG58C/U; 141A/U, 142B/U; BICC T3010; Davu UR5604
12	75	UR 41, 56, 84; URM 70; Davu UR5602;
18	50	URM 74; RG218/U
	75	URM 77
19	50	UR 92
22	50	URM 95, 109, 116; RG 174A/U, 188A/U, 316/U; BICC T3264, T3306, EC59.
	75	URM 111; RG 179B/U; BICC T3289, EC60
24	50	URM 110; RG 178B/U, 196A/U; BICC T3261 T3263
25	75	URM 90, RG59B/U, 140/U, BICC T3304, TR115/023
27	75	BICC T3231;
29	50	BICC T3250,T3328, TM3328
	75	Transradio JO2230
30	50	BICC T3008;
	75	BICC T3187; P.O. 2001*
42		Duradio M68, BICC T3109
52	75	URM 201; 202; Aerialite M4207, BICC T3020, T3172, T3173;
60	50	URM 301; RG55B/U, 223/U
61	75	BICC T3357;
62	75	BICC T3358, TR 109/023; PO2003
73	50	UT 141A; Sealectro PT 119, 141-HP;
79	50	RG 143A/U, 212A/U
	75	RG6A/U
81	75	BICC T3512, 3514, 3516, TR 107/083, TR 108/056, TR 113/091, TR 116/091, TR 116 UG091
87	50	Transradio MHP/50, KO1292a
107	50	URM 107
	75	URM 113
117	75	BICC T3330, PO2002
119	75	Amphenol 21-597
167	75	
223	75	BICC T3515, T3517
246	75	Aerialite 4303
247	75	Aerialite 4305
253	75	Aerialite 4304
274	75	BICC T3518

BNC 50 ohm and 75 ohm series

PLUGS AND JACKS

Connector outline	Dim A	Dim B	Assy. data	Greenpar Eng. No. 50 ohm	Greenpar Eng. No. 75ohm	Cable clamp	Cable groups 7 10 12 22 24 25 27 29 30 52* 60 61 62 73 79 117 119
PLUGS							
			15	35001		–	
			2	35001		C	
			15		35048*	–	
			1or16	35070		A or –	
			2	**35070**		C	
			1		37570	A	
			2		**37570**	C	
	27.8		16	35018		–	
			16		35019*	–	
			16		35047*	–	
	31.0	14.3	2	35071		C	
	31.0	14.3	2		37571	C	
			11	35002		A	
			8	**35002**		C	
			11		37502	A	
			8		**37502**	C	
JACKS							
	11.1		15	35003		–	
	11.1		2	35003		C	
			16	35020		–	
			1or16	35060		A or –	
			2	**35060**		C	
			1		37560	A	
			2		**37560**	C	
	11.1		15		35021*	–	
			16		35022*	–	
			16		35037*	–	
			2	35061		C	
			2		37561	C	

Notes.
*1. These items are nominally 75 ohms.

Greenpar series BNC 50 ohm and 75 ohm connectors are intermateable.

Fig. 1. Plugs and jacks: captive contact, improved UG style braid clamp

1. Place clamp nut, flat washer (when provided) and V-groove gasket over cable. Note that groove in gasket is towards free end of cable.
2. Trim outer sheath from cable to dimension shown.
3. Fit braid claimp so that internal shoulder butts against end of outer sheath.
4. Fold back braid, avoiding crossed wires, and trim surplus braid.
5. Trim dielectric and check that dimension of exposed centre conductor is as specified.
6. Tin centre conductor.
7. Slide clamp bushing over dielectric to butt against braid, and fit rear insulator to butt against bushing.
8. Fit contact (male for plugs, female for jacks) over centre conductor, to butt against rear insulator.
9. Hold contact and cable firmly together, and solder.
10. Slide V-groove gasket, flat washer (when provided) and clamp nut to braid clamp.
11. Fit front insulator over contact to butt against rear insulator.
12. Press sub-assembly into body as far as possible, and engage clamp nut.
13. Holding body and cable rigid, tighten clamp nut to shear V-groove gasket.

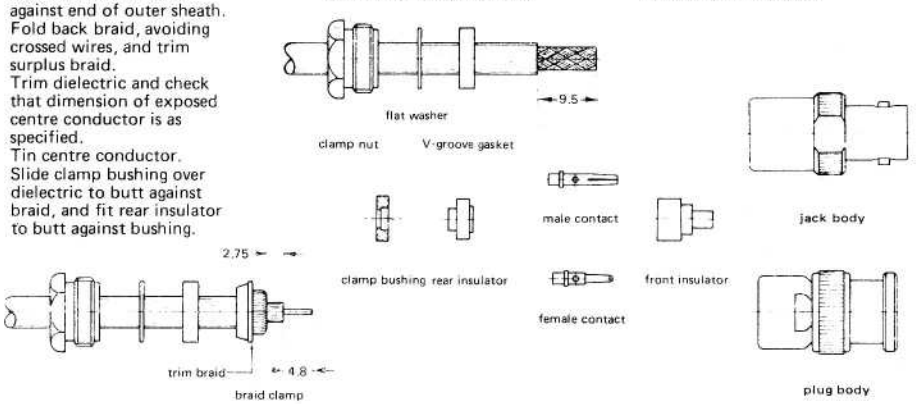


Fig. 2. Plugs and jacks: captive contact, pressure sleeve cable clamp

1. Slide clamp nut and plain gasket over cable.
2. Trim outer sheath from cable, as indicated.
3. Fold back braid, and insert ferrule over dielectric to trap braid between outer sheath and ferrule.
4. Trim off surplus braid.
5. Trim back dielectric and check that dimension of protruding centre conductor is as indicated.
6. Tin centre conductor.
7. Slide rear insulator over dielectric, to butt agianst ferrule.
8. Fit contact (male for plugs, female for jacks) on centre conductor, with shoulder pressed into recess in rear insulator.
9. Hold cable and contact tightly together, and solder.
10. Slide plain gasket and clamp nut up to ferrule, trapping braid
11. Fit front insulator over contact to butt against rear insulator.
12. Press sub-assembly into body as far as possible.
13. Engage and tighten clamp nut.

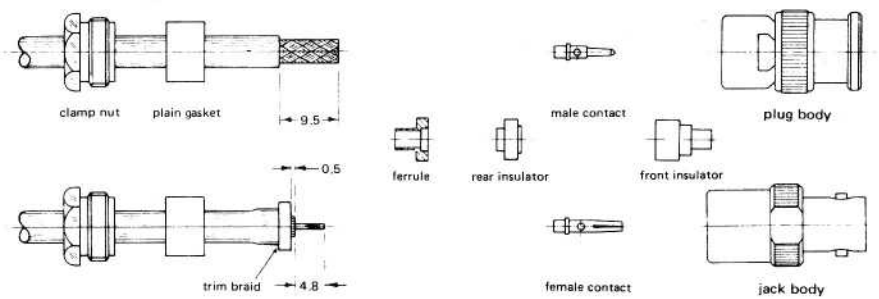
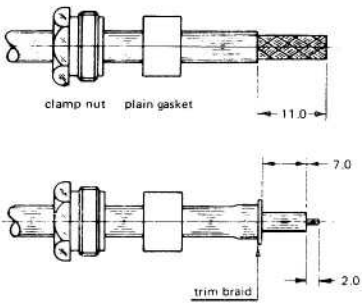


Fig. 8. Elbow plugs: captive contact, pressure sleeve cable clamp

1. Slide clamp nut and plain gasket over cable.
2. Trim outer sheath from cable, as indicated.
3. Fold back braid, and insert ferrule over dielectric to trap braid between outer sheath and ferrule.
4. Trim off surplus braid.
5. Trim back dielectric and check that dimension of protruding centre conductor is as indicated.
6. Tin centre conductor.
7. Ensure that slot in contact is positioned to receive cables.
8. Slide plain gasket and clamp nut to ferrule, trapping braid.
9. Press sub-assembly into body as far as possible.
10. Engage and tighten clamp nut.
11. Solder centre conductor into slot in contact.
12. Fit plug insulator and plain gasket, and secure plug.



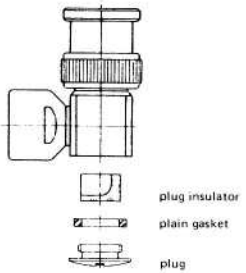
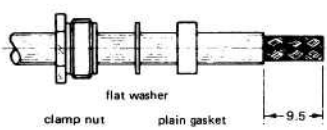
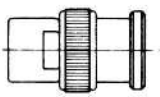
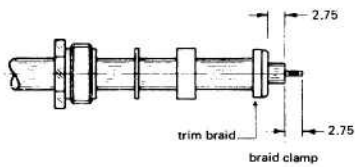


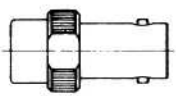
Fig. 15. Plugs and jacks: non-captive contact, original UG-style braid clamp

1. Place clamp nut, flat washer (when provided) and plain gasket over cable.
2. Trim outer sheath from cable, as indicated.
3. Fit braid clamp so that internal shoulder butts against end of outer sheath.
4. Fold back braid, avoiding crossed wires, and trim surplus braid.
5. Trim dielectric and check that dimension of exposed centre conductor is as specified.
6. Tin centre conductor.
7. Fit contact (male for plugs; female for jacks) over centre conductor, to butt against face of dielectric.
8. Hold contact and cable firmly together, and solder.
9. Slide plain gasket, flat washer (when provided) and clamp nut up to braid clamp.
10. Press sub-assembly into body as far as possible.
11. Engage and tighten clamp nut.









A look at....

THE HELIX ON 1·3

By J.L.Wood. G3YQC

It has been mentioned before in this publication that, when all things are considered, the helical aerial must be the most suitable design for amateur TV use in the 1.3GHz band. Among the more important reasons for this conclusion are:-

1. The aerial exhibits very wide bandwidth. In a typical design around 1.3GHz the performance is maintained at ± more than 100MHz, this makes it ideal for ATV since it easily covers all the amateur band allocation.

2. Construction is simplified by the fact that dimensions are not at all critical.

3. Beamwidth is just right for general use - 36 degrees for a 10-turn aerial.

4. Its small size and low wind-loading characteristics make it easy to erect and makes possible very compact multi-aerial arrays.

5. The fact that polarisation is circular means that when used against linear aerials, the worst-case cross-polar discrimination is only about 3dB. It should be realised though that although a transmission may leave an aerial as (say) horizontal, by the time it arrives at the receiving aerial it could be anything BUT horizontal since a radio wave at these frequencies can undergo severe phase changes over the path - this is what causes much of the fading on signals. The use of the helix will help to minimise this effect and will result in more stable signals and often a greater communications range.

Design information, as set forth by W8JK follows. The helical aerial is shown schematically in Fig.1.

$D = 0.32\lambda$

$G = 0.8\lambda$ or more

$S = 0.22\lambda$

$g = 0.12\lambda$

Bandwidth = 0.75 to 1.3 x design λ.

$$\text{Impedance} = 140\ \frac{\text{circumference}}{\lambda}$$

Pitch angle = 12.5 degrees

$$\text{Beam width} = \sqrt{\frac{12,300}{\text{No. of turns}}}\text{, or}$$

10 turns = 36 degrees

8 turns = 41 degrees

6 turns = 47 degrees

Gain is maximum if each turn is 1.2 wavelength long.

In an article by W4VSN and W4SGI (QST, July 1962) a ten-turn helix was constructed ostensibly for use at 1215MHz. The aerial was in fact designed for a centre frequency of 1100MHz since there were stations of interest between 1000 and 1200MHz (outside the amateur band). Due to the very wide bandwidth of the helix the aerial performed perfectly over the entire range. It is a fact that as frequency increases above the design centre, the aerial gain also increases!

Fig.1 gives the dimensions of a helix with a design centre frequency of 1280MHz. The dimensions shown are not critical and have been rounded for simplicity. The dimension 'g' however should be as accurate as possible to ensure correct matching.

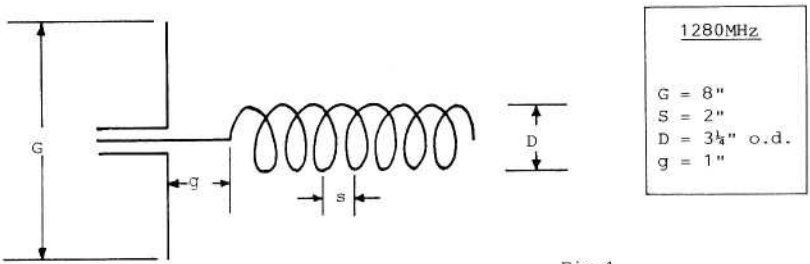


Fig.1

CONSTRUCTION

A suitable material for the helix is 3/16" or 1/4" copper tubing sold by model shops for fuel-line use. When the tubing is wound as tightly as possible on a 3" diameter former and then released, it loosens to about 3¼ inches in diameter. Material to support the helix should have good insulating qualities, a flat length of polystyrene or fibre-glass epoxy printed circuit board material (with all the copper removed!) measuring 3¼ by 24 inches in size, notched at the mounting end and drilled and tapped as shown in Fig.2 may be used. Alternatively, single or double insulating rods fitted as shown in Fig.3 may also be used. Try fibreglass fishing rod material.

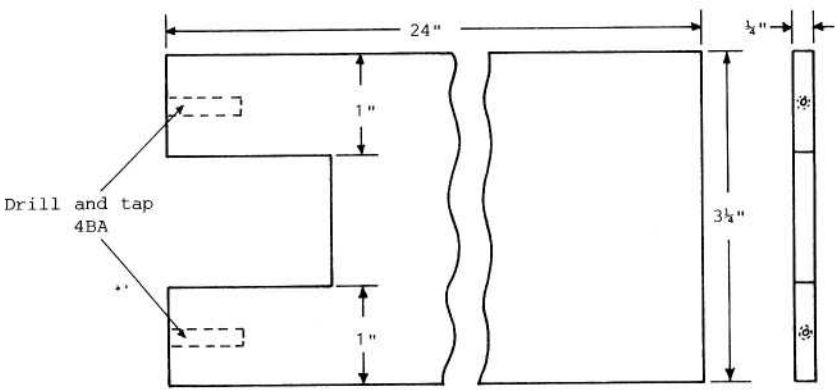


Fig.2 AERIAL INSULATION

The ground plane (reflector) should have at least a 4" radius. It can be anything larger and may be of copper, brass or any other good conductor, though the reflector need not be circular in shape. The support for the helix is centred on the reflector, which has a 1-inch hole at the centre for the matching transformer, Fig.4a.

The 'g' section of the helix is a continuation of the conductor. Bend the tubing gently into a smaller radius, so that you end up with a straight piece 1-inch long, on the axis of the coil. Mount the insulation support on the reflector and work the coil onto the support, 'g' end towards the reflector. Shape the coil to a uniform 2-inch pitch and pin or cement it in place.

A helix may be made with as many turns as required, but for correct operation at least six turns should be used.

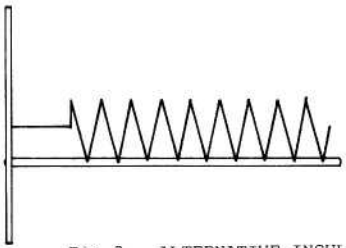


Fig.3 ALTERNATIVE INSULATING SUPPORT

MATCHING

The impedance of a single helical aerial is approximately 130-ohms, which can be matched to 50-ohm coax with an 80-ohm 'Q' section. The inner conductor of the matching section can be the same size as used for the helix if a 1-inch outer sleeve is used, as shown in Fig.4a. The inner conductor can be a continuation of the helix, if it is soldered to the 'N' type coax fitting, and the latter mounted through a hole in the end of the 1-inch sleeve. Or, the matching section can be made separately, mounted in position on the back of the reflector, and then the ends of the inner conductor and helix butted together and soldered through the hole in the reflector.

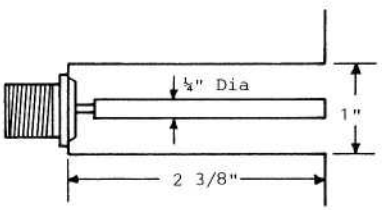


Fig.4a 'Q' MATCHING

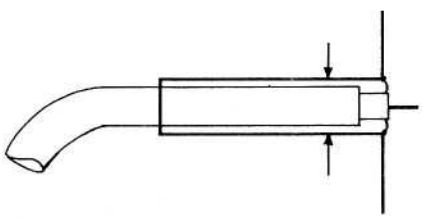


Fig.4b COAXIAL 'Q' MATCHING

POLARISATION

The U.K. 'standard' circular polarisation direction is right-hand circular. If the helix is wound like a right-hand screw, it is polarised this way. It is important that if BOTH stations in a QSO are using circular polarisation BOTH aerials should be wound in the same direction otherwise the attenuation will be some 23dB or more.

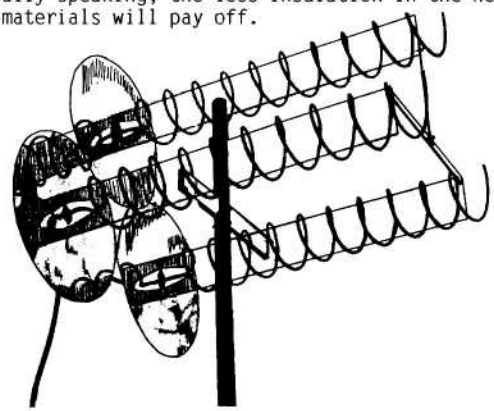
A 3-HELIX ARRAY

Three helices in phase may be used to good effect. These may be mounted at the corners of an equilateral triangle measuring 12-inches each side, backed by three 12-inch discs. These will overlap a bit and they may be left that way or trimmed where necessary to present an even surface. At the centre of each disc is soldered a quarter-wave decoupler made as shown in Fig.4b. A piece of 75-ohm coax (such as RG-11U) 5/4-wavelengths long is run inside a ½-inch diameter sleeve. The outer vinyl covering is left on, except for a short length at the end. Here the braid is folded back and soldered to the surface of the reflector. The centre conductor is soldered to the 'g' piece. The three pieces of coax are then brought together for a 4-way splice with the 50-ohm transmission line. A splice, if done carefully, is possibly better than plugs and sockets of the ordinary variety although a similar system was illustrated in CQ-TV 117 (page 36). Be sure that the helices are mounted so as to have their axes exactly parallel.

RESULTS

Precise measurement of the performance of these aerials was not possible by the writers with the equipment at their disposal, but indications are that the single helix of 10-turns is about 4dB better than their best single Yagi. At least part of this superiority is undoubtedly due to the non-critical nature of the helix. Dimensional accuracy of about plus or minus 0.01 inch is necessary in a Yagi for this frequency whereas the helix is not critical at all. It can be made almost any size within reason and still work well, provided that the transmission line and aerial impedances are reasonably well matched.

Some may want to experiment with the helix without going to the expense of fibreglass supports. Any good insulation may be used and even wood may serve if it is thoroughly dry and treated so that it will remain so when used out of doors. Generally speaking, the less insulation in the helix itself, the better, and good materials will pay off.



U.S. ATV SOCIETY

AN INTERVIEW WITH MIKE STONE WBØQCD, EDITOR/PUBLISHER A5 ATV MAGAZINE.

By our U.S. corespondent.

Mike Stone WBØQCD of Lowden, Iowa, USA is the Editor/publisher and owner of A5 ATV magazine, a monthly journal printed by QCD Publications, Inc. A5ATV magazine is now in its' 16th year of service to Amateur Radio Television operators worldwide and has published over 1,500 articles on Fast-Scan, Medium-Scan, Narrow Band, Slow-Scan Television as well as many articles in other specialised communication fields such as Facsimile (FAX), Radio teletype (RTTY), Microwave, Satellite, Earth-Moon-Earth (EME), Satellite TV (TVRO), Computers and Packet Communications. It is one of the leading amateur radio technical journals based in the USA. In this interview, we shall discuss how amateur television got started in the United States, what is being accomplished today and what lies ahead for the future of ATV operators.

"How did your interest in short-wave radio communication begin?"

I guess it started back in 1964 when my father bought me my first CB rig and I became fascinated in communicating with others in a hobby-type operation. At that time, technically the FCC banned the use of CB for hobby type operation, but the sheer number of interested 'hobbyists' flourished with many of us progressing into amateur radio. My chosen spectrum of the hobby has been specialised communication modes. In 1974, I tired of banging out 'CW' with my Novice ticket and began operating facsimile and radio teletype with my new technician ticket. Things kept progressing along with a general class licence and with it came SSTV and my first exposure to computers. Turned off by a lot of jealous politicing on the SSTV bands, I ventured into the area of fast-scan TV of which I quickly learned there wasn't a single soul on the mode in the satet of Iowa. It wasn't necessarily discouraging however, as just a handful of RTTY enthusiasts were active when I got on teletype, but by the time I finished 'promoting' the mode to friends, we had at one time over 70 active VHF RTTY stations within 100 miles and an 'official' RTTY club with over 50 members that sponsored the state's first RTTY repeater. It would be just a matter of time before we could accomplish similar results on fast-scan TV. Just two short years later, we now have over 40 workable ATV stations on the American UHF TV band (420 - 450MHz).

"How did American Ham TV get started and what standards were used initially?"

Way before my time, several groups were forming on the east and west coasts interested in amateur type television. Many of these 'pioneers' had experimented with the first actual television transmissions ever back in the 1930's and earlier. It was from these 'hams' that commercial TV really got its inception. Amateur TV as it is known today came from people like Frank Madaffore K2KVT, Bob Neuhaus K2KQZ, L.C.Waller W2BRO, Arthur Lynch W2DKJ, Fred Cusick W2HID, Sam Laine W2BKU (now W4MDP) and others. The video mode has been promoted and further developed in the past few years by other ATV amateurs like Martin Balk WB2SZW, Donald LeWine WB2UMF, Ron Cohen K3ZKO

Henry Ruh WB9WWM (now KB9FO), Tom O'hara W6ORG and many others too numerous to mention. The best known 'claim' of amateur two-way TV operation in early years goes way back to the 1939-40 World's Fair when W2USA Radio Club operated on 5 and 2.5 metres with 120 line resolution beaming 'live' television signals (seen by many for the first time ever) from the 11th floor of the New York Daily News building out to the fair's location in Flushing, Long Island, New York. Almost invariably, everytime we mention a 'claim' to the first TV transmission in the USA (in A5 Magazine) somebody else always comes up with earlier dates!

"Why has American ham-TV not caught on as well as in other countries and how well will its popularity develop in the future?"

I think the biggest factor of comparitively slow development and recognition by U.S. amateurs has been the lack of organization by the ATV'ers themselves. Until recently there was no 'official' voice for ATV operators (FSTV/SSTV) by a sponsoring organization. There are a lot of active local groups and clubs around the country, but standards and accomplishments pretty well stayed in the workable radius. Only through a few pioneering articles by some of the larger more recognised amateur publications and constant efforts by 'A5 ATV Magazine' since 1967 has the American ATV mode grown to what it is today. With the development and inginuity of the microprocessor and

integrated circuits, ATV is as up-to-date as commercial television only on an affordable budget with basic features. The future of amateur TV communications is in my opinion a 'sleeping giant'. We are just now starting to see some of the possibilities in which ATV can play a unique part in ham radio visual communications. Coordination is currently under-way with several commercial satellite projects that may lead to 'in space' intercontinental live TV transmissions via the use of TVRO type receive systems. The time of unheard of ATV operation is about over and I predict in the not-too-distant future that visual communications will be as common place as the two-metre band is today. Let's hope we are all still around and active to ride in on the coat tails of popularity.

"What is "THE UNITED STATES ATV SOCIETY" and how will it benefit the U.S. television mode?"

The USATVS was founded in January 1983 by WBØQCD and uses the sponsorship and membership roster of subscribers to A5 ATV MAGAZINE which has been declared as the journal for USATVS. Legislation is initiated from any member of the Society and consists of over 50 USATVS advisors. The purpose of the political organisation is to promote the ATV modes (FSTV, NBTV, MSTV, SSTV and FAX), protect and expand mode privileges and frequencies, set standards of operation and act as a 'voice' in lobbying and representation

efforts. With the creation of the USATVS, the TV radio amateur has for the first time a say as to the direction and advancement of his chosen mode. Membership is restricted to U.S. Citizens holding valid amateur radio licences with only a serious interest in amateur TV communications as a requirement. As of January 1983, there were over 1,200 members representing all 50 states.

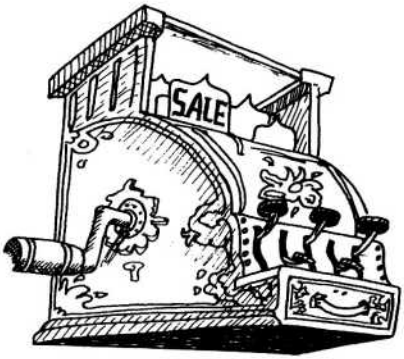
"What things in ATV would you like to see further developed or excluded?"

Since UHF-ATV'ers are so widely dispersed across the country, local standards exist to determine things such as 'sound coordination channels and modes', antenna polarizations etc. It would be nice to see a bit more standardisation of these traits, but reality most likely will not allow it to get any better. I would like to see better ATV transceivers developed, perhaps doing away with the vast amount of inconsistancy found on domestic TV receivers and feeding the video signal into closed-circuit monitors thereby controlling many of the essential factors in ultra-sensitive wide-band reception techniques. Programming material used by ATV'ers needs to be updated to ensure more interesting and imaginative productions which benefit all. A spece satellite relaying system opens the range of the ATV'er to unheard of limits and new found personal friendships. It certainly will be an interesting and rewarding challenge to coordinate such a programme. More ATV clubs need to be formed officially getting the local interested users of the mode together at regular intervals. There are so many areas which can be enhanced in the field of ATV that the challenge of the specialised mode continues on methods of just how best to use it.

"Can International efforts by ATV groups worldwide benefit the single ATV operator?"

I would like to see immediately an exchange of ideas, programmes, technical achievements and general cooperation by the amateur TV groups from all parts of the globe. Radio and TV have certainly brought us all closer together and it is only through our neglect that we fail to progress forward. It is very easy to sit back and criticize others while they are attempting to do something very constructive. This is why the USATVS recognises and supports the American Radio Relay League in amateur affairs. Like what they do or do not do, they are the only organisation out there fighting for hams. It is far better to get involved within the political structure than to do nothing and complain about the way things should be. The same type of thing exists with ATV'ers. Single handedly we can accomplish little, but together we can accomplish greatness. As a representative of the United States ATV Society I extend my hand in friendship and cooperation to amateur TV operators in other countries.

Mike Stone. WBØQCD



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